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Mednarodna revija za management, znanje in izobraževanje *je namenjena mednarodni znanstveni in strokovni javnosti; izhaja v angleščini s povzetki v slovenščini. Izid je finančno podprla Agencija za raziskovalno dejavnost Republike Slovenije iz sredstev državnega proračuna iz naslova razpisa za sofinanciranje domačih znanstvenih periodičnih publikacij. Revija je brezplačna.*

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International Journal of Management, Knowledge and Learning, 6(1), 3–4

Guest Editor's Foreword

Matti Muhos
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Transitions and changes in business are never-ending. The management of knowledge, technology and business in today's globally networked economy is no exception. Information and communications technology (ICT) and many related disruptive innovations continue to transform our environment, the business landscape and society, including the way we live. Taking this transition component as the focal point of research is therefore important. This special issue strives to present and address key issues related to this topic, primarily in the areas of business and management. The central themes of this special issue are knowledge management, human resource management, technology management, business administration, innovation and entrepreneurship.

The papers selected for this thematic issue were submitted to the MakeLearn & TIIM Conference 2017 held in Lublin, Poland from 17 to 19 May. These research contributions were submitted with the intention to share and discuss the most recent developments in the management of knowledge, technology and business. This year, the specific focus was on the network economy. As beautifully expressed on the conference website, 'We can see the growth of more dynamic networks and organizations generate new knowledge more quickly. In order to maximize the benefits, knowledge must be properly managed and exploited. If you combine knowledge from different perspectives, you can create new opportunities and respond to challenges in innovative ways. Networking gives organizations flexibility and responsiveness.'

The papers in this special issue address a range of topics relating to transitions in the management of knowledge, technology and business in a network economy. The paper 'Individual, Technological, and Organizational Predictors' aims to identify factors that are important for organizational knowledge sharing and examine their relative impact on knowledge sharing practices in Norwegian context. The paper entitled 'Assessing the Health of a Business Ecosystem: Contribution of Anchoring Actor in Formation Phase' focuses on Taiwan, and this work contributes to the business ecosystem and business network literature by introducing anchoring actors and their important role in ecosystem formation, and by presenting how ecosystem health can be assessed. The papers 'A Proposed Model for Measuring Performance of the University-Industry Collaboration in Open Innovation' and

'European Cohesion Policy and Structural Funds in Sparsely Populated Areas – Case Study of the University of Oulu' deal with the role of universities in the network economy by examining how universities participate in the creation of a European cohesion policy and in regional development through their regional networks, and by introducing a new scientific model for measuring the performance of university-industry collaborations. The paper 'Manufacturers' Benefits from Their Cooperation with Key Retailers in the Context of Business Models' examines the benefits of manufacturer-retailer cooperation in the Polish ecosystem. The paper entitled 'Comparison of IAS 39 and IFRS 9: The Analysis of Replacement' explores transitions in the context of international financial reporting standards. The paper 'Does Education Matter for Entrepreneurship Activities? The Case of Kosovo' analyses the role of education on entrepreneurship performance in a post-crisis economy in Kosovo.

The papers in this issue were selected through a rigorous screening process, including a double-blinded review process. At this point, I would like to thank the authors who submitted their manuscripts for this special issue and who all made extensive efforts in revising their papers. Finally, I thank the Editor-in-Chief for his trust and guidance, as well other colleagues for their excellent cooperation.

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Individual, Technological, and Organizational Predictors of Knowledge Sharing in the Norwegian Context

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Organizational knowledge sharing (OKS) represents a distinct sub-field in knowledge management theory. The present study adopts a quantitative approach and reports data collected in a medium sized industrial organization in Norway. The aim of the study is to identify factors that are important for OKS and examine their relative impact on knowledge sharing practices. The present analysis of OKS includes personal (i.e. personality dispositions), technological (i.e. technological aids), and organizational (i.e. social climate) variables. Results of a stepwise hierarchical regression support previous research that individual dispositions, technological components, and organizational variables are important predictors of OKS. The discussion of results focus on the relation between predictors in terms of mediating effects and their relative impact on OKS. Limitations and implications of the present work are also examined.

Keywords: knowledge sharing, technology, personality, organizational climate, Norwegian context

Introduction

The topic of knowledge management (KM) gained a prominent place in contemporary literature in the 1990s (Scarbrough & Swan, 2001; Wilson, 2002). Interest on how knowledge is created, distributed, and applied in organizational settings has gradually increased since then, and has been relatively stable over the last few years (Serenko, Bontis, Booker, Sadeddin, & Hardie, 2010). This is also evident in the increasing number of books, scientific journals, reviews, and journal articles that emerged in the last decade, aiming to cover this theme (Bolisani & Handzic, 2014; Durst & Edvardsson, 2012). The emergence and current prominence of KM is logical, considering the long-standing history of this concept, its epistemological roots, and relatively recent but evident historical development that emphasizes the importance of intellectual activities over traditional forms of straightforward

and simple labor (Spender, 2014). Furthermore, KM is appreciated in modern society since effective and appropriate responses based on knowledge might directly influence growth, sustainability, and progress in any given entity.

Although the quantity of work in the KM area has unavoidably produced complexity in terms of research focus (Jennex, 2008), formal definitions (Jennex, 2005), models (Edwards, 2014), factors that influence KM (Holsapple & Joshi, 2000), and various epistemological perspectives (Hislop, 2013; Spender, 2014), it is nevertheless fair to say that there exists a reasonable degree of consensus in contemporary literature considering the main underlying processes that comprise KM. For example, Bhatt (2001) refer to KM as a process that consists of five distinct phases involving creation, validation, presentation, distribution, and application of available knowledge. Similarly, Holsapple and Joshi (2004) consider KM as systematic and deliberate efforts to expand, cultivate and apply existing knowledge in the organization. This is basically parallel to Alavi and Leidner (2001), who also emphasize creation, storage/retrieval, transfer and purposive application of knowledge within a given entity. Thus, it seems that most definitions view the overall process of KM as selective and deliberate efforts related to identification, cultivation, and application of useful knowledge and past practices, aiming to facilitate decision-making processes that strategically lead to the creation of a sustainable and productive working environment (see also Jennex, 2005).

Based on these various definitions, it is easy to recognize that the process of organizational knowledge sharing (OKS) represents one important and distinct sub-field in KM theory, where the aspect of learning is especially emphasized (Kogut & Zander, 1996). The process and capacity for OKS emphasizes the fact that it is not only the amount of knowledge in an organization that is important, but it is also crucial that knowledge is transferred in the best possible way (Argote & Ingram, 2000). The importance of OKS is also obvious considering that distribution of knowledge in organizations between employees or/and within and between departments provides entities the ability to meet demands faster, to come up with effective and innovative solutions earlier, and consequently maintain a competitive edge (Pai & Chang, 2013). Indeed, research shows that OKS can reduce costs, improve collaboration, speed up production, increase effectiveness and innovation, and consequently earnings in the enterprise (Hansen, 2002).

However, previous research has shown that OKS does not necessarily occur without interference, in the sense that some organizations fail in attempts to collect, share, and distribute knowledge in an efficient manner (Barson et al., 2000). For example, Hendriks (1999) emphasizes that there are barriers that prevent individual knowledge to internalize in other

individuals. Such barriers might be related to a potentially uninspiring working environment not fostering knowledge sharing or whether the employees themselves choose to be on the supply side in terms of sharing knowledge. Similarly, Riege (2005) identifies several potential individual factors (e.g. lack of interaction, trust, skills, and time) that might prevent people from sharing knowledge (Lee & Al-Hawamdeh, 2002).

The existence of possible inference and barriers in the process of OKS are probably reasons why considerable amount of research has investigated the manner in which knowledge is dynamically distributed in organizations (Jang, Hong, Bock, & Kim, 2003; Kogut & Zander, 1996). Many of these studies are theoretically driven with the aim of identifying central processes and assumed theoretical predictors of OKS (Nonaka & Takeuchi, 1995; Bock, Zmud, Kim, & Lee, 2005; Yeh, Lai, & Ho, 2006). For example, Lin (2007) showed that organizational culture in terms of leadership support, joy of helping, and own self-efficacy had a great influence on the willingness to share and gather knowledge. Similarly, McGrath and Argote (2001) posit that knowledge is embedded in three basic elements of organization, namely people, technology, and the nature of tasks. This is basically analogous to Barson et al. (2000), who also identified personal, technological, and organizational factors as important in relation to OKS, and to Holsapple & Joshi (2000), who emphasize the importance of leadership, resources, and context in managing knowledge. This sort of fragmentation is acknowledged by Walsh and Ungson (1991), who identified five parts of any given organization where knowledge might be stored: individual members, roles and organizational structures, the organization's standard operating procedures and practices, its culture, and the physical structure of the workplace.

Notwithstanding the quantity of theoretical propositions on this topic, investigations aiming to identify the most important factors that influence knowledge sharing practices in organizations are still warranted (Wang & Noe, 2010). This is understandable considering that the identification of important processes that influence KM in general and OKS in specific, their nature, and possible interaction effects among them, represent a complex issue (Holsapple & Joshi, 2000).

Hence, the purpose of the present study is to identify factors that are important for OKS and examine their relative impact on knowledge sharing practices. More specifically, the theoretical framework that is adopted in the present study analyzes OKS as influenced by personal (i.e. personality dispositions), technological (i.e. technological aids), and organizational (i.e. social climate) processes. The personal variables that are included in the present analysis are knowledge self-efficacy, future orientation, and extrovert dimension of personality. The technology aspect encompasses processes related to IT infrastructure in the organization. And finally, orga-

nizational aspects comprise organizational culture (OC) and organizational trust (OT) among colleagues. The study adopts a quantitative approach and reports data collected in a medium-sized industrial organization in Norway. Examination of these questions in a Scandinavian context are needed, especially considering the obvious importance that cultural premises have on KM (e.g. Holden, 2002). Thus, there still exists a limited number of studies from Northern Europe that investigate the relative impact and interaction between various factors that are on theoretical grounds expected to influence OKS (e.g. Gottschalk, 1999; Persson, 2013). In addition, previous research suggests that explorations of OKS in small- and medium-sized companies are also warranted considering the lack of knowledge about these processes in smaller-sized organizations (Yew Wong, 2005). Indeed, meta-analytic review of antecedents of organizational knowledge management suggests that size positively impacts organizational knowledge transfer (Van Wijk, Jansen, & Lyles, 2008).

Theoretical Variables

Personality Variables

The literature recognizes that there is a link between the individual and the overall organizational level in the sense that knowledge at the individual level is strategically utilized through the practices on the general organizational level (Hendriks, 1999). Hence, it is important to investigate whether person-based characteristics are transferred into organizational knowledge or not (Pai & Chang, 2013).

The first personality-based variable in the present study is the notion of future orientation (FO). A great number of theorists have dealt with the way people conceive and actively create a relation between current actions and future outcomes (see overview in Kovač & Rise, 2007). For example, Zimbardo (see Zimbardo & Boyd, 1999) has developed a theoretical framework that suggests that people differ with regard to their temporal orientations and ability to mentally construct past, present, and future events. Theory further advocates that the manner in which abstract cognitive processes participate in mental reconstructions of the past and constructions of the future directly influences current decision-making. The notion of FO represents one part of the more general concept of time, which includes the dynamic interplay of the past, present, and future (Zimbardo & Boyd, 1999). In the present study, we use a subscale that measures the way people tend to relate to future tasks. FO is conceptually closely connected with goal-directed orientation and goals that are localized in that perspective. It follows that actions of future-oriented individuals typically depend on the execution of a series of interrelated activities in the service of a future greater plan. Although FO was not, to our knowledge, used previously in this

context, we reason that the ability to 'think ahead' and behave accordingly should be positively related to OKS.

The second personality-based variable in the present study is the concept of self-efficacy. Generally, self-efficacy typically refers to beliefs associated with an individual's ability to successfully perform a certain task (Huang, 2011). Self-efficacy appraisals provide information about the degree of perceived self-control over future actions without necessary assessing actual performances or individual skills. As such, the concept of self-efficacy influences motivation by revealing personal confidence to cope with obstacles in one specific domain. Nevertheless, people who report higher levels of confidence in their abilities to perform one particular action are also more likely to actually display such behavior. Previous research indicate that the effect of self-efficacy is better understood when assessment is domain-specific rather than focused on general behavior (Bandura, 1997; Valentine, DuBois, & Cooper, 2004). In the present study, we assess the level of confidence individuals have in their provisioning and the sharing of valuable knowledge in the organization. The connection between knowledge self-efficacy and knowledge sharing has been previously established in several studies (e.g. Hsu, Ju, Yen, & Chang, 2007; Endres, Endres, Chowdhury, & Alam, 2007).

The third personality-based variable in the present study is the concept of extroversion. Tendency for extroversion is one of the basic categories of personality, which is characterized by moving the focus away from inner experiences toward outer experiences (Jung, 1971). Extroverts are typically energized by increased social interaction and communication with other people in contrast to introverts, who may experience difficulties in forming stable relationships based on exchange of cognitions and sentiments. Based on these premises, it is not surprising to find out that the tendency for extroversion is frequently found to be associated with OKS (Ismail & Yusof, 2010a; Wang, Noe, & Wang, 2014). This is logical considering that extroverts more frequently tend to express themselves and promote their positions during social interaction (Benet-Martínez & John, 1998). Hence, we expect that an individual's tendency for extroversion is significantly associated with knowledge sharing in the organization.

Technological Variables

Aside the obvious importance of personality variables, knowledge sharing in many modern and complex organizations might bypass direct social interaction due to an increasingly important role of technology in daily operations and communication (Argote & Ingram, 2000). In recent decades, Information Technology (IT) has progressively been implemented in virtually all types of organizations worldwide (Nonaka, Toyama, & Konno, 2000). Modern tech-

nologies are designed with the purpose of facilitating execution of various daily tasks and routines and effectuating the exchange of information between workers in the organization at all levels. Considering the obvious connection between IT and information exchange, several studies have examined the way knowledge sharing is affected by technological infrastructure (e.g. Ismail & Yusof, 2010b). For example, Yeh et al. (2006) pointed out that it is crucial for an organization's knowledge sharing culture being supplemented by information technology. Similarly, Wang et al. (2014) emphasize that IT infrastructure might provide help in documenting, distributing and transmitting different types of knowledge between employees, thus increasing organizational efficiency and consequently knowledge production. McDermott (1999) discovered early that technology unlocks possibilities for organizations to think of new ways to share knowledge, and to use electronic networks for sharing knowledge between people. On the other side, studies have found that technology-related factors actually might prevent knowledge sharing due to lack of information, inadequate IT support, unrealistic expectations of what technology can deliver, faulty systems, and similar (Ismail & Yusof, 2010b).

Taking into consideration that the widespread use of IT represents a relatively new phenomenon, constantly evolving and changing over time, it is easy to acknowledge that there exist no clear answers in research on how technological factors affect knowledge sharing processes (Nonaka et al., 2000; Yeh et al., 2006; Lin, 2007; Van den Hooff & Huysman, 2009; Ismail & Yusof, 2010b). Nevertheless it is clear that employees in many organizations are forced to deal with technological solutions because technology can provide communication channels to retain knowledge, correct mistakes along the way and effectively shorten the time it takes to find relevant information (Yeh et al., 2006). Based on previous research, we expect that IT infrastructure represents a variable that is significantly associated with knowledge sharing in the organization.

Organizational Variables

In addition to variables that reside in individual characteristics or technological support, each organization unavoidably have a set of rules, attitudes, and instructions that guide and shape the behavior of employees. One of the central concepts that characterize each organizational structure is the notion of organizational culture (Ismail & Yusof, 2008). Organizational culture (OC) can be defined as a set of shared beliefs, assumptions, values, and norms that the members of the organization have in common (Miron, Erez, & Naveh, 2004). A well-organized and functioning OC facilitates positively in decision-making processes, since values and norms act as a normative for action. OC increases effectiveness of organizations (Zheng, Yang,

& McLean, 2010) and represents one of the main determinants of corporate success (Damanpour, 1991; Mumford, 2000; Crossan & Apaydin, 2010). The conceptual connection between OC and OKS is theoretically obvious. It is easy to acknowledge that the establishment of an encouraging environment with shared core norms might be positively related to increased knowledge sharing among employees in the sense that knowledge sharing practices frequently underlie the company's cultural expectations (Van den Hooff & Huysman, 2009; Zheng et al., 2010). Indeed, existing literature suggests a positive relationship between OC and OKS (Brockman & Morgan, 2003; Van den Hooff & Huysman, 2009; Wiewiora, Trigunarsyah, Murphy, & Coffey, 2013). This is not surprising considering that positive OC gives more insight into how relevant knowledge exists, stimulates interaction between employees, provides higher mutual understanding, fosters an atmosphere of social identification, trust and reciprocity, that in turn results in knowledge-friendly environments (Brockman & Morgan, 2003; Van den Hooff & Huysman, 2009). In sum, organizations should create an encouraging knowledge-sharing environment further stimulating such behavior among employees (see Nonaka & Takeuchi, 1995; Nonaka, von Krogh & Voelpel, 2006; Wu, Hsu, & Yeh, 2007; Wu, 2013).

The second variable being a part of the general traits that organizations possess is the notion of organizational trust (OT). OT represents, compared to OC, a more specific variable that describes the degree to which an employee believes that sharing knowledge among colleagues will act towards the best interest of the organization without exploiting their good faith in intentions of others (Ismail & Yusof, 2008). Certainly, the concept of trust in general represents a complex phenomenon, especially considering the quantity of literature that covers this topic, including its 'dark' or potentially negative aspects (see overview and discussion in Kovac, 2010). Nevertheless, considering that trust represents a basic process related to many aspects of human functioning and communication, it is not surprising to learn that this concept was in previous research frequently connected to KS (Ismail & Yusof, 2008, 2010a, 2010b; Disterer, 2001; Levin, Cross, Abrams, & Lesser, 2002; Mooradian, Renzl, & Matzler, 2006).

Specific Hypotheses

In sum, we sought to test the following hypotheses:

H1 *OKS is significantly predicted by personal variables.*

H2 *OKS is significantly predicted by technological variables.*

H3 *OKS is significantly predicted by organizational variables.*

H4 *Organizational variables are stronger predictors of OKS comparing to personal and technological variables.*

Methods

Data Collection and Participants

The participants in the present study are employees in a medium-sized organization in Norway within the international oil and gas industry ($n = 507$). Most employees have their permanent office in a populous city in Norway, but there is also personnel at other locations both in Norway and a few places abroad. Bearing in mind potential challenges associated with data collection given this setting, an electronic self-report questionnaire was considered as the quickest method to collect data. An introductory e-mail was sent to each employee a few days prior to opening the survey for responses. The e-mail described the survey in general, and briefed on the purpose of the survey, privacy issues, the way individual answers would be treated, and a description of how to contact the researchers if necessary. Three days later, the participants received an explanation of how to approach the survey in an e-mail, along with a hyperlink to the actual survey, which could be opened in all major browsers. In filling the questionnaire, respondents were initially asked to choose their desired language, followed by a brief description of the procedure involved in answering the questions. 253 (50%) respondents had completed the survey before the deadline.

Development of the Questionnaire

The international composition of respondents required a survey developed in both English and Norwegian. Considering that all measures used in this study were originally developed in English and, except for the scale for future orientation to our knowledge not previously used in a Norwegian context, a strict adaptation process was applied. The questionnaire was three times back and forth translated from English to Norwegian. Consequently, some wording of the instruments was partially modified and adapted to the objectives of this study. The original and final English versions were cross-checked to ensure that they were identical. Additionally, a pilot study was carried out to secure that the questions in the survey were understandable to the participants. The pilot was carried out with ten respondents working for organizations that were comparable with the primary organization in this study. The respondents were encouraged to give feedback on instructions, wording, potential typing errors, and general understanding of the survey. Based on the feedback and statistical analyses of responses, the survey instructions and some questions were reworded.

Description of Respondents

87% of the respondents were Norwegian, whilst the reminding 13% were foreign nationals. The lowest completed education level among the participants in this study was high school, while 61% had a bachelor's degree or

higher. 22% of the respondents were female, being almost identical to the overall gender distribution in this specific organization. Mean age was 41 (SD = 10.23).

Measures

Future orientation (FO) was measured with a scale based on a short version of the 'Stanford Time Perspective Inventory' (Zimbardo & Boyd, 1999), where the focus was the measurement of future orientation (see Keough, Zimbardo, & Boyd, 1999). The six items were: (1) If I wish to achieve something, I define targets, and consider specific ways to reach those targets, (2) Meeting tomorrow's deadlines, and completing work assignments are prioritized over leisure activities, (3) I complete projects on time by working consistently, (4) I take notes of what I am going to work on, (5) I am able to resist temptations when I know that assignments must be completed, and (6) I believe that planning each day is crucial. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.78.

Self-efficacy was measured with four items (see Lin, 2007): (1) I am confident in my ability to provide knowledge that others in my organization consider valuable, (2) I have the expertise required to provide valuable knowledge for my organization, (3) It does not really make any difference whether I share my knowledge with my colleagues or not, and (4) Most other employees can provide more valuable knowledge than I can. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.67.

The extrovert dimension of personality was measured with four items (see Benet-Martinez & John, 1998): (1) I see myself as someone who is outgoing, sociable, (2) I see myself as someone who is talkative, (3) I see myself as someone who generates a lot of enthusiasm, and (4) I see myself as someone who is full of energy. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.79.

IT infrastructure was measured with seven items (see Van den Hooff & Huysman, 2009): (1) The IT facilities within this organization provide a positive contribution to my productivity and effectiveness, (2) Our IT facilities make it easier to cooperate with others within our organization, (3) Our IT facilities make it easier to cooperate with others outside our organization, (4) The IT facilities within this organization provide a positive contribution to the development of my knowledge, (5) The IT facilities within this organization provide important support for knowledge sharing, (6) IT makes it easier for me to get in contact with employees who have knowledge that is important to me, and (7) IT makes it easier for me to have knowledge that is relevant to me at my disposal. The response alternatives varied

from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.92.

Organizational culture (OC) was measured with six items (see Van den Hooff & Huysman, 2009): (1) The management of our organization expects everyone to actively contribute in knowledge sharing, (2) Employees are encouraged to innovate, to investigate and to experiment, (3) In this organization staff is encouraged to ask others for help whenever necessary, (4) Interaction between different departments is encouraged in this organization, (5) The goals and visions of this organization are clearly communicated to the employees, and (6) The management of this organization stresses the importance of knowledge to the success of the organization. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.80.

Organizational trust (OT) was measured with four items (Choi, Kang, & Lee, 2008): (1) I believe colleagues in my organization are honest and reliable, (2) I believe colleagues in my organization treat others reciprocally, (3) I believe colleagues in my organization are knowledgeable and competent in their area, (4) I believe colleagues in my organization will act towards the best interest of organizational goals. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.89.

Organizational knowledge sharing (OKS) was measured with eight items (see Lin, 2007): (1) When I learn something new, I tell my colleagues about it, (2) When they learn something new, my colleagues tell me about it, (3) Knowledge sharing among colleagues is considered normal in my organization, (4) I share the information I have with colleagues when they ask for it, (5) I share my skills with colleagues when they ask for it, (6) Colleagues in my organization share knowledge with me when I ask for it, (7) Colleagues in my organization share their skills with me when I ask for it, and (8) I consider it important that my colleagues are aware of what I am working on. The response alternatives varied from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha was 0.77.

Results

Descriptive statistics (means, standard deviations and correlations) for all measures are provided in Table 1. OKS correlated significantly with FO (r = 0.25, $p < 0.001$), self-efficacy ($r = 0.22$, $p < 0.01$), extroversion ($r = 0.22$, $p < 0.01$), IT ($r = 0.27$, $p < 0.001$), OC ($r = 0.50$, $p < 0.001$) and OT ($r = 0.54$, $p < 0.001$). As expected, organizational variables (OC and OT) correlated strongly and significantly ($r = 0.58$, $p < 0.001$) indicating that OC and OT jointly refer to a social climate that characterizes the given organization. The same pattern, revealing high correlation coefficients among individual variables, was not expected due to individual differences that exist among people regarding these dispositions.

Table 1 Correlations and Descriptive Statistics among Study Variables

Variables	1.00	2	3	4	5	6	7
1. Knowledge sharing	1.00	0.25***	0.22**	0.22**	0.27***	0.50***	0.54***
2. Future orientation		1.00	0.18**	0.29***	0.16*	0.30***	0.21**
3. Self-efficacy			1.00	0.12	0.06	0.14	0.04
4. Extroversion				1.00	0.04	0.17**	0.16**
5. Iformational technology					1.00	0.43***	0.29***
6. Organizational culture						1.00	0.58***
7. Organizational trust							1.00
Mean	4.23	4.00	4.00	3.70	3.26	3.60	4.16
SD	0.47	0.64	0.63	0.78	0.89	0.86	0.77

Notes * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $n = 253$.

Table 2 Regressing Organizational Knowledge Sharing (OKS) on Individual, Technological Variables, and Organizational Variables

Step	Variables	Adj. R^2	*F*-change	Beta
1	Future orientation			0.18**
	Self-efficacy			0.18**
	Extroversion	0.11	9.75***	0.15*
2	Future orientation			0.15**
	Self-efficacy			0.17**
	Extroversion			0.15**
	Informational technology	0.15	12.16***	0.22**
3	Future orientation			0.06**
	Self-efficacy			0.17**
	Extroversion			0.11**
	Informational technology			0.07**
	Organizational culture			0.17**
	Organizational trust	0.36	35.61***	0.38**

Notes * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Predicting OKS

Table 2 shows the hierarchical regression analysis in which OKS was regressed on the individual variables in the first step (FO, self-efficacy, and extroversion), the technological variable (IT) in the second step, and measures of organizational climate (OC and OT) in the third step. In the first step, individual variables accounted for 11% of the variance in OKS scores (adj. $R^2 = 0.11$, $p < 0.001$). All three individual variables emerged as significant predictors exhibiting similar effects on OKS (see β values in Table 2). In the second step, IT emerged as a significant predictor ($\beta = 0.22$, $p < 0.01$) and the inclusion of IT added significant incremental validity to the prediction of OKS (4%). All three individual variables remained significant

at step 2. In the third step, the inclusion of measures of organizational climate (OC and OT) resulted in additional significant incremental validity to the prediction of OKS (21%). Both measures of organizational climate emerged as significant predictors (OC $\beta = 0.17$, $p < 0.05$ and OT $\beta = 0.38$, $p < 0.001$). In the final regression equation, the predictors under consideration explained 36% of the variance in OKS scores. In addition to OC and OT, only the measure of self-efficacy remained significant at the final step. Table 2 shows that the reduction of β values in the third step, after the measures of organizational variables were included, was substantial for FO and IT. Although mediational effects were not initially hypothesized, the reduction of beta values indirectly provides support for hypothesis 4 stating that organizational variables represent better predictors of OKS comparing to personal and technological variables.

According to Baron and Kenny (1986), the confirmation of mediation effects is demonstrated when a mediating variable account for a relationship between two other variables such that the effects of predictor variables are significantly reduced when a hypothesized mediating variable is included in the regression analysis. To test that this reduction was statistically significant, two Sobel tests were conducted. The results of these tests clearly showed that the reduction of FO and IT influence on OKS was due to the function of OT ($z = 3.22$, $p < 0.001$ for FO and $z = 4.06$, $p < 0.001$ for IT). Additionally, considering that the effect of OT on OKS was considerably stronger compared to OC, we conducted an additional mediation test to further illustrate the relation between organizational variables (i.e. OT and OC). Indeed, results of the mediational analysis showed that OT also functions as a mediator between OC and OKS ($z = 5.07$, $p < 0.001$).

Discussion

The purpose of this study was to investigate the relative effect of personal, technological, and organizational factors on organizational knowledge sharing (OKS). The overall findings support the notion that OKS represent a complex concept that is associated with qualitatively different processes ranging from specific dispositional characteristics to general organizational climate. More specifically, hypothesis 1 is supported showing that all three personal variables that were included in the present study (FO, self-efficacy, and extroversion) were significantly associated with OKS. The unique contribution of the present analysis is the inclusion of FO as a predictor of knowledge sharing. Indeed, the results show that the ability to 'think ahead' and behave accordingly is related to knowledge sharing practices. The association between OKS and self-efficacy was also found to be statistically significant in all three steps of the regression analysis. This was expected, considering that the relatively consistent association between these vari-

ables had been established in previous research (Hsu et al., 2007; Endres et al., 2007). Once again, this provides support for the notion that confidence in personal abilities represents an important predictor of motivational and intentional processes in general, and OKS in specific. Like FO and self-efficacy, extroversion was also found to be positively associated with OKS indicating that extroverted individuals contribute more to knowledge sharing in the organization compared to their introverted counterparts. This is also in line with earlier research, where it was found that highly extroverted employees were more likely to share knowledge, regardless of the level of expectations that underlay the organization (Ismail & Yusof, 2010a; Wang et al., 2014). Overall, the general results suggest that individual dispositions cannot be easily dismissed when it comes to the way organizational knowledge is shared and distributed. However, it is important to note that the quantity of personalized knowledge is effective only in situations where employees are prepared to cooperate and share resources (Lin, 2007). Thus, individual learning and development contributes only marginally to the totality of available knowledge if conditions that stimulate willingness to share, are not a part of the social norm in any given organization (Senge, 1990). However, although the effect of individual variables on OKS is evident in present and previous research, it is nevertheless important to acknowledge that the effect of these variables is typically relatively modest. One possible explanation for a relatively weak effect of individual variables in this study might be connected to measuring issues. For example, measures of extroversion and FO were presently assessed as general tendencies of outgoingness and long-term thinking, without specific references to a behavior in question (i.e. OKS). Hence, the assessment of this kind might interfere with a principle of compatibility or correspondence, that posits that the relationship between a criterion variable and predictors should be strong to the extent that they are measured at the same level of specificity or generality (Ajzen & Fishbein, 1977). It follows that effects of extroversion and FO would be stronger in situations where these variables are explicitly connected with a criterion variable (e.g. OKS).

Results further provide support for hypothesis 2 and show that IT, as a representative of technological variables, is also a significant predictor of OKS (see Table 1). This finding is expected based on previous research. For example, Lin (2007) argues that technological aids and OKS are compatible based on extended possibilities for rapid search, access, and storage of large quantities of information, and alternative means of communication and collaboration between people, both internally among employees in one specific organization and globally between different organizations (Lin, 2007). Similarly, Wang et al. (2014) found that information systems contributing in documenting and transferring knowledge between employees,

can increase the production of knowledge, and down the line improve the capacity of organization to be innovative and sustainable (see also Yeh et al., 2006). However, it is important to note that advances in technological aids ultimately depend on skilled people who control technology (Ismail and Yosof, 2010b). Thus, if advantages of technological aids are not properly put to use, technology in itself might represent an obstacle to OKS. According to Wang et al. (2014), organizations that have benefited from IT systems are those with leaders who deliberately promote the use of such aids, while simultaneously taking care of people in the process. In sum, it seems that success in this area is based more on fundamental human skills to cope with technological advances and less on overly optimistic expectation that machines or technological systems automatically would improve knowledge management, sharing, and distribution.

The present results also provide support for hypothesis 3 showing that organizational variables, as measured by organizational culture (OC) and organizational trust (OT), represent important processes when it comes to prediction of OKS. The empirical connection between these processes is expected on theoretical grounds in the sense that it is reasonable to assume that establishing encouraging environments with shared core norms and mutual trust leads to increased knowledge sharing among employees (Wang & Noe, 2010). Thus, our findings accord with a previous research showing that relational capital as measured in tie strengths and trust represents the most important driver of organizational knowledge transfer (see meta-analytic overview in Van Wijk, Jansen, & Lyles, 2008). Prior research shows that knowledge sharing practices frequently underlie the company's cultural expectations (Van den Hooff & Huysman, 2009; Zheng et al., 2010). Each organizational culture contains established values and norms in different degrees of explicitness that set normative directions for daily action and decisions. Whether the employees are motivated or stimulated to share knowledge will thus largely depend on cultural expectations in any given organization (Lee & Choi, 2003; Van den Hooff & Huysman, 2009; Zheng et al., 2010). Previous research also suggests that a well-organized and functioning OC facilitates decision-making processes, increases effectiveness of organizations (Zheng, Yang & McLean, 2010) and represents one of the main determinants of corporate success (Damanpour, 1991; Mumford, 2000; Crossan & Apaydin, 2010). In sum, it is evident that positive interaction between employees, higher mutual understanding and an atmosphere of social identification, trust and reciprocity, typically result in knowledge-friendly environments (Brockman & Morgan, 2003; Van den Hooff & Huysman, 2009).

And finally, the fact that OT functioned as a mediator between OKS and FO, IT, and OC provides support for hypothesis 4 and shows the importance

of organizational processes when it comes to prediction of OKS. Mediators per definition demonstrate the manner of how or why observed effects occur (Baron & Kenny, 1986). Based on our results, it is tempting to conclude that even though personality and technology variables are clearly associated with knowledge sharing practices, the effects are even so affected by the workings of the social and cultural settings (Wells, 1999). In other words, it seems that personal dispositions, as well as the use of technological aids, are overpowered by the way dominating norms and expectations are established in organizations and communicated to employees. Or more bluntly, you do not share if you do not trust that others act reciprocally and in the best interest for you and/or your organization. Similar to individual and technological variables, the results also show that OT mediates the effects of OC on OKS. This is an interesting finding considering that mediating effects between various organizational variables and OKS are rarely explicitly addressed. The primacy of OT in our data confirms the importance of trust as a mechanism of smooth social norm that promotes knowledge sharing practices (Wang & Noe, 2010). Aside the fact that work on trust is extensive in virtually all scientific disciplines (Arnott, 2007), including organizational literature (Connell & Mannion, 2006; Nooteboom & Six, 2003), the specific analyses illustrate the way trust tends to influence human interaction at all levels of organizational life. Consequently, this clearly deserves further research attention.

Limitations and Contributions

The present study has several limitations that should be acknowledged with the aim of improving design and theory in future research. First, a relatively low number of participants in the present study limits the possibilities for analyses of data with a focus on distinct groups of interest for OKS. For example, one could hypothesize that the willingness and ability for knowledge sharing is influenced by gender, age, organizational position, and other background variables. Second, the present study does not explicitly include concepts that might have moderating effects on the relation between individual, technological, and organizational variables on one side and OKS on the other. Third, the present study included a relatively limited number of variables. For example, technological and organizational variables could be extended and further nuanced with the aim of assessing their relative and joint effects. In addition, future studies should develop longitudinal designs that include several measuring points aiming to assess mediating effects between relevant processes and OKS. And finally, the topic of OKS is well suited for a mixed method approach. For example, after the quantitative data were collected, it would be useful to perform semi-structured individual and/or focus groups interviews aiming to shed light on issues that (1)

are left unanswered by quantitative data, and (2) pursuing further issues that are actualized by quantitative data.

Set aside these limitations, the present analysis clearly contributes to existing literature on OKS. The present study contributes in accumulating knowledge that is undoubtedly useful for any given organization, especially those that are dependent on efficient and productive KM in general and OKS in specific. In terms of design, this study offers a useful theoretical approach to the understanding of OKS in the light of different aspects or levels in organizations. As noted in the limitations, although the present model could and should be further developed, the present findings nevertheless provide solid support for the role that all three organizational levels (i.e. personality, technology, organizational climate) have on OKS. The notable contribution of the present research is the meditational effect of organizational trust when it comes to relations between personal/technological aspects within the organization and OKS.

In addition, two other aspects are worth mentioning when it comes to the contribution of the present research. First, the literature on OKS in a Scandinavian context is still underdeveloped. The present study contributes to accumulation of knowledge in this cultural context by identifying the importance of specific processes that influence OKS, and even more importantly shed light on their mutual relation in terms of mediational processes. Second, the present results elucidate the organizational dynamic in this relatively small-sized company and consequently contribute to the accumulation of knowledge in this area of research that was previously acknowledged to be underdeveloped (Yew Wong, 2005).

Conclusion

It is evident that OKS represent a process that is vital for further organizational development. OKS provide a ground for organizational ability to survive by adapting to ever changing and rapid advances that characterizes a modern market. Our data accentuates the relative importance of distinct aspects of organizational life and their impact on OKS. More specifically, the present results show that OKS is a complex issue that is influenced by many different processes including personal, technological, and relational aspects within the organization.

Furthermore, it seems that organizational trust represents a ‘glue’ that unifies these distinct aspects and facilitates the smooth knowledge sharing. We must remember that the ultimate result of knowledge sharing is learning, having a potential to foster further learning. Future research should in more detail explore the workings of processes that stimulate or hinder knowledge sharing practices with the aim of improving the condition under which a positive learning climate occurs.

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Assessing the Health of a Business Ecosystem: The Contribution of the Anchoring Actor in the Formation Phase

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Business ecosystem concept takes ideas from ecological ecosystems into analysis of complex networks. Business ecosystems emerge either as managed initiatives or organically, impacted by internal or external stimuluses. Ecosystem formation is unpredictable and challenging to control transferring project front-end into an operational ecosystem. The theme of this research is how to form a healthy business ecosystem. If defines a framework for formation analysis and introduces the concept of the anchoring actor as a role leading the formation. Ecosystem health assessment through actors and relationships provides information to support ecosystem formation. Through a case study in Taiwanese health and wellbeing domain, this research presents how the anchoring actors can be identified and how they contribute to ecosystem formation. Building on the anchoring actors' contribution, the research defines a model for ecosystem health assessment. Practitioners can use the findings to facilitate the ecosystem formation and to monitor the ecosystem health. This research contributes to the business ecosystem and business network literatures by introducing the anchoring actor as an important role for ecosystem formation and by presenting how ecosystem health can be assessed.

Keywords: Business ecosystem, ecosystem formation, anchoring actor, ecosystem health, business network formation

Introduction

Business ecosystem is not an own organizational form as such. It takes ecological ecosystem concepts like food web, co-evolution and self-organized development to approach dynamics of business networks (Snehota & Håkansson, 1995; Möller & Rajala, 2007; Powell, 1990) and complex adaptive systems (Choi, Dooley, & Rungutusanatham, 2001; Ritter & Gemu-

nden, 2006). Complexity logic from the strategy research (Lengnick-Hall & Wolff, 1999) can be used to explain the business ecosystem core logic, behavior of relationships and applicable strategies to operate in it. The main advantages of using business ecosystem to approach contemporary business networks is that it emphasizes elements like coevolution, interdependency of actors, multidimensional transactions and self-organizing as the key characteristics (Provan & Kenis, 2008; Anggraeni, den Hartigh, & Zegveld, 2007).

Business ecosystems consist of multiple actors and their relationships (Gossain & Kandiah, 1998; Anggraeni et al., 2007). The total value of a business ecosystem resides in the capabilities of actors to co-operate, compete and complement each other to create value they could not achieve as independent actors (Iansiti & Levien, 2004; Moore, 1998). Multidimensional relationships and tangible and intangible asset transactions (Baldwin, 2007) determine the ecosystem scope and purpose (Anggraeni et al., 2007). Ecosystem success is the result of its robustness, productivity and ability to create new business opportunities (Iansiti & Levien, 2004). Ecosystem success can be evaluated through its health. Actor roles and the relationships between the actors are the key components for the health of the ecosystem measurable through resilience, sustainability, innovativeness and renewal capabilities (den Hartigh, Tol, & Visscher, 2006; Iansiti & Levien, 2004).

The management of business ecosystem is challenging due to multidimensional relationships, infrequent changes, lack of formal hierarchy and unpredictable changes (Capaldo, 2014; Jones, Hesterly, & Borgatti, 1997; Baldwin, 2007). Through understanding the behavioral patterns of actors and relationships in the context of the core logic, the actors can define governance actions supporting the ecosystem health (Baldwin, 2007; Borgatti & Foster, 2003). The governance actions conducted in the formation phase have a strong impact to the health of operational ecosystem.

Ecosystem evolution is impacted by governmental, social, technological and economical forces that create shocks and regulations to the ecosystem (Adomavicius, Bockstedt, Gupta, & Kauffman, 2006). Business ecosystem evolution can be summarized as formation, operational and renewal or death phases based on literature descriptions (Iansiti & Levien, 2004; Moore, 1998; Lu, Rong, You, & Shi, 2014). Ecosystem formation and health has not been widely addressed in academic literature (Kortelainen & Järvi, 2014). Emergence, as described in the earlier literature, focuses on the early unstructured phase, and the operational phase focusses on the developed entity. To complement the lifecycle view of business ecosystem, we introduce formation as a transition from project-type front-end towards an operational entity.

Based on the reviewed literature on business ecosystems, business networks and project front-end we identified research foundation elements: ecosystem characteristics and core logic, actors and relationships, health and performance, governance and evolution. From this baseline, we formulated the research theme and main research problem as 'How to form a healthy business ecosystem' and set the following research questions to guide an empirical case study on Taiwanese health and wellbeing domain:

RQ1 *How to analyze business ecosystem formation?*

RQ2 *How to describe the role of the anchoring actor in the formation of a healthy ecosystem?*

RQ3 *How to assess business ecosystem health?*

To answer the RQ1, we defined an analysis framework from literature that presents the ecosystem formation elements. We utilized the framework in a single case study on Taiwanese health and wellbeing domain to gather practical understanding about the formation process. We combined a business ecosystem from eight interrelated business networks that we positioned as ecosystem network modules. To respond to RQ2, we defined the contribution of the network module's lead actors, the size of the network module and the time of presence in the ecosystem into a description of the anchoring actor and how the anchoring actors drive the ecosystem formation. The anchoring actor as a novel role description in the business ecosystem context represents a conceptual contribution to the business ecosystem literature.

Anchoring actors contribute to the ecosystem health through relationships they create. They are the actors who have been present for the longest time and whose direct business network is the biggest. As a response to RQ3, we consolidated a model of ecosystem health assessment through a number of anchoring actors, a number of moderator actors and a number of strong and weak relationships. The model of ecosystem health assessment can be used by practitioners to guide the ecosystem governance.

The research process is described in Figure 1 and presents in a logical format how the research theme is derived from the theoretical foundations. The analysis framework synthesizes the literature review and serves as a baseline to address the research questions through an empirical case study conducted in the Taiwanese health and wellbeing area.

This research broadens the understanding of early phases of business ecosystems. The findings contribute to the business ecosystem literature and business network research by defining how to analyze formation and how to identify the role of anchoring actors. The model of ecosystem health assessment introduces a new concept that complements the success evaluation perspectives for complex systems.

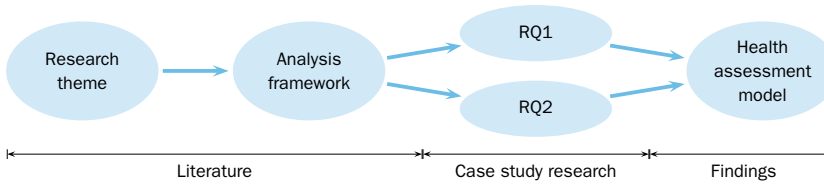

Figure 1 Research Process

Literature Review

Ecosystem Characteristics and Core Logic

The paradigm of individual isolated companies competing against each other is becoming less applicable in today's networked environment (Baldwin, 2007; Adomavicious et al., 2006). The environment is impacted by the actors decreasing the applicability of current business network doctrine promoted by, for example, Håkansson & Snehota (2006). The study of the strategic management is moving towards network perspective (Powell, 1990). For instance, a number of studies on social networks perspective on business is showing an exponential increase (Borgatti & Foster, 2003). Different backgrounds of the studies, methods and objectives make the field fragmented and create conceptualization and empirical investigation challenges (Ritter & Gemunden, 2003).

The concept of business ecosystem takes ecological ecosystem as a metaphor (Moore, 1993, 1998) to approach multi-organizational networks and relationships. The foundations for business ecosystems as a network analysis perspective originate from strategic research (Porter, 1985), business network research (Snehota & Håkansson, 1995; Möller & Rajala, 2007; Ford & Håkansson, 2013; Powell, 1990) and complex adaptive system theory (Choi et al., 2001; Ritter & Gemunden, 2003; Gulati, Nohria, & Zaheer, 2000; Gundlach & Foer, 2006). The formation of business ecosystem in a complex environment has similarities with project front-end phase making project management applicable perspective (Williams & Samset, 2010; Flyvbjerg, 2014) to analyze ecosystem formation.

Business ecosystems develop through self-organization and co-evolution enabling them to acquire adaptability (Hu, Rong, Shi, & Yu, 2014). According to Moore (1993; 1998), including non-directly involved actors, 'species' such as governmental bodies, associations or standardization bodies, expands a business network to a business ecosystem. Approaching the compilation of business networks as an ecosystem (Campagnolo & Camuffo, 2010) opens up new perspectives for organizational structures, technologies, customers and products. On the system level, actors can have multiple roles and the focus of the analysis will be on relationships and their

dynamics combined with networked value (Peltoniemi, 2005; Campagnolo & Camuffo, 2010).

Network core logic describes a set of strategic principles that define goals, operating principles, competences and success measures (Anggraeni et al., 2007; Häkansson & Snehota, 2006). Business ecosystems follow a complexity logic (Lengnick-Hall & Wolff, 1999) as the core logic meaning that the success of the ecosystem and its actors is a function of the actors' capabilities to drive dynamic non-linear systems that rely on network feedback and emergent relationships (Anggraeni et al., 2007). Effective strategies in a complexity logic need to address both competition and co-operation in multidimensional transactions (Lengnick-Hall & Wolff, 1999).

Complexity logics bring an interesting perspective to analyze relations between ecosystem actors and their networks (Lengnick-Hall & Wolff, 1999). They can provide a wider perspective to relationships and business environment research and strategy making in practice (Ritter & Gemunden, 2003; Gulati et al., 2000).

The key premises of complexity logics (Lengnick-Hall & Wolff, 1999) adapted to business ecosystems are:

1. The success of actors and the whole system requires a healthy ecosystem.
2. Unpredictable, nonlinear and natural consequences of actions are significant drivers.
3. Influence is achieved through managing initial conditions and underlying capabilities.
4. The system is in constant, undirected change where coevolution is a result of interdependency in relationships.
5. Self-organization triggers transformation.
6. Cultural integrity, like shared values and common purposes, defines the scope of the ecosystem and the scope changes while the ecosystem evolves.

Complexity logics promote connections and enduring relationships in the same way as business ecosystems (Iansiti & Levien, 2004). They strive the actors to rethink their fundamental targets of engagement into surrounding business ecosystems (Choi et al., 2001).

Roles and Relationships of Ecosystem Actors

The concept of business ecosystem identifies multiple actor roles in different life cycle phases (Iansiti & Levien, 2004). Different authors (Moore, 1993, 1998; Iansiti & Levien, 2004: Gossain & Kandiah, 1998) use differ-

ent role descriptions. The central actor role is a common nominator, also referred as keystone player, focal company or key architect. The central actor controls the access to the ecosystem critical capabilities and drives the system level value creation process and success of the ecosystem (Gossain & Kandiah, 1998; Anggraeni et al., 2007).

Other roles in business ecosystems have multiple definitions. Iansiti and Levien (2004) present landlord, dominator, niche and commodity as other roles, whereas, for example, Lu et al. (2014) consider only participant and opportunist in addition to the central actor. In their recent study, Lappi and Lee (2017) complement the discussion about ecosystem roles by introducing the role of 'moderator actor.' Moderator actors operate strong relationships that are critical interfaces between actors for the creation of ecosystem joint value. The business model concept can sharpen the role description (Kinnunen, Sahlman, Harkonen, & Haapasalo, 2013). The role description is a subjective attribute and needs to be set into context of the ecosystem scope (Tsvetkova & Gustafsson, 2012; Lappi & Haapasalo, 2016).

Diversity of roles has been identified as a key characteristic of a healthy ecosystem (Anggraeni et al., 2007) as it provides the ecosystem with a portfolio of innovations and capabilities that can be combined in different ways via relationships. Diversity makes ecosystems less vulnerable to external shocks but is challenging to manage. Diversity comes as a result of self-organization and flexible boundaries (Gossain & Kandiah, 1998; Anggraeni et al., 2007).

Relationships between actors build the ecosystem structure (Borgatti & Foster, 2003) and define the value creation. All actors involved into the creation of ecosystem value are in internal or external customer relationship with each other (Lappi & Haapasalo, 2016). Customer relationships can also be be defined between modular network units (Borgatti & Foster, 2003; Campagnolo & Camuffo, 2010). Key relationships in business ecosystems are driven by actors that connect the network modules and host system level processes (Lengnick-Hall & Wolff, 1999).

Ecosystem Evolution

As evolving entities the business ecosystems follow the biological ecosystem lifecycle (Moore, 1998: Iansiti & Levien, 2004). There are several descriptions also for ecosystem lifecycle phases (Moore, 1993; Iansiti & Levien, 2004; Lu et al., 2014; Hu et al., 2014) but in general the ecosystem lifecycle includes formation (birth, emergence), operational (current, consolidating) and renewal or death phases. Moore (1993) defines ecosystem formation as the ecosystem's transition from a random collection of elements to a more structured community. Formation includes activities

where actors develop co-operation strategies to adapt to a new ecosystem mode of operation (Gulati et al., 2000).

Complexity in business ecosystems implies that everything is interconnected and more information does not lead into more accurate decisions as the impact of the planning actions is nonlinear (Hearn & Pace, 2006). To manage in an evolving ecosystem actors need to revisit the internal and external relationships that served to protect and isolate core competences and capabilities in favor of relationships directed by sharing and cooperation (Lengnick-Hall & Wolff, 1999).

Business ecosystems have common elements with complex projects. A project can be seen as a temporary value proposal embedded in a more permanent business ecosystem (DeFilippi & Sydow, 2016), making projects vehicles of ecosystem formation (Lappi & Haapasalo, 2016). The purpose of ecosystem formation planning is to establish a system that addresses both technical and organizational design (Lundrigan & Gil, 2015). As the design must meet the preferences of actors with needed resources, the central actor cannot specify the requirements before the core actors of the ecosystem are involved into the ecosystem formation (Lappi & Haapasalo, 2016; Gossain & Kandiah, 1998). On the other hand, these actors are unlikely to support the ecosystem targets unless they are specified in relevant details. The central actor needs to balance in the development of a detailed design to convince the core actors but simultaneously is flexible enough to accommodate emergent preferences (Lundrigan & Gil, 2015; Gossain & Kandiah, 1998).

The formation of business ecosystems has similarities with project front-end (Lundrigan & Gil, 2015; Williams & Samset, 2010). Project front-end includes all activities from the time the idea is conceived until the final decision to finance the project is made (Williams & Samset, 2010). It includes concept definition but not detailed planning. Front-end phase governance need to focus on stakeholder requirements, frequent changes and managing the concept definition in a turbulent environment (Aapaoja, Haapasalo, & Söderström, 2013). Similar challenges apply also in the formation of business ecosystems, where relationships are unstructured, value proposals are immature and actors seek alignment with the ecosystem targets (Iansiti & Levien, 2004; Gossain & Kandiah, 1998).

Ecosystem Success and Health

Following the key premises of complexity logic (Lengnick-Hall & Wolff, 1999), the success of all ecosystem actors depends on the success of the ecosystem as a whole. Iansiti & Levien (2004) define ecosystem success through robustness, productivity and the ability to create new business opportunities. The success of business ecosystem follows also the organizational

network success definition (Provan & Kenis, 2008), where success is defined as the attainment of positive ecosystem level outcomes that could not be achieved by individual actors independently (Gossain & Kandiah, 1998).

The ecosystem success can be evaluated through ecosystem health. The ecosystem health dimensions and related capabilities are sustainability (capability for long-term success), resilience (capability to adapt to changes), innovativeness (capability to explore new value opportunities) and renewal (capability to modify roles, practices and relationships) (den Hartigh et al., 2006). Stability as an enabler for the ecosystem health refers to the capability to build long-term trust based relationships where the actors understand each other's strengths and weaknesses and are willing to act to maximize the network outcomes (Provan & Kenis, 2008). Measuring the health status can provide the central actor of the ecosystem a 'compass' to guide the ecosystem governance (den Hartigh et al., 2006). Ecosystem health is the result of efficient formation (Gossain & Kandiah, 1998).

Ecosystem Governance

Governance of business ecosystems has not been widely discussed. Partly the reason might be that the organizational scholars are focusing on organizations, not multi-organizational entities (Provan & Kenis, 2008). Furthermore, developing a deep understanding of business ecosystems is time and effort consuming, requiring the collection of data of multiple interconnected network modules (Borgatti & Foster, 2003; Campagnolo & Camuffo, 2010). As the ecosystems are self-organized entities, managerial mechanisms, including hierarchy and control, do not apply (Jones et al., 1997) and, as they are not legal entities, the legal governance imperatives are only partially present (Provan & Kenis, 2008).

Business ecosystems use social networks to stimulate access to knowledge, increasing the potential of the actors to achieve strategically significant outcomes (Capaldo, 2014; Gulati & Foer, 2006). Social relationships create mechanisms for shared governance. Social relationship mechanisms consist of relational (interpersonal relationships, trust, etc.) mechanisms and network structural (macroculture, norms, reciprocity etc.) mechanisms (Capaldo, 2014). Both of these mechanisms affect the behavior of the ecosystem actors but the processes that impact the ecosystem governance are different (Adner & Kapoor, 2010).

Governance of ecosystem formation should have flexibility from the beginning (Williams & Samset, 2010). Central actors should focus on sensemaking rather than detailed planning (Aapaoja et al., 2013). In the early phase, the lack of detailed information can actually benefit rather than be a negative item in providing focus and flexibility for the decision maker (Choi et

al., 2001; Williams & Samset, 2010). The formation cannot be directly managed due to complex interactions and unpredictability of events (Anggraeni et al., 2007).

However, some archetypal behavior patterns can be recognized based on the relationships between ecosystem network modules. Ecosystem formation can thus be operationalized when these behavioral patterns are observed.

The nature of relationships determine the level of control an actor has over another (Adomavicius et al., 2006). Reducing relationship dimensionality and negative feedback can increase control in the ecosystem. Positive empowerment of actors and the involvement of new relationship dimensions can increase self-organization and diversity (Moore, 1998). Following a complexity logic (Lengnick-Hall & Wolff, 1999), influence in ecosystems relies on shaping the ecosystem structure and relationships, as they serve as catalysts to increase or reduce system regularity.

As the number of actors in ecosystems grows, the number of relationships increases exponentially making governance extremely challenging (DeFilippi & Sydow, 2016). A mode of shared governance can become inefficient in large ecosystems when actors either ignore critical network issues, or spend a lot of effort trying to coordinate the relationships across several organizations (Provan & Kenis, 2008; Gundlach & Foer, 2006). Centralized governance around a lead organization or external facilitator can provide a structural solution to this problem as direct involvement of all actors is no longer required (Jones et al., 1997). There is no strict number of actors for a correct governance form but shared governance seems to be effective with fewer than six to eight actors or network modules (Provan & Kenis, 2008).

Social network theories emphasize behavior of ecosystem actors as their position in the network is influenced by it (Borgatti & Foster, 2003). Centrally-positioned actors hold considerable power access to the ecosystem because other actors are dependent on them. According to Moore (1998) the most important governance methods are community governance systems and quasi-democratic mechanisms. Anggraeni et al. (2007) list the following governance activities for centrally-positioned actors:

1. Provide incentives and vision of shared goals to the members.
2. Empower the members to strive for the goals with their own incentives.
3. Apply steering mechanisms to ensure that activities are aligned with the shared goals.
4. Improve ecosystem internal innovativeness and capabilities to cope with external changes.

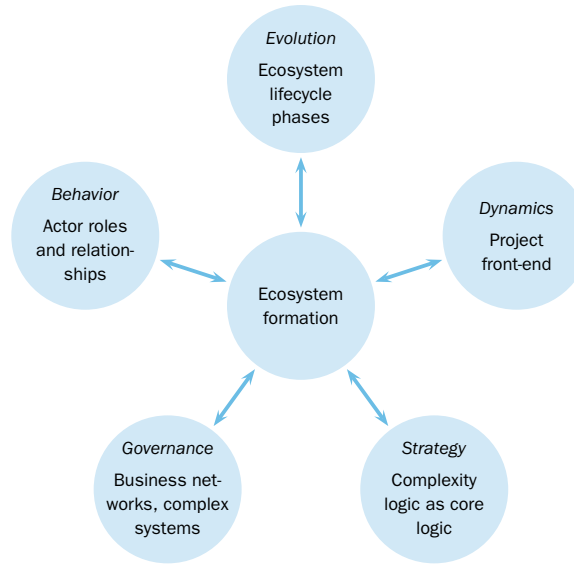

Figure 2
Ecosystem Formation Analysis Framework

Summary: Ecosystem Formation

We use term 'ecosystem formation' in this research to discuss about how unstructured business networks are joined as operational ecosystems. The merging of different definitions as ecosystem formation enables a wider analysis of the role of actors in the transition, in the establishment of important relationships and in the governance mechanisms during the formation. The formation phase defines whether the ecosystem becomes healthy or not.

Based on the reviewed literature we defined 'How to form a healthy business ecosystem' as the research theme. To structure the research and as a response to RQ1 (How to analyze business ecosystem formation?), we formulated the analysis framework for ecosystem formation described in Figure 2. The framework elements evolution, dynamics, strategy, governance and behavior derived from literature review bring inputs from different sources ranging from project front-end (dynamics) to complex systems theory (governance) and ecosystem literature (evolution, behavior). The inputs from various literature streams enable comprehensive analysis of ecosystem formation as a phenomenon. In Figure 2 the five elements of the ecosystem formation are discussed in the previous chapters but the consolidation of the picture was done by identifying the most relevant elements in conducted research and theoretical foundations that contribute to the business ecosystem formation.

Figure 2 presents the elements to approach healthy ecosystem forma-

tion. As a turbulent, complex, and unpredictable phase, the *dynamics* in the formation of business ecosystems can be adapted from literature discussing project front-end characteristics (Williams & Samset, 2010). Forces impacting project front-end combined with complexity logic (Lengnick-Hall & Wolff, 1999) as the ecosystem core logic provides important elements to define the *strategy* for ecosystem formation.

Governance mechanisms of business ecosystem formation are not studied extensively (Kortelainen & Järvi, 2014). The central actor can set governance actions for the formation phase of the ecosystem by applying insights from complex adaptive theory (Choi et al., 2001), a complexity logic as the ecosystem core logic (Lengnick-Hall & Wolff, 1999) and project front-end governance activities (Williams & Samset, 2010).

The roles and responsibilities of the actors define the formation process of the ecosystem. Their *behavioral* patterns set baseline for the ecosystem health during *evolution*. The role of the central actor and the key actors who define the process of ecosystem value need to involve the ecosystem customers into the ecosystem planning. Due to criticality of relationships and roles for a healthy ecosystem (Iansiti & Levien, 2004; Moore, 1993; Gossain & Kandiah, 1998), we set as the target of this research the following: to clarify who are the actors driving ecosystem formation and how the health of ecosystems can be assessed.

Case Set-up

Lappi and Haapasalo (2016) and Lappi, Aaltonen, and Haapasalo (in press) presented that a project-type front-end phase precedes the operational ecosystem. Based on the reviewed literature, we position ecosystem formation as the phenomenon that transfers the front-end or the project phase-depending on the context- ecosystem into an operational ecosystem. We applied the analysis framework of ecosystem formation in Figure 2 into empirical setting to investigate further the ecosystem formation. Based on this analysis framework, we visualize how the front-end and operational ecosystems are linked as a formation process in Figure 3. The actor roles follow the description from Lappi and Haapasalo (2016). Figure 3 serves as research methodology framework to guide the empirical research. Identification of the actors that drive the formation improves the success opportunities of the ecosystem and supports the governance. We present for this research that the actors driving the formation are called anchoring actors. The analysis framework presented in Figure 2 is used to identify those anchoring actors. The anchoring actor is a novel role description not previously discussed in business ecosystem literature.

We conducted a single case study in the Taiwan health and wellbeing domain to investigate the formation mechanisms and how to describe the role

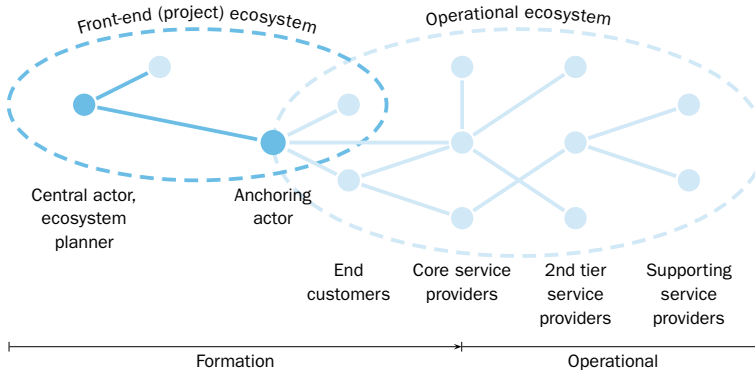

Figure 3 Business Ecosystem Formation from Front-End to Operational

of the predicted anchoring actor. The ecosystem perspective as described in literature review is applicable to the Taiwanese business context, as it emphasizes cross-industrial social networks as value creation and delivery channels (Hsieh, Yeh, & Chen, 2010; Chang & Lu, 2007). We selected the case study subject based on data access and as it was considered to reflect a self-organized business ecosystem with Taiwanese business culture characteristics as described by Hsieh et al. (2010). The case study ecosystem was in operational phase. The research set-up included interviews of the present actors to understand what their roles and relationships were in the ecosystem formation.

The case study was qualitative, like many studies related to business ecosystems (Kortelainen & Järvi, 2014). A qualitative research approach for a single case study provides in detail access to data (Yin, 1994) that was considered essential to address the research theme. Due to missing exact theoretical frameworks, we selected inductive research method (Eisenhardt, 1989) and applied the formation analysis framework from Figure 2. We interviewed 28 actors from private and public sectors as semi-structured interviews (Eisenhardt, 1989) to get insights on the business networks of the actors and how the ecosystem was formed. The interviews focused on describing the business networks, actors and relationships and how the business network evolved into the current status. In average the interview sessions lasted 1.5 hours. Based on the interviews, we mapped the actors' business networks following the relationship description from Lappi and Haapasalo (2016) and defined how the actors contributed to ecosystem formation.

Eight networks from the interviewed 28 were selected as business ecosystem modules following Baldwin (2007). We combined the networks as modules of business ecosystem in three separate 4 hour specialist work-

shops. The combined ecosystem described was self-organized but each of the network modules had their own lead actor. Eight network modules represent the ecosystem size. Following Provan & Kenis (2008), shared governance is an applicable governance mode in an ecosystem of this size. Based on the interviews, we defined the strong relationships that keep the ecosystem structure in place and moderator actors who hosted them. The role of the moderator actor was presented by Lappi and Lee (2017). The ecosystem was analyzed to clarify how the network module lead actors were linked to the moderator actors. The more connections the lead actor of the module has with moderators, and thus for strong relationships, the bigger the role the lead actor has had in the formation. Simultaneously, we identified weak relationships as temporal transaction specific connections. They are important for the ecosystem renewal and innovativeness as gates for actors to enter or exit the ecosystem (Adomavicius et al., 2006; Gossain & Kandiah, 1998). Weak relationships drive operational ecosystem renewal and adaptability capabilities.

Each network module is essential for the ecosystem health (den Hartigh et al., 2006). The level of contribution of a network module can be evaluated by calculating the number or connection points of moderator actors to the module (Baldwin, 2007). This parameter presents the significance of the network module lead actor to the ecosystem health.

The number of involved actors determine the impact of the network module in the ecosystem (Baldwin, 2007; Campagnolo & Camuffo, 2010). Therefore we selected network size as another parameter to estimate the impact of a module's lead actor in the ecosystem formation. Big networks are more developed and their contribution to the formation is higher following the ecological ecosystem analogy from Moore (1993).

How long an actor has been operating in the environment determines the longevity of the contribution (Kinnunen et al., 2013; Peltoniemi, 2005). We clarified when the interviewed lead actors had started their business in the ecosystem. Actors that had been present for longer time have been through and contributed into the ecosystem formation.

Results

We used Figure 2 framework to gather understanding about the Taiwan health and wellbeing ecosystem formation. We approached behavior and strategy elements by multiplying the number of involved moderator actors (doctors, nurses, hospital management and government) with the network module size to assess the level of importance of the lead actor. Involvement to the evolution can be evaluated from the establishment year of the business.

Results presented in Table 1 show that private nursing home and Chung

Table 1 Actors and Network Size in Taiwanese Health and Wellbeing Ecosystem

Business network module	Involved moder. actors				(1)	(2)	(3)	(4)
Hospital nursing home	D	N	H	G	4	12	48	2013
Private nursing home	D	N	H	G	4	18	72	1986
Chung Teng medical instrument (CTMI)	D	N	H	G	4	14	56	1995
iHealth	D		H	G	3	16	48	2010
Yong Wei Security			H*		2	13	26	2005
Jen Ai hospital long term care (JALTC)		N	H**		2	17	34	2007
Changhua Christian hospital logistics	D	N	H		3	15	45	2014
IMC Taichung				G	1	19	19	2015

Notes Column headings are as follows: (1) total, (2) size, (3) score (total × size), (4) established (year). D – doctor, N – nurse, H – hospital management, G – government; * other institutions, ** JALTC.

Teng Medical Instrument (CTMI) are the lead actors with the biggest role in ecosystem formation. We identified those actors as the ecosystem anchoring actors as presented in the ecosystem formation process (Figure 3). Ecosystem formation was self-organized as there was no single actor purposefully setting up the ecosystem from separate networks. Forming relationships between network modules and joining them as an unified business ecosystem involved multiple actors and transactions such as sharing of medical equipment and patient information. These dynamics of the ecosystem formation are common elements with project front-end characteristics (Williams & Samset, 2010) where actors are focused on creation of necessary enablers and relationships for the operational ecosystem (Defilippi & Sydow, 2016). Private nursing home and CTMI had also the strongest connection with the moderator actors (Lappi & Lee, 2017), as presented in Table 1.

The private nursing home established in 1986 has long customer and partner relationships and over 180 inhabitants. Due to long operation time, there is a constant flow of new inhabitants keeping the business profitable. Recreational events and sound therapy are examples of new service concepts that the private nursing home develops via involving new actors through weak relationships and deploys them through the ecosystem via strong relationships. Novel services and solid reputation enable the private nursing home to respond to megatrends such as aging population and the need for physical exercise. Deep co-operation with hospital management units and doctors as the moderator actors connect the private nursing home with other modules through strong relationships.

CTMI's significant role in the case study ecosystem comes from efficient network management both locally and globally. CTMI was established in 1995. Services such as clinics with US medical institutions enrich CTMI's

position and invite new activities into the ecosystem. CTMI offers not only medical instruments but solutions with services and consultancy, making it an important value integrator. The integrated value delivery has strengthened their position and increased the ecosystem's capability to respond to external global competition. CTMI's engagement with doctors and nurses and the deployment of their needs across the ecosystem have contributed to strong relationship formation. CTMI also drives the ecosystem evolution through new technologies like robotics. The CTMI's business model seeks for a win-win-win business model (company-customer-network) fitting the strategy with a complexity logic (Lengnick-Hall & Wolff, 1999).

The results have elements, such as large entities formed when resources and knowledge flow through social connections, supporting modular network formation mechanisms (Borgatti & Foster, 2003). Applying the elements from Figure 2, we conclude that the lead actors of the module with the widest contribution to strong relationships and the biggest size of connected actors are the anchoring actors for healthy ecosystem formation (Capaldo, 2014; Powell, 1990), and that the contribution to ecosystem health comes from the establishment of strong relationships. Supporting this conclusion, the identified anchoring actors have been operating for the longest time in the domain. Long history has built up their anchoring actor role and developed wide and sustainable modules that have contributed most to the formation and health status of the ecosystem, as it stands today.

The case study of the ecosystem evolved in a self-organized manner with a shared governance mode (DeFilippi & Sydow, 1016). The formation has been triggered by external inputs such as changes in government regulations and technology innovations. The evolution of the ecosystem has taken over fifteen years and the first anchoring actors have been present for over thirty years. Over time the ecosystem has gone through changes that have formed the current structure and health status. The organic formation of the ecosystem reflects the Taiwanese amorphous business culture, where social relationships and trust build business networks (Hsieh et al., 2010; Chang & Lu, 2007).

Discussion

To form the ecosystem from the front end to operational phase as described in Figure 3, it requires careful facilitation. Lappi et al. (in press) discuss about how to identify and involve the key customers and core service providers into the formation planning of a health and wellbeing campus ecosystem. That research had a nominated central actor, whose strategic goal was to set up a business ecosystem. That case study can be considered as a managed business network establishment (Capaldo, 2014) with

purposeful governance activities described by Anggraeni et al. (2007), such as building in flexibility for the stakeholder requests.

We identified that in this research case the ecosystem formation was self-organized, not purposefully managed and that the ecosystem formed when the business network modules joined via strong relationships set up by anchoring actors. The formation of the ecosystem in this case was driven by the actors' intent for joint value creation, by network benefits following the ecosystem formation mechanisms (Adner & Kapoor, 2010) and by network formation conditions (Jones et al., 1997). These mechanisms and conditions developed over time from triggers from internal stakeholders and external inputs.

We present, based on the reviewed literature and the case study results, that the role of anchoring actors can be identified in both managed and self-organized business ecosystems. We propose that the answer to the RQ2 (How to describe role of anchoring actor in healthy ecosystem formation) can be obtained from the operational ecosystem through identifying network module lead actor links to moderators, to the size of direct business network and to the presence longevity in the ecosystem. Describing the actors who contribute most to ecosystem formation as anchoring actors enable a practical focus of the network governance activities (Capaldo, 2014). As a novel concept, the role of anchoring actor complements the discussion about the importance of role diversity in a healthy business ecosystem (Iansiti & Levien, 2004; Kinnunen et al., 2013; Lappi & Lee, 2017).

Anchoring actors contributed to the ecosystem formation by building trust based on strong relationships between network modules and by developing new value through initial actors and their capabilities. For example, CTMI enhanced new technology deployment amongst the network modules by training doctors. Such contributions represent that, in this case study, the anchoring actors' strategies follow a complexity logic (Lengnick-Hall & Wolff, 1999).

Ecosystem formation can be supported with project front-end governance activities like sense-making, scope control and flexible communication (Williams & Samset, 2010) with a complexity logic aligned strategy (Lengnick-Hall & Wolff, 1999). Based on Jones et al. (1997) and Williams and Samset (2010), the governance framework in ecosystem formation should recognize the realities of uncertain environments and should be sufficiently flexible to enable adaptation to changes and to avoid pre-mature concept lock-in. The mode of shared governance in the case study ecosystem includes simultaneously somewhat conflicting capabilities (Capaldo, 2014), such as capabilities to share resources and information between the actors but under government regulations. The mode of shared governance

in ecosystem formation requires a structure that will maintain a strategic alignment of involved actors (Provan & Kenis, 2008).

The size of the business network module presents how much the actor contributes to the value creation of the business ecosystem and how many interfaces the actor has, including both strong and weak relationships. As the anchoring actors establish strong relationships, they define the structure of the operational ecosystem and set baseline for the ecosystem health. This contribution to the ecosystem's strong relationships makes the ecosystem resilient against internal and external changes (den Hartigh et al., 2006). The more diverse and frequent the transactions in the strong relationships are, the more sustainable the ecosystem is.

Anchoring actors' contribution to the ecosystem comes from the establishment of strong relationships and from building an impactful size of direct business networks. These contributions are interrelated to the moderator actors described by Lappi and Lee (2017) that keep strong relationships active and to weak relationships that represent external interfaces. Therefore, we present that the anchoring actors' contribution to the health of the ecosystem needs to be complemented with moderator actors and strong and weak relationships to assess the ecosystem health status.

Through weak relationships in their business networks, the anchoring actors bring in new innovations and renewal capabilities to the ecosystem making it to evolve. The number of weak relationships determine the health of the ecosystem as opportunities to develop the ecosystem by involving new service providers into the ecosystem scope.

Based on the number of strong and weak relationships and roles of anchoring actors and moderators, we present that the ecosystem health status can be assessed in dimensions of resilience, sustainability, innovativeness and renewal. We propose the following parameters as an answer to RQ3 (How to assess business ecosystem health?):

1. Size of anchoring actor's business networks (sustainability).
2. Number of moderator actors in the ecosystem (renewal).
3. Number of strong relationships in the ecosystem (resilience).
4. Number of weak relationships in the ecosystem (innovativeness).

The parameters are derived from the empirical results when the available data was analyzed to identify what are the ways to define the contribution levels for ecosystem formation using the ecosystem formation analysis framework (Figure 2) as a guideline. Parameters and health dimensions are illustrated as a health status assessment model in Figure 4. The parameters are interconnected, and the health assessment outcome needs to be evaluated in the context of the ecosystem size. The size of anchoring

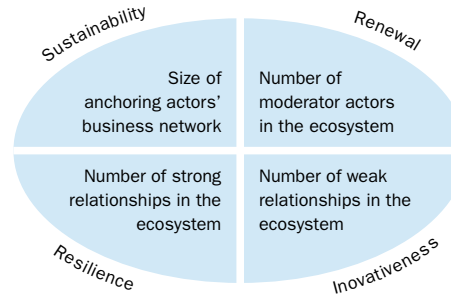

Figure 4

Business Ecosystem Health Status Assessment Model

actors' business networks and the number of moderator actors need to be divided by the total number of actors in the ecosystem. The number of strong and weak relationships need to be divided by the total number of relationships in the ecosystem.

The health status assessment model in Figure 4 gives an indication on where the ecosystem is at the current state. The health assessment model is a conceptual model where easy to calculate parameters from a business ecosystem is multiplied to as weighed scores per actor to prioritize them in terms of their contribution to the ecosystem formation. The size of the anchoring actors' business network present the impact of the actors contributed most to the formation of ecosystem following Powell (1990) networks as forms of organization. If the network size is large, then their contribution is likely to continue making the ecosystem sustainable. Moderator actors coordinate value creation (Lappi & Lee, 2017). The more moderator actors in the ecosystem are connected with the network modules, the more diverse and renewing capable the ecosystem is. The number of strong relationships define how adaptive and resilient the ecosystem is when facing changes. The number of weak relationships stipulate how many interfaces the ecosystem provides for new actors and services, reflecting the ecosystem innovativeness (Lappi & Lee, 2017).

These health assessment dimensions complement the Iansiti and Levien (2004) description on how business ecosystem success is evaluated. Renewal and innovativeness capabilities, for example, add more details about the process of ecosystem formation and operating routines that give indication about ecosystems' ability to react to either internal or external shocks, as described by DeFillippi and Sydow (2016) as one of the tensions related to project network governance.

This research builds on Kinnunen et al. (2013) in that the business models of the actors can be used to map the business ecosystem, and applies Baldwin (2007) insights on how a large ecosystem can be viewed as network of modules. The activities leading to ecosystem's formation cannot be

managed in a controlled manner following network governance challenges (Jones et al., 1997). Formation processes as two overlapping phases of front-end and operational ecosystem (Figure 3) provides a visual support for planning of the ecosystem formation before the process begins. It can be used to identify where the anchoring actors would reside and what would be the connections between actors that need managerial attention to develop strong relationships. Understanding the behavioral patterns of the anchoring actors can be used as a guide to the ecosystem towards intended direction. The behavioral patterns (Choi et al., 2001) can be defined through the business models (Kinnunen et al., 2013) and core logics of the actors (Lengnick-Hall & Wolff, 1999).

This case study results present that the anchoring actors have a critical role in ecosystem formation also when the ecosystem does not have a central actor (Provan & Kenis, 2008). In a planned set-up, such as megaprojects (Flyvbjerg, 2014), the central actor or project manager can utilize our answer proposal for RQ2 in the project front-end to identify the anchoring actors for a healthy ecosystem to be formed based on the project.

The health status assessment model (Figure 4) responds to the ecosystem health and success measurement challenges presented by den Hartigh et al. (2006). The assessment brings indications about resilience, sustainability, innovativeness and renewal capabilities that can be reflected against the ecosystem targets derived from customer requirements (Lappi et al., in press). The health assessment should always be done with detailed information coming from the actors themselves as, presented by Capaldo (2014), databases for financial transactions, etc. do not contain all the information relevant for a dynamic, trust-based networked organization analysis. Business ecosystems whose strong relationships are social with structural and relational shared governance mechanisms (Capaldo, 2014) benefit from in-depth insights of relationship nature for adequate health assessment. This applies especially to the Taiwanese business context (Hsieh et al., 2010).

The answers we propose for RQ3 can be used to evaluate ecosystem formation success. Combining the health assessment with strong and weak relationship content analysis provides comprehensive information of the ecosystem dynamics to the actors who are willing to lead the evolution. For the ecosystem central actor these tools are essential methods to define suitable governance actions.

Conclusions and Further Research

We present in this research the analysis framework in Figure 2 as a response to RQ1 (How to analyze business ecosystem formation?). As a response to RQ2 (How to the describe role of anchoring actors in healthy

ecosystem formation?), we propose that the longest present actors with biggest direct business networks and strongest contribution ecosystem formation are the anchoring actors. The anchoring actors with moderator actors and strong and weak relationships define ecosystem health assessment model as a response to RQ3 (How to assess business ecosystem health?). The case study findings from the Taiwanese health and wellbeing ecosystem support the ecosystem life cycle concept from Moore (1993), Iansiti and Levien (2004) and Lu et al. (2014) and complement the description of different roles in the ecosystem (Moore, 1993; Iansiti & Levien, 2004; Lappi & Lee, 2017). Furthermore, the answers to RQ2 and RQ3 bring novel insights into ecosystem characteristics, evolution and health assessment (Kortelainen & Järvi, 2014; Iansiti & Levien, 2004; den Hartigh et al., 2006; Lappi & Lee, 2017) and into how business ecosystem perspectives can be used to analyze complex network systems based on social relationships (Choi et al., 2001; Borgatti & Foster, 2003; Capaldo, 2014).

The health status assessment model (Figure 4) introduces a new concept to complement the academic knowledge on ecosystem success factors, development mechanisms and governance models (Capaldo, 2014). It serves as an example of how to define the 'ecosystem health compass' concept presented by den Hartigh et al. (2006), and deepens the applicability of the ecosystem success parameters defined by Iansiti and Levien (2004). Applying the health assessment model in different business ecosystems and in different life-cycle stages would provide an interesting source of information to compare ecosystems as further application of this research. Further research would also be beneficial in order to validate and develop further contributions of the conceptual health assessment model.

Mapping business ecosystems presents them as multidimensional entities that go beyond a dyadic organization mode as traditionally discussed in organizational theory and strategic management literatures (Provan & Kenis, 2008). Business ecosystems need to be governed without benefit of hierarchy and ownership (Borgatti & Foster, 2003). In addition, the actors have limited formal accountability for the ecosystem level goals, especially in self-organized ecosystems (DeFilippi & Sydow, 2016). Conformity to rules and agreed operational practices is voluntary. Identification of the anchoring actors and continuous health assessment provide tools for ecosystem governance that do not rely on formal authority. The findings of this research introduce concepts in order to approach the managerial complexity challenges identified by Provan and Kenis (2008) and Williams and Samset (2010) both in operational ecosystems and in the early phases of networks and projects.

This case study research presents how anchoring actors build strong relationships in ecosystems. The weak formal relationships present ecosys-

tem interfaces for external innovations and renewal capabilities. The role of external interfaces in the evolution of a business ecosystem would provide an interesting topic for further research. Furthermore, analyzing the behavioral patterns of the actors (Anggraeni et al., 2007) would build knowledge about specifics of the governance actions that could be applied in ecosystem formation planning.

In our case study. we identified that in self-organized ecosystems trust is an essential enabler for a healthy ecosystem. Distribution of trust amongst the ecosystem members is a critical component for the ecosystem relationships and the structure of the ecosystem as a whole (Provan & Kenis, 2008; DeFilippi & Sydow, 2016). How the trust is defined, how anchoring actors build trust as part of the strong relationship and how trust is distributed in a business ecosystem would complement the health assessment model.

This research presents how formation of business ecosystem can be facilitated through anchoring actors and through an health assessment model. In a networked economy the findings can be used to guide managerial actions towards networked value as globally the transition of value is from traditional linear process towards multidimensional networked value (Hearn & Pace, 2006). This research builds knowledge on how to address this megatrend using business ecosystems as the research approach. The findings also increase understanding on how to learn to utilize an operational ecosystem to model an emerging one.

The Taiwanese health and wellbeing ecosystem represents a self-organized business ecosystem with diverse actors and deep social relationships. As a single and unique case study, the generalization opportunities are limited. Though the results are obtained from a single case study in Taiwan, the implications can be seen as globally applicable to facilitate evolution of business ecosystems. The events leading to formation of self-organized ecosystems would benefit from further research, as those events can explain how the anchoring actors establish their role. The actors willing to impact operational ecosystems would benefit from the understanding of change events to predict better the possible disruptions in the ecosystem. Using the analysis framework and applying it in cases where the ecosystem has dissolved could bring up characteristics of actors that have had a biggest impact to the discontinuation.

For practitioners, this research provides methods to describe the role of anchoring actors and focus on the ecosystem governance to guide the formation towards resilient and sustainable ecosystems with relevant innovation and renewal capabilities. Understanding how the anchoring actors contribute to the health of the ecosystem and assessing ecosystem health on a continuous basis enables for a definition of strategies that would increase the network value of the ecosystem.

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A Proposed Model for Measuring Performance of the University-Industry Collaboration in Open Innovation

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The paper aims to present a scientific approach to the creation, testing and validation of a model for performance measurement for university-industry collaboration (UIC). The main idea of the design process is to capitalize on existing success factors, facilitators and opportunities (motivation factors, knowledge transfer channels and identified benefits) and to diminish or avoid potential threats and barriers that might interfere with such collaborations. The main purpose of the applied methodology is to identify solutions and measures to overcome the disadvantages, conflicts or risk issues and to facilitate the open innovation of industrial companies and universities. The methodology adopted was differentiated by two perspectives: (1) a business model reflecting the university perspective along with an inventory of key performance indicators (KPIs); (2) a performance measurement model (including performance criteria and indicators) and an associated methodology (assimilated to an audit) that could help companies increase collaboration with universities in the context of open innovation. In addition, in order to operationalize the proposed model (facilitating practical implementation), an Excel tool has been created to help identifying potential sources of innovation. The main contributions of the research concern the expansion of UICs knowledge to enhance open innovation and to define an effective performance measurement model and instrument (tested and validated by a case study) for companies.

Keywords: university, industry, collaboration, knowledge management, performance model

Introduction

Starting with the researches of Etzkowitz and Leydesdorff in 2000, universities' roles have been reconsidered from the innovation promotion perspec-

tive. Researchers retain the traditional academic roles of social reproduction and extension of certified knowledge, but placed them in the broader context of a knowledge-based society. Based on tri-lateral networks and a hybrid organizations model, the Triple Helix framework of Etzkowitz and Leydesdorff underline how universities can develop their implication and contribution to local (regional) economic wealth. In this context, third mission's activities of universities are related to generation and application of knowledge outside the academic environment. This is currently a topic of growing importance in the agendas of both research and education policymakers, as well as of university administrators. Academic and scientific communities have recognized that 'universities are the fuel that propels knowledge-based economies' (Comacchio, Bonesso, & Pizzi, 2012; Perkmann & Walsh, 2009).

In the last decade, university third mission has been reconsidered in the new economic context by refining academic strategy (Laredo, 2007; Trencher, Yarime, McCormick, Doll, & Kraines, 2014; Etzkowitz & Leydesdorff, 2014). Furthermore, universities worldwide have intensified their effort in creating visible and strong achievements for their communities and society, and have thus actively participated in economic development, in addition to their own regular research and teaching achievements (Lai, 2011; Perkmann & Walsh, 2009).

This new emergent mission focused on economic development through several types of implications, such as collaborations or networks with business or industrial partners, which have been proved to be effective and efficient ways of nurture that generate mutual economic benefits (Etzkowitz & Leydesdorff, 2014). Furthermore, research and development interactions between universities and partners from the real economy 'represent the type of link by which the main influence of science on economy is carried out' (Morandi, 2011). Relevant researches have underlined a direct positive dependency between collaborating with a university and the innovation capacity of an economic entity (such as enterprises, companies or even public bodies) (Spithoven & Knockaert, 2012). University-industry collaborations (UICs) have a positive impact on universities knowledge processes development, too (Kinyata, 2014).

Despite the overall recognized role universities play as knowledge providers in order to support technological innovation (Thune, 2007; Vuola and Hameri, 2006; Ng, Lee, Foo, & Gan, 2012) and despite the positive dynamics of UICs, some challenges have been identified and they need special attention in order not to lead to conflicts among the involved actors. There are still interests' differences between universities and economic entities. These could be transferred into differences in their motivations and expectations in terms of collaboration outcomes:

- Universities are most interested in creating knowledge that is public and accessible through publications and patents (Ahrweiler, Pyka, & Gilbert, 2011; Zukauskaite, 2012);
- Industrial entities' main objective is to generate profit by taking ownership of the economic value of new knowledge in order to achieve a high level of competitiveness (and this should be done in a short period);
- Universities focus on long-term research based on academic objectives, whereas firms face a changing environment, which requires them to focus on shorter-term research (Lee, 2011).

The main research questions that this article addresses are related to the Romanian context of UICs development:

- How can the performance of UICs be measured and evaluated?
- Which are the particularities of UICs performance measurement by universities and enterprises?
- In both cases, which could be the relevant key KPIs that could be considered?

The paper aims to present a model for measuring the performance of UICs. The core idea of the model design is to valorise existing success factors and opportunities, and to diminish or avoid the potential threats and barriers that could interfere with collaboration. The performance-measuring model is based on the created ontology of UIC in open innovation as developed in a reference review and creative common work of a research group of experts in the context of a Romanian research and development project. The main ideas of the article refer to: (1) description of the adopted methodology and the research context; (2) description of the designed UICs ontology and the process of its testing and validation; (3) description of the performance measurement approach for UICs from the industry perspective; (4) case study for testing and validation of the theoretical researches (a pilot research).

The main innovative practical contribution of the research refers to the usefulness of the performance measurement model and tool (preliminary tested and validated), which have been proved as valuable in enabling the strategic alliance management between universities and industrial partners.

Literature Review

Universities as Active Actors of Open Innovation Processes

In the actual context of the education market dynamics, universities are more and more involved in open innovation practices in order to achieve

their third mission. Their capabilities of building networks in research, development and innovation projects, but also their capacities to support knowledge management processes with external partners, support their initiatives in successful open innovation processes. Chesbrough (2003) recognized that universities have moved from a so-called closed innovation system to an open innovation one. Other studies have debated the university ways of implications in open innovation processes, by showing process models associated with knowledge flow between both actors (Laredo, 2003; Geuna & Muscio, 2009; Draghici, Foldvary-Schramko, & Baban, 2015).

While the term 'open' may include a number of factors as legal, economic etc., the process of supporting and encouraging networking (for innovation and creativity increasing) refers to public-private partnerships as university-industry cooperation or collaboration. Researchers and practitioners from the academia have considered this innovation context as a key element for European universities (referring to their research units). In addition, it has been underlined the fact that universities 'play a leading global role in terms of top-level scientific out-put, but lag behind in the ability of converting this strength into wealth-generating innovation' (Maassen & Stensaker, 2011).

Opinions on UICs Performance Measurement

Measuring the performances of UICs was the subject of different studies from different perspective:

- The Perkmann, Neely, and Wals (2011) have underlined the motivation and benefits of firms when building alliances with universities. The subject has been present in their previous work (Perkmann & Walsh, 2009). Based on the analysis, a success map with metrics has been designed by considering relevant components of input, of processes, of output and of impact (outcomes). The proposed model included appropriate metrics for each of the component. Authors recognized the difficulties of the model application and that researchers should investigate the challenges encountered by firms in setting up and managing performance management systems;
- Other authors have used the bibliometric approach to measure UICs performance, to demonstrate universities performance in the field (Ankrah, 2007), but this assessment model is of most interest for universities;
- Other group of researches have developed a model based on the Balanced Scorecard for measuring the results of UICs (Flores, Al-Ashaab, & Magyar, 2009; Al-Ashaab, Flores, Doultsinou, & Magyar, 2011). This was a consequence of the idea of introducing key performance indi-

cators (KPIs) for the performance measurement in the case of UICs (Lee, Lee, & Kang, 2005).

Despite the different approaches of UICs performance measurement presented in the literature, there is still a gap of knowledge. The main limits of the actual researches are related to their practical exploitation and the difficulties that may occur when a specific model should be implemented in a company engaged in open innovation processes with universities. Our research approach is focused on fulfilling this gap and overcoming these disadvantages.

Brief Description of the Research Context

The context of the proposed methodology development and implementation has been defined by the national project entitled 'Knowledge Management-Based Research Concerning Industry-University Collaboration in an Open Innovation Context' (contract no. 337/2014, project code PN-II-PT-PCCA-2013-4-0616, acronym: UNIinOI). The project partnership consists of three Romanian public universities (University of Oradea, Politehnica University of Timisoara, and the Technical University of Cluj-Napoca) and a small Romanian company (EMSIL TECHTRANS Ltd.), which agreed to collaborate in order to implement an approved working plan. The project objective was to develop a procedure for nurturing an open innovation environment between universities and industrial partners, as well as to design a performance measurement model of UICs that can support industrial partners (this perspective was of main interest).

Methodological Aspects

The adopted research approach aims at designing the performance measurement model of UICs, in particular from the perspective of the Romanian industry that needs to intensify the open innovation processes, and consists of four phases. They were inspired by the LEAD framework (Learn, Energize, Apply and Diffuse as represented in Table 1) adapted from Flores et al. (2009) and Al-Ashaab et al. (2011), and which has been proved to be a feasible approach for collaborative projects of universities with industry (the case of CEMEX – Cranfield University research project).

Each phase of the methodological approach are described in Table 2.

The definition of the UICs ontology (in phase two, ENERGISE) has been done following the next steps: (a) identification and selection of the dimensions and items to be considered; (b) documentation and debate on the items definition and their adaptation to the UICs Romanian specificity; (c) the ontology building and visualization. This stage was completed with the test and validation of the designed UICs ontology. In addition, some

Table 1 LEAD Methodology Applied in the Case of UNIinOI Project

Phase 1 (2014): Learn	Literature review on UNICs, university third mission, UNICs from the university and industry perception, facts and challenges. *Results:* Background theory and best practices of UNICs.
Phase 2 (2015): Energise	Synthesis on key aspects of UIcs: motivation factors, barriers, channels for knowledge transfer, benefits and disatvantages. Buiding and visualisation of the ontology. Conducting a diagnosis for UICs in the case of three Romanian universities (public). *Results:* UICs ontology definition.
Phase 3 (2016–2017): Apply (exploite)	Definition of the UNICs business model (applied for the Romanian universities). Performance measurement model design for the UNICs, applying in industry. Designing the associated methodology for the performance measurement model (procedure of practical exploitation). *Results:* UNIinOI_BSc model and methodology; test and and validation.
Phase 4 (2014–2017): Diffuse	Dissemination of the research results on UICs (international conferences and journal).

considerations on the business model development related to Romanian universities were included in order to better fundament phase three (APPLY) of the LEAD framework.

In the phase three of the proposed approach, six evaluation criteria were considered; for each of them, key performance indicators (KPIs) were associated. Based on these, working procedures and the UNIinOI_BSc model for the performance measurement model were designed. For the purpose of the model's preliminary testing and validation, an UNIinOI_BSc tool was designed (an Excel software application) that allow score calculations for each KPIs and the graphical representation of the assessment results.

After considering the research results gained by the project team in the following chapters of the article, we will present the main findings that were convergent to the design of the performance measurement model of UICs.

The University-Industry Collaborations Ontology Designed, Testing, and Validation

The Design Phase

In order to define a coherent performance measurement model of UICs, the created conditions and the environmental context of the collaborative and creative work between universities and industrial partners were investigated. The UICs ontology definition is based on this preliminary investigation.

The established framework consists of five dimensions described by 30 relevant items, which have been defined for suitable ontology exploitation (transformed and assimilated with an evaluation model of the universities capacity to collaborate with industrial or business partners). The main is-

sues for the characterization of ontology dimensions were inspired mainly by the previous work of Ankrah (2007). Furthermore, the early research results of the UNIinOI project's team, were considered in defining the ontology, while analysing the knowledge transfer processes in the context of UICs (Draghici et al., 2015; Draghici, Baban, Ivascu, & Gaureanu, 2016; Ivascu, Cirjaliu, & Draghici, 2016).

The integration of relevant research results from the literature and their adaptation to the concrete situation of UICs in Romania were conducted within the definition of UICs ontology dimensions together with their representation as a hieratical structure (Table 1).

Based on Ankrah (2007), Van de Vrande, de Jong, Vanhaverbeke, and De Rochemont (2009), Padilla-Melendez and Garrido-Moreno (2012), Draghici et al. (2015), Draghici et al. (2016) and Ivascu et al. (2016), the following items were considered for the first dimension 'motivation factors:'

1. Industrial partner has no expertise in the research field;
2. Industrial partner has no resources for research activities in the field;
3. Industrial partner has identified a potential benefit by implementing or adopting a different approach;
4. The opportunity of adopting a multidisciplinary approach is associated with big success;
5. University intellectual property rights needs industrial valorisation;
6. Incomes increasing through the facilitation of open innovation processes in UICs;
7. Industrial partner can get considerable cost reduction related to research and development;
8. Both partners reputation assure successful results of UICs.

For the 'barriers' dimension of UICs there the previous researches of Van der Meer (2009), Bruneel, d'Este, and Salter (2010), Howells, Ramlogan, and Cheng (2012), Draghici et al. (2015), Draghici et al. (2016) and Ivascu et al. (2016) were considered. In this case, the main items of characterization were:

1. Weaknesses in relevant partners' identification, selection and recruiting;
2. Weakness in contractual negotiation;
3. Weaknesses in issues regarding the project management in UICs;
4. Weaknesses regarding the communication process between partners of the UICs for open innovation processes development;
5. Weaknesses in time management;

6. Technical capabilities weaknesses of the selected teams involved in the UIC;
7. Weaknesses of the cost management strategy;
8. Weaknesses regarding intellectual property management associated with the innovation transfer between partners involved in the UIC.

Another dimension of ontology are the 'channels of the knowledge transfer' and it was defined by considering the research results of Van der Meer (2009), Alexander and Martin (2013), Draghici et al. (2015), Draghici et al. (2016) and Ivascu et al. (2016). The items of characterization in this case are:

1. Publications of all types;
2. Face-to-face meetings and networking activities between partners involved in UIC;
3. Mobility and employability availabilities;
4. Collaborative research during the UIC's contract development;
5. Activities of continuing education or lifelong learning supported in by UIC;
6. Intellectual property products;
7. Other dissemination activities and products share between UIC partners and using different environments (off-line, on-line).

The dimension 'benefits' of UICs has been described using the findings of Ankrah (2007), Draghici et al. (2015), Draghici et al. (2016) and Ivascu et al. (2016). The characterization items refers to the following aspects:

1. Institutional or organizational benefits of both actors involved in UIC;
2. Economic benefits (improvement of economic indicators);
3. Social benefits.

For the 'disadvantages' dimension of the ontology, the research results of Ankrah (2007), Draghici et al. (2015), Draghici et al. (2016) and Ivascu et al. (2016) were considered, and the items of characterization were:

1. Deviations from the initial objective of the collaboration or project or contract (more often delays generated by unpredictable situations or aspects that may occur);
2. Quality problems (UIC do not meet industrial requirements);
3. Conflicts or misunderstandings that may occur between UICs' partners;
4. Appearances and development of risks that were not estimated or were badly managed.

The creative work developed in a collaborative manner by the specialists from the three Romania universities and partners in the UNIinOI project have led to the UICs ontology configuration. Based on partner experiences and expertise in UICs, the ontology was used as a basis for the definition of the evaluation approach regarding the actual state of involvement by Romanian universities in collaborative projects or contracts with actors from the business environment (particularly with industrial actors). In order to achieve this task, several face-to-face and virtual sessions were developed between partners from December 2014 until December 2015. The UICs ontology versions' visualization were done using the facilities of the MindManager software tool (www.mindjet.com). This has been a useful tool to support the collaborative design sessions between partners, as well as for the graphical modelling (Table 2).

The UICs Ontology Test and Validation

The designed UICs ontology dimensions and items were used for the implementation of a survey scenario in order to test and validate the preliminary research results. The ontology items were transformed into questions that defined a proposed questionnaire in order to characterize the main dimensions of the UICs. The designed questionnaire allowed the collection of responses related to each dimension and item; the respondents' opinions or perceptions (answers) were evaluated based on the Likert scale with 5 points (1, totally disagree/unimportant, . . . 5, totally agree/very important).

The dimensions considered for the analysis, together with their items for characterization, were codified as shown in Table 1. In addition, a mathematical model was established for the related scores calculation: scores related to the D1, D2, D3, D4 and D5 dimensions and for the total score (T). In the case of dimension D3 'channels for knowledge transfer,' an open question was included that was not considered for the mathematical approach. Finally, the developed model for the evaluation of the UICs consisted of five dimensions and 29 related items.

Answers of the applied survey were collected through face-to-face meetings with Romanian researchers (managers from different levels of the research domain and research staff were subjects of the survey) who belonged to three research communities within three Romanian public universities involved in the UNIinOI project. The collected responses were processed (using Excel software facilities) by the responsible person of each university and the global research results determined the UICs foot print (radar graphic).

The testing and validation approach of the designed ontology benefited from the support of the research communities from the following Romanian universities: Politehnica University of Timisoara (UPT), University of Oradea

Table 2 The UICs Ontology General Overview

Motivational factors	Industrial partner has no expertise in the R&D field. Industrial partner has no resources for the R&D activities in the field. Industrial partner has to identify a potential benefit by implementing/adopting a different approach. The opportunity of adopting a multidisciplinary approach that conduct to a successful solution. University intellectual property rights needs. Incomes increasing (facilitates open innovation processes between partners). Cost reduction. Partners reputation.
Barriers	Identification of relevant partners. Contractual negotiation. Project management issues. Communication process for open innovation between partners involved in the collaboration. Time management. Technical capabilities of the selected teams (involved in the collaboration). Cost strategies. Intellectual property management (rights, patents, licences and access mechanisms).
Channels for the knowledge transfer	Publications. Participation in face-to-face meetings and networking activities. Mobility and employability availabilities. Collaborative research developed during research and consulting contract. Continuing education and lifelong learning. Intellectual property.
Benefits	Institutional benefits. Economic benefits. Social benefits.
Disadvantages	Deviation from the initial objective of the collaboration (project, contract). Quality problems. Conflicts. Risks.

(UO) and Technical University of Cluj-Napoca (UTCluj). The research sample consisted of researchers from those three universities and the questionnaires were collected from September 2015 until November 2015, using face-to-face meetings. Table 2 presents the research results gained after the fill-up questionnaires were processed, for each university. In Table 3 the UICs foot print graphs are presented for each university involved in the research together with the ideal profile (maximum score achieved for each considered dimensions).

The research results (Table 2) shown similar opinions and attitudes of the respondents from each university related to UICs. The Total/university (3.55, 3.68, and 3.59) scores demonstrate that existing collaborations are developed with difficulties in the field of knowledge and innovation trans-

Table 3 The Mathematical Model Adopted for the UICs Foot Print Determination

Code	Dimension	Score/item/dimensions' score	
D1	Motivation factors	$X_1 = (1x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5)/5,\ i = 1,\ldots,8$ $D1 = (\sum X_i)/8,\ i = 1,\ldots,8$ $X_1 \ldots X_8$ – absolute value of the score by each item $x_1 \ldots x_5$ – number of responses related to the Likert scale points	(1) (2)
D2	Barriers	$X_1 = (1x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5)/5,\ i = 1,\ldots,8$ $D2 = (\sum X_i)/8,\ i = 1,\ldots,8$ $X_1 \ldots X_8$ – absolute value of the score by each item $x_1 \ldots x_5$ – number of responses related to the Likert scale points	(3) (4)
D3	Channels for the knowledge transfer	$X_1 = (1x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5)/5,\ i = 1,\ldots,6$ $D3 = (\sum X_i)/6,\ i = 1,\ldots,6$ $X_1 \ldots X_6$ – absolute value of the score by each item (X_7 was transformed into an open question) $x_1 \ldots x_5$ – number of responses related to the Likert scale points	(5) (6)
D4	Benefits	$X_1 = (1x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5)/5,\ i = 1,\ldots,3$ $D4 = (\sum X_i)/3,\ i = 1,\ldots,3$ $X_1 \ldots X_3$ – absolute value of the score by each item $x_1 \ldots x_5$ – number of responses related to the Likert scale points	(7) (8)
D5	Disadvantages	$X_1 = (1x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5)/5,\ i = 1,\ldots,4$ $D5 = (\sum X_i)/4,\ i = 1,\ldots,4$ $X_1 \ldots X_4$ – absolute value of the score by each item $x_1 \ldots x_5$ – number of responses related to the Likert scale points	(9) (10)
T	Total score	T = (D1 + D2 + D3 + D4 + D5)/5	(11)

Table 4 Research Results on Testing and Validation of UICs Ontology

UPT (212 subjects)	UO (154 subjects)	UTCluj (232 subjects)
D1 = 3.784788	D1 = 3.857955	D1 = 3.745151
D2 = 3.898585	D2 = 4.112825	D2 = 3.967134
D3 = 3.242138	D3 = 3.494589	D3 = 3.41822
D4 = 3.281447	D4 = 3.500000	D4 = 3.346264
D5 = 3.542453	D5 = 3.435065	D5 = 3.479526
T_{UPT} = 3.55	T_{UO} = 3.68	T_{UTCluj} = 3.59
Global score: T_{global} = 3.61 (of max. 5)		

fer. The research has identified that Romanian universities do not have a coherent business model (definition, implementation in relation with their strategy and the national, regional strategy for research and development) for their collaboration with industrial actors and this is a top management problem. According to the answers given by the university researchers, it was observed that they understand well the D2 'barriers' dimension of the UICs (the scores calculated for D2 are near the value 4, in the case of all investigated universities). According to the average profile determined

for the three universities, low scores were observed for the 'channels for the knowledge management transfer' (D3 = 3.38) and the 'benefits' (D4 = 3.38) dimensions, and the general causes could be similar to those presented above (missing a business model and a coherent strategy for UICs). In the project context, additional conclusions were elaborated per each university in order to explain the lower scores value for some dimensions (in rapport with the maximum score 5, which reflects a perfect collaboration of the university with industrial partners).

The Performance Measurement Model

Debate on the University Business Model for Intensifying UICs

In general, the success of the university system has been built on the trust the community has in universities mostly because of the high quality didactical and scientific processes that they deliver; reputation has always spurred competition between institutions. Both quality and trust grew in large part due to universities' historic independence from business and government in relation to teaching and research (Mitchell, 2015).

The literature is weak in presenting how universities should design their business model, but some trends are being debated around the ideas of Entrepreneurship University, university focusing on sustainability, on-line university, and smart or smarter university.

On the other hand, the university business model design could be similar to the case of a company, but the actual trends of the concept have to be considered. By synthesizing the business model literature, Brad and Brad (2016) have formulated a new representation of the business model, one that is linked to a business strategy and offers quantitative measures of its value. The proposed model by Brad & Brad (2016) considers two type of values, which can be adapted to universities also:

- The one for customers, as students, business partners and communities in the universities case (the reason for going on the market as high prestige organizations), and
- The one for shareholders, assimilated with different national agencies or policy makers in the case of the Romanian higher education system (which determines and motivates the academic business running).

'Both types of value are strongly linked to a business vision, which at its turn is linked both to a differentiation strategy and a development strategy. In the proposed innovative business model, key resources are mainly responsible for customer value creation, whereas key processes are mainly responsible for shareholders value creation. Key processes are strongly influenced by key resources, and the development strategy is influenced by a differentiation strategy' (Brad & Brad, 2016).

Because Romanian universities do not have a well established business model that facilitates and strongly supports UICs, preliminary researches were focused on discovering the key areas that are used to support UICs (more efficient and effective), by considering the values described above. From the results of several cross-case analysis (done during focus group meetings with researchers of the three Romanian universities), it was concluded that a business model for effective collaboration should consider six key areas (Draghici et al., 2016):

- A well-established research structure (in the university) that supports efficiently the administrative activities related to the research projects. Romanian university research centers and transfer of innovation centers do not have financial autonomy;
- Providing high quality project management, particularly with regard to objective setting, progress monitoring and effective communication;
- Understanding (maintain contact) the specifics of the UICs' economic and social environment. The administrative staff of universities supporting the research project development should identify trends and specifics of the activity (e. g. by using alumni) together with priorities and requirements in order to satisfy industry specific requirements;
- Develop new partnerships and nurture the existing ones by valorising funding opportunities. Factors such as trust, commitment and continuity of high experienced human resources have been shown to be of maximum importance for the collaboration success;
- Nurture the organizational culture that recognized the power of research and its benefits for the industry. This could be a veritable 'weapon' for the continuous development of human resources, which could positively impact the university reputation;
- Establish a coherent strategy of research activity dissemination (with high impact) and support marketing activities associated with this.

Partially these key areas are well-defined and functioning properly in Romanian universities. In addition, KPIs of the UICs are defined in order to assess the university research performance, each year. Their definition is based on legal provisions regarding the minimum standards for professors and associate professors positions, as well as the quality standards regarding the development of the study programs. These KPIs can be summarized as following:

1. KPI related to research and innovation projects, consultancy or technical services provision: (a) No. of industrial partners per year; (b) Length of industrial partnership/relationship; (c) No. of UIC projects

per year; (d) Total value of the UICs projects per year; (e) Total investments in infrastructure development and maintenance; (f) No. of new product/services created by UICs; (g) No. of new processes created by UICs; (h) No of university researchers involved in UICs; (i) No. of PhD students from industry; (j) Technology transfer mechanism supported each year (total grant given by industry);

2. KPI related to education: (a) No. of new created facilities for education per year; (b) Total value of the industry investment for students' education (facilities for education); (c) No. of students' internships supported by the industry; (d) No. of students' placements (on-the-job training); (e) No. of students' examinations regarding their scholastic achievement; (f) No. of invited seminars, demonstrations developed by industrials representatives; (g) No. of best/talent students rewards; (h) Total value of the grants supporting best/talent students (rewards);
3. KPI for university prestige: (a) No. of papers (only papers having common authors from university and industry or having mention to a company name in the acknowledgement); (b) No. of patents, invention disclosures, value of copyright licenses (only those having common authors from university and industry); (c) No. of patents, invention disclosures, value of copyright licenses (only those having common authors from university and industry); (d) No. of new spin-off companies created annually; (e) Value of revenue generated by the spin-off; (f) Value of external investment raised; (g) Prizes given to the university by industry, professional organizations, network of industrial partners etc.; (h) No. of UIC common events (conferences, seminars, workshop, job shop etc.) having industrial partners as sponsors.

The annual report of the Romanian universities assessment regarding their research activity, including UICs aspects are published on their web pages. For example, in the case of the Politehnica University of Timisoara (UPT), the research report can be found at http://www.upt.ro/Informatii_research-yearbooks_170_en.html.

In the case of the Romanian universities, it is a regular practice to assess their research performance and this is not only for financial reasons, but also to demonstrate their prestige and their market position and success.

The Performance Measurement Model Design (the Industry Perspective)

In the following pages, the industry perspective regarding UICs will be considered. The aim of industrial companies is to generate innovative solutions of products/services, processes or systems and thus to positively af-

fect their business performance and sustainability (Al-Ashaab et al., 2011). Companies' business models have to allow the acceleration of their internal innovation processes through the intensification of all knowledge circulation processes (e.g. acquisition, transfer, sharing and dissemination in UICs) (Lee at al., 2005). Furthermore, companies expect to enrich their Intellectual Capital when intensifying open innovations (Michelino, Cammarano, A., Lamberti, & Caputo, 2014).

By adopting and applying a LEAD framework, the design process of the model for the effectiveness of the UICs has been supported as an extended collaborative Balanced Scorecard model (having the acronym UNIinOI_BSc). The proposed model includes six evaluation criteria; for each of them key performance indicators (KPIs) were associated, as shown in Table 3. The designed working procedures and the UNIinOI_BSc model have allowed the design and visualization of the taxonomies (or knowledge maps done using MindManager software tool) associated with each criterion and the corresponding KPIs, as suggested by previous research of Al-Ashaab et al. (2011).

Considering the proposed UNIinOI_BSc model, an associated methodology of practical exploitation similar was created with an audit procedure for UICs that can be easily adopted by an industrial company. The main steps of the proposed audit consists of:

1. Data collection (internal proofs and information from the industrial company);
2. KPIs calculation. During this methodological step, the relevant criteria or audit perspective for the company will be established (sometimes not all the defined KPIs are needed for the audit or some of them have to be re-defined), together with the representative employees that will be involved in the audit process (from each company areas);
3. The UICs footprint representation that intends to calculate the scores related to each KPI, it will calculate the average score related to each considered criteria and then UICs footprint representation;
4. The determination of the UICs level of maturity and elaboration of the audit conclusions (including debates on the results gained).

The whole approach is aided by a developed UNIinOI_BSc tool (based on Excel software) that allows not only the score calculations for each KPIs as an average of the scores given by different employees from different companies area and the average per each criteria, but also the graphical representation of the UICs footprint (as a radar graph). In addition, a total score of the UICs is established by calculating the average score obtained by each six criteria.

Table 5 Key Performance Indicators Used in the UNIinOI_BSc Model

Competitiveness	KPI_C1	annual budget of R&D activities of UICs
	KPI_C2	no. of new products, services, process as results of UICs
Sustainability of the business (short term)	KPI_S1	no. of UICs projects with positive environmental or social impact
	KPI_S2	no. of universities included in collaborative projects of open innovation dedicated to product lifecycle sustainable development improvement
	KPI_S3	no. of open innovation projects with universities for the development of models, methods and/or normative for sustainable development
	KPI_S4	no. of conferences or workshops for knowledge transfer in open innovation, events organized in collaboration with universities
Innovation processes	KPI_I1	no. of intangible assets per year (patents and licenses, trademarks etc.)
Strategic partnership	KPI_SP1	no. of partnerships with collaborative strategic projects in open innovation with universities
	KPI_SP2	no. of collaborative projects in open innovation with universities per year
	KPI_SP3	no. of financed international project proposals that were developed with universities in open innovation (e.g. Horizon 2020)
	KPI_SP4	no. of scientific articles (in journals and/or proceedings) published in common by industrial and university's researchers
Internal business processes	KPI_IBP1	no. of best practices developed and adopted per year, in each organization process as a consequence of UICs
	KPI_IBP2	no. of improvements done during the key products' lifecycle because of UICs
	KPI_IBP3	no. of new methodologies, methods and tools developed for the improvement of any organizational process through UICs projects

Continued on the next page

KPIs are evaluated based on the company's internal information (concrete information about different aspects of UICs), as in the case of criteria 1 to 5 and 6b. For the 6a criteria (description in Table 3), the collected opinions from the employees were processed using a Likert scale of 5 points (1 – very low perception, opinion,... 5 – very high perception, opinion). The considered employees group involved in the audit needed to have high representativeness (they know and/or they are usually involved in UICs).

The use of the UNIinOI_BSc Excel tool assumes the following actions to do (their description is taken from the created tool):

1. On the tab identified as 'UICs Summary,' to identify the name of the assess company;
2. On the tab identified as 'UICs Summary,' to identify the date that this assessment was completed;

Table 5 *Continued from the previous page*

Knowledge management	KPI_KM1	understanding the tasks and duties of open innovation with universities
	KPIKM2	understanding information in open innovation
	KPI_KM3	the use of data, information and knowledge based on open innovation with universities
	KPI_KM4	systematic management tasks in the field of knowledge for open innovation with universities
	KPI_KM5	individual capacity for knowledge accumulation in open innovation with universities
	KPI_KM6	sharing individual knowledge, which is essential in open innovation collaboration with universities
	KPI_KM7	sharing knowledge with other teams involved in open innovation with universities
	KPI_KM8	the degree of knowledge utilization in open innovation with universities
	KPI_KM9	the culture of knowledge use in open innovation with universities
	KPI_KM10	the capability of tasks internalization related to knowledge in open innovation with universities
	KPI_KM11	training opportunities for the implication in open innovation with universities
	KPI_KM12	the level of organizational learning for open innovation with universities
Intellectual Capital	KPI_IC1	no. of joint training courses developed with universities
	KPI_IC2	no. of joint know-how acquisition processes developed with universities
	KPI_IC3	no. of joint documented best practices per year developed with universities
	KPI_IC4	no. of joint laboratories developed with universities
	KPI_IC5	no. of joint databases developed with universities
	KPI_IC6	no. of joint workshops developed with universities

3. On each of the remaining tabs within this file, to simply read the explanations related to the questions. Then to collect the related information from the company or to do a survey (collect employees opinions). Finally, to provide a numerical answer in the box adjacent to each question.

The graphical representation of each evaluated KPIs is based on the following defined colour codes:

- For the allocated score 1 (in the case of a specific KPIs), the corresponding Excel box is coloured in RED, which means that the corresponding practice in the company is 'Not Developed;'
- For the allocated score 3, the corresponding Excel box is coloured in

YELLOW, which means that the corresponding practice in the company is 'Under Development;'
- For the allocated score 5, the corresponding Excel box is coloured in GREEN, which means that the corresponding practice in the company is 'Developed and Executed.'

When user input has a valid score value of either a 1, 3, or 5, the box containing the score will automatically turn into the corresponding colour in order to equalize the score value, as mentioned previously. In addition, the colour code for the global score calculation (UICs footprint) and interpretation are:

- Score between 560 (100%) to 411 (73.39%), the Excel box will turn into GREEN, which means 'UICs are developed and executed;'
- Score between 401 (71.61%) to 262 (46.79%), the Excel box will turn into YELLOW, which means 'UICs are under development;'
- Score between 261 (46.61%) to 112 (20%), the Excel box will turn into RED, and the conclusions is that 'UICs are not developed.'

The UNIinOI_BSc Excel tool has been defined based on the collected opinions, practical experiences of responsible general managers and research-development (R&D) staff who have experience in common projects with universities. The refinement of the designed tool has been done following considerable repetitive tests. The colour code represented for the KPIs indicators evaluation and the assessment ragnes for the global score of the company represents the resulting effects of the UICs on a company's general performance.

The Methodological Framework Test: The Case of an Automotive Industry Company

In the following section, the assessment or audit results of an automotive company (of big size) will be presented using the UNIinOI_BSc model and its associated methodology (including the created Excel tool). The company has a long and relatively intensive collaboration with universities in its geographical area (the case study was located in the West Region of Romania, Timisoara city). The production and R&D managers supported the assessment process. The UICs audit was developed based on several interviews and information collections done during a five-day period when researchers visited the company. Each criteria was assessed in accordance with the established and refined KPIs. In the case of poor existing data for some KPIs calculation, in the field allocated for their scores in the UNIinOI_BSc tool, a score was filled by the production and the R&D managers opinions. The results of the audit are shown in Table 4.

Table 6 Calculation Results' Summary from UICs Audit: Case Study of an Automotive Company

Criteria/Perspectives	Target values (100%)	Category scores
1. Competitiveness	45	45
2. Business sustainability	50	50
3. Innovation process	105	71
4. Strategic partnership	125	71
5. Internal business processes	75	43
6. KM and IC	55	35
Total Assessment Score	455	315

As it can be seen form the research results, the automotive company reaches the target value for competitiveness criteria (maximum score gained), but its UICs are underdeveloped in the case of the other criteria in the model. Based on these results, the company's management has discovered a lack of UICs and, consequently, they have elaborated measures in order to correct the situation. The results discovered an unused resource of innovation through UICs. Through this case study, the UNIinOI_BSc model and the design tool have been tested, refined and validated.

Discussions and Conclusions

This paper addresses how performance of UICs could be measured considering the universities perspective on one side, and the industry perspective on the other side. The research problem formulation and solving took into consideration the specifics of the Romanian education market and the research-development and innovation environment related to higher education.

The proposed approach inspired itself by similar research results achieved at the international level, and it was motivated by the increasing requirements for collaboration with business or industrial partners of Romanian universities.

The paper has presented the research approach in order to establish a UICs performance measurements model for the assessment of the collaborative research impact. The study has underlined two perspectives of assessment:

- University, based on the designed UICs ontology, a questionnaire and a methodology were proposed for the assessment of their collaboration (through projects or contracts) with industrial partners. The calculations results of the considered dimensions evaluation, together with the UICs footprint (both considered as valuable results of the university audit related to its third mission), have proved that the designed

ontology can be considered mature and valuable for practical use. In addition, based on the analysis results of the three Romanian universities, strengths and weaknesses have been provided in the field of their research and development strategies and most of their actual collaborations with industrial partners (also, gaps in the national policy and regulations in the field have been identified by further analysis and debates);

- Industry (or companies' perspective), for which the UNIinOI_BSc model and tool have been developed, tested, and validated. This second perspective has offered a more contested area of research due to the lack of existing literature.

The proposed UNIinOI_BSc model for the UICs performance measurement reflects an output-based approach, which is of real interest for companies' policies, with considerable emphasis on open innovation outcomes and competitiveness. The proposed UNIinOI_BSc methodology and the created Excel tool enable precise information to managers for their companies' maturity levels in UICs, as well as to identify potential sources and ways to allow and support open innovation.

Our approach was developed using the LEAD framework, adapted to the specific context of the UNIinOI Romanian project. This framework supported the definition of a coherent and logical research scenario that allows consistent preliminary results, as the described UICs ontology and its testing and validation. Furthermore, the outcome of this systematic approach is the methodological renewal of UICs performance measurement in the case of universities (a better positioning of this process remains in the context of university's third mission development) and the definition of the UICs audit in the case of industrial companies, which could discover new sources for intensifying open and collaborative innovation process.

The benefits of the applied methodology come out especially from the industry perspective through the case study but, as there is only one single company in the scope of the research, the generalization is challenging. The presented case study for the exploitation of the performance measurement model (in the case of the automotive company) represents a pilot test and, as such, we considered that the testing and validation processes should continue (for companies of different industries and of different sizes). This is a limit of our research, but a motivation for future researches, as well.

In conclusion, the presented research on UICs audits both from the perspective of universities and from industrial partners showed not only the actual state of UICs specifics in Romania, but also the gaps of understanding and realization of such collaborations in order to nurture open innovation and future collaborative innovation processes. Furthermore, we estimate

that the university third mission is mature in the case of Romanian universities and their industrial partners, and that the university role should be refined and renewed continuously. It has already been estimated that a fourth mission will be dedicated to a higher education role and implication in building a sustainable development society.

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The European Cohesion Policy and Structural Funds in Sparsely Populated Areas: A Case Study of the University of Oulu

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The regional policy is one of the European Union's main investment policies to support regional equality and convergence, cohesion policy being one of its key policy areas and aiming to support job creation, business competitiveness, economic growth, sustainable development and citizens' quality of life. As education, research and innovation are amongst the main objectives of these policies, universities play an important role in regional development, research and education being their main tasks, while interaction with society the third one. The aim of this study is to examine how universities participate in cohesion policy and regional development by utilising structural funds in fulfilling their third task (RQ1) and how do the closest stakeholder groups view the regional role of the university (RQ2). A single case study was conducted having the Oulu Southern Institute (OSI) of the University of Oulu as the case study unit. The data was collected using an adapted Delphi method in a workshop with OSI staff, from an online questionnaire to OSI's closest stakeholders and from in-depth interviews to examine the themes that arose in the questionnaire answers. In the findings, the importance of the university unit for regional development is clearly evident. Structural funds are the main tools for universities to stimulate development, the university was seen as a crucial actor, knowledge creator, collaboration partner and regional developer, as well as a fundamental part of the regional innovation system.According to the findings, the university should participate in recommending development areas for cohesion policy guidelines for the next structural fund period.

Keywords: European cohesion policy, regional development, structural funds, sparsely populated areas, third task of universities

Introduction

Regional policy is one of the European Union's (EU) main investment policies and arises from EU's key ideologies, which highlight equality and joint

efforts to develop the member states. With respect to regional equality and convergence, the EU cohesion policy is a key policy area. This policy aims to support job creation, business competitiveness, economic growth, sustainable development and citizens' quality of life (European Commission, 2016). This policy is the second biggest policy field in the EU and also represents a significant portion of the budget. Concretely, cohesion and structural funds comprise almost a third of the total EU budget. In the current programme period of 2014–2020, budget allocation was 351.8 billion euros (European Commission, 2016). The cohesion policy is applied through member states and their intermediate authorities and projects, often including regional actors from both the public and private sectors.

EU's cohesion policy strongly supports the development of research, technology, education and training (European Commission, 2015a). It has set 11 thematic objectives for the 2014–2020 programme period, and two of those objectives directly link with educational and research institutions such as universities, which are listed as follows: strengthening research, technological development and innovation (objective 1) and investing in education, training and lifelong learning (objective 10) (European Commission, 2015a). Both the European regional development fund (ERDF) and the European Social Fund (ESF) support these objectives.

As education, research and innovation are amongst the main objectives of the EU's cohesion and regional policy, educational and research institutions play an important corresponding role in regional development. The way in which universities are participating in regional development varies and has evolved greatly over time. The roles of universities can be viewed from different perspectives, but their main functions are defined by law. For example, Finnish law states that the main mission of universities is to promote free research and academic and artistic education, to provide higher education based on research and to educate students to serve their country and humanity. In carrying out their mission, universities must promote lifelong learning, interact with the surrounding society and promote the impact of research findings and artistic activities on society ('Yliopistolaki,' 2009). Research and education are seen as the main tasks and the interaction with the society as the third task of the university. Within these statutory tasks, universities can adopt different roles in areas related to these tasks.

The regional role of universities is often linked to ongoing discussions about universities' 'third task,' also called 'third mission' or 'third stream' (Laredo, 2007; Business/Higher Education Round Table, 2006). May and Perry (2006) note that it is not enough for universities to simply produce knowledge, but universities must actively transfer that knowledge to industry, user and community groups. In summary, the 'third mission' relates to

the interactions between a university and the rest of society (Molas-Gallart, Salter, Patel, Scott, & Duran, 2002, article 4). However, the nature of this interaction and its impact varies amongst different universities.

After joining the European Union in 1995, the European cohesion policy became a core of Finnish regional development and regional policy (Jauhiainen & Niemenmaa, 2006). Universities and other education actors are key players in regional development, especially in northern, sparsely populated areas.

Our aim was to examine how universities participate in cohesion policy and regional development and, in particular, to study how universities utilise structural funds in fulfilling their 'third task.' The research questions are (1) how universities participate in cohesion policy and regional development by utilising structural funds in fulfilling their 'third task,' and (2) how do the closest stakeholder groups view the regional role of the university. For the purposes of this study a single case study was conducted examining Oulu Southern Institute (OSI), a unit of the University of Oulu, as the case in the 2007–2013 structural fund period. The data was collected using an adapted Delphi method in a workshop with OSI staff, from an online questionnaire to OSI's closest stakeholders and from in-depth interviews to examine the themes that arose in the answers. The results of this study may be effectively used by other universities to focus their regional actions and utilisation of structural funds. In addition, other regional actors can use the results to support or to deepen their collaboration with universities in sparsely populated areas.

This article is structured as follows: literature review enlightens universities as regional actors and cohesion policy implementers. Subsequently, the methodology is outlined and the results of the case study are presented. The discussion summarizes the main points and suggests some implications.

Literature Review

Uyarra (2010) identified five models for universities from the scientific literature. She also examined how the university is perceived in these models and the kind of impact that universities have at the regional level. Uyarra (2010) showcases the university as a (1) knowledge factory, (2) relational actor, (3) entrepreneur, (4) systemic actor and (5) regionally engaged actor.

When a university is seen as a 'knowledge factory,' its regional impact comes from creating and transferring knowledge and educating citizens, thus producing skilled labour for regions. A related perspective in which the university is conceptualised as a knowledge accumulator dates back to medieval universities such as Oxford and Cambridge in the UK (Youtie & Shapira, 2008). Back then, universities were separated from the rest

of the society, whereas universities today often work closely with different stakeholder groups.

Universities may also be seen as boosters of regional economies and certainly have undisputable effects on regional competitiveness. In the scientific literature, the economic impact of universities is largely examined in terms of the 'relational role' and the 'entrepreneurial role' of universities (Uyarra, 2010). The relational role acknowledges universities as partners of industry and supposes different forms of cooperation between universities and other actors. The economic slowdown of the 1980s created new possibilities for universities to raise extra funding since public financial support was stagnant (Geiger & Sá, 2008). Many factors are influential in the success of these partnerships, as several studies have shown, for example, that companies' ability to cooperate with universities depends on companies' age, size, research intensity, openness and sector in which the company is operating (Cohen, Nelson, & Walsh; 2002; Schartinger, 2002; Laursen & Salter, 2004).

In their study, Laursen and Salter (2004) examined different factors that would explain how and why firms take advantage of university functions in their innovation processes. As a conclusion, they note that firms utilise universities in distinct ways. The same results have also been shown elsewhere (D'Este & Patel, 2007; Arvanitis, Kubli, & Woerter, 2008; Mowery & Ziedonis, 2015). Cohen et al. (2002) noted that up to 60% of industrial research and development (R&D) laboratories utilise university research in their innovation processes. According to Cohen et al. (2002), larger companies are more likely to utilise university applications than small- and medium-sized enterprises (SME). The data collected by D'Este and Patel (2007) clearly showed that over 40% of university researchers have been in cooperation with firms at some level. In particular, small firms may require more routine services and consultancy, which are more likely to be sourced from their local university (Siegel, Wright, & Lockett, 2007). When universities relate and cooperate with firms, cooperation and knowledge transfer no longer occurs in an institutional or policy vacuum (Uyarra, 2010). Even so, every region and university has its own specific political and institutional structures, and the interactions between different actors cannot be generalised.

Meanwhile, the literature concerning the entrepreneurial university views the university in a commercial role, in which one of its main functions is to strategically commercialise research results, often via technology transfer offices. This connects directly to immaterial property rights and their interaction with traditional academic research (Uyarra, 2010). In the 1990s and early 2000s, university technology transfer and commercialisation processes began to be rationalised and institutionalised (Geiger & Sá, 2008;

Etzkowitz, Webster, Gebhardt, & Cantisano Terra, 2000). Since then, this parameter has become popular for studying the impact of a university (Bramwell & Wolfe, 2008). Because universities and companies might use 'different languages' when doing business with each other, so-called intermediary organisations can provide an interface for interaction. Also, regional development authorities might have significant roles when it comes to starting or boosting university-company cooperation (Siegel et al., 2007).

Most importantly, in an entrepreneurial university, science represents a means of tackling businesses' problems, and commercialisation of research results is one of the main goals. In addition to universities' internal need for change in order to orient themselves toward these goals, other actors have also demanded that universities participate more actively in different projects, perform outsourced research with the business sector or cooperate with public sector actors (Tijssen, 2006). According to Tijssen (2006), leading universities often work closely with different actors such as contract researchers. By consulting their client base and other R&D activities, universities may obtain extra funding for research and also maintain and strengthen their strategic position in networks and innovation systems. In addition to technology transfer offices, different regional authorities have tried to accelerate knowledge transfer and the formation of technology clusters in regions by setting up science parks.

However, in academia, there have been concerns that the commercialisation of research might harm basic research and its quality. Also, some companies have expressed their fears about universities being in competition with the business sector and have argued that universities should focus on business consulting activities (Etzkowitz et al., 2000). As academic entrepreneurialism has become more widespread, universities are forced to re-evaluate their strategies and arrangements, especially with respect to the kind of cooperation they are pursuing and how cooperation is being promoted (Siegel et al., 2007). Siegel et al. (2007) suggest that universities should target their commercialisation processes to involve specific sectors at the local level rather than trying to offer a wide range of services to all sectors (i.e. smart specialisation).

Following the 1990s, universities have increasingly been studied in the context of innovation systems. The perspective of innovation systems has been widely recognised in Finland, as Finland was one of the first countries to officially incorporate the concept of innovation within science and technology policy in the 1990s (Miettinen, 2002). According to Coenen (2007), the enhanced role of the public sector in creating regional advantages has highlighted the importance of universities in regional innovation systems. Meanwhile, according to Edquist (2005), an innovation system includes all important economic, organisational, institutional and other kinds of ac-

tors that have an impact on the creation, transfer and use of new innovations. Innovation systems conceptualise innovation as a collective process, wherein regional innovation stems from locally and institutionally supported networks.

In this regard, universities are crucial when it comes to creating and transferring new knowledge and are one of the key actors in regional networks (and also in national and sectoral networks). Thus, their impact on innovation systems can be significant. Regional innovation systems place universities as important generators of research for large spin-off companies but also as a support system for regional clusters, different supply chains and, especially, small- and medium-sized enterprises (Uyarra, 2010). Innovation systems are often linked to the 'triple helix' approach (Etzkowitz & Leydesdorff, 2000), which portrays the relationship between universities, businesses and the public sector. The triple helix is based on the blurring boundaries between the public and private sector, technology and science and universities and industry. Notably, universities are adopting roles that were previously associated with other actors (Etzkowitz & Leydesdorff, 2000). From this perspective, the regional impact is determined by the effectiveness of the triple helix.

There are plenty of success stories regarding universities and regional innovation. These successes are unable to be widely generalised since universities have different regional roles; thus, their impact on regions and economic development vary. In addition, regional innovation systems are structured differently, and one regions' success might not be applicable to other regions (Tödtling & Trippl, 2005). The regional impact of a university from the perspective of regional innovation systems results from the cooperation between a university with regional actors and policy formation as well as a university's ability to mobilise key stakeholder groups for innovation (Uyarra, 2010).

Lately, and especially during the 2000s, universities have been seen as a wider part of society – working closely with different networks, sectors and actors. In this sense, academics and politics have referred to the 'third mission' of universities. Rather than considering knowledge transfer processes and strategies to valorise existing university research and poise it for regional growth, this focus is on 'regional needs' and the adaptive responses of universities to meeting these needs (Uyarra, 2010). In this line of thought, universities should take part in different regional committees and networks as equal partners in order to share and learn information. In their categorisation, Youtie and Shapira (2008) considered that current 'knowledge hub universities' are actively embracing boundary-spanning roles in order to work with and bring together different stakeholder groups. This responsive role implies a greater alignment between different

university functions and regional development trajectories. Instead of undertaking a separate regional or 'third mission' alongside the traditional missions of teaching and research, the regional focus becomes embedded and integrated in all key university functions: promoting social inclusion and mobility, providing a base for skill development and stimulating innovation through basic scientific research (Uyarra, 2010).

A key driver of this policy shift at the EU level is the provision of funding to different regions through structural funds that require universities to have a greater regional focus and economic engagement and operate in a multi-level partnership mode. Participation in different regional development projects is one feature of an engaged university. Finnish universities and, in particular, universities in northern Finland have traditionally and actively participated in programme-based regional development. Many universities have actively sought out funding from structural funds and other financial instruments such as Horizon 2020. In the Oulu region, the University of Oulu was the single most active project implementer of the ERDF in the 2007–2013 programme period (Kelhä, 2014) and of the ERDF objective 2, which promotes regional innovation.

According to Boucher, Conway, and Van Der Meer (2003), the most regionally engaged universities are 'peripheral universities,' which, in most cases, are the single players in their regions. They are significant actors in the production of knowledge and the generation of economic impacts. Also, these universities were mentioned as the most active type of university in regional politics and decision-making processes. In most cases, they utilise different financial instruments, for example EU structural funds, and often in cooperation with different actors and projects, by which they participate in regional development.

Evaluation plays a fundamental role in structural fund programmes. They are made from different perspectives and at different points of the programming cycle (beforehand to verify targets, mid-project to evaluate the need for adjustments and post-project to assess the outcomes) (Bachtler & Wren, 2006). The evaluation process involves individual project evaluations up to programme-based evaluations that constitute the whole EU. Even so, evaluation and monitoring practices vary across the EU Member States and to some degree amongst regions of one Member State (Armstrong & Wells, 2006).

Current evaluation methods range from those that are 'bottom-up,' survey-based assessments of project and beneficiary outcomes to those that are 'top-down,' input-output models of aggregate programme impacts as well as process studies of structural fund implementation (Bachtler & Wren, 2006). Ederveen, de Groot, and Nahuis (2006) divided research on structural funds into three main groups: (1) simulation models, (2)

case studies and (3) econometric models (Rodríquez-Pose & Fratesi, 2004; Dall'erba & Le Gallo, 2008; Mohl & Hagen, 2010). The commonalities of these study methods is their aim to understand the impact of interventions stemming from extra funding for different regions.

The results of such evaluations in the scientific literature vary. One study showed that structural funds do not have a positive effect on regions or development (Cappellen, Castellacci, Fagerberg, & Verspagen, 2003), and, similarly, another found a lack of resulting development, or at least statistically significant development (Mohl & Hagen, 2010). Others have questioned the impact of funds, and some have even claimed that the results might be negative (Mohl & Hagen, 2010).

Because of these controversial results of the impact of EU cohesion policy and the variation of methodologies used for evaluation, EU cohesion policy has faced criticism and is currently under scientific and political debate. Batterbury (2006) noted that since the evaluation process has been decentralised to Member States, the evaluation of cohesion policy relies on the presence of a pre-existing evaluation culture and related skill base in the regions. She also noted that obstacles to effective evaluation arise from the lack of data comparability, rigidity of time frames and a focus on performance approaches.

Furthermore, it may be challenging to grasp the actual influence of a certain project or programme due to the multiple factors that influence outcomes. As previously mentioned, cohesion policy does not occur in a vacuum, considering the following:

- There are many policies and additional factors (social, cultural, economic and institutional) that influence regions' economic performance (Rodríquez-Pose & Fratesi, 2004).
- Regions also have specific features and developmental needs.
- The national and regional political climate and history affect project work and implementation. Even today, political parties and agendas have an effect on the distribution of structural funds and the projects that are being funded.

In this respect, Farole, Rodriguez-Pose, and Storper (2011) suggested that instead of trying to implement a 'one-size-fits-all' model to every region, a highly tailored set of interventions should be designed and implemented to address specific challenges in different regional contexts. Such a set could provide for a more accurate regional evaluation of the impact of structural funds or at least provide a valuable evaluation framework for regional authorities.

After conducting a literature survey, a framework was built using Uyarra's (2010) categorisation, which was slightly modified for the context of the

Table 1 The Impact of the University at the Regional Level

Category	Knowledge creator	Collaboration partner	Entrepreneurial university	Member of innovation system	Regional developer
Impact on society	Creating high level academic knowledge; knowledge transfer.	Exchange of knowledge; creating new linkages.	Role of the university in business growth and commercialisation of research results.	Activity in networks; spanning boundaries.	Creating social impact; participating in development.
Main concepts	Knowledge spillover; added value to firms; tacit knowledge; cognitive proximity.	Transfer of knowledge and technology; university-industry collaboration; enterprises' capability to exploit results.	Commercialising science; research collaboration; knowledge transfer offices; industry parks; transaction of intellectual property rights.	National, regional and sectoral innovation system; ecosystem of innovations.	Regional collaboration; networks; projects.
Indicators	Publications; degrees; research, development & innovation (RDI) indicators.	Changes in enterprises of the region.	Patents; licenses; start-ups; spin offs.	Success stories; interest group feedback; networks.	Projects; interest group feedback; networks.

Notes Modified from Uyarra (2010).

present study wherein universities as are conceptualised as regional actors and cohesion policy implementers (Table 1).

Method

In scientific literature, the roles and functions of universities are discussed from different perspectives. Universities have been connected, for example, to the knowledge economy, regional competitiveness and economic development. To examine the role of universities as regional actors and cohesion policy implementers, we conducted a literature survey and created a framework to analyse our case study unit.

The case study data were collected using an adapted Delphi method in a workshop with OSI staff, from an online questionnaire to OSI's closest stakeholders and from in-depth interviews to examine in greater depth

the themes that arose in the questionnaire answers. The Delphi method is based on the expertise and know-how of people that are closely connected to the study subject. These experts are believed to have the adequate knowledge and ability to evaluate future prospects with respect to a specific theme or subject (Kuusi, 2002). Delphi is a versatile study method, and different types of Delphi methods have been identified: the classical Delphi, policy Delphi and decision Delphi (Hanafin, 2004). In our study, the Delphi method is used in two ways: first, to get an overall picture of the development of OSI and to gain feedback from its closest stakeholders, and, second, to uncover developmental needs in order to provide solutions and an overall scenario of OSI's future.

In this study, the group of experts consisted of the closest stakeholder groups of OSI. According to Linstone and Turoff (2011), the use of the Delphi method will be even more popular in the future amongst different organisations, particularly as the era of the internet enables greater accessibility to large study groups. The Delphi method is best suited for studying values and for bringing new perspectives and ideas into planning and decision-making processes. The use of the Delphi method can be also justified if the research problem is vague or if a single analytical research method would not provide the required results. The Delphi method is particularly useful for evaluating long-term societal or technological changes, evaluating different programmes or objectives and supporting decision-making processes (Kaivo-oja & Kuusi, 1997). Traditionally, the Delphi method tries to find consensus, but, in this study, it was used to identify controversies and differing perspectives in order to better inform the work of OSI in the future.

The data for this study were collected in three ways, as mentioned above. The first phase of this study started in December 2014 with a workshop organised for OSI staff. The purpose of the workshop was to present an impact analysis study and to start an evaluation process based on the self-assessments of OSI staff. The workshop was conducted around four main discussion themes: (1) the regional impact of OSI, (2) recruitment of students to the University of Oulu, (3) collaboration with the business sector and (4) how regional impact can be measured. These themes worked as starter topics for the whole study and created a knowledge base for the following phases.

After the workshop, an online questionnaire was created and sent to OSI's closest stakeholder groups of the southern Oulu area. The used stakeholder model closely imitates and applies the Freeman (2010) stakeholder model. The respondents represented municipalities, educational and research institutions, local companies, regional financiers and business development centres in southern Oulu. The main purpose for the questionnaire was to examine the impact of OSI in different subthemes and its role

as a knowledge creator, collaboration partner, member of innovation systems and regional developer, based on the created framework.

Finally, in-depth interviews were conducted during spring 2015. In total, 18 interviews were conducted, lasting between 30–90 minutes. The purpose of the interviews was to deepen the themes that arose from the questionnaire answers. The themes discussed in the interviews were (1) OSI as a regional actor, (2) research, education and development projects, (3) success stories, (4) visibility and publicity, and (5) future developmental needs. Both the questionnaire and interview data were analysed using content analysis.

In this context, the purpose of university evaluation was to assess the university's ability to affect surrounding areas and to work in coordination with different actors that have close ties to the university. Even though stakeholder evaluation is not a key evaluation theme in European cohesion policy, some have argued that involving local communities is an essential aspect of the evaluation process (Batterbury, 2006). Therefore, the outcome of stakeholder interviews and questionnaires are useful for evaluating OSI as a regional actor. This is further justified because the universities' 'third task' (ability to impact society) is strictly connected to a university's ability to impact its surrounding environment, including companies and other actors. Moreover, feedback from stakeholder groups is important to analyse given that OSI is an active structural fund utiliser and that stakeholder groups are, in most cases, the target groups of different measures promoted by university projects.

Results

Universities have become increasingly active in society and regional development. The role of a university can be viewed from many perspectives, and, as may be reasonably argued, the regional impact of a university is often difficult to evaluate.

The Oulu Southern Institute (OSI) is a regional unit of the University of Oulu. In terms of regional development, the institute contributes significant academic research and fosters development activities in the sub-region of the southern part of northern Ostrobothnia in northern Finland. The OSI was established in 2000 based on the desire of the sub-regions in the area to have a strong science-based actor to apply, coordinate and implement development projects in the region.

The strategic lines of action of OSI focus on the research and development of future manufacturing technologies, micro-entrepreneurship and regional development. The institute participates in the development of enterprises and collaborates on joint projects with education and development organisations as well as with municipalities, sub-regions and enterprises.

The development projects are mainly funded by European Union structural funds. Thus, OSI has a broad national and international cooperation network.

OSI was described in an extremely positive tone by stakeholders. Collaboration between OSI and key stakeholder groups occurred through projects, educational collaborations and joint work in different networks. Companies acknowledged this collaboration in everyday activities, such as collaboration in the development of prototypes for different development projects. The stakeholder groups described the following as OSI's main functions:

- extending the University of Oulu to southern Oulu and bringing university-level research to the area;
- R&D, increasing relevant knowledge bases and bringing research results closer to companies;
- a link between the University of Oulu and the companies located in southern Oulu, thereby supporting and developing companies in southern Oulu;
- a collaboration partner with numerous actors and coordinator of regional cooperation amongst actors and
- a regional developer.

The importance of OSI was especially considered to result from its roles as a coordinator and collaboration partner in southern Oulu and from its role in facilitating cooperation between different educational organisations.

Stakeholder groups were asked to describe their cooperation with OSI. Based on the responses, OSI is highly networked in southern Oulu since 84% of respondents had cooperated with OSI in the 2007–2013 programme period. The main network partners are municipalities, small companies, education providers, research organisations and funding agencies. The cooperation mainly occurred on different projects for strategy development and education. Of the respondents, 78% reported having benefitted to some degree from the cooperation. Furthermore, OSI's development projects were seen to boost competitiveness. When assessing the importance of a regional university unit, the respondents clearly stated (86%) that OSI has managed to bring the University of Oulu closer to the southern sub-region, companies and additional actors.

A majority (91%) of the interviewees stated that it is important that southern Oulu have a regional university unit because OSI can:

- channel new knowledge and research results to southern Oulu actors,
- initiate regionally-based cooperation between different actors,
- improve the ability of different actors to succeed and capitalise the demographic potential (young age structure),

Table 2 Summarised Results of the Role of Oulu Southern Institute As a Regional Actor According to Stakeholders

Category	Knowledge creator	Collaboration partner	Part of regional innovation system	Regional developer
Identified measures taken in southern Oulu	Formation of research groups that combine regional needs and scientific research; building of the knowledge base of the region.	Joint projects; collaboration with firms.	Developing the key industries in the area; cooperation and networking with other educational organisations.	Provider of funding for the area; participating in strategic work projects in the area; networking.
Results of measures	Best results found for the metal industry, CUPP and micro-entrepreneurship; knowledge base built up.	Good reputation; competent partner; different actors brought together; collaboration between different actors intensified and further developed.	Significant regional actor; part of different sectoral innovation systems; became driving force of cooperation between educational organisations.	Long-term effects on firms; successful projects; success stories; knowledge base built up.

Continued on the next page

- increase the credibility and knowledge bases in the area (a matter of image),
- widen the operating area of the University of Oulu and
- support micro-, small- and medium-sized companies in the area.

Specifically, OSI's role in building regional competitiveness was seen as a priority. Also, OSI's ability to build international connections was considered to be very important. The results are summarised in the adapted framework (Table 2).

Structural funds, especially the European regional development fund (ERDF), were seen as the main tools for regional development in southern Oulu. OSI was seen as a crucial ERDF and ESF utiliser, and most of the respondents indicated that structural funds would not have been utilised as well without the presence of OSI. In fact, 87% of the respondents agreed that OSI's projects have boosted competencies and skill levels in southern Oulu and that OSI has been a key actor in building knowledge bases, especially in ICT, micro-entrepreneurship, the metal industry and underground physics.

Project work, especially ERDF and ESF projects, are in most cases joint

Table 2 *Continued from the previous page*

Category	Knowledge creator	Collaboration partner	Part of regional innovation system	Regional developer
Future expectations	Serve as a transferor of knowledge; benefit the region through its research groups; obtain competitive funding for high level research; provide education to citizens (i.e. courses, lectures).	Continue development of regional cooperation; contribute toward the regionalisation of education; support the University of Oulu in student recruitment; link between academia and regional actors.	Become a more visible actor in innovation systems; share good practices; function as a facilitator.	Further develop the fields of micro-entrepreneurship, CUPP and the metal industry; discover weak links, for example in the bio industry; seek to obtain a more versatile use of different funding opportunities; link between academia and regional actors.

efforts, and cooperation is a crucial part of structural fund projects. The data collected by the questionnaire and interviews clearly stated that ERDF projects encourage different regional actors to participate in regional development. Projects also bring different actors together and create new forms of cooperation. In this sense, projects are one means of achieving jointly set goals at the local and the regional levels.

Stakeholder groups largely considered OSI projects to be successful. In particular, micro-entrepreneurship research (MicroENTRE), future manufacturing technologies (FMT) and the underground physics research group (CUPP) were seen as the most successful.

In evaluating the effectiveness of structural funds, the leverage effect, or the ability to create economic returns, is often under scrutiny. The respondents were asked to give examples of unexpected project results. The FMT research group of OSI has contributed toward current changes in metal industry. For example, the dependence of the metal industry on Nokia Corporation in southern Oulu was reduced. The FMT projects of OSI have also managed to reach numerous companies working in the metal industry of the area. The projects and international collaborations of the underground physics research group (CUPP) of OSI have opened new possibilities, for example, to reuse the Pyhäjärvi Mine's infrastructure in the CallioLab project (Kutuniva et al., 2016). The results of such projects often lead to new projects (funded with either structural funds or other financial instruments). In questionnaires and interviews, bringing good practices to public awareness was mentioned as important.

When asked if these developmental activities and projects would have happened without ERDF, all interviewees clearly stated that ERDF was a crucial development tool. Some developmental activities might have been possible in the area but at a smaller scale and longer time frame. ERDF was considered to be a key promoter of development and a pathway to different financial instruments (e.g. Horizon 2020). Thus, without this support, international financial instruments would have been less actively exploited. In addition, the research activities that have supported local companies would not have been possible or have achieved the current state of operations without structural funds. From the perspective of regional competitiveness, OSI has succeeded in allocating resources to developmental themes that arise from developmental needs.

Discussion

Regional policy in one of the EU's main investment policies. It arises from EU's key ideologies, which highlight equality and joint efforts to develop the member States. Cohesion policy is one of the key policy areas aiming to support job creation, business competitiveness, economic growth, sustainable development and citizens' quality of life. It is the second biggest policy field in the EU. As education, research and innovation are amongst the main objectives of the EU cohesion and regional policy, universities play an important role in regional development research, being education their main task and interaction with the society the third task. Universities and other education actors are key players in regional development, especially in northern sparsely populated areas. The universities' role and impact at the regional level can be conceptualised as that of a knowledge creator, collaboration partner, member of an innovation system, regional developer or entrepreneurial actor.

Our aim was to examine how universities participate in cohesion policy and regional development by utilising structural funds in fulfilling their third task. Based on our single case study (OSI), the key roles were to provide collaboration opportunities, function as a binding force, foster high-level skills and knowledge and encourage developmental measures. In this sparsely populated area, credit was given by the interviewed stakeholders to the university unit as a provider of external funding for development actions in the region. In terms of university categorisation, OSI was mainly seen as a knowledge creator, collaboration partner and member of the regional innovation system. Its role as a regional developer was notable in the field of micro-entrepreneurship, the metal industry and underground physics. These successful projects and stories were important to the stakeholders and served as evidence of the long-term effects of the EU cohesion policy and regional development.

Another research question about how the closest stakeholder groups view the regional role of the university gave interesting results regarding the realisation of the third task by universities. The core stakeholders pointed out that several of the R&D actions would not have been possible without the university unit. In this sense, the university understood the needs and the business structure of the region and was able to focus its actions on creating dialogue amongst stakeholders, thereby enabling genuine collaboration and interaction. Its established collaboration networks with enterprises and other organisations is a significant indicator of the positive fulfilment of this task. Overall, OSI has brought the university into closer contact with the companies of the region, lowering the threshold for joint project collaboration and raising regional competencies.

As implication to universities, the stakeholders expressed a desire for collaborations to continue between the university and regional actors. Other expectations, for example, include the wish that the university would provide more academic educational opportunities in the region. The discovery of weak areas or industries and the more versatile use of different funding opportunities were also mentioned as part of the future expectations in addition to the hope that the university would continue to become a more visible actor in regional innovation.

This study complements the discussion of universities as regional actors and cohesion policy implementers. In the findings, the importance of the university and its unit for regional development is clearly confirmed. Structural funds are the main tools for development. The university unit was perceived as a crucial actor and knowledge creator, collaboration partner and regional developer as well as a fundamental part of the regional innovation system. Limitations of this study include the analysis of only one case unit. In further studies several units in different cohesion policy areas should be analysed.

Practitioners and interested academics might find the results beneficial. According to the findings, the university should participate in recommending development areas for cohesion policy in order to form the guidelines for the next structural fund period. This kind of influence might also be applied at national level. Namely, Finnish legislation for universities strongly supports their collaboration with society. However, there is a contradiction between the law and the rewarding system of government financing for actions seen as fulfilment of the 'third task' of the university. The financing system rewards only research and education results, not the results of interaction with the society, the 'third task.' Currently, there are no commonly accepted indicators for evaluating universities' regional actions in order to allocate governmental funding and budget for the third task of universities. In future studies, there is room for policy recommendations in this area, too.

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Manufacturers' Benefits from Their Cooperation with Key Retailers in the Context of Business Models: A Cluster Analysis

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The aim of this study is to examine if, among consumer durable goods' manufacturers operating in Poland, clusters could be distinguished in terms of the strength of benefits obtained from their cooperation with the key retailer. Also, this article aims to verify if these clusters could be differentiated according to the business models employed by the two parties. With the CATI method data was collected from 613 respondents that were clustered into 5 groups. The established clusters proved to differ statistically in terms of the manufacturer's business model. From the perspective of the manufacturer, however, these differences proved to be poor predictors of the overall level of the obtained benefits.

Keywords: business model, consumer durables market, cooperation, coopetition, cluster analysis, manufacturer-retailer relationships

Introduction

The issue of the inter-organizational relationships, including buyer-supplier relationships, for years has remained a topic of numerous studies (Soosay & Hyland, 2015). Manufacturers-retailers relationships are classified as vertical inter-organizational relationships (Ailawadi et al., 2010; Antoinette & Hyland, 2015). According to Bengtsson, Hinttu, and Kock (2003), there are four types of inter-organizational relationships: cooperation, competition, coopetition, and coexistence. According to this typology, the relationships between manufacturer and retailers as partners in the supply chain can be recognised as cooperation (Tsou, Fang, Lo, & Huang, 2009; Buxmann, von Ahsen, & Diaz, 2008) or coopetition (Kim, Kim, Pae, & Yip, 2013; Li, Liu, & Liu, 2011; Osarenkhoe, 2010). Anderson and Narus (1990) stipulate that cooperation is characterised by both interdependence and simultaneity of the joint and individual partners' objectives and by a voluntary entry into a relationship. Buxmann et al. (2008) distinguish decentralised cooperation and centralised cooperation. The former pertains to cooperation, where the

parties independently make plans and then exchange information on issues concerning their processes of planning, and the latter concerns cooperation, where one party deals with planning for all engaged in the relationship. The authors emphasise that the centralised cooperation usually leads to better results in comparison to the decentralised approach. Coopetition between a manufacturer and a retailer includes the simultaneous relation of horizontal cooperation and horizontal or vertical competition (Kotzab & Teller, 2003; Bengtsson, Hinttu, & Kock, 2003). In this case, a manufacturer and a retailer work together to achieve joint goals, yet at the same time they compete to realise individual objectives (Kim et al., 2013). Coopetition between a manufacturer and a retailer takes place when a manufacturer produces both their own and the retailer's brand/brands and where the latter competes with the manufacturer's brand or when the retailer simultaneously sells not only the retailer's brand/brands produced by the cooperating manufacturer, but also the manufacturer's brand/brands.

There are few studies on the cooperation and coopetition between manufacturers and retailers in the market of consumer durables (Chow, Kaynak, & Yang, 2011) compared to numerous studies on the cooperation of manufacturers with retailers on the FMCG market (Kotzab & Teller, 2003; Vlachos, Bourlakis, & Karalis, 2008). Researchers more often take the perspective of retailers (Chavhan, Mahajan, & Sarang, 2012; Ahmed & Hendry, 2012; Swoboda, Pop, & Dabija, 2010; Dapiran & Hogarth-Scott, 2003) than manufacturers (Gomez-Arias & Bello-Acebron, 2008; Blundell & Hingley, 2001). The cooperation and coopetition between the manufacturer and the retailer are crucial for improving their efficiency. Nonetheless, the factors determining efficiency and the benefits that are achieved by the relationship of the parties have not yet been fully explored. Many researchers are focused on a narrow perspective – supply chain management or relationship marketing (Corsten & Kumar, 2005; Dhar, Hoch, & Kumar, 2001). There are only a few empirical studies, especially few using quantitative methods, on the topic of benefits resulting from the relationship between a manufacturer and a retailer (Mentzer, Foggin & Golicic, 2000; Simatupang & Sridharan, 2002).

Studies have supported not only the benefits from supplier-retailer relationships but also some negative outcomes that arise due to the conflicts between cooperating partners (Gerzon, 2006) originating from the frequent contract infringements by partners (Radaev, 2013), price changes for downstream partners and demand for faster delivery from upstream partners (Bartoçu, Doğan, Bartoçu, & Kulakli, 2010) or regarding their online sales strategy (Webb, 2002). However, the outcome of a conflict depends on the cooperating partners' interactions (Radaev, 2013) and reactions, including the adopted conflict management strategy (Webb, 2002; Lam, Chin, & Pun, 2007; Bobot, 2011).

In the recent decades, the role of manufacturers and retailers in the value chain has evolved, which has been accompanied by changes in their business models. Therefore, many authors suggest that the supply chain management, including various aspects of manufacturer-retailer relationships, should be studied from the perspective of the partners' business models (Trkman, Budler, & Groznik, 2015).

This article consists of the following parts: the first part, via a literature study, examines the benefits of the manufacturer-retailer cooperation. Next, the literature review changes its focus to the presentation of the key business models of both, manufacturers and retailers. The third section is an empirical section, which consists of a cluster analysis followed by an ANOVA test with post hocs. The aim of the statistical analysis is to answer the following research questions and examine: (1) If, among consumer durable goods' manufacturers operating on the Polish market, there could be distinguished clusters in terms of the strength of benefits they obtain from their cooperation with the key retailer, and (2) If these clusters are statistically different with respect to the business models employed by the two parties.

Benefits from the Manufacturer-Retailer Cooperation

Authors of the papers on the outcomes of supplier-buyer, including manufacturer-retailer, relationships emphasise that the cooperation between the manufacturer and the retailer can contribute to achieving individual objectives and/or joint objectives and/or benefits (Tuusjarvii & Moeller, 2009; Pereira, Brito, & Mariotto, 2013). According to Terpend, Tyler, Krause and Handfield (2008), the mentioned relationships, can contribute to the improvement of operational performance, integration-based improvements, capability-based improvements and to a better financial performance. Cooperation also supports shared improved outcomes (Heide & John, 1990) and aids the creation of competitive advantages that relationship partners would not reach alone (Singh & Power, 2009; Togar & Sridharan, 2002; Simatupang & Sridharan, 2002; Nolan, 2007). To achieve this, they need to develop an appropriate level of mutual trust, share information of crucial importance (Larson & Kulchitsky, 2000), make joint decisions and, in some cases, integrate supply chain processes. According to the resource-based view, the creation of relation-specific assets through the acquisition of complementary resources from a partner contributes to the achievement of competitive advantages (Dyer & Singh, 1998). In turn, according to the transaction cost theory, cooperation allows to gain a competitive advantage by lowering transaction costs and enabling the creation of relationship-specific investments, information sharing or involving partners in value-added activities (Grover, Teng, & Fiedler, 2002). Cooperation between manufacturers and retailers supports the formation or maintenance of the competitive ad-

vantage of cooperating parties not only because it helps to reduce costs (Larson, 1994; Svensson, 2002) but also because it improves the level of customer service (Svensson, 2002), quality (Larson, 1994), delivery and logistics service performance (Artz, 1999) and allows to extend the product portfolio. Another benefit from the cooperation between manufacturers and retailers is outcomes improvement (Hewett & Bearden, 2001) and a risk reduction through sharing it with a partner (Parkhe, 1993).

According to the studies on the vertical relationships in the supply chain (Heide & John, 1990; Noordewier, John, & Nevin, 1990; Anderson & Narus, 1990), cooperation leads to better outcomes than relationships oriented towards rivalry (Palmatier, Dant, Grewal, & Evans, 2006). Following Kim et al. (2013), the stronger the cooperative dimension of manufacturer-retailer relationship, the greater the joint benefits achieved by the parties. Furthermore, a stronger competitive dimension of the relationship does not influence the changes in the joint benefits (Kim et al., 2013). The results of the cooperation are also determined by the level of dependence (Heide & John, 1988) and trust between manufacturer and retailer (Kumar, Scheer, & Steenkamp, 1995). Authors also emphasise that close cooperation with one partner can make it difficult to achieve economies of scale and reduce costs (Dyer, 1996; Corsten & Felde, 2005).

Manufacturers and Retailers in the Business Model Context

Starting from the 90s of the last century, the number of publications on the business models has steadily increased. Authors are not unanimous about the definition of a business model, including its elements and typology. A business model is understood, among others, as: a way an organization creates value proposition for its customers (Magretta, 2002; Osterwalder et al., 2005), the way an organization generates revenues/incomes (Timmers, 1998; Rappa, 2000; Linder & Cantrell, 2000) or profits (Slywotzky, Morrison, & Andelman, 2000), the architecture of an organization or the set of its competences (Timmers, 1998) or its business logic (Osterwalder et al., 2005). According to Torbay, Osterwalder and Pigneur (2001), a business model is an architecture of an organisation and a network of its partners contributing to the creation of marketing activities and to the delivery of value to the target groups in order to generate profits and sustainable revenue streams. In turn, Dudzik, Gołębiowski, and Witek-Hajduk (2008) define a business model as the logic underlying a company's business activities in a given business unit and is comprised of a description of the value proposition addressed to its target groups, essential resources, activities, external relationships of a firm and revenue sources.

According to Anderson, Day, and Rangan (1997), the traditional boundaries between retailers and manufacturers vanish and the diversification

Table 1 Characteristics of Manufacturers' Business Models

Model	Characteristics
Tradition-alists	The value proposition for customers: functional benefits of products, and the relationship of these benefits to costs. Lack of unique resources. Passive role in the supply chain. Weak bargaining power in relations with partners in the supply chain. The internal supply chain is relatively long: R&D, production, marketing, sales and after-sales services. Sources of the revenues: sales of manufactured products.
Market players	The value proposition for customers: functional benefits offered by products, as well as the strength of the brand and relationships with other members of the value chain. Unique resources: advanced technologies, strong brand, patents, unique designs and recipes, and managerial skills. The internal supply chain: long (R&D, production, marketing, sales and after-sales services). Leader of its supply chain. Partner relationships in the supply chain. Sources of the revenues: the sale of self-manufactured products, supplemented by income from licensing technology, brand names and franchising.
Contractors	The value proposition for customers: functional product benefits. Unique resources: production facility and equipment. Internal supply chain: focused on the production or services for third parties. Passive role in the supply chain. Sources of the revenues: sales of manufactured products or services.

Notes Adapted from Witek-Hajduk (2016).

of their business models occurs (Witek-Hajduk, 2016). Those changes are triggered by the consolidation of retail chains, development of information technology, easier retailers' access to information about customers (Kotzab & Schnedlitz, 1999), increased use of multichannel distribution (Seiders, Berry, & Gresham, 2000), plural governance (Heide, 2003) and an increase in sales of private brands (Soberman & Parker, 2006). Referring to the typology of the business models proposed by Dudzik and Witek-Hajduk (2007), Witek-Hajduk (2016) points out that manufacturers, that is companies, in which production is a part of the internal value chain and is an action carried out by these companies, implement the following business models: the Traditionalist, the Market Player or the Contractor; whereas retailers choose business models of the Distributor or the Integrator. Short descriptions of these business models are shown in Table 1 and Table 2.

Different variants of relationships between the manufacturer and the retailer can be distinguished due to the configuration of business models implemented by the parties in a given business. This may exert an impact

Table 2 Characteristics of Retailers' Business Models

Model	Characteristics
Distributors	The value proposition for customers: a favourable relation of functional and emotional benefits of products to their costs. Unique resources/competencies: market knowledge (about suppliers and customers). The internal supply chain: short and focused on the sales function. Sources of the revenues: trade intermediary.
Integrators	The value proposition for customers: favourable functional features of products, strong brands, patents, etc. Internal supply chain: focused on R&D, designing, marketing, sales and after-sales services, while manufacturing is outsourced. Partner relationships with members of a supply chain. Sources of the revenues: sales of its own brand-name products and offering its own unique know-how and technology by means of franchising and licensing.

Notes Adapted from Witek-Hajduk (2016).

on the joint and individual cooperation outcomes/benefits. The business model of the partner determines what complementary resources, including unique assets, can be available to the other party of the relationship and in what processes in the value chain they can cooperate. Business models of cooperating partners determine also their potential in terms of creation/co-creation of the value for the customers. However, there is a lack of studies on the benefits/outcomes of the cooperation between the manufacturer and the retailer resulting from the configuration of the business models of the both parties. Many authors are focused on the benefits from the manufacture-retailer cooperation in the production of private labels. Cooperation in this area is more common between manufacturers using the Contractor as a key business model, but sometimes it is undertaken also by the Market Players or Traditionalists offering the manufacturer's brands. Authors underline that cooperation in the production of private labels may have a negative impact on the manufacturer's competitive position and brand equity, including a brand image of the national brand (de Chernatony & McDonald, 1998; Halstead & Ward, 1995; Hoch, 1996; Quelch & Harding, 1996). Moreover, cooperation in this field can cause complications in production and distribution and, as a result, an increase in costs (Quelch & Harding, 1996) and a dependence on the retailer caused by sharing with him experience and knowledge (e.g. about the innovative technology and cost structure) (Kumar & Steenkamp, 2010). In a number of publications, several advantages for manufacturers from the cooperation with retailers in the production of private labels are mentioned (Witek-Hajduk, 2015): utilization and improvement of production capacity (Hoch, 1996; Oubina, Rubiuo, & Yaüge, 2006), improvement in profitability (Oubina et al., 2006),

production costs reduction (Quelch & Harding, 1996), transfer of revenues from the production of private labels to the development of the manufacturer's brands (Verhoef, Nijssen, & Sloot, 2002), maintenance of the level of production (Quelch & Harding, 1996), risk reduction (Jonas & Roosen, 2005), lack of branding-related expenditures (Omar, 1999), improvement of relationships with retailers (Narasimhan & Wilcox, 1998), support of the process of the new product development (Dunne & Narasimhan, 1999) and branding (Quelch & Harding, 1996), the achievement of effective inventory control (Dunne & Narasimhan, 1999), an increase of the manufacturers' brands awareness (Halstead & Ward, 1995; Gomez-Arias & Bello-Acebron, 2008), prevention of the production of store brands by other manufacturers (Oubina et al., 2006), an increase in market share (Dhar & Hoch, 1997; Verhoef et al., 2002; Kumar & Steenkamp, 2007), the achievement of benefits from the retailers' promotional activities (Omar, 1999) and diversification of product lines (Dunne & Narasimhan, 1999).

Based on the examined literature, we aim to test the following hypothesis: Among consumer durable goods' manufacturers operating on the Polish market, there could be distinguished clusters in terms of the strength of benefits they obtain from their cooperation with the key retailer, and these clusters are statistically different with respect to the business models employed by the two parties.

If our hypothesis proves to be true, we hope to find that the composition of each cluster in regard to the studied business models would help explain the extent of benefits enjoyed by the manufacturers, i.e. there would be a unidirectional relationship between the two variables.

Methods of Data Collection and Statistical Analysis

The aim of this section is to empirically confirm our hypothesis. The procedure follows the steps presented in Figure 1.

To confirm the research hypothesis, this study uses CATI-collected data of 613 medium and large Polish manufacturers of durable consumer goods, where respondents were the managers responsible for relations with retailers. The sample was randomly drawn from 1,661 records extracted from the EMIS database with the penetration rate of 36.9% and the response rate of 82.61%. The respondents were asked a set of questions about individual and joint benefits from their cooperation with a key retailer of consumer durables goods that they had cooperated with.

The concept of benefits was measured as a reflective construct with sets of Likert-scale items. As part of a multi-construct survey, respondents were asked to agree-disagree on whether a given statement representing a particular benefit (list provided in Table 3) applies to their firm. The question asked was worded as follows: 'Please provide an opinion on a case of ben-

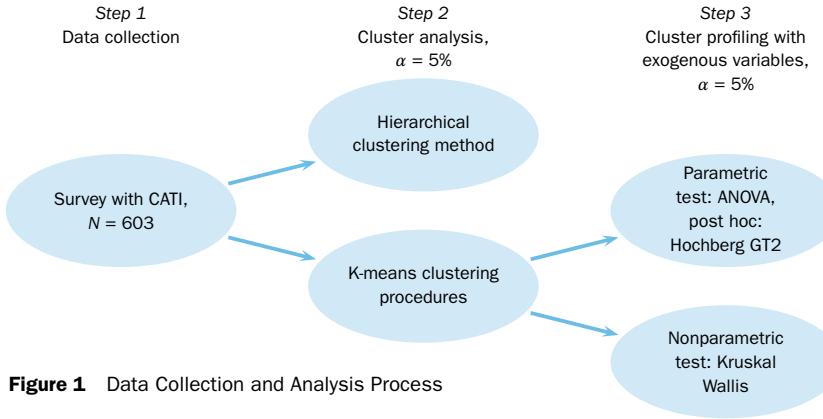

Figure 1 Data Collection and Analysis Process

efits coming from your direct relationship with a key retailer in the category of durable consumer goods on the Polish market on a scale 1–5, where 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – strongly agree.'

These answers constitute data for the clustering variables. Respondents were also presented with descriptions (see Table 1 and Table 2) of: (1) three business models (Traditionalist, Market Player and Contractor) for the manufacturers and asked to choose the business model that best characterized their firms and (2) two retailers' business models (Distributor and Integrator) and asked which one best described the business logic of their key retailer. These constituted data for the exogenous variables.

To operationalize the set goal, a cluster analysis with a set of accompanying ANOVA tests was carried out (Schmoltiz & Wallenburg, 2011).

The first step in the cluster analysis is to search for a significant collinearity between the variables. Based on the analysis of Pearson linear correlation coefficients across all studied variables, it can be concluded that there is no issue of significant cross-linearity as in none of the cases there are values of the studied coefficients greater than the absolute value of 0.9.

A dendrogram, which is a result of the hierarchical clustering method, with Ward clustering method and with Squared Euclidean centroid distance measure, suggests possibilities ranging from a 4- to a 7-cluster solution.

After conducting a series of *k*-means clustering procedures, the 5-cluster solution (Table 3) has been proven to be the most stable as (1) the number of cluster members reached the lowest difference between the hierarchical and the *k*-means (ranging from 4% for cluster 1 to 19% for cluster 3, see Sarstedt & Mooi, 2014; Zaborek & Mirońska, 2014) and (2) allowed for the lowest difference between the initial (the ones coming from the hierarchical method) and the final cluster centres (the highest average difference is seen in cluster 2, 5%, with an overall average equal to 3% – all measured

Table 3 Final Cluster Centres

Benefits	Clusters				
	1	2	3	4	5
Limited risk	3.36	4.59	3.64	2.33	4.89
Obtained or strengthened our cost advantages over other manufacturers	3.33	3.15	3.56	2.07	2.44
Increased the effectiveness of our actions	3.82	4.09	4.32	2.79	4.23
Strengthened the relationships of our firm with consumers	3.54	4.58	4.30	2.72	4.59
Strengthened our auction/business position as compared with other co-operators	3.65	3.16	4.08	2.12	2.53
Strengthened the image of our brands/firm	3.76	4.13	4.40	3.12	3.97
Created a unique offer as compared with other manufacturers	3.20	3.71	4.36	2.19	3.05
Increased the quality of our products and services	3.72	4.27	4.44	2.98	4.00
Increased the exposition of products in our stores	2.32	3.97	3.99	2.47	3.69
Obtained marketing know-how	2.63	3.07	3.91	1.88	3.54
Increased our market share	3.80	3.34	4.51	2.93	2.65
Reached range benefits (geographical expansion, including international, new target markets, new distribution channels)	3.54	2.70	4.28	2.72	4.35
Reached along with our key retailer a high level of shared profits	3.44	2.28	4.23	2.74	2.01
Worked out a high level of profits with our key retailer	3.36	3.47	4.02	2.49	4.19
Increased common profits shared with our common retailer	2.54	2.01	3.34	1.93	1.99
Number of cases per cluster	100	86	87	43	297

differences are in absolute values in order to avoid cancelling out). The procedure was guided by a set of requirements as listed by Sarstedt and Mooi (2014).

A set of ANOVA tests (all sig. = 0.000) with Welch (1951) correction (all sig. = 0.000) when needed (due to a lack of homogeneity of variance as indicated by a set of Levene's tests – all sig. = 0.000 except for the 'Strengthened out auction/business position as compared with other co-operators' variable where sig. = 0.116) (Sarstedt & Mooi, 2014) confirms that the means of clustering variables significantly (α = 5%) differ between (at least two) clusters.

In order to provide a ranking to the clusters, the average of cluster centres for each group was calculated. And so, the order of clusters ranging from the one with the highest to the one with the lowest level of obtained benefits (with the calculated mean) is as follows: 3 (4.09), 2 (3.50), 5 (3.47), 1 (3.33) and 4 (2.50).

Table 4 Means of the Exogenous Variables within the Clusters

Exogenous variable	Cluster number				
	1	2	3	4	5
Business model: Traditionalist	0.35	0.7209	0.3448	0.4186	0.6431
Business model: Market player	0.21	0.1279	0.3563	0.3023	0.1751
Business model: Contractor	0.44	0.1512	0.2989	0.2791	0.1818
Partner's business model: Distributor	0.46	0.7209	0.4713	0.6047	0.7239
Partner's business model: Integrator	0.54	0.2791	0.5287	0.3953	0.2761
Cluster rank	IV	II	I	V	III

When comparing across clusters, members of cluster 3 (cluster numbering as set by the clustering procedure) represent firms enjoying the highest benefits across almost all the ones listed, with the limitation of risk being the weakest realised benefit. Cluster number 2 is represented by manufacturers whose highest benefits, as compared to other groups, encompass those related to creating a better (more unique and more visible) offer and to increasing their relationship with consumers, all while decreasing the overall level of perceived risk. In other words, manufacturers from this group focus on increasing their own sales and are not that concerned with achieving common benefits. Manufacturers in cluster 5 gain significant range benefits (geographical expansion, including international, new target markets etc.) that can be linked to other obtained benefits, namely, an increase in the strength of their relationship with their consumers, better product quality and effectiveness of their actions. Interestingly, members of this cluster rank the highest in terms of limiting risk and working out a high level of profits with their key retailer. Firms in cluster 1, as compared with those classified in other groups, are characterised by benefits that relate to an increase in their competitive position against other manufacturers albeit to a small degree. Lastly, manufacturers in cluster 4 appear to obtain next to no benefits from their cooperation with their key retailer. Interestingly, with the exception of clusters 3 and 5, obtained benefits are not of the joint nature.

The results of ANOVA tests – all sig. ≤ 0.001 – (accompanied by a set of Levene's tests – all sig. ≤ 0.013 – and Welch – all sig. ≤ 0.004) show that there is a statistically significant difference among the examined clusters when looking at all three business models practised by the manufacturer and both partner retailer's business models. Because the dependent variable is not a continuous variable (i.e., it is a categorical one) – despite the general robustness of ANOVA – Kruskal Wallis tests (Kruskal & Wallis, 1952; Field, 2009) were conducted to confirm the obtained results – all sig. ≤ 0.001.

Cluster 3 (i.e., the highest level of reported benefits) has an almost equal

distribution of business models employed across both manufacturers and retailers, while in cluster 4 (the other side of the spectrum) there is a slight advantage of Traditionalists (41.86%) over Market Players and Contractors (30.23% and 27.91%, respectively) and of Distributors (60.47%) over Integrators (39.63) (Table 4). However, the business model of the key retailer cannot be decisive when examining the level of obtained benefits as (and to a greater extent) what was said for the cluster with the lowest rank is true for clusters 2 (ratio of 72.09/27.91) and 5 (73.39/27.61), which are ranked second and third after cluster 3. Similarly, cluster number 1 (ranked as one but last) has the analysed distribution (46/54) nearly identical to the one in cluster 3. Returning to the business model of the manufacturer, the within-cluster composition also serves as a poor predictor of the cluster rank (i.e., the level of obtained benefits) as cluster 2 (ranked second best) has a large share of Traditionalists (72.09%) with very few Market Players (12.79%) and Contractors (12.12%) – distribution similar to that of cluster 5 (ranked as number 3): 64.31/17.51/18.18; additionally, clusters 3 (rank I) and 4 (rank V) also have a near alike distribution of manufacturer's business models.

Because of the design of the hypotheses in ANOVA, a set of post hoc (Hochberg GT2) was carried out to examine the extent of the examined differences. We have found that the Traditionalist business model differentiates the clusters the most (i.e., the highest number of found statistically significant differences), but it failed to differentiate between clusters 3 (rank I) and 4 (rank V). The same for the Contractor and the Distributor manufacturer business models. Similarly, as much as types of business models of retailers do differentiate between the three middle clusters, they fail to differentiate between the two clusters that represent two sides of the spectrum of the level of benefits enjoyed, i.e. clusters 3 and 4. In fact, with the exception of the Traditionalist model, no differences are found between cluster 4 and other clusters.

As the final step of our empirical analysis, we graphed a share of the business models employed within a cluster across cluster ranks to see if there is a unidirectional relationship (Figure 2) – we found none.

Our empirical analysis leads us to conclude that as much as there are differences between some of the established clusters in their composition of the business models used by both manufacturers and retailers, they do not allow us to explain the differences in the extent of enjoyed benefits.

Conclusions

In this study, we have examined the topic of the relationship between manufacturers and their key retailers and the resulting benefits for the manufacturer, and have framed it within the context of business models employed by both manufacturers and retailers.

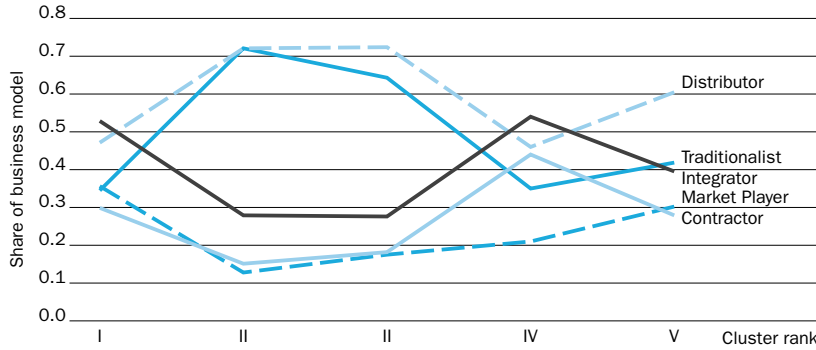

Figure 2 Share of a Business Model Employed within a Cluster across Cluster Ranks

Our assumption was that if there are statistically significant differences in business models applied across groups of manufacturers that were established according to the level of benefits they enjoy from their relationship with the key retailer, then these types of business models of manufacturers and retailers can serve as predictors of the size of the studied benefits.

First, we established the researched topic within the literature on the relationships between manufacturers and retailers, and then, within the literature on the business models applied by the mentioned parties. Next, we aimed to see if the manufacturers can be grouped in accordance with the benefits they enjoy from the cooperation with their key retailer. To do so, a combined (hierarchical and *k*-means) cluster analysis was applied, which has shown that such groups can be statistically established. With the use of ANOVA tests, we have looked if the business models used by manufacturers and retailers statistically differ across the established clusters.

Our results show that, as much as some statistically significant differences in the shares of business models applied can be found between the clusters, these differences do not explain the level of obtained benefits.

The source of our finding, we believe, can come from the fact that (as mentioned in the literature study) there is a vanishing line between a manufacturer and a retailer and the fact that in reality firms are hardly ever purely classified as only one business model type with the ratio between two or more business models employed being dependent on many factors. Additionally, there could also exist differences in term of the applied business model across various product categories. Lastly, as our results show, we do not exclude the possibility (rather we support it) that there is a wide set of determinants of benefits achieved by manufacturers from their cooperation with their key retailers.

At the same time, we are aware of the limitation of the study, which chiefly arise from the methods used to obtain and the use of data. Firstly, as

our data is questioner-derived, it can suffer from respondents' subjectivism. Given that the measured constructs are of qualitative nature, this source of potential error is recognized, but cannot be eliminated. Secondly, we do realize that it is impossible to generalize based on cluster analysis due to its sensitivity; therefore, we hope that our results will serve as hypothesis for further research on other samples.

Further studies should focus on the identification of possible determinants of the found differences at the level of benefits enjoyed. Given that a manufacturer-key retailer cooperation can refer to various elements of the value chain, the identification of manufacturers' clusters in terms of both the benefits from these cooperation and the cooperation areas could also be an important topic of further studies. Also, conflicts arising from the partnership between firms within a value chain should be given more attention as there is a limited number of existing studies, especially of those that look to the topic from the perspective of business models.

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Comparison of IAS 39 and IFRS 9: The Analysis of Replacement

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The financial crisis had an impact on international financial reporting standards. The International Accounting Standards Board (IASB) prepared a new standard for financial instruments. The replacement changes the view to accounting data in financial statements and changes the view to data in organizations, especially banks, and financial institutions. Historical prices are replaced with expectation in the future, which is not anymore a decision of the managers but has its basis on business operations.

Keywords: international financial reporting standards, IFRS 9, expected credit loss, business model, impairment

Introduction

The IASB published a final version of the international financial reporting standard IFRS 9 – Financial instruments in July 2014, which will replace the current international accounting standard IAS 39 – Financial instruments on 1st January 2018. All organizations tha have financial instruments in the statement of financial position have to replace the existing IAS 39 with IFRS 9. The replacement has a significant impact on accounting itself, processes, activities, decision-making and ultimately on financial statements. This article presents the comparison between standards, its pros and cons, a fair value accounting, impairment of financial instruments and changes in decision making in the organizations.

IAS 39 and IFRS 9: Pros and Cons of Replacement

IFRS 9 introduces accounting on the basis of principles, while IAS 39 is based on rules, despite the fact that these rules allow the decision makers to take more stable and predictable decisions in an unstable environment (Scapens, 1994, p. 310). Criticism to the rules-based approach includes the fact that rules do not adapt and are useless in an environment with innovative transactions, while criticism to the standards based on the principles approach include the lack of operational guidance (Benston, Bromwich, & Wagenhofer, 2006, p. 169). With the introduction of standards based on principles, a comparison across organizations is no longer possible, because standards require from the organizations the determination of the

assumptions and judgments that are confirmed and verified by the regulators and auditors (Benston et al., 2006, p. 169).

Huain (2012, p. 28) summarizes that the IAS 39 is one of the causes of the financial crisis in 2008, so the G20, the Ecofin Council, and the Committee proposed the improvement of the standard for financial instruments with the view to increase financial stability, taking into account:

- the complexity of the existing standard for financial instruments,
- the extent to which the financial instrument is subject to fair value, and
- the procedure of recognition and measurement of financial instruments.

The IASB's Chairman, in a speech in January 2016 before the European Parliament, pointed out that the biggest change deriving from the replacement of the standard is a model of expected credit losses that require a timely recognition of inevitable losses in financial statements, particularly in banks (Hoogervorst, 2016). Furthermore, IFRS 9 improves the financial reporting, notably in the field of debt instruments. Impairment of financial assets brings different but significant changes in accounting policies, which are based on the model of future losses, while stakeholders have an insight into instruments with increased credit risk (Marshall, 2015).

As a weakness, we can point out the costs incurred at the time of implementation, but Marshall (2015, p. 1) estimates that the benefits outweigh the costs of implementation. A further disadvantage is the lack of convergence with US GAAP standards, but the IASB believes that requirements for recognition, classification, measurement and concluded are the same in EU and USA and that the European organizations are not in a position of competitive disadvantage mainly on specific models of impairments (Marshall, 2015, p. 2).

IFRS 9 introduces a new accounting within the selected business model and where assets are managed in order to generate cash flows – by collecting contractual cash flows, selling financial assets, or both (Marshall, 2015, p. 13). The business model for managing basic debt instruments is set up by the operations in an organization that has to consider into the nature of business (Marshall, 2015, p. 13):

- the way the presentation of performance within business model and management of financial assets and the presentation to the key management personnel,
- risks that affect the performance of the business model and the way in which those risks are managed, and
- the determination of the compensation for executives.

Table 1 Comparison of Key Categories between IAS 39 and IFRS 9

Category	IAS 39	IFRS 9
The purpose of the standard	Applies to all financial assets, with a few exceptions.	The same.
The initial recognition of assets	When an organization becomes a party to the contractual provisions.	The same.
Initial measurement	The fair value including transactions costs (for financial assets that are not intended for trading purposes).	The same.
Subsequent measurement	The fair value. Amortized cost. Cost (for the share-based instruments, which do not have a reliable fair value measurement).	Fair value through profit or loss (FVTPL). Amortized cost (AC). Fair value through other comprehensive income (FVOCI).
Types of classification	Available for sale (AFS). Held to maturity (HTM). Loans and receivables. Fair value through profit or loss (FVTPL).	Fair value through profit or loss (FVTPL). Amortized cost (AC). Fair value through other comprehensive income (FVOCI).
Reclassification	Reclassification is prohibited through profit or loss after initial recognition.	Change of business model.
Equity instruments	All equity instruments available for sale are measured at a fair value in another comprehensive income.	Irrevocable choice to designate as fair value through other comprehensive income, fair value through profit and loss if held for trading.
Gains and losses	Usually through profit or loss.	Usually through profit or loss.
Impairment	Several models of impairment, model of incurred losses.	A unified model of impairment for all financial instruments – the expected loss model.

Notes Adapted from Huian (2012, p. 35).

In Table 1 we present a comparison between IAS 39 and IFRS 9 in the light of the purpose of the standard, the initial recognition, the measurement of the initial categories of the instruments, reclassification of instruments, profit or loss and impairment.

We can conclude that in purpose, in initial recognition and in initial measurement there are no differences between the standards. The classification of financial instruments and its subsequent measurement are the biggest changes in the replacement. IAS 39 has four categories of classification and three categories of measurement, while IFRS 9 has only three categories of measurement, which are also the categories of classification. IFRS 9 simplifies the classification of financial instruments. The replace-

Table 2 Changes When Replacing Standard Financial Instruments

Removed elements of IAS 39	New elements in IFRS 9
Cost expection of unquanted equity. No bifurcation of embedded derivates. No tainting rules; business model direven reclassification: (1) only possible for financial assets, (2) if and only if an entity's business model changes (should be uncommon).	Fair value through profit or loss (FVPL) is a 'residual' category. Presentation option: fair values changes in OCI for some equity instruments not for trading. If measured at fair value, own credit gains and losses be presented in OCI. Unified impairment model.

Notes Adapted from European Banking Authority (2015, p. 9.).

ment also decreases several models of impairment in IAS 39 to a less complex and unified model of impairment in IFRS 9. By replacing the standard, some elements of accounting for financial instruments will change.

The authors Onali and Ginesti (2014, p. 636) note on their research that investors embraced a positive accounting reform in the field of financial instruments, highlighting in particular the stakeholders of countries that have bigger differences in the implementation of accounting rules and that are sure that the replacement solves the problems of the standard IAS 39.

Huian (2012, p. 42) has prepared a SWOT (strengths and weaknesses and opportunities and threats) analysis for IFRS 9, which we summarize below.

Strengths. The benefits of IFRS 9 are the following:

- reduce the complexity of the classification and measurement,
- accounting is aligned with business strategy,
- extensive disclosures of the reasons for any changes in the business model,
- addressing the issues arising from the financial crisis,
- simplification of rules with measurement of derivate (Huian, 2012, p. 42),
- focus on shareholders,
- detecting the losses properly,
- comparability and standardization of accounting and of financial reporting,
- improving in consistency and transparency of reporting with global rivals,
- better access to foreign capital investment (Ghasmi, 2016, pp. 28–30).

Weaknesses. The disadvantages may be grouped into the following points:

- the introduction of new concepts (business model) that require more professional judgment and can introduce subjectivity,
- the detention of many options and a variety of financial solutions,
- does not provide a systematic approach for financial liabilities,
- does not solve questions about impairment of hedge accounting (Huian, 2012, p. 42),
- adjusting or upgrading the existing accounting systems to new calculations for IFRS 9 (Ghasmi, 2016, pp. 30, 31).

Opportunities. IFRS 9 opportunities are defined as (Huian, 2012, p. 42):

- the standard allows professional judgment in accounting decisions,
- the original classification, reclassification of certain financial assets measured at fair value at amortized cost, and vice versa,
- the completion of the second and third stages of a slower staging may allow better choices made by the standard setter.

Threats. Threats, offered by IFRS 9:

- reduces comparability due to various decisions (for example, the business model),
- too much tolerance on several topics (removal of tainting rules) that may result in choosing a certain option only to meet accounting requirements,
- the indicator of the cost-benefit ratio does not favor an early adoption of the standard,
- the cost of implementation is relatively difficult to quantify,
- earlier adoption of standard means the display of both standards in presentations and disclosures, which weakens the usefulness of financial statements,
- an approach with multiple stages creates mismatches because of new requirements or other existing rules (Huian, 2012, p. 42),
- IASB as the only standard-setter,
- the possibility that the IFRS 9 applies only to the organizations listed on the stock exchange (in 2005, at the first implementation of the standards was 7000), while around 700,000 small and medium organizations are using the national accounting standards (Ghasmi, 2016, p. 31).

In 2000 the CFA Institute distributed among its members a questionnaire on IFRS 9 (Centre for Financial Market Integrity, 2009, p. 3). The aim was to obtain opinions about the objectivity of the reform of accounting for financial instruments, a general introduction, and an evaluation of certain

standard assessment solutions by introducing a standard and the use of the fair value of assets and liabilities. Respondents pointed out that the most important goal was improvement and usefulness of accounting information about the financial instruments (p. 5).

The replacement affects accounting in organizations and it is a shift from values at historical or fair prices to fair prices and future expectations. In the European Union, more than 7,000 organizations are changing the accounting policies because they are committed to consolidating financial statements in accordance with international financial reporting standards from 2005, of which 5,323 are issuers of shares and thus committed to making statements in accordance with IFRS (Pope & McLeay, 2011, p. 1).

Fair Value Accounting

IASB introduces a fair value measurement in IFRS 9. Fair value accounting means that assets and liabilities are valued at fair value that 'represents the amount by which an asset could be exchanged between two knowledgeable, willing parties in an arm's length transaction.' Fair value accounting is defined as the mark-to-market accounting, as in the determination of the value of the account of fair prices, which are provided by the market (see http://lexicon.ft.com/term?term=fair-value-accounting).

Historically speaking, the prior of fair value accounting is accounting to the purchase price. The difference between two accountings was researched by Jones in 1988 (Emerson, Karim, & Rutledge, 2010, p. 80), who noted that the purchase price does not represent the general economic situation of complex instruments. Financial Accounting Standards Board (FASB) in the 1990's apparated Jones's predictions and introduced a standard SFAS 115, which allows classification of assets into three categories: bond investments measured to maturity at amortized cost, bond and stock investment measured in the category of trading at fair value, including unrealized gains and losses and other investments that do not fall into the first two categories, but fall within the category of available for sale at fair value but unrealized gains and losses are reported separately in the capital (Emerson et al., 2010, p. 81).

Reactions to the proposed standard were different: proponents of traditional measurement were convinced of the advantages of the measurement at the purchase price, while proponents of the fair value accounting were disappointed by the introduction of the evaluation at fair value (Emerson et al., 2010, p. 81). The introduction of the standard was the answer to the dilemma of how to evaluate and report to the securities market.

The debate in the following years focused on the introduction of the standard with the definition of fair value, which was after the FASB (Emerson et al., 2010, p. 81) 'the amount of replacement instrument between two

willing parties, except in the case of a compulsory winding-up or sales.' Researchers (Barth, Landsman, Lang, & Williams, 2013) argued that the definition is too restrictive on FASB markets where competition is limited and they pointed out that the fair value can be measured in three different ways, as (Emerson et al., 2010, p. 81):

- entry value, which is the value of the purchase, in the event of changes in price levels, as a means of replacement costs,
- the exit value, which includes the price at which the asset could be sold, and
- the value in use, which represents the incremental value that an asset provides to the organization.

FASB proposed that standards use the exit value of the financial assets on the reporting date because assets are not in the acquisition (Emerson et al., 2010, p. 82). A similar criticism came from Europe, where authors (Cristin & Pepi, 2013; Korošec, 2011; Linsmeier, 2011; Palea, 2014) pointed to both positive and negative features of the introduction of fair value accounting. Accounting at cost has a weakness in the selling of those assets, whose value increased during the period from the purchase because the carrying amount is not adapted to the increased prices (Cristin & Pepi, 2013, p. 1400). Such a failure value eliminates accounting at fair value where the assets are valued in the financial statements under the current transaction prices, which is optimal only in markets with high liquidity, but as it is in terms of lower liquidity of the asset depends on the prices realized by other players on the market (Cristin & Pepi, 2013, p. 1400).

After the year 2008 the criticism was louder and the US Congress, the European Commission, as well as banking and financial regulators around the world, debated about the fair value. Some critics argue that fair value accounting contributed to the financial crisis, others claim that the fair value of the long-term assets has no influence and potentially is not misleading if the assets are in possession to the maturity (Palea, 2014, p. 103).

The existing model of financial reporting represents a compromise between the traditional accounting and accounting at fair value, while the IASB announced an approximation of fair value, which is introduced and adopted in standard IFRS 9 since it refers to all the fair value of financial instruments (Palea, 2014, p. 104).

Reporting of fair value presents the current market situation in the organization and enables decision makers to create the usefulness and the importance of information (Palea, 2014, p. 104). Similarly, Linsmeier (2011, p. 410) defines fair value stating that fair value provides early warning for investors and regulators, due to changes in current market expectations,

when prices on the market are falling and the risk regarding financial institutions is high. The IASB uses the standard IFRS 13 to introduce the measurement of fair value and to set the definition of fair value, which refers to both assets as liabilities in the financial statements, the definition of transaction participants, pricing, and the use of non-financial assets. IASB also introduces techniques of assessing the fair value in levels from 1 to 3, where level 1 represents a fair price in an active market, while level 3 represents a fair price calculated on the basis of the models.

The former president of IASB, Mr. Tweedie, in his speech announced the end of the times when income and profits were steady, because of the existence of uneven and fragile markets (Palea, 2014, p. 104).

Impairment of Financial Assets

Impairment of financial instruments is a correction of the prices in the financial statements with the prices and conditions on the markets. Impairment of financial instruments in IAS 39 is based on incurred losses, while IFRS 9 introduces an impairment on the basis of the expected losses (Marshall, 2015, p. 15) and is the response to the problems that caused the financial crisis because of delayed recognition of impairment and losses. The model of impairment under IFRS 9 is conceptually a 'loss allowance' model, recognizing a provision for expected credit losses on financial assets before any losses have been incurred and updating the amount of expected credit losses recognized at each reporting date to reflect changes in the credit risk of financial instruments (Marshall, 2015, p. 15). Organizations in connection with impairment increase the number of assumptions and additional assessment regarding the expectations of expected credit losses (Deloitte, 2015, p. 5).

For a better understanding, we present the difference between the economic and accounting value of the loans, which is the basis for a subsequent accounting in accordance with IFRS 9 and with the calculation of expected credit losses. The economic value of the loans is the present value of future cash flows from the borrower and, when the loans are recorded on economic values, there is no need for recognition and compensation for the loss (loss allowance), because the contractual interests cover all of the expected losses for the entire period of the loan (Novotny-Farkas, 2015, p. 11). With the new circumstances, the economic value is adapted due to changes in the expected probability of default of the borrower and changes in the interest rate. The expected loss can be calculated using the following formula (Novotny-Farkas, 2015, p. 11):

$$EL_t = \sum_{(t=1)}^{N} (PD_t(I_t) \frac{LGD_t(I_t)}{(1+dr)^t}, \quad (1)$$

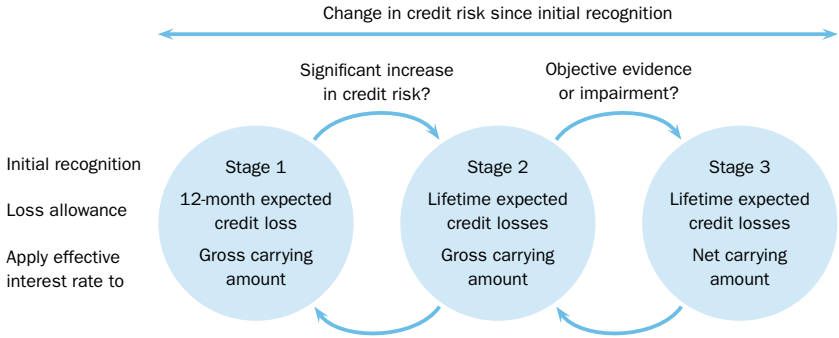

Figure 1 A General Model of the Impairment of the Financial Assets (adapted from Deloitte, 2016, p. 10)

where EL_t is expected life loss, $PD_t(I_t)$ is cumulative probability of default, $LGD_t(I_t)$ is loss given default, and *dr* is discounted rate for discounting expected cash flows; all parameters are upsized at the new information at time $t(I_t)$.

Only fair value accounting should include all expected losses arising both from changes in the credit risk (and reflects a change in PD) and from changes in market interest rates. Fair value accounting corresponds to the definition of the economic value of the loans (Novotny-Farkas, 2015, p. 11).

A model of expected credit losses is used for financial assets measured at amortized cost, and for financial assets measured at fair value through other comprehensive income and for loans and financial guarantees, which are not measured through profit and loss in accordance with IAS 17 leases and receivables IFRS 15 (Marshall, 2015, p. 15). The model of impairment in accordance with IFRS 9 is based on three stages. According to the change in credit risk, the financial instrument is placed on stage 1 or stage 2 or stage 3.

The financial asset is classified in stage 1 on initial recognition and if the instrument has low or unchanged credit risk. In accordance with IFRS 9, the 12-month expected credit loss is calculated and recognized as a provision in liability in the statement of financial position and as profit or loss in the statement of profit and loss. On the first reporting date, the organization examines whether the credit risk of the financial instrument significantly increases and, in the case of a significant increase, the lifetime expected credit risk is calculated and the financial instrument is transferred from stage 1 to stage 2. If, on the next reporting date, the credit risk significantly decreases, there is a transfer from stage 2 back to stage 1. Transfer from stage 2 to stage 3 is for those financial instruments for which there are objective facts for impairment, which standard sets. Depending on the stage, there is a different use of the annual effective interest rate for the

calculation of future cash flows (whether it is the basis for the calculation of the gross or net book value).

As shown in Figure 1, stage 1 includes financial instruments with an insignificant increase in credit risk at the reporting date or financial instruments with low credit risk. For such assets, the 12-month expected credit loss is recognized in profit or loss. A 12-monthly expected credit loss represents a credit loss of defaults that we can expect in the next 12 months after the reporting date (12-month ECL = 12-monthly probability of default × LGD × EAD). (Novotny-Farkas, 2015, p. 13) In addition, it is necessary to point out that the calculations take into account the effective interest rate at the time of recognition or purchase of the financial instrument. Comparison with IAS 39 shows that, in the case of an existing standard, interests are recognized as income without an adjustment for credit risks at purchase (Novotny-Farkas, 2015, p. 13).

Stage 2 includes financial instruments with a significant increase in the credit risk from the initial recognition or purchase, but there are no objective conditions for impairment and the lifelong credit loss is recognized in the financial statements (Novotny-Farkas, 2015, p. 13). If we compare a 12-month expected credit loss with a lifetime credit loss, we can expect several (maybe more than 10-fold) increases in provisions.

Stage 3 includes financial instruments with an objective factor of impairment on the reporting date and the lifetime credit loss is recognized (but prior to the actual default), and this is before as it is in accordance with IAS 39 (Novotny-Farkas, 2015, p. 13).

The difference between stage 2 and stage 3 refers to the recognition of interest income. In stage 3 the calculation is based on the adjusted value of gross book value less net claims adjustment, similar to IAS 39 (Novotny-Farkas, 2015, p. 13).

A three-staged model of impairment on the basis of the expected credit losses is an approximation of fair value accounting and the economic value of the loans.

How the organization defines the significant change of credit risk can be assumed from a questionnaire carried out by Deloitte. 41% of the bank questioned are defining as a trigger the missed payments and 35% the change in in the rating (Deloitte, 2015, p. 6) Additionally, 60% of banks replied that they use the existing models of impairments, used for the calculations of capital adequacy according to Basel (Deloitte, 2015, p. 11). At the same time, however, they see the biggest challenge in the data.

In terms of assets, which fall into the measurement model FVTPL, impairment has never been the subject of debate. IFRS 9 introduces a new model of impairment from events in the past to a forward-looking expected loss model (KPMG, 2015, p. 4). Calculations at each reporting date are

more detailed and require a comprehensive review of the existing portfolio of the organization. The new model introduces impairment the day after purchasing a financial instrument (Deloitte, 2016, p. 4). Let me cite as an example that of one organization purchasing assets in the amount of 100 euros, but, as a result of fair value accounting using expected loss, it recognizes only the amount of 90 euros in the statement of financial position (100 euros of assets and 10 euros of provisions for expected credit loss, although the price is still 100).

The new model of impairment on the basis of the expected credit losses assumes that organizations are able to evaluate the expected credit losses and on the reporting date verify a significant increase in credit risk (KPMG, 2015, p. 4).

The model of expected credit losses approaches generally uses double measurement (the credit loss is recognized in the price and then in the impairment).

Changes in the Decision-Making of the Organization

Despite the similarities in the categories of measuring for financial instruments under an existing and new standard, standards are different and this change arises mainly in the processes of decision-making within the organization. All financial instruments should be assessed on the basis of their cash flows and/or business model in which they are placed (KPMG, 2015, p. 2).

At the time of recognition of a financial asset, the organization uses the decision tree (Figure 2) that allows the classification of assets in the relevant business model. Differences exist in equity and debt securities.

Investments in equities primarily serve the objectives of the business model, either through profit or loss (FVTPL) or through other comprehensive income (FVOCI). Then the organization has to check whether the investment supports the liability or surplus. For those investments that are classified as available for sale in accordance with IAS 39 the decision on the classification is complex. Such an equity might be classified in FVTPL (all changes in fair value are measured in profit and loss accounts) or, if it is not intended for trading, also in FVOCI. The FVOCI business model represents an obstacle because the decision for the classification is irrevocable and all gains and losses that are recognized in the other comprehensive income remain in the OCI and are not recycled in profit or loss, even if the asset is sold (KPMG, 2015, p. 3). Organizations are likely to select the classification of equities in FVTPL where changes in fair value are recognized in profit or loss (KPMG, 2015, p. 3).

Investments in bonds or debt securities generally fall into two categories: the amount being used to back policy liabilities (the majority of the invest-

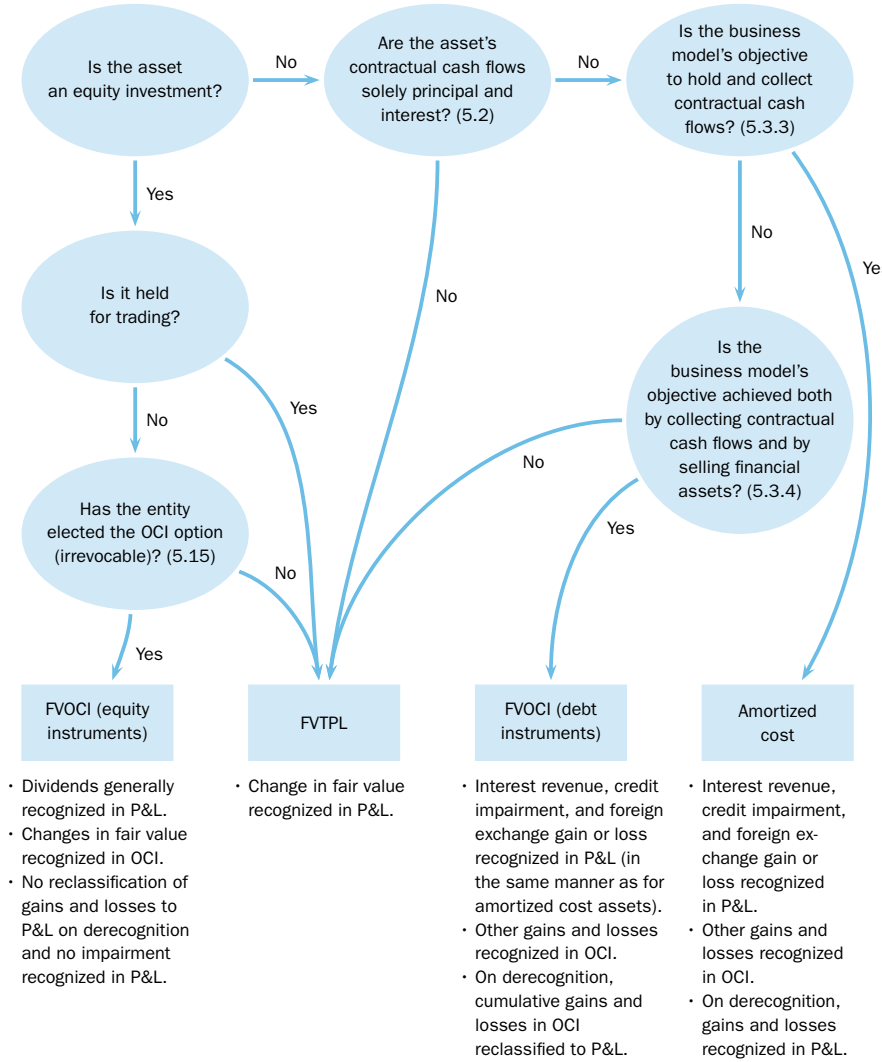

Figure 2 Decision Tree for Financial Instruments at the time of Recognition in Accordance with IFRS 9 (adapted from KPMG, 2015, p. 2)

ment) and the amount being used to back surplus (the amount remaining after investment assets having been matched with policy liabilities/potential claim payouts) (KPMG, 2015, p. 3). Classification is the business model of amortized cost (AC) or through other comprehensive income (FVOCI) or in the business model through profit or loss (FVTPL). If the bond is placed in the business model for the collection of cash flows without selling, the SPPI-test has to be made (business model of AC or FVOCI). If the test is

passed the bond can be classified in the AC or FVOCI. If the bond does not pass the test, the business model of FVTPL is chosen. The organization has to consider other factors that affect the decision on the classification of the bonds (maturity of liabilities, the nature of the obligation, etc.).

According to the current standard, the loans and receivables are measured held to maturity, and also in accordance with IFRS 9, the loans and advances are classified in amortized cost (Linsmeier, 2011, p. 409).

Conclusions

The lack of prudence is the basis for criticism of the existing standard of IAS 39, which is based on the perception that the IFRS allows greater lending and credit expansion, unrealized profits and unwarranted bonuses and dividends (D'Alterio, 2012), but the academic research in the years after the crisis, which is summed up by the Basel Committee, shows that there is no evidence to support the statement that fair value accounting should have triggered, or even extended, the financial crisis.

Similarly, if we compare the financial statements of the failed banks with information in theirs' audited annual reports, we can see that even auditors had difficulties with the impact on liquidity and the functioning of the organization because the last audit reports were positive (Hollow, Akinbami, & Michie, 2016, p. 298). In the United States in 2009, 140 banks failed, of which 120 publicly released financial statements from which is apparent that they were in accordance with the regulation of the relevant capital (Linsmeier, 2011, p. 409).

Fair value accounting should not only recognize the unrealized gains but should also require early recognition of expected losses (D'Alterio, 2012). Additional professional literature in the field of early recognition of future accounting losses estimates as crucial even for the supervisory institutions that can carry out the corrective action at the time and not with delay (D'Alterio, 2012). The fair value accounting identifies changes in the overall credit risk exposure and the changes in interest rates, which are among the key risks to which financial organizations are exposed (Linsmeier, 2011, p. 414).

The replacement of the standard that determines financial instruments is a challenge for organizations, as there is a shift from looking back to forward-looking. Even if the organization purchases the debt instrument at the market at the fair price, it should still calculate the expected credit loss on the day after the purchase.

Increased confidence in financial markets, a greater the independence of financial institutions and a greater complexity of business and organizational structures before the crisis contributed to various decisions that were based on a variety of technical accounting solutions (Hollow et al., 2016,

p. 299), but lost confidence can be returned with the help of the qualitative characteristics of IFRS standards, which include the importance of the reliability of the presentation, comparability, verifiability, timeliness, and understandability of the accounting data presented (International Accounting Standards Board, 2010, p. 16).

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Does Education Matter for Entrepreneurship Activities? The Case of Kosovo

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Based on the innovation and technology progress, it is expected that in the near future there will be an increasing trend of jobs that require high qualifications. There is a debate whether education is significantly increasing probabilities of earning higher wage for employees or whether higher education will increase probabilities of entrepreneurship performance. In post-conflict countries, entrepreneurial education does not have a significant impact on entrepreneurship performance, especially in Kosovo due to different factors. First, due to the structure of enterprises, as most of the enterprises are involved on trade activities; second, due to the level of macroeconomic development and, third, due to the lack of involvement of enterprises in EU knowledge and innovative projects, such as Erasmus and Horizon 2020. By using a probit model this paper analyses several factors, such as level of education, gender, marital status and health, for the case of Kosovo. Finally, it confirms empirically that currently the level of education does not seem to play an important role on entrepreneurship performance compared to other factors, such as gender and marital status.

Keywords: entrepreneurship, education, transition, knowledge management, innovation

Introduction

According to Kirzner's (1973) theory, entrepreneurship requires a very special type of knowledge: the kind of knowledge required is that the entrepreneurship knows where to look for knowledge. The word that most closely captures this kind of knowledge seems to be alertness. It is true that 'alertness' may also be hired, but someone who hires an employee in order to alert about the possibilities of discovering knowledge has himself displayed knowledge of a still higher order. Entrepreneurial knowledge maybe described as the highest order of knowledge.

Furthermore, Kirzner (1973) added that entrepreneurs are considered to be the most alert persons in society. They can learn from wrong decisions or by not perceiving the best opportunities. He added that, once the profit opportunity is discovered, one can capture the associated profit by innovating, changing and creating. However, being able to act upon profit

opportunities adequately requires additional qualities such as creativeness and leadership (Kirzner, 1973).

In their analysis, Klein and Cook (2005) found that Shultz conceives entrepreneurial ability as a form of human capital. This ability can be increased through education, training experience, health care, etc. In addition, with regard to education, Schultz (1971) pointed out that education is an investment in knowledge and, as a consequence, it increases labour productivity.

The first studies to investigate the economic effects of knowledge investments revealed the positive influence of human capital on growth for individuals, firms and nations (Schultz, 1971). In their seminal works, Becker (1975) and Schultz (1969) stress that human resources are a major production factor and therefore contribute in large proportion to the increase in productivity. Empirical testing of the endogenous growth theory showed that economies with higher percentages of well-educated employees were those that exhibited higher rates of growth (Schultz, 1993).

Modern economic theories differ in three ways compared to the classical, neoclassical and Austrian theories described above. First, individuals do not have to be entrepreneurs if this does not offer them the greatest expected utility, which means they will be based on utility maximisation. The second issue is that, before entering into entrepreneurship, entrepreneurs face the occupational choice as a continuous process. Some economists inspired by these conceptual differences therefore rekindled the idea of a specific entrepreneurial activity and started looking for an indicator of abilities in human capital general education and experience (Calvo & Wellisz, 1980; Lucas, 1978).

In this paper the impact of individual factors on entrepreneurship activities in transition countries such as Kosovo is analysed as a specific environment that experienced long-term political and socio economic challenges, such as unemployment, educational defies, low managerial experience and other crucial factors for entrepreneurship growth.

Literature Review

In his model, Lucas assumed a closed economy with homogenous capital, and a workforce that is homogenous with respect to productivity in paid employment, but heterogeneous regarding managerial ability in entrepreneurship. He took into consideration wage experience and education as factors that affect entrepreneurial abilities. He believes that incentives to become an entrepreneur are the strongest for individuals who have accumulated managerial talent through work experience and education. Regarding outputs or rewards, Lucas pointed out in his model that wages are similar for all workers regardless of their entrepreneurial ability, but, on the con-

trary, rewards for entrepreneurship are based on individual entrepreneurial ability. Thus, greater ability translates into higher outputs. Lucas also introduced into his model the concept of marginal entrepreneur. A marginal entrepreneur is indifferent to becoming an entrepreneur or being an employee. An individual with greater ability than a marginal entrepreneur enters into entrepreneurship, while the others with a lower ability become workers.

The model by Calvo and Wellisz (1980) further develops the Lucas model and introduces technological change, which affects the age and human capital expected from an entrepreneur. According to Calvo and Wellisz (1980), the returns to employment and entrepreneurship given a level of entrepreneurial ability are known *ex-ante*. This assumption was not supported by Card (1999), who in his empirical studies reported that individuals seem to be choosing between the expected returns from either profession choice and not from a given wage or profit equation. Mainly based on Calvos' model, a higher accumulated level on education should increase the probability of an individual engaging in entrepreneurial activity. In the model of Calvo and Wellisz (1980), the individual should possess an ability regarding productivity-enhancing technological information. An individual's output is assumed to grow through time given the stock of knowledge. Thus the greater the individual's learning ability or the faster the individual learns, the more they produce. According to Parker (2004), Calvo and Wellisz (1980) showed that in a steady-state equilibrium the greater the growth rate in the total stock of knowledge and, therefore in the potential output, the more able the marginal entrepreneur is. Hence, given a fixed distribution of ability, the smaller is the number of entrepreneurs and the larger is the average firm size. Making ability two-dimensional, individuals are characterised by youth and ability. Calvo and Wellisz (1980) also reported that faster technological progress leads to an equilibrium outcome where older, less able entrepreneurs are replaced by younger and inherently more able entrepreneurs. This result reported by Calvo and Wellisz (1980) provides a rationale for Lucas' prediction of ever-declining entrepreneurship and ever-increasing average firm size. The Calvo and Wellisz (1980) model is *ad hoc* and partial equilibrium in nature, and ideally a general equilibrium analysis of both occupations is needed to fully understand the impact of technological change on entrepreneurship. Generally, this model assumes that heterogeneous abilities generate heterogeneous returns only in entrepreneurship, while returns in paid-employment are assumed to be invariant to ability. Furthermore, Calvo and Wellisz (1980) conclude that age and education should be determining characteristics of entrepreneurs and wage experience should be lees important. He assumes that an analysis of entrepreneurs and non-entrepreneurs should show that the group

of entrepreneurs should possess a high level of education, high risk and less experience. Bae (2014) extended the analysis on the impact of entrepreneurship education on entrepreneurship intensions followed by Martin, McNally, and Kay (2013), who found a statistically significant relationship between entrepreneurship education and human capital outcomes respectively, and a positive correlation between entrepreneurship education and entrepreneurial intentions. Further literature evaluates the impact of entrepreneurship education on curricula activities analyzed by Jones, Maas, and Newbery (2017).

The Impact of Education, Gender, Age, Marital and Health Status on Entrepreneurship Activities

In this part, the paper describes the role of specific factors such as: education, gender, marital status and health on entrepreneurship performance by exploring different theories and approaches. There is different evidence describing the role of the above mentioned factors in entrepreneurship activities. These factors, such as individual and psychological, sociological and institutional factors, are analysed by different authors (Djankov, Qian Roland, & Zhuravskaya, 2005, 2006a, 2006b) along with financial constraints and labour market experience (Demirgüç-Kunt, Klapper, & Panos, 2008).

Education

There is evidence that education improves individuals' future earning and overall success (Angrist & Krueger, 1999). On the one hand, more educated people are better informed about business opportunities and might select occupations in which entrepreneurship is more common. On the other hand, the skills needed for entrepreneurship are different from those provided by formal education. They are generally regarded as relatively original persons who may have learned their business skills without too much formal education. There is some evidence suggesting that for highly educated people wage-based work tends to be a more attractive choice compared to self-employment. According to Lucas (1978), highly educated people earn more as employees than they would if they employed themselves. According to Bloodgood, Sapienza, and Almeida (1996), entrepreneurs provide a variety of tangible and intangible resources to an organisation. These include several types of human capital, management know-how and the ability to acquire financial capital (Cooper, Gimeon-Gascon, & Woo, 1994). Also, if education is seen as a screening device, then entrepreneurs have fewer incentives to acquire formal education.

Empirically, however, most studies have found positive effects of education on self-employment. In general, a higher education of self-employed

people should improve the growth opportunities of their firms because higher education improves the ability to comprehend market prospects, better exploits market demand, enhances the awareness of risk and improves adaptability in changing circumstances. Pekkalas and Kangasharju (2001) analysed the success of the self-employed and their firms in a period of economic downturn (1990–1992) in Finland and reported that in an economic downturn a higher level of education raises the probability of survival. The impact of education on self-employment depends on the industry in which someone is self-employed. Bates (1995) found significant and positive effects of education on the probability of commencing self-employment in skilled services, significant negative effects on the probability of commencing self-employment in construction and insignificant effects on the probability of commencing self-employment in wholesale and manufacturing activities. In 2002, Lazear proposed a 'jack-of-all-trades' model of entrepreneurship, suggesting that individuals with a wide variety of skills are more likely to become entrepreneurs, while those who specialise are likely to pursue wage-based work.

A UNDP survey for Kosovo (United Nations Development Programme 2005) reported that the education system in Kosovo does not offer proper knowledge and skills to young generations in order to prepare them in line with market economy requirements. They proposed that vocational education and training could help young generations adapt to the labour market. Based on this report, expectations are low that education will be a significant factor in supporting entrepreneurship and self-employment activities in Kosovo.

Gender

Gender differences concerning entrepreneurial characteristics have received considerable attention in recent years (Buttner, 1993). This attention is due to gender discrimination that puts women in a disadvantageous position, thereby creating a gap in the supply of entrepreneurs (Fisher, Reuber, & Dyke, 1993). By analysing self-employment in Bosnia and Herzegovina, Demirgüç-Kunt et al. (2008) found that gender determines entry into self-employment. Men are more likely to commence entrepreneurship activity than women. Bellu (1993), as well as Chagnati and Parasuramman (1996), suggest that there are few differences between male and female entrepreneurs.

In terms of the psychological traits associated with entrepreneurial performance and success, researchers have obtained mixed results. Master and Meier (1988) found no difference between a sample of male and female entrepreneurs in their risk-taking propensity. On the contrary, Sexton and Bowman-Upton (1990) reported that females score lower on traits re-

lated to energy level and risk-taking and higher on traits related to autonomy and change represented by exceptions. Mathews and Moser (1995) found that males showed a higher level of interest than females in small businesses ownership. Scherer, Brodzinski, and Wiebe (1990) also found that males have a stronger preference for entrepreneurship than females.

Age and Experience

It is generally argued that older and more experienced people are more likely to become self-employed. Namely, older people have had time to build networks and have been learning long enough about the business environment so that can more easily identify profitable opportunities in entrepreneurship (Calvo & Wellisz, 1980). Further, older people are more experienced and possess more of the human and physical capital requirements needed for entrepreneurship (Lucas, 1978). Lucas also pointed out the role of the capital that older people have accumulated over the years and that can be used to set up a business and overcome financial constraints. Since entrepreneurs possess greater control over the amount and pace of their work, entrepreneurship is probably better suited to older people. On the other side, entrepreneurs are less risk-adverse people and need to work longer hours, which, according to Miller's (1984) 'job shopping' theory, suit younger workers better. Empirical studies usually find a concave relationship between the occurrence of self-employment and age and experience. Cowling (2000) and Global Entrepreneurship Monitor (2002) found that self-employment is concentrated among individuals mid-career aged between 35 and 44 years. Most econometric studies have found a significant positive relationship between age and self-employment. In their studies in the USA, van Praag and van Ophem (1995) found that for older people the opportunity to become an entrepreneur was significantly greater compared to younger people. Blanchflower, Oswald, and Stutzer (2001) supported these results with a finding that the actual number of those choosing self-employment increases with age.

Marital Status

Spouses and other family members can provide cheap labour and assistance. They can also provide emotional support, are more trustworthy workers and are less likely to shirk (Borjas, 1986). Based on the argument above, one might expect a positive relationship between marital status and self-employment. However, people who are married with children are generally less likely to take a risk and hence less suited to commence self-employment. Cross-sectional econometric evidence reveals that self-employed people are significantly more likely to have been married with dependent children (Devine, 1994; Cowling & Taylor, 2001).

Health Status

The relationship between self-employment and health is ambiguous. On the one hand, entrepreneurship is generally associated with greater flexibility and so is more suited to less healthy people. On the other hand, work hours and stress are on average greater for the self-employed and so they are less suited to people with poor health. Also, employees generally receive health cover while the self-employed must provide their own. According to Curran and Burrows (1989), evidence from the UK suggests that self-employed men have slightly better health than male employees, while self-employed females are less healthy than their employee counterparts. On the contrary, American studies such as that by Fredland and Little (1981) showed that mature American self-employed workers have significantly poorer health than employees. The evidence based on a probit analysis is hence mixed.

The Impact of Education on Entrepreneurship Development in the EU

According to the European Commission (2011), in 2000 around 22% of the jobs required higher qualifications and higher education, while 29% of the jobs required lower qualifications. Based on these projections, there will be a changing trend: by 2020, around 35% of the jobs will require higher qualifications.

The high-tech sector, i.e. sectors with a large proportion of high-skilled jobs, represented 5.5% of total employment and about 8% of EU's GDP in 2009. The sector has grown much more rapidly than the rest of economy (4.1% versus 1.8%) and it has created 1.4 million jobs between 1995 and 2009. This is particularly the case for high-tech services such as telecommunications, computer services and research & development. With regard to the comparison of EU, US and other countries, currently in the EU, only about one person in three aged 25–34 has completed a university degree, compared to well above 50% in Japan and more than 40% in the US. Canada, Australia and South Korea all do better than the EU. About 80 million people in the EU have only low or basic skills. More access to training could help reduce this, but actual participation is stagnating. Participation is highest for the youngest, the most educated and the employed, and is thus lowest amongst groups needing training the most. Beside the internal factors such as education and qualifications the external characteristics are very crucial for the entrepreneurship development, therefore, entrepreneurs in many EU member States still face important barriers, such as regulatory and administrative capacity, administrative burden for start-ups and barriers to competition, that slow economic growth. The Small Business Act for Europe (Commission of the European Communities, 2008) as a framework for entrepreneurship development is monitoring the policy environment for the SMEs in the EU but also in Western Balkan countries. EU SMEs still

face market failures undermining the conditions in which they operate and compete with other players in areas like finance (especially venture capital), research, innovation and the environment. For example, about 21% of SMEs indicate that accessing finance is a problem and in many EU countries the percentage is much higher for micro-enterprises. Also, fewer European SMEs innovate successfully when compared to large businesses. The situation is worsened by structural difficulties such as the lack of management and technical skills, and remaining rigidities in labor markets at national level.

According to the Small Business Act for Europe (Commission of the European Communities, 2008) the EU countries should promote innovative and entrepreneurial mindsets among young people by introducing entrepreneurship as a key competence in school curricula, particularly in general secondary education. It should ensure that it is correctly reflected in teaching materials and that the importance of entrepreneurship is correctly reflected in teacher training and in step-up cooperation with the business community in order to develop systematic strategies for entrepreneurship education at all levels. It should also ensure that taxation does not unduly hamper the transfer of businesses put in place schemes for matching transferable businesses with potential new owners provide mentoring and support for business transfers provide mentoring and support for female entrepreneurs provide mentoring and support for immigrants who wish to become entrepreneurs.

Methodology

The empirical analysis consists as follows: first, descriptive statistics are used. In the second part of the empirical analysis, regression analyses, such as Probit analyses, are used. According to Johnston and DiNardo (1997), a probit model has a 'behavioural interpretation' that is instructive and often analytically convenient.

According to Greene (2003), logit and probit models should always be used instead of regression techniques when the dependent variable is binary. Probit models are used to explain the selection into survival in entrepreneurship. Based on that (y) might be the outcome; whether an individual decides to be an entrepreneur or an employee, or whether an entrepreneur survives in entrepreneurship or exits the sector. On the contrary, (x) would be vector covariates such as personal characteristics or institutional characteristics etc.

With regard to empirical analysis, a questionnaire is employed comprising a random sample of 100 respondents, entrepreneurs in Kosovo, in order to measure the impact of education, gender, marital status, and health on entrepreneurship. Cross-sectional data is used in order to examine the de-

Table 1 Age, Gender, Marital Status, Education and Health Characteristics

Variables	Entrepreneurs	*p*-value test	Significance
Age	40.0	0.000	***
Male (%)	92.5	0.000	***
Married (%)	91.0	0.000	***
Education (number of years of education)	8.1	0.760	
Health (good or very good health)	72.3	0.000	***

Notes *** $p < 0.001$

Table 2 Individual Characteristics

Individual characteristics	Probit
Age	0.322 [0.143]
Male	0.361 [0.051]***
Health	0.026 [0.054]
Married	0.232 [0.052]***
Education	0.005 [0.060]

Notes *** $p < 0.001$

terminants of entrepreneurs. The important methodological issues in this research are the design of the questionnaire, the sampling frame and the data collection process.

The individual characteristics are proxied by age, marital status, gender, education and health. This paper briefly describes each of them. Age: denotes the year of birth of a respondent. Marital status: the variable has a value of 1 if a respondent is married, otherwise it equals 0. Gender: if a respondent is male, the variable equals 1, otherwise its equals 0. Education: the variable is equal to the logarithm of the number of years of education. Health: the variable equals 1 if a respondent evaluates his/her health situation as very good and good, otherwise it equals 0.

In addition, Table 2 describes the similar characteristics of entrepreneur's respectively individual characteristics by using probit analysis in order to compare them as well as to confirm the results of descriptive statistics.

According to the KOSME analysis and statistics, Table 3 represents the structure of enterprises in Kosovo according to the sectors and number of enterprises, and therefore the insolvent of enterprises in different sectors of the economy (Kosova SME Promotion Program 2014).

Interpretation of the Results

From Table 1, the paper summarises that, with regard to gender in Kosovo, entrepreneurs are mostly men, aged around forty years, and married. On average, they have had almost 10 years of education and are in relatively good health. The paper extends the analyses by using a Probit analysis in

Table 3 Enterprises According to the Economic Sectors in Kosovo

Economic Sectors	Number	Percentage
Production	4,825	10.5
Construction	3,289	7.1
Trade	19,672	42.7
Transport	2,602	5.7
Accommodation	3,499	7.6
Services	4,716	10.2
Personal services	4,376	9.5
Other sectors	3,053	6.6
Total	46,032	100.0

Notes Adapted from Kosova SME Promotion Program (2014).

order to confirm the previous results, therefore entrepreneurs from Kosovo have a higher probability of being married men and more optimistic (happy). Furthermore, with regard to the analyzed factors such as education, gender, age and marital status, the paper can conclude the following:

The education system in Kosovo does not offer adequate knowledge and skills in order to adopt them in line with labour market and entrepreneurship challenges. With regard to marital status in Kosovo, families take care of their children and young adults not only because of tradition but also due to economic dependence. This factor could motivate or push parents in Kosovo to intensify their entrepreneurship activities due to financial responsibility for their children.

Based on this evidence, it seems that females in Kosovo have a weaker preference for entrepreneurship activities than males due to the extreme business environment, lack of financial support and unfair competition. According to age, the new generations are transferring from school to the labour market. In Kosovo, it is very difficult to successfully achieve good performance due to the lack of practical skills offered by school programmes. Therefore, adequate experience or human capital is needed to induce and intensify entrepreneurship.

Furthermore, the structure of the enterprises in Kosovo explains why education is not a significant factor for entrepreneurship activities: taking into consideration that most of the enterprises are involved on trade (around 42.7%), construction and accommodation (around 15%), these sectors engage low educational background of entrepreneurs and employees. Only around 20% of entrepreneurs are involved on services and production activities. These sectors are expected to possess higher profile of educational background and specific knowledge of entrepreneurs. According to the Small Act Business report, the main challenges for the Western Balkan countries are revealed by the relatively small size of SMEs and their lack of

innovation and internationalization. Therefore enterprises tend to be local market-oriented.

Conclusions

Entrepreneurship development can contribute to increasing competitiveness, attracting foreign direct investments, as well as increasing employment and economic prosperity. Trade liberalization and regional integration gives access to larger markets for Kosovo enterprises but, at the same time, the EU market requires high level of services. Therefore Kosovo entrepreneurs lack a high level of education and knowledge.

The main conclusion of this paper is that entrepreneurs in Kosovo differ from other countries, as Kosovo is a region that in the last few decades has experienced adverse political and socio-economic conditions and has been unable to achieve substantial development. In this environment, entrepreneurship has not proceeded in a growth-oriented approach. As a consequence, Kosovo entrepreneurs could be accepted as predominantly trade-oriented, ready to take local market advantages, engaged in the trade sector and less engaged in small production activities and EU markets. They could be accepted as necessity entrepreneurs ready to perceive profit opportunities – the Kirzner-type of entrepreneur.

Kosovo entrepreneurs use redistribution effects of the local economy, are ready to undertake risk and new ventures, but are less prepared to compete at the international level. The Kosovar entrepreneur is an imitator rather than an innovator.

Taking into consideration the current level of education and its low impact on entrepreneurship, vocational education and training could help young generations adapt to the labour market and entrepreneurship activities.

Considering these factors, but also future challenges and opportunities such as engagement on regional and EU market, involvement on EU projects requires an increase in the educational and knowledge background of Kosovo entrepreneurs in order to adapt to a 'creative destruction' of the global market.

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Abstracts in Slovene

Individualni, tehnološki in organizacijski napovedovalni kazalniki izmenjave znanja v norveškem kontekstu

Kristin Spieler in Velibor Bobo Kovač

Organizacijska izmenjava znanja (OKS) predstavlja razločno podpolje v teoriji upravljanja znanja. Ta študija prevzema kvantitativni pristop in poroča o podatkih, zbranih v srednje velikem industrijskem podjetju na Norveškem. Namen študije je opredeliti dejavnike, ki so pomembni za OKS, in preučiti njihov relativni vpliv na prakse izmenjave znanja. Predstavljena analiza OKS vključuje osebne (npr. osebnostne dispozicije), tehnološke (t.j. tehnološke pripomočke) in organizacijske (t.j. socialno podnebje) spremenljivke. Rezultati postopne hierarhične regresije podpirajo predhodno raziskavo, da so posamezne dispozicije, tehnološke komponente in organizacijske spremenljivke pomembni napovedovalni kazalniki OKS. Razprava o rezultatih se osredotoča na razmerje med napovedovalnimi kazalniki glede posrednih učinkov in njihovim relativnim vplivom na OKS. Preučujejo se tudi omejitve in posledice sedanjega dela.

Ključne besede: izmenjava znanja, tehnologija, osebnost, organizacijska klima, norveški kontekst

IJMKL, 6(1), 5–26

Ocena zdravja poslovnega ekosistema: prispevek sidrnega akterja v fazi oblikovanja

Tuomas Lappi, Tzong-Ru Lee in Kirsi Aaltonen

Koncept poslovnega ekosistema prenaša ideje iz ekoloških ekosistemov v analizo kompleksnih omrežij. Poslovni ekosistemi se pojavljajo bodisi kot upravljane pobude bodisi organsko, na njih pa vplivajo notranje ali zunanje spodbude. Oblikovanje ekosistemov je nepredvidljivo in predstavlja izziv za nadzor prenosa sprednjega dela projekta v operativni ekosistem. Tema te raziskave je, kako oblikovati zdrav poslovni ekosistem. Določa okvir za analizo oblikovanja in uvaja koncept sidrnega akterja kot vlogo, ki vodi oblikovanje. Ocena zdravja ekosistemov prek akterjev in povezav zagotavlja informacije za podporo oblikovanja ekosistemov. S študijo primera na tajvanskem področju zdravja in dobrega počutja ta raziskava prikazuje, kako je mogoče identificirati sidrne akterje in kako le-ti prispevajo k nastajanju ekosistemov. Raziskava na podlagi prispevka sidrnih akterjev določa model za oceno zdravja ekosistemov. Praktiki lahko uporabijo ugotovitve, da olajšajo nastajanje ekosistemov in spremljajo njihovo zdravje. Ta raziskava prispeva k literaturi poslovnih ekosistemov in poslovnih mrež z uvedbo sidrnega akterja kot pomembne vloge pri oblikovanju ekosistemov in s predstavitvijo, kako je mogoče oceniti zdravje ekosistemov.

Ključne besede: poslovni ekosistem, oblikovanje ekosistemov, sidrni akter, zdravje ekosistemov, oblikovanje poslovne mreže

IJMKL, 6(1), 27–51

Predlagani model za merjenje uspešnosti sodelovanja med univerzami in industrijo pri odprtih inovacijah

Anca Draghici, Larisa Ivascu, Adrian Mateescu in George Draghici

Namen prispevka je predstaviti znanstveni pristop k oblikovanju, preizkušanju in vrednotenju modela za merjenje uspešnosti sodelovanja med univerzami in industrijo (UIC). Osnovna ideja procesa načrtovanja je izkoristiti obstoječe dejavnike uspeha, spodbujevalce in priložnosti (motivacijske dejavnike, kanale za prenos znanja in opredeljene koristi) in zmanjšati ali preprečiti morebitne grožnje in ovire, ki bi lahko ovirali takšno sodelovanje. Glavni namen uporabljene metodologije je prepoznati rešitve in ukrepe za premagovanje pomanjkljivosti, konfliktov ali tveganj in olajšati odprte inovacije industrijskih podjetij in univerz. Sprejeta metodologija se razlikuje glede na dve perspektivi: (1) poslovni model, ki odraža univerzitetno perspektivo, skupaj s seznamom ključnih kazalnikov uspešnosti (KPI); (2) model merjenja uspešnosti (vključno z merili uspešnosti in kazalniki) in z njim povezano metodologijo (prilagojeno reviziji), ki bi lahko podjetjem pomagala povečati sodelovanje z univerzami v okviru odprtih inovacij. Poleg tega je bilo za uresničitev predlaganega modela (olajšanje praktičnega izvajanja) ustvarjeno orodje Excel za pomoč pri prepoznavanju potencialnih virov inovacij. Glavni prispevki raziskav se nanašajo na širjenje znanja UIC-jev za povečanje odprtih inovacij in opredelitev učinkovitega modela in instrumenta merjenja uspešnosti (preizkušen in potrjen s študijo primera) za podjetja.

Ključne besede: univerza, industrija, sodelovanje, upravljanje znanja, model uspešnosti

IJMKL, 6(1), 53–76

Evropska kohezijska politika in strukturni skladi v redko poseljenih območjih: študija primera Univerze v Oulu

Eija-Riita Niinikoski, Laura Kelhä in Ville Isoherranen

Regionalna politika je ena glavnih naložbenih politik Evropske unije za podporo regionalne enakosti in konvergence, kohezijska politika pa je eno od njenih ključnih političnih področij in je namenjena podpori ustvarjanja delovnih mest, konkurenčnosti podjetij, gospodarske rasti, trajnostnega razvoja in kakovosti življenja državljanov. Kohezijski in strukturni skladi obsegajo skoraj tretjino celotnega proračuna EU. Ker so izobraževanje, raziskave in inovacije med glavnimi cilji teh politik, igrajo univerze pomembno vlogo pri regionalnem razvoju, raziskavah in izobraževanju, ki so njihova glavna naloga, medtem ko je medsebojno delovanje z družbo njihova tretja naloga. Namen te študije je preučiti, kako univerze sodelujejo v kohezijski politiki in regionalnem razvoju z

uporabo strukturnih skladov pri izpolnjevanju svoje tretje naloge (RQ1) in kako skupine najbližjih nosilcev interesov vidijo regionalno vlogo univerze (RQ2). Izvedena je bila študija enega primera, pri čemer je bil Oulu Southern Institute (OSI) Univerze v Oulu enota študije primera. Podatki so bili zbrani z uporabo prilagojene metode Delphi v delavnici z osebjem OSI, iz spletnega vprašalnika za najbližje nosilce interesov OSI in iz poglobljenih intervjujev, da bi preučili teme, ki so se pojavile v odgovorih vprašalnikov. V rezultatih je jasno razviden pomen univerzitetne enote za regionalni razvoj. Strukturni skladi so glavna orodja univerz za spodbujanje razvoja; univerza je bila obravnavana kot ključni akter, ustvarjalec znanja, sodelovalni partner in regionalni razvijalec ter temeljni del regionalnega inovacijskega sistema. Za praktike in zainteresirane akademike bodo ti rezultati morda koristni. Glede na ugotovitve bi morala univerza sodelovati pri priporočanju razvojnih področij smernic kohezijske politike za naslednje obdobje strukturnih skladov.

Ključne besede: evropska kohezijska politika, regionalni razvoj, strukturni skladi, redko poseljena območja, tretja naloga univerz

IJMKL, 6(1), 77–96

Koristi proizvajalcev, ki izhajajo iz njihovega sodelovanja s ključnimi trgovci na drobno v okviru poslovnih modelov: analiza grozdov

Marzanna Witek-Hajduk in Tomasz Marcin Napiórkowski

Namen te študije je preučiti, ali bi bilo mogoče med proizvajalci trajnih proizvodov, ki delujejo na Poljskem, razlikovati med grozdi glede na moč koristi, pridobljenih pri njihovem sodelovanju s ključnim trgovcem na drobno. Cilj tega člena je tudi preveriti, ali bi se lahko ti grozdi razlikovali glede na poslovne modele, ki jih uporabljata obe strani. Z metodo CATI so bili zbrani podatki 613 anketirancev, ki so bili združeni v 5 skupin. Ustanovljeni grozdi so se izkazali za statistično različne v smislu proizvajalčevega poslovnega modela. Z vidika proizvajalca pa so se te razlike izkazale za slabe napovedovalce skupne ravni pridobljenih koristi.

Ključne besede: poslovni model, trg trajnih potrošnih dobrin, sodelovanje, kooperativna konkurenca, analiza grozdov, odnosi med proizvajalci in trgovci na drobno

IJMKL, 6(1), 97–114

Primerjava MRS 39 in MSRP 9: analiza zamenjave

Mojca Gornjak

Finančna kriza je vplivala na mednarodne standarde računovodskega poročanja. Upravni odbor za mednarodne računovodske standarde (UOMRS) je pripravil nov standard za finančne instrumente. Zamenjava spreminja pogled na računovodske podatke v računovodskih izkazih in spreminja pogled na podatke v organizacijah, zlasti v bankah, in finančnih institucijah. Zgodovinske cene so nadomeščene s pričakovanji v prihodnosti, kar ni več odločitev vodstvenih delavcev, temveč temelji na poslovanju.

Ključne besede: mednarodni standardi računovodskega poročanja, MSRP 9, pričakovana izguba kredibilnosti, poslovni model, oslabitev

IJMKL, 6(1), 115–130

Ali je izobraževanje pomembno za podjetniške dejavnosti? Primer Kosova

Gazmend Qorraj

Na podlagi napredka na področju inovacij in tehnologije se pričakuje, da bo v bližnji prihodnosti naraščal trend delovnih mest, ki zahtevajo visoko usposobljenost. Razpravlja se, ali izobraževanje bistveno povečuje verjetnosti zaslužka višje plače za zaposlene oziroma ali bo višja izobrazba povečala verjetnost uspešnosti podjetništva. V post-konfliktnih državah podjetniško izobraževanje zaradi različnih dejavnikov ne vpliva pomembno na uspešnost podjetništva, zlasti na Kosovu. Prvič, zaradi strukture podjetij, saj je večina podjetij vključenih v trgovinske dejavnosti; drugič, zaradi stopnje makroekonomskega razvoja in, tretjič, zaradi pomanjkanja vključenosti podjetij v znanje EU in inovativne projekte, kot sta Erasmus in Horizon 2020. Z uporabo probitnega modela ta prispevek analizira več dejavnikov, kot so raven izobrazbe, spol, zakonski stan in zdravstveno stanje v primeru Kosova. Končno tudi empirično potrjuje, da trenutno raven izobraževanja ne igra pomembne vloge pri uspešnosti podjetništva v primerjavi z drugimi dejavniki, kot sta spol in zakonski stan.

Ključne besede: podjetništvo, izobraževanje, tranzicija, upravljanje znanja, inovacije

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