ENTREPRENEURSHIP AND INNOVATIONS: NOVEL RESEARCH APPROACHES

Edited by

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Contents

From the Editors

This issue contains several articles, which could be considered examples of frontier research in the fields of entrepreneurship and innovation management: emerging research themes, recently gaining in popularity and casting a new light on the phenomenon of the innovative economic activity. In this manner, the Journal of Entrepreneurship, Management and Innovation contributes to the development of theoretical propositions and their empirical verification in topics as diverse as: business models, role of human and social capital in entrepreneurship, involvement of customers in the generation of innovations, licensing of intellectual property, social enterprises and pluriactivity in agriculture. The carefully selected sample of articles offers a variety of approaches to these increasingly popular themes of entrepreneurship research.

The importance of business model innovations cannot be underestimated in the modern business. The article by Lasse Torkkeli, Hanna Salojärvi, Liisa-Maija Sainio and Sami Saarenketo links the issue of developing and changing business models to the decision-making logic and psychological factors, which are expected to affect the pace and direction of these changes. In a similar manner, Ahlem Omri and Younes Boujelbene focus on the composition of entrepreneurial teams, which affect the identification of business opportunities and mobilization of external resources. The authors analyze these relations using the lenses of human and social capital, and a probit regression model.

The third article, written by Kaja Prystupa-Rządca and Justyna Starostka, offers insights into the role of potential customers in the creative process of developing new games. The qualitative research describes interactions between users and developers at various stages of game conceptualization, production and testing, outlining specific methods that could increase the users' involvement in the new product development process.

Rafał Wisła and Tomasz Sierotowicz look at the role of intellectual property in intra- and inter-sectoral collaborations by mapping the patent licensing in European countries. Using the database of the European Patent Office, they track the patenting tendencies over a period of 15 years, highlighting the industries with the highest propensity for out- or in-licensing

in selected countries and thus revealing the differentiated importance of open innovations across European national economies.

Chao-Tung Liang, Li-Pei Peng, Shu-Nung Yao and Chaoyun Liang focus on social enterprises, and propose and psychometrically test a novel Social Enterprise Performance Scale, which links the business activities to personality traits of social entrepreneurs, in addition to social and economic elements. Thus, the article benefits from the psychological perspective to shed new light on the advancement of social, environmental and ethical agendas by means of entrepreneurial activities.

Finally, Tarja Niemelä tackles the problem of pluriactivity in farming enterprises, i.e. the development of multiple, parallel streams of entrepreneurial activities, which accompany the traditional, agricultural work and thus stimulate the pursuit of new business opportunities and the resulting innovativeness. The author's quest for factors that could explain the willingness to engage in pluriactive business activities might be of interest not only to researchers, but also to policy makers, who aspire to increase the innovativeness of the rural economies.

This issue of JEMI combines contributions from Finland, Poland, Taiwan and Tunisia, offering a truly global perspective on the entrepreneurship research, using a diversity of underlying methodological paradigms and research methods. We would like to express our gratitude to the Authors who enabled us to publish this insightful selection of papers.

We are also indebted to all of the distinguished Reviewers for their excellent assistance in evaluating and improving the submitted papers, and for their readiness to offer specialist knowledge and friendly support to the Authors. Owing to this fruitful collaboration, the present issue of JEMI offers high-quality contributions to the body of knowledge in the field of entrepreneurship and innovation management, which would hopefully interest our international readers and encourage new, scientifically excellent article submission in the future.

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Do All Roads Lead to Rome? The Effect of the Decision-Making Logic on Business Model Change

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Abstract

Business models and business model change have drawn increasing attention from both researchers and practitioners across various disciplines, including the domain of entrepreneurship. However, even though the importance of business model innovation as a driver of firm performance has been widely acknowledged, empirical studies explaining the business model change remain limited. This study contributes to prior research by examining the effects of effectual and causation-based decision-making logics on the degree of business model change in the context of small and medium-sized enterprises in Finland. The findings of hierarchical regression analysis show that both causation and effectuation-based logics have positive effects on business model change, thereby highlighting the need for both strategizing and seizing of opportunities in business model development.

Keywords: *business model, decision-making, effectuation, causation, small and medium enterprises.*

INTRODUCTION

Business models and business model change have intrigued both business researchers and practitioners in various fields, including the domain of entrepreneurship. Competition in today's business is increasingly determined by the ability of companies to innovate their business models: Competition between companies has been driven by technological oversupply (Christensen, 1997), and older companies in particular have been struggling to adapt to the

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accelerating cycle of product development (Nagle & Golden, 2002). Indeed, product innovation may not suffice in evolving competition, due to pressures for cost reduction (MacMillan, 1998) and brand management (Gopalani & Shick, 2011).

Conversely, innovating the business model, rather than specific products, can provide the solutions companies need to survive in the ever-evolving cycle of competition, due to the fact that business model innovation can improve the competitive position of the company in ways that traditional product innovation cannot (Amit & Zott, 2012). Moreover, it can also result in beneficial adaptation of competitive strategy (Chesbrough & Rosenbloom, 2002; Chesbrough, 2007) to account for the changing business environment, thus enabling companies to respond to those changes at the strategic level. In general, it is now acknowledged that business model innovation may complement or even outperform the role of product or process innovation in the success of firms (Amit & Zott, 2012). Business model change may be incremental or radical in scope, triggered by either internal or external input. Business model innovation in itself may be considered as a dynamic capability (Mezger, 2014). Overall, however, there is still room for research elaborating on the firm-internal processes related to business model change and managing change in SMEs.

In this study, we examine how the decision-making logic in small and medium-sized enterprises (SMEs) comes to determine their business model change. In doing so, we differentiate between the influences of causal and effectuation-based logics, as defined by Sarasvathy (2001) and Chandler, DeTienne, McKelvie & Mumford (2011). According to Sarasvathy (2001, p. 245) effectuation refers to processes that "*take a set of means as given and focus on selecting between possible effects that can be created with that set of means*" while causation refers to more planned strategic approach where an entrepreneur sets a particular goal and selects appropriate means to reach the goal. This type of study is timely and relevant due to several reasons.

Firstly, even though effectuation has presented a paradigm shift in understanding the entrepreneurial decision-making logic, until recently there have been only a few studies to empirically test the effectual logic (Perry et al., 2012). This is a noteworthy omission since, in addition to bricolage (Baker, Miner & Eesley, 2003; Baker & Nelson, 2005), effectuation is the most potent emerging theoretical perspective in entrepreneurship (Fisher, 2012).

Secondly, most of the empirical studies investigating the causation–effectuation dynamics in decision-making have been either conceptual or descriptive case studies (Perry, Chandler & Markova, 2012) and have tended to focus on the individual entrepreneur, rather than the enterprise, as the unit of analysis (Bird & Schjoedt, 2009; McMullen & Shepherd, 2006).

Yet, the paradigm shift in entrepreneurial decision-making facilitated by effectuation theory also has deep implications for management research at the organizational level, as management has traditionally been described by causation-based logic with the firm as the main unit of analysis (Drucker, 1998; Shane & Venkataraman, 2000) – a view that is now being challenged by the rise of the effectuation theory. Moreover, even though Chandler et al. (2011) have recently validated a scale for effectuation, its further application has been lacking, particularly in the SME context.

Thirdly, in their literature review on studies examining the decision-making logic from the effectual point of view, Perry et al. (2012), while noting that research has neglected to highlight the relationships between variables, explicitly call for testing its effect on business model change.

Based on the research gaps identified above, it appears that more empirical research into the entrepreneurial decision-making logic is called for. We respond to the above-mentioned gaps by investigating the impact of effectual and causation-based logics on the strategic outcomes of SMEs in a measurable, quantitative research setting. The question of how the business model innovation process occurs is an interesting one, and by investigating how the type of decision-making logic impacts on the ability of an entrepreneurial company to exert change in its business models we are also further responding to the call for more research on the drivers of business model change.

This article continues as follows: First, we will present a review of the existing literature on the two main decision-making logics found prevalent in entrepreneurial companies – causation and effectuation-based logics. Next, we outline the potential linkages between the logics and the business model change. The following section introduces our research methodology. Finally, the results are illustrated, and we conclude by discussing their contributions and implications, while also highlighting the limitations of the present study and further research avenues provided by it.

LITERATURE REVIEW

Decision-making logic: Causation and effectuation-based logics

The traditional models of entrepreneurial decision-making have tended to align with those prevalent in strategic management, where firms try to predict future changes in their business environment, to create a formalized strategy in order to achieve the set goals, and to measure performance against those goals through actualized returns (Alvarez & Barney, 2007). Sarasvathy (2001; 2008) has differentiated this causation-based logic from effectuation, by

which entrepreneurs conversely tend to start with the means rather than the goals, to prefer the principle of affordable loss to optimized pre-strategizing, and to leverage contingencies rather than trying to predict them.

This view has been argued to better describe the nature of entrepreneurial opportunities, which consist of recognizing new ideas and inventions, beliefs, and actions (Sarasvathy, Dew, Velamuri & Venkataraman, 2010). The perception of potential new business models and the subsequent innovation of business models would by extension be expected to fit into this view (Perry et al., 2012). That would imply a non-predictive strategy (Wiltbank, Dew, Read & Sarasvathy, 2006), a logic that is in part contrast to the traditional views of organizational management based on formalized strategizing and trying to predict the future business environment (Porter, 1996).

Fisher (2012) provides a clear description of these differences in the decision-making logic, based on a literature review of the existing research on effectuation theory. He notes that a major distinguishing factor between the use of causal or effectual logic in entrepreneurship comes down to decision theory: i.e., decision-makers facing a measurable and/or predictable future tend to favor the former, whereas decision-makers dealing with an unpredictable environment and uncertainty may favor experimentation and iterative learning instead. McMullen and Shepherd (2006) also suggest that the extent of uncertainty lies at the root of entrepreneurial theorizing.

In addition, existing research has suggested that effectual thinking is associated with over-trust in entrepreneurs (Goel & Karri, 2006) and that, even though new ventures tend to engage in more effectual decision-making compared to established firms (Dew, Read, Sarasvathy & Wiltbank, 2008), effectual thinking can be prevalent in both types of firms (Wiltbank et al., 2009). In general, effectual logic tends to be associated with increased uncertainty in the market environment, the newness of the enterprise, and an increased likelihood of success for a given company (Sarasvathy 2001; 2008).

The underlying decision-making logic may come to determine practical product and organizational strategies: First, experimentation based on the affordable loss principle of effectuation may shorten product development cycles, resulting in companies conceptualized as "lean startups" (Blank, 2013; Ries, 2011). Companies embracing such mindset can speed up the product development process by pivoting and creating minimal viable products for testing (Ries, 2011). These methods are related to trial-and-error learning, which has been highlighted as an enabler of business model innovation (Sosna et al., 2011). Trial-and-error learning can also help link organizational routines to organizational schemata, thus helping them manage in changing environments (Rerup & Feldman, 2011). However, so far we still do not have a clear view of how effectuation as a decision-making logic is linked

to the differing capabilities of SMEs to innovate their business model; the investigation by Sosna et al. (2011) was conducted in a longitudinal single case setting, and thus a more comprehensive, cross-industry view into the phenomenon across different types of SMEs is still to be developed.

Effectual logic has been further highlighted in international entrepreneurship (Sarasvathy, Kumar, York & Bhagavatula, 2014) in general, as well as been found to impact on the internationalization process (Kalinic, Sarasvathy & Forza, 2014) and small-firm internationalization (Andersson, 2011; Harms & Schiele, 2012; Nummela, Saarenketo, Jokela & Loane, 2014; Schweizer, 2015) in particular. Recent studies have also found the effectual logic to be linked to the level of corporate R&D (Brettel, Mauer, Engelen & Küpper, 2012), to entrepreneurial exit strategy (DeTienne & Chandler, 2010), and to increased entrepreneurial orientation (Mthanti & Urban, 2014). However, despite the fact that its impact on corporate business models should be clarified (Perry et al., 2012), the dynamics of causal and effectual logics on the extent of business model change have not received prior research attention.

Decision-making and business model change

A business model describes the design or architecture of value creation and capture – a system of interdependent and interconnected activities determining the way of operation of a firm (Teece, 2010, Zott, Massa & Amit, 2011). Lately, the concept has been widely used in various contexts and management areas ranging from strategy and technology management to entrepreneurship (for a thorough conceptual investigation, see e.g. Zott et al., 2011). In today's changing environmental and competitive conditions, the question of how to adapt and change the business model (Doz & Kosonen, 2010) is of utmost relevance to companies. A growing body of research investigates the phenomenon of business model innovations from various viewpoints, such as capability (Achtenhagen, Melin & Naldi, 2013), learning (Andries & Debackere, 2013) and sustainability (Schaltegger, Lüdeke-Freund & Hansen, 2012), but only a few empirical studies examine the connection of firm-level decision-making and business model change. Current literature provides some support for both the causation and the effectuation perspectives of decision-making in the context of business model change. Thus, we intend to present "both sides of the coin" for hypothesis testing in our exploratory empirical setting.

The need for business model change can arise as a response to either an internal or external opportunity or threat (Bucherer, Eisert & Gassmann, 2012), followed by a process of analysis, design, implementation, and control.

The degree of change may vary from small incremental business model adaptations to a more dramatic business model renewal (Achtenhagen et al., 2013) changing both the strategy and organization of the firm (Agarwal & Helfat, 2009). The dynamic capabilities framework for sustainable enterprise performance by Teece (2007) consists of capacities to sense, seize, and transform opportunities. His construct of sensing market and technological opportunities is analytical and reflects a system of causal logic, followed by delineating a proper business model as part of the seizing construct. Similarly, Mezger (2014) identifies both technology and business model sensing as capabilities that precede seizing capabilities related to business model configuration and the advancement of business models. His description of business model sensing reflects causal logic supported by his empirical findings that firms with frequent, institutionalized processes to get e.g. formal and informal customer feedback on emerging business models and customer requirements were better able to generate and advance new business model ideas. Therefore, we hypothesize:

H1: The higher the level of causal logic in an SME, the bigger the change in its business model.

As a contrast to the traditional strategic planning processes, an emerging stream of literature (see e.g.: McGrath, 2010) argues that instead of thorough analysis processes, experimentation or trial-and-error-learning (Sosna, Trevinjo-Rodrigues & Velamuri, 2010; Khanagha, Volderba & Oshri, 2014) are the keys for business model change. Chesbrough (2010) argues that business model innovation is about managing change in an organization through the processes of experimentation, effectuation, and successful leadership. Especially as the entrepreneurial process of an SME can be considered to be a mechanism for continuous and rapid innovation, early-stage firms require business model experimentation to rapidly test the market and validate or reject the business opportunity. (Trimi & Berbegal-Mirabent, 2012).

The proponents of effectuation processes argue that emergent opportunities typically lack rich data to justify corporate actions such as reframing the dominant logic of one's business model. In those situations, entrepreneurs do not analyze their environment but rather take actions that create new information and reveal latent possibilities regarding business model innovation (Chesbrough, 2010; Khanagha et al., 2014). Especially start-ups may favor this "pivoting" approach, where the new venture starts with quite imprecise facts about the opportunity at hand, followed by multiple stages of information gathering and trial-and-error attempts (Girotra and Netessine, 2014). Experimentation may also make business

more dynamic compared with the analytical strategic approach: even though most experiments may fail, new designs cannot be found without failures (McGrath, 2010). Experimentation with business models may also take place outside the core business of the firm (Agarwal & Helfat, 2009).

However, according to Doz and Kosonen (2010), experimentation activities may be hampered by organizational limitations. Existing business models tend to be rigid: the elements are tightly coupled as a system, and a possible modification attempt in the system creates tension that may prevent change. Organizational inertia combined with the limited resources of an SME may limit the possibilities for organizational change and innovation (Huang, Lai, Lin & Chen, 2012). Thus, flexibility may be one of the preconditions for business model innovation and change. Flexibility is a leadership challenge: the success of previous business models may create a barrier to change existing asset configurations (Chesbrough, 2010). Thus, managers need to encourage a culture of strategic flexibility to challenge the blinders of the dominant logic that favors existing business models. Bock, Opsahl, George & Gann (2012) examined the roles of organizational culture and structure with regard to strategic flexibility and business model innovation. They found out that organizations with a creative climate are more likely to achieve strategic flexibility in their business model innovation efforts. Based on the above discussion, we hypothesize:

H2: The higher the level of effectual logic in an SME, the bigger the change in its business model.

Research Methods

Sample and data collection

A cross-industrial sample of small and medium-sized firms (10–250 employees) in Finland was used to test our hypotheses. The sample was drawn from the Amadeus database. A structured, online survey instrument was used for collecting the data during May–September, 2014. A total of 1,130 firms were identified and contacted by phone to ensure their eligibility and willingness to participate in the study. Eligibility was determined based on two criteria. First, the size of the firm had to be within the limits of 10–250 employees. Second, the respondents needed to have independency in terms of strategic decision-making. Because of this, for example the sub-branches and Finnish subsidiaries of foreign firms were excluded from the study. Thus, 78 firms were determined as non-eligible. In spite of numerous efforts, 306 firms were not reached. Furthermore, 311 firms were not willing or able to

participate, mostly due to the lack of time. The link to the survey was sent immediately after the respondent agreed to participate in the study.

We used several incentives to increase the response rate. First, in order to encourage participation in the study we promised a summary report of the survey results. Second, anonymity and confidentiality were assured. Finally, the respondents were also given an opportunity to win an iPad in a draw after the data collection. A reminder to the non-respondents was sent two weeks later. As a result we received 148 usable questionnaires, which lead to a response rate of 14% (148/1052). The respondents were mainly CEOs (84 % of the respondents) or other persons in knowledgeable key positions. Thus, the key informant approach was used in collecting the data.

Several actions were taken to control for possible methodological biases. A possible non-response bias was evaluated by comparing the early and late respondents based on the recommendations by Armstrong and Overton (1977). No significant differences between the two groups were found. The possibility of common method bias was recognized already at the beginning of the questionnaire design following the recommendations by Podsakoff, MacKenzie & Lee, 2003 (2003). The predictor and criterion variables were separated proximally in the questionnaire and anonymity of the respondents during the data collection was assured. We also used Harman's one factor test to check for common method bias after collecting the data. No signs of a common factor underlying the data were found, thus, common method bias was not considered a problem.

Measures

To assess the degree of business model change we generated items that would reflect concrete changes in the actions of the firm over previous years. Five items describing the magnitude of change and concerning the activities of the firm in the upstream (changes in the type of suppliers used), downstream (changes in the customer base, customer value proposition, sales network), and internally (know-how of the personnel) loaded on a single factor. In order to measure the main independent variables, namely causation and effectuation, we adapted items from Chandler et al. (2011) and, in addition, generated a few items ourselves. In doing so, we followed the suggestion by Perry et al. (2012) to distinguish between effectuation and causation processes and to apply measures that are not contrasted as the total opposites of causation measures. A seven-point Likert scale ranging from *totally disagree* to *totally agree* was used to measure the main independent variables and the dependent variable.

Scale reliability and validity

Principal component analysis with Varimax rotation was used to develop composite measures for the independent and dependent constructs. Items with low correlations or strong cross-loadings (over .4) were deleted. Five items describing the business model change loaded on a single factor with an eigenvalue greater than one. In terms of independent variables, the causation and effectuation items mainly adapted from Chandler et al. (2011) loaded on three different factors with an eigenvalue larger than one. Four causation items adapted from Chandler et al. (2011) describing the extent to which strategic vision and analytical approach guide the actions of the firm loaded on a single factor. Five effectuation items adapted from Chandler et al. (2011) and one self-generated item on the other hand loaded on two different factors. Three items adapted from Chandler et al. (2011) describing the degree of experimentation in the firms loaded on the first factor. This we decided to name *experimentation*.

Finally, two effectuation items describing organizational flexibility adapted from Chandler et al. (2011) loaded on the same factor with one self-developed item. This factor was named *organizational flexibility* accordingly. In order to assess the discriminant validity of the scales, we conducted another principal component analysis with Varimax rotation by including all the items of the main independent variables concurrently in the analysis (see item loadings in Table 1). The internal consistency of the scales was examined by calculating the reliability coefficient values (Cronbach's alpha) for each construct (see Table 1). The subsequent values were 0.818 (business model change), 0.812 (causation), 0.812 (experimentation) and 0.733 (organizational flexibility). As all values were well above 0.70, they were considered reliable (Nunnally, 1978).

Control variables

In addition to management and the decision-making style also other factors could have an effect on business model change. For example, the size and age of the firm could be related to the ability of the firm to renew its value proposition and change the business model. On the other hand, also internationalization could be related to business model change, as internationalization could bring along new opportunities that accelerate business model change (see e.g., Mainela, Puhakka & Servais, 2014), with experimentation being essential for international new ventures as they try to optimize their business models for global markets (Zahra, 2005). Similarly, control variables should be added in conjunction with analysis on effectual logic (Perry et al., 2012).

Table 1. Factor loadings

Main constructs and items	Loadings
Causation (α=.812)	
We analyze long run opportunities and select what we think will provide the best returns	.806
We research and select target markets and do meaningful competitive analysis	.779
We design and plan business strategies	.749
We organize and implement control processes to make sure we meet objectives	.785
Experimentation (α=.812)	
We experiment with different products and business models	.696
Our product/service concept is quite different from our original conception	.918
We tried many different approaches, until we found a functional business model	.868
Organizational flexibiliy (α=.733)	
We evolve the business to evolve as opportunities emerge	.833
We are flexible and utilise all opportunities as they open up	.855
We avoid acting in ways that would restrict our flexibility and ability to adjust	.727
Business model change (α=.818)	
We have directed our products /services to entirely new types of customers	.754
Our personnel's knowledge base has significantly changed	.710
Our value proposition to customers has significantly changed	.820
We use very different subcontractors than before	.820
We have renewed our sales network	.730

ANALYSIS

Description of the sample

The sample was cross-industrial with the main industrial fields being manufacturing (53%) and construction (20%). Other industries in the sample

were for example electricity, gas, steam, and air conditioning supply (5%) and water supply, sewerage, waste management, and remediation activities (5%). The average age of the firms was 31 years (standard deviation 24, range 2–142 years). Of the firms, 70% had less than 50 employees, and the remaining 30% more than 50 but less than 250 employees. The average size of the firm measured by the number of employees was 48 employees (SD=46, range 6–240).

Hypotheses testing

A linear hierarchical regression analysis was used for testing our hypotheses. Prior to conducting the analysis we checked for the normal distribution and possible multicollinearity. The normal probability plot of the standardized residuals and scatterplot were appropriate and no deviations from normality were found. Variance inflation factors (VIF) were all below the cut-off value 10 (Hair, Anderson, Tatham & Black, 1998), with the highest being 1,250. Thus, multicollinearity was not regarded as a problem. Mean values, standard deviations, and correlations between the variables are shown in Table 2. As seen in the table, business model change correlated positively and statistically significantly with all of the potential determinants: the strongest ($p<0.01$) were its correlations with causation (0.52) and experimentation (0.61) variables, with the correlation coefficient of organizational flexibility being positive (0.19) at the 5% risk level.

Therefore, the pre-requirements for hypotheses testing were fulfilled, as potentially all of the variables included in the hypothesis could be expected to have the hypothesized effect. As two constructs regarding effectuation logic emerged in the factor analysis, both constructs were used in the regression analysis. The internationalization control variable also correlated positively with business model change (0.26, $p<0.01$), a development which could also be expected based on existing research on SME internationalization (Mainela et al., 2014; Zahra, 2005). The inter-correlations between the variables measuring the aspects of the decision-making logic were also overall positive and significant, which supports the notion by Chandler et al. (2011) that causal and effectual logics can by and large exist parallel to each other, rather than being the opposite ends of a single continuum.

The results of the hierarchical regression analysis are shown in Table 3. We entered the variables into the analysis in two phases. The control variables, namely firm size and internationalization, were entered in the first phase and the main independent variables in the second phase. This allowed to detect the added variance explained by the independent variables over the control variables.

Table 2. Means, standard deviations, and correlations

Variable	Mean (SD)	1	2	3	4	5	6
1. Business model change	3.69 (1.31)	1.000					
2. Internationalization	.62 (.49)	.261**	1.000				
3. Firm age	31 (24,07)	.020	.153*	1.000			
4. Firm size (number of employees)	48 (46.43)	.134	.273**	.247**	1.000		
5. Causation	4.63 (1.15)	.523**	.224**	.075	.248**	1.000	
6. Experimentation	3.66 (1.41)	.612**	.193*	.059	.128	.328**	1.000
7. Organizational flexibility	5.49 (1.02)	.189*	.034	-.087	.098	.249**	.142*

Significance *p<.05, **p<.01

The results show firstly that of the control variables only internationalization had a positive effect on business model change. However, once the independent variables are added in the equation the positive effect of internationalization remains no longer significant. Of the independent variables, causation was found to be positively associated with business model change (β=0.345, p<0.01). A highly significant positive relationship was also found between experimentation and business model change (β=0.480, p<0.01). Contrary to our expectations, organizational flexibility was not related to business model change.

DISCUSSION AND CONCLUSIONS

Our aim in this study was to investigate how the decision-making logic in small and medium-sized enterprises impacts on the extent of their business model change. In doing so, we expanded upon the nascent (Perry et al., 2012) paradigm of effectuation in entrepreneurship research and examined the traditional, causation-based logic parallel to the effectual one, in line with the model and suggestions by Chandler et al. (2011). In particular, the present study helps in extending the knowledge on the nature of the business model innovation from capabilities and learning perspectives (Achtenhagen et al., 2013; Andries & Debackere, 2013) towards the overall decision-making logic practiced at the organizational level.

Table 3. Results of hierarchical regression analysis

Dependent variable: Business model change

Variable	Model 1	Model 2
Firm size	.075	-.036
Firm age	-.037	-.039
Internationalization	.246**	.105
Causation		.346**
Experimentation		.481**
Organizational flexibility		.031
R2	.074	.503
Change in R2		.430**
F	3.571**	22.269**

**Significant at .01 level (two-tailed)

*Significant at .05 level (two tailed)

In sum, our results revealed that both causation and effectuation-based logics are linked with increased levels of business model change, thus highlighting the need for both strategizing and seizing of opportunities in business model development. More specifically, we found that experimentation, but not organizational flexibility, is the kind of effectual logic needed for such a change. These results align with Dutt, Gwebu & Wang, (2015) who found that entrepreneurial intentions in emerging industries may develop through both causation and effectuation-based logics, and with the notion of Chandler et al. (2011, p. 177): "*entrepreneurs using an effectuation approach may try different approaches in the marketplace before settling on a business model.*" Similarly, Chesbrough (2010) emphasizes that effectuation creates actions based on the preliminary results of experiments and generates new data for further business model design*.* Our results extend these studies by further emphasizing the differences in how different types of effectual logic impact on such change and by providing empirical evidence of the linkage based on a survey of 148 Finnish SMEs.

The non-significant result on the impact of organizational flexibility is contrary to Doz and Kosonen (2010), Chesbrough (2010) and Bock et al. (2012), whose studies have highlighted the need for managers to promote a culture of flexibility in order to overcome the dominant logics in legacy business models. Even though our analysis showed positive correlations and coefficients between organizational flexibility and the extent of business model change in

SMEs, we still found that the former did not determine the extent of the latter. One possible reason for this might be that SMEs tend to be agile organizations by nature, and thus the added value of striving for maximal flexibility does not provide an increased impetus for innovating one's business model compared to competitors. The high mean value of organizational flexibility in the present study (5.5 out of 7) would appear to support this notion. Overall, however, successful business model innovation appears to require that SMEs are ready to engage in not only formal pre-strategizing, but also experimenting with potentially suitable business models and being willing to take affordable risks as suitable market opportunities emerge.

We readily recognize several limitations in our study. One is that we did not control for the experience of the decision-maker, which Dew, Read, Sarasvathy & Wiltbank, (2009) have noted to be a substantial differentiator in the type of logic applied. Similarly, Perry et al. (2012) have suggested a mixed methods approach to studying the impact of effectual logic, and ours was a cross-sectional survey analyzed through quantitative methods. Thus, the dynamics of effectual and causal logic could be examined in further detail in future studies. Potentially arising questions are, for instance: Does the importance of causal and effectual logics on business model change develop over time, as the company learns from its experimentation and consequently accounts for that learning in its market strategy? And does strategizing allow the company the justification and sufficient frames to experiment upon the affordable loss principle suggested by effectuation? In other words, a possible feedback loop between the two logics could be explored in more detail in a longitudinal setting.

Another limitation of the present study, and simultaneously a promising approach for future studies, is the fact that our analysis did not investigate contingency effects, e.g. how market or technological dynamism and uncertainty may influence the relationship between decision-making logic and innovation of business models. For instance, rapid technological change may require managers to avoid trying to predict technological trajectories and rely more heavily on effectuation-based decision-making (Dew, Sarasvathy, Read & Wiltbank, 2008). In addition, the overall characteristics of the focal technology may further influence the process of selecting business models: Pries and Guild (2011) distinguish between legal protections, specialized complementary assets, commercial uncertainty and technological dynamism. While our empirical sample, covering a wide spectrum of industry sectors, was aimed at generalizing across SMEs in general, we acknowledge that industry-specific examination might yield further detail on these contingencies.

Moreover, we suggest that beyond the prevalent organizational culture (Bock et al., 2012), the national culture of origin may have an effect on the type and dynamics of the entrepreneurial decision-making logic. Hofstede's

(1980) indices measure the different continuums on a set of traits in the national context, and it is possible that these cultural traits have several effects: For instance, the extent of uncertainty avoidance could determine how willing firms are to engage in experimentation in favor of formal pre-strategizing; long-term orientation could have the opposite effect. In this sense, we also recognize the limitation of a single country context in the present study, although we are confident that these results could be to a certain extent generalizable across countries similar to Finland, i.e., small open economies where technology-intensive SMEs are the norm rather than the exception, countries such as Sweden, Denmark, and Ireland. Finally, as key informant approach was used in collecting the data, we call for further research that would cross-validate our findings by using multiple informants. The use of different respondents for predictor and criterion variables would also facilitate eliminating the risk of potential common method bias as suggested by Podsakoff et al. (2003)

To conclude, we still have a limited understanding of business model change in firms and how the various decision-making logics influence this change. To extend our model, future research could focus more on, for example, the role of entrepreneurial bricolage, i.e. "making do with what is at hand" (see: Baker & Nelson, 2005), and thus provide an even richer portrait of why and how small entrepreneurial firms change their business models. Furthermore, our unexpected finding on the role of organizational flexibility brought about a need to further theorize and investigate this determinant. Finally, while focusing on the antecedents in this study, we should also scrutinize the impact and outcomes of business model change more thoroughly. For example, the question whether and how the change of business models leads to the growth and success of firms remains an intriguing topic for the future.

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Abstrakt (in Polish)

Modele biznesowe i zmiana modelu biznesowego przyciąga rosnącą uwagę zarówno naukowców i praktyków z różnych dziedzin, w tym w dziedzinie przedsiębiorczości. Jednak, chociaż znaczenie innowacyjnego modelu biznesowego jako siły napędowej przedsiębiorstwa jest powszechnie uznawane, badań empirycznych wyjaśniające zmianę modelu biznesowego jest ciągle niewiele. Ta praca wnosi wkład we wcześniejsze badania, analizując skutki stosowania logiki podejmowania decyzji, opartej na zróżnicowanych zasadach wprowadzania w życie i przyczynowości, na stopień zmian modelu biznesowego w kontekście małych i średnich przedsiębiorstw w Finlandii. Wyniki hierarchicznej analizy regresji pokazują, że zarówno obie logiki mają pozytywny wpływ na zmianę modelu biznesowego, podkreślając w ten sposób zarówno konieczność obrania strategii i wykorzystania możliwości w celu rozwijania modelu biznesowego.

Słowa kluczowe: *model biznesowy, podejmowanie decyzji, wprowadzanie w życie, przyczynowość, małe i średnie przedsiębiorstwa.*

Entrepreneurial Team: How Human and Social Capital Influence Entrepreneurial Opportunity Identification and Mobilization of External Resources

Ahlem Omri[1], Younes Boujelbene[2]

Abstract

Entrepreneurial teams play an extremely important role in the development of any country, especially in developing countries. To understand entrepreneurial teams that operate in a low-technology industry, we rely on the network and human perspective on entrepreneurship. In this paper, we investigate how the social and human capital of entrepreneurial team members influences their ability to identify entrepreneurial opportunities and mobilize external resources. We extend prior research in two ways. First, by using the ordered probit method to measure the identified entrepreneurial opportunities number at the level of entrepreneurial teams. Second, to our knowledge, there is a very small number of studies that have theoretically and empirically investigated the mobilization of external resources, especially at the level of entrepreneurial teams.

Keywords: *entrepreneurial team, entrepreneurial opportunity, external resources, social capital, human capital.*

INTRODUCTION

The concept of entrepreneurial team has been present since the nineties, emerging with the work of Kamm, Shuman, Seeger & Nurick, 1990. These authors emphasized the importance of firm creation by a team, but were not interested in identifying business opportunities and mobilizing resources that are key processes for any entrepreneurial project. In our study, we have taken as reference the definition of Cohen and Bailey (1997) who considered the team as a group of individuals that share interdependent tasks and outcomes associated with these tasks, and are also seen as a social unit by themselves and by others.

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Shane and Venkataraman (2000) showed that human capital increases the ability of entrepreneurs to discover and exploit business opportunities. In the same vein, Kinias (2013) confirmed that the entrepreneurial background (educational level and prior experiences) helps the entrepreneur not only in the discovery of new business opportunities, but also to recognize the tools of financing used for the future project. Prior experiences play a crucial role in the mobilization of external resources required for the opportunities identified (Kotha & George, 2012).

Besides human capital, social capital plays a key role in the discovery of entrepreneurial opportunities as well as the mobilization of external resources by entrepreneurial teams. Packalen (2007) confirmed that social capital enhances the legitimacy of creative teams and facilitates their access to financial resources.

Although there are several studies on the entrepreneurial opportunity identification and external resource mobilization, however those interested in the processes in entrepreneurial teams are very rare. For this reason, our study aims to analyze the factors that affect the number of entrepreneurial opportunities identified by entrepreneurial team, as well as those that affect the mobilization of external resources.

Literature review

Human capital and entrepreneurial opportunity identification

Opportunity identification is a step that initiates the entrepreneurial process and is the key driver for starting new businesses (Shane and Venkataraman, 2000). Then, opportunity recognition is the ancestor of both individual and social wealth, Venkataraman (1997).

The entrepreneurial team is characterized by the diversity of human capital which increases the team efficiency and therefore the performance of the company, especially during the launch and development phases of an entrepreneurial project. In addition, Eisenhardt and Schoonhoven (1990) confirmed that the unobservable human capital attributes of entrepreneurial teams are a stimulus for innovation and new ideas creation.

Some studies such as (Arenuis & Declercq, 2005; Davidson & Honig, 2003) showed that there is a positive relationship between education level and the ability of entrepreneurs to identify business opportunities. However, Ucbasaran, Westhead & Wright (2009) confirmed that in a sample of 630 entrepreneurs, experienced entrepreneurs have identified and exploited more entrepreneurial opportunities than those with no prior experiences.

Hypothesis 1: There is a positive relationship between human capital and the number of entrepreneurial opportunities identified by the entrepreneurial team.

Human capital and mobilization of external resources

First of all, Villanueva, Van de Ven & Sapienza, (2012) indicated that resource mobilization theory is more pertinent in entrepreneurship than the theory of resources acquisition, given that the mobilization focuses on the access to resources and not on the resources allocation between the different parties.

Then, prior start-up experiences and prior industry experiences provide entrepreneurs with knowledge about the resources needed to create, and how these resources can be combined to generate more value. In addition, experience and education of the entrepreneur represent quality indices for resource holders (Hellmann & Puri, 2002). According to Bhagavatula, Elfring, Tilburg, & Van de Bunt, (2010) the human capital, represented by experiences and professional skills, has a direct impact on access to external financial resources. They confirmed, on a survey of 107 entrepreneurs, that those who have higher experience levels can mobilize more external resources that are useful for exploiting the opportunities identified.

Hypothesis 2: There is a positive relationship between human capital and the ability of an entrepreneurial team to mobilize external resources.

Social capital and entrepreneurial opportunity identification

The concept of social capital highlights two main dimensions that assess its added value. The structural dimension is to measure the size or the extent of social networks in terms of direct links number maintained with some categories of actors, Burt (1992). The second dimension (relational capital) refers to the nature of these links. According to Granovetter (1973), these links can be strong (strong ties) or weak (weak ties). Strong links are maintained with friends, intimate relationships or close relatives, while weak ties are related to distant parents, old friends, Lin (1995).

Moreover, (Burt, 2004; Obstfeld, 2005) have shown that individuals who have larger networks will benefit from an easier access to information, which, in turn, strengthens the possibility to benefit from opportunities and new ideas. Similarly, Singh, Hills, Lumpkin & Hybels (1999) have shown, on a survey of 303 entrepreneurs, that the social network size has a positive influence on the ability of entrepreneurs to identify opportunities. Furthermore, weak ties are expanding the network of an entrepreneur and give him an easy access to

new information, which helps to discover profitable business opportunities (Elfring & Hulsink, 2003).

Hypothesis 3: *There is a positive relationship between social capital of entrepreneurial teams and the number of entrepreneurial opportunities identified.*

Social capital and external resources mobilization

Mobilization of external resources is often seen as a constraint for entrepreneurs. However, the entrepreneur can rely on social relationships (bankers, suppliers, clients, and friends) to mobilize funds for his company. Packalen (2007) showed that social capital enhances the legitimacy of creative teams and facilitates their access to financial resources. Moreover, (Birley, 1985; Elfring & Hulsink, 2003) have found that the larger the social networks of entrepreneurs are, the easier access to financing is.

Besides, Uzzi (1997) confirmed that the strong relationship between the entrepreneur and the banker have positive effects on the conditions of obtaining a credit. Therefore, entrepreneurs who maintain strong links with their bankers can mobilize resources easily and at lower cost of financial resources through the high degree of confidence that characterizes such relationships.

Hypothesis 4: *There is a positive relationship between social capital and the ability of an entrepreneurial team to mobilize external resources.*
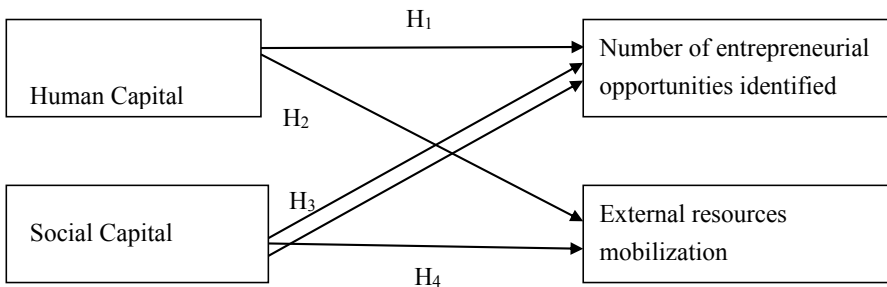
Research model

Figure 1. Conceptual model of study

METHOD

Participants

The survey was carried out during 2013. We have adopted the technique of semi-structured interview with members of the Tunisian entrepreneurial teams in Sfax region. This region is located in the south of Tunisia and is characterized by an entrepreneurial spirit.

We tested our hypotheses with a representative sample of 225 Tunisian entrepreneurial teams from Sfax region. The target population of 225 Tunisian entrepreneurial teams was chosen according to the size (2 to 5 members) and location (Sfax region). These entrepreneurial teams belong to different sectors of the economy (shoes industry, textile industry, agribusiness, sales of automobiles). Our study is interested in the small groups, so we limited the team size to five members. In addition, we chose teams whose members have been working together since the creation of the company and aim at making their projects successful. The study was carried out by distributing questionnaires to 510 entrepreneurial teams. We received responses from only 225 entrepreneurial teams. The response rate was 44.11 %.

Materials and procedure

The aim of our empirical investigation is to study the relationship of human and social capital of entrepreneurial teams with identifying entrepreneurial opportunities (Burt, 2004; Davidsson & Honig, 2003; Shane, 2003) and, secondly to study the relationship between these capitals and mobilizing external resources (Bhagavatula et al., 2010; Hulsink & Elfring, 2003; Jenssen & Greve, 2002). To verify our research models, we used a questionnaire to collect data related to human capital and social capital of entrepreneurs, the number of entrepreneurial opportunities identified and the ease of mobilizing external resources. Next, we tested the relationship between the attributes of human capital and social capital with the number of entrepreneurial opportunities identified by the ordered probit method. However, we estimated the relationship between human capital, social capital and mobilizing external resources with a regression analysis on the *Eviews* software.

In this section, we use the ordered probit method to analyze the number of entrepreneurial opportunities identified. Because of the nonlinear nature of the ordered probit model, it is difficult to directly interpret the coefficients of this model, Greene (2000). Therefore, we will rely on the marginal effects analysis to better understand the impact of different variables on the entrepreneurial opportunity identification. A latent variable y^* can model

in a meaningful way the occurrence of an event (Y) with reference to its probability. Greene (2000).

$$Y^* = pX \, \varepsilon, \; \varepsilon \in [0, 1] \; (1) \tag{1}$$

1 if $Y^* \leq \delta 1$ (the team identified one opportunity)
$Y =$ 2 if $\delta 1 < Y^* \leq \delta 2$ (the team identified two opportunities)
3 if $\delta 2 < Y^* \leq \delta 3$ (the team identified three or more opportunities)

Where $\delta 1$, $\delta 2$ and $\delta 3$ are boundaries that define the response categories and that are estimated at the same time with other model parameters. Marginal effects measure the impact of a "marginal" change or unit of an explanatory variable on the probability of a response choice. A marginal effect is simply the probability derivative with respect to a continuous explanatory variable xj. Assuming that the explanatory variables are linearly in the model specification $\partial (X'\beta) / \partial xj) = \beta j$, we have:

$(\partial \, \text{Prob} \, (Y = 1)) / \partial \, xj = - \, \varphi \, (X' \, \beta) \, \beta j,$
$(\partial \, \text{Prob} \, (Y = 2)) / \partial \, xj = [(- \, \varphi \, (X'\beta) - \varphi \, (\delta 1 - X'\beta)] \, \beta j$
$(\partial \, \text{Prob} \, (Y = 3)) / \partial \, xj = [(- \, \varphi \, (X'\beta) - \varphi \, (\delta 2 - X'\beta)] \, \beta j$

Where $\emptyset \, (.) = \partial \, \emptyset \, (.) / \partial \, (X' \, \beta)$ is the density function for a normal distribution. Then, we tested the relationship between the attributes of human and social capital and the access to external resources at the level of 225 Tunisian entrepreneurial teams with a regression analysis. To use the regression technique, we verified the conditions of its utilization such as the model linearity, residuals normality and the absence of multicollinearity between the independent variables.

DEPENDENT VARIABLES

Entrepreneurial opportunity identification
Consistent with previous studies (Shepherd and Detienne, 2005; Ucbasaran et al., 2009), identification of opportunities was operationalized in terms of the number of opportunities identified. Respondents were presented with a statement asking them, "How many opportunities for creating or purchasing a business have you identified before the creation of your entrepreneurial team?". They were presented with eight opportunity identification results (that is to say, 0, 1, 2, 3, 4, 5, 6 to 10, or more than 10 opportunities). The eight opportunity identification outcomes were divided into three groups,

and the number of respondents belonging to each group was more evenly distributed. Respondents who reported that they had identified one opportunity were allocated a score of "1", those who reported that they had identified two opportunities were allocated a score of "2" score, while those who had identified three or more opportunities were allocated a score of "3". The number of opportunities identified by an entrepreneurial team is equal to the average of opportunities identified by its members.

External resources mobilization

Access to external resources is often described as one of the main challenges faced by many entrepreneurs. Consistent with previous studies (Villanueva et al., 2012), we used entrepreneurs' perceptions of resources flows collected via questionnaire, to measure this variable. The extent to which entrepreneurial team obtained resources from the resource providers was measured in terms of the ease in obtaining different resources such as money, equipment, human resources and technical resources. Respondents were asked "to what extent is it easy to acquire money, equipment, human resources and technical resources needed to create the firm?". The answers vary according to the Likert's scale with five positions, from 1 (not easy at all) to 5 (very easy).

INDEPENDENT VARIABLES

Education level

Respondents were divided into five categories according to their education level: (1) those who had completed primary education, (2) those with a secondary education level, (3) those who had a bachelor degree, (4) those who had a license, and (5) those who had a master or doctoral degree. The answers vary based on a five-point scale from 1 (those who had primary education) to 5 (those with a master or doctoral degree).

Prior managerial experience

This variable was measured in terms of number of years of managerial experience that are reported by the respondent.

Prior entrepreneurial experience

This variable takes the value 1 if the respondent has a prior entrepreneurial experience and 0 if not.

Network size

To measure this variable, we gave respondents a list of seven categories of links. These respondents were asked to select the links that they had personally undertaken among these seven categories. The network size of each entrepreneur is thus equal to the number of links categories that they had selected.

Strong and weak ties

To measure these two variables, we asked the respondents to indicate the nature of the relationship they had with each link they had selected. Several authors, such as (Brüderl and Preisendorfer, 1998; Lin, 1995), have reported that ties with intimate friends, spouses and close parents are considered strong, whereas those with distant parents and old friends are considered weak. The nature of relationship of each entrepreneur is equal to the number of links for each type of relationship (strong or weak) divided by the number of the link categories that he has selected.

Control variables

Age and team size were used as control variables. Age was measured as a continuous variable (between 25 and 55). The team size was measured as a continuous variable (between 2 and 5).

RESULTS

Means and standard deviations for the dependent, independent and control variables are reported in Table 1. The correlation coefficients suggest that the reported regression model will not be seriously distorted by multicollinearity. We can see that the average age of respondents was 38.5 years and they had a higher or secondary education level. The average managerial experience was equal to 3.02 years while the average experience in business creation was equal to 0.62.

For social capital, we found an average network size equal to 3.77. The average of strong ties and weak ties are respectively about 0.55 and 0.72. This Table confirms the average number of entrepreneurial opportunities identified to 2.42 while the access to external resources facility had an average of 3.90. Finally, the average team size was equal to 3.63. The number of entrepreneurial opportunities identified was positively correlated with weak ties and network size, however, it was negatively correlated with the team size. Mobilizing external resources was positively correlated with the entrepreneurial experiences, managerial experiences, the social network

size and strong ties, whereas it was negatively correlated with age, team size and the education level. Thus, the number of entrepreneurial opportunities identified and mobilizing external resources were negatively correlated, which means that the greater the number of opportunities identified by the team is, the more difficult it will be to mobilize external resources.

Table 1. Descriptive Statistics and correlations of the variables

	Mean	S.D	1	2	3	4	5	6	7	8	9	10
1 Age	38.5	4.30	1.00									
2 Team size	3.63	1.10	.13*	1.00								
3 Education level	3.2	.84	. 009	.04	1.00							
4 Entrepreneurial experience	.62	.48	-.08	-.08	-.03	1.00						
5 Managerial experience	3.02	1.16	.004	.05	.04	.023	1.00					
6 Network size	3.77	.76	-.01	.02	.02	.081	-.11	1.00				
7 Strong ties	.55	.49	.15*	-.05	-.01	-.003	.002	.2**	1.00			
8 Weak ties	.72	.44	-.02	-.14*	-.009	-.022	.10	-.02	.03	1.00		
9 Entrepreneurial opportunity identification	2.42	.67	-.11	-.14*	-.09	.066	.01	.13*	-.05	.17**	1.00	
10 External resources mobilization	3.90	.94	-.15*	-.20**	-.27**	.32**	.18**	.24**	.22**	.12	-.01	1.00

*. Correlation is significant at the 0.05 level.

**. Correlation is significant at the 0.01 level.

Hypotheses 1 and 3: Entrepreneurial opportunity identification

The results of the ordered probit analysis regarding entrepreneurial opportunity identification are presented in Table 2. Deviance as indicated by the log likelihood coefficient is a "badness-of-fit" measure, and weak "explanatory" models generally report higher deviance coefficients. The pseudo-R^2 coefficient provides an indication of the "explanatory" power of the model. This Table provides information about factors that had influenced the number of entrepreneurial opportunities identified. We note that the identification of entrepreneurial opportunities was significantly and negatively influenced by the education level. Moreover, the results of the marginal effects revealed that while the education level increases by one unit, the probability of the respondents group who identified "two opportunities" increased by 2.45%, while the probability of being part of those who discovered "3 or

more opportunities" decreased by 3.36%. Against the probability of being in the group who identified "one opportunity" was low.

In addition, we found that managerial experiences had significantly and negatively influenced the number of entrepreneurial opportunities identified by the Tunisian entrepreneurial teams. Therefore, the analysis of marginal effects showed that when managerial experience increases by one unit, the probability of the respondents group who identified "two opportunities" increases by 0.8%. While the probability of being in the respondents group who identified "three or more opportunities" decreased by 1.08 %.

Entrepreneurial experiences influenced positively the entrepreneurial opportunity identification at a confidence level of 99%. Moreover, an increase by one unit of these start-up experiences increases the probability of being part of the respondents group who identified "three or more opportunities" by 0.89%. While the probability of being in the group that discovered "two opportunities" decreases by 0.67%.

Two variables were used to measure social capital in entrepreneurial teams. These were the social network size and the weak ties. These two variables influenced significantly and positively opportunities identification at a confidence level of 99%. When the network size increases by one unit, the probability of being in the respondents group who identified "two opportunities" decreases by 0.14%, while the probability of being in the respondents group who identified "three or more opportunities" increases by 0.19%. However, the probability of being part of entrepreneurs who discovered "one opportunity" was not significant.

Table 2. Ordered probit model

Variables	Coefficients	S E	P value	Marginal Y= 1	Effects Y= 2	Y= 3
Age	-0.0524	0.0195	0.0074	-5,51931E-07	0,0045	-0,0065
Team size	-0.1666	0.0842	0.0480	-1,43961E-06	0,0047	-0,0063
Education level	-0.4371	0.1127	0.0001	-2,14015E-05	0,0245	-0,0336
Entrepreneurial experience	0.5847	0.1721	0.0007	-6,81601E-06	-0,0067	0,0089
Managerial experience	-0.2485	0.0754	0.0010	-3,69374E-06	0,0080	-0,0108
Network size	0.4293	0.1285	0.0008	-1,05208E-06	-0,0014	0,0019
Weak ties	0.7024	0.1892	0.0002	-8,53222E-06	-0,0070	0,0093
Akaike info criterion	1.631794					
Log likelihood	-174.5768					
(Pseudo-R2)	0.177621					

The marginal effect analysis revealed that while weak ties increase by one unit, then the probability of being part of entrepreneurs who identified "two opportunities" decreases by 0.7 %. Whereas the probability of being in the group who identified "three or more opportunities" increases by 0.93 %.

Hypotheses 2 and 4: mobilization of external resources

Table 3 contains the results of the regression analysis. This Table shows that the explanatory power of the model is acceptable (adjusted R^2 = 0.336, p < 0.001) and the global significance allows to reject the null hypothesis which states that the coefficients are all zero (F = 17.211, p <0.001). The results of this model confirm that the relationship between the human capital attributes of entrepreneurial teams and the mobilization of external resources was statistically significant at a confidence level of 99%.

As expected, prior entrepreneurial experiences and prior managerial experiences were positively related to the mobilization of external resources (respective coefficients: 0.52 and 0.18, p < 0.001). This result implies that the higher the prior entrepreneurial experience and managerial experience are, the easier the access to external resources by entrepreneurial team is. While the education level was negatively related to the dependent variable external resources mobilization. These results confirm our hypothesis 2 related to human capital (with the exception of education level).

Table 3. Regression Model of external resources mobilization variables

	External resources mobilization			
	Coefficients	**S E**	**t-Statistic**	**Probability**
Age	-0.0295	0.0122	-2.4070	0.0169
Team size	-0.1369	0.0475	-2.8813	0.0044
Education level	-0.3030	0.0610	-4.9668	0.0000
Entrepreneurial experience	0.5273	0.1070	4.9276	0.0000
Managerial experience	0.1814	0.0446	4.0617	0.0001
Network size	0.2706	0.0693	3.9003	0.0001
Strong ties	0.3619	0.1070	3.3792	0.0009
R^2	0.3569		Durbin-Watson	1.4624
Adjusted R^2	0.3362		N	225
F	17.211			
Prob(F-statistic)	0.0000			

The social capital of entrepreneurial teams represented by the social network size and strong ties has significantly influenced the external resources

mobilization at a confidence level of 99%. As expected, the social network size and strong links have positively influenced the access to external resources (respective coefficients: 0.27 and 0.36, $p < 0.001$). This implies that the higher the number of strong ties and the larger the network size are, the easier the access to external resources is. These results confirm our hypothesis 4.

DISCUSSION

Our empirical study examined the influence of human and social capital related variables of entrepreneurial teams on opportunity identification and external resources mobilization.

Entrepreneurial opportunity identification

The results of ordered probit model show that variables which represent the human capital of entrepreneurial teams have significantly influenced the identification of opportunities. Shane and Venkataraman (2000) showed that entrepreneurs with higher levels of human capital are more likely to discover perceived opportunities as sufficiently attractive to start their own business.

Prior entrepreneurial experience has positively influenced the number of entrepreneurial opportunities identified. In the same vein, Ucbasaran et al. (2009) have confirmed, based on a sample of 630 entrepreneurs, that experienced entrepreneurs identified and exploited more opportunities than novice entrepreneurs. However, the study of (Bhagavatula et al., 2010) confirmed that managerial experiences negatively affected the identification of entrepreneurial opportunities, which proves our result for prior managerial experiences. Davidsson and Honig (2003) explained this result by the fact that managerial activities may foster routines that do not facilitate the opportunity recognition and the allocation procedures that are not adapted to the successful entrepreneurial exploitation.

The third variable of human capital that has a negative influence on the entrepreneurial opportunity identification is the education level. Two possible explanations for this result: the discovery of entrepreneurial opportunities may require a specific level of education or a specific quality of training, for example entrepreneurship training. Moreover, Davidsson and Honig (2003) have shown that these human capital attributes may affect, in different ways, the opportunity identification process.

Generally, the results of our study showed that the human capital represented by the education level, prior managerial experiences and prior entrepreneurial experiences, played a key role in identifying entrepreneurial opportunities.

The entrepreneurship literature considers social networks a key factor in the business success. Our results confirmed the role of the network size, which positively influenced the number of entrepreneurial opportunities identified by the entrepreneurial teams. Furthermore, the team members with larger networks will benefit from a greater access to information which allows them to benefit from new ideas and opportunities (Burt, 2004; Obstfeld, 2005). Similarly, Ardichvili, Cardozo & Ray (2003) showed that the success of identifying opportunities is associated with the existence and the use of an extended social network.

In addition, our results concerning the nature of social networks showed a positive impact of weak ties on the ability of entrepreneurs to identify opportunities. According to Granovetter (1983), weak ties can be considered bridges to the new differentiated information, that gives entrepreneurs a better chance to recognize opportunities (Hill, Lumpkin & Singh, 1997). Also, Arenius and DeClercq (2005) showed that, entrepreneurs who maintain weak ties have identified a higher number of entrepreneurial opportunities than those who have strong ties.

Thus, our study shows the importance of social capital in identifying entrepreneurial opportunities by entrepreneurial teams. The larger the social network of entrepreneurial teams and the higher the number of weak ties are, the greater the number of entrepreneurial opportunities identified is.

External resources mobilization

The human capital attributes of entrepreneurial teams have significantly influenced the mobilization of external resources. Prior entrepreneurial experiences and prior managerial experiences of the team members allow them an easy access to external resources. Beckman, Burton & O'Reilly, (2007) showed that the probability of obtaining financial capital increases with prior managerial experiences acquired by the founding team or the management team. In addition, individuals with prior start-up experiences are likely to be aware of the resources needed to create a successful venture. These experiences also enable entrepreneurs to have more information and knowledge to choose the resource holders (Kotha and George, 2012).

Therefore, individuals with prior entrepreneurial experiences can require a high quality level for their subsequent business (Gimeno, Folta, Cooper & Woo, 1997), the value of these companies will be, on average, higher than businesses founded by persons who have no prior entrepreneurial experiences (Kotha & George, 2012). While Beckman et al. (2007) showed that the chances of acquiring financial resources decrease for founding teams or management teams who have prior entrepreneurial experiences.

The last variable of human capital is the education level that has negatively influenced the access to external resources. Audretsch and Lehman (2004) showed that, in a sample of 341 German companies, the number of management team members who have a doctoral degree has no impact on access to financial capital. This result may partly explain our results with entrepreneurial team members who had a secondary or higher education level. However, Engel and Keilbach (2007) confirmed that the education level of founders crucially influenced the chance to receive financial resources from resource holders.

Thus, our results showed that the social capital of entrepreneurial teams represented by the networks size and strong ties plays a key role in mobilizing external resources. The higher the number of social relationship is, the more the entrepreneur will be able to have relations with bankers, credit institutions and resources holders. These links enable entrepreneurial teams to easily access external resources and at lower costs. In the same way, the studies of (Birley, 1985; Hulsink & Elfring, 2003) showed that the larger the networks of entrepreneurs is, the easier the financial resources acquisition is.

Furthermore, the results of our study showed a positive influence of strong ties on external resources mobilization. Therefore, this result reflects the importance of family relationships and friendships in the creation and support of new businesses ((Ruef, Aldrich & Carter, 2003). Similarly, Kotha and George (2012) found that family ties raise the count of personal resources that the entrepreneur can obtain. Furthermore, Bhagavatula et al. (2010) confirmed, on a sample of 107 entrepreneurs in the handloom sector, that strong ties play a crucial role in the resources acquisition process which is a key entrepreneurial process affecting the company performance.

While our study extends the entrepreneurial literature by the results found that support the importance of human and social capital to identify opportunities and to mobilize external resources, however, these results can be generalized to all Tunisian entrepreneurial teams given that our survey was carried out in the Sfax region.

Although several studies have analyzed the factors related to the mobilization of resources, a small number of researches have focused on opportunity identification by entrepreneurial teams. Our results confirm the value of prior entrepreneurial experiences and weak ties to identify a high number of opportunities. In addition, access to different resources was facilitated by informal links as well as specific human capital. These results have implications for financiers. In fact, many resource holders require prior experiences as a feature of entrepreneurs who can receive a credit bank. Future research may focus on the nature of opportunities identified by entrepreneurial teams and the ways to exploit these opportunities.

Conclusion

Identification of entrepreneurial opportunities and mobilizing external resources are two key processes for any entrepreneurial project. The review of the literature on entrepreneurial teams revealed the lack of research carried out on this type of company. The purpose of this study was to empirically examine the relationship between various dimensions of human and social capital of Tunisian entrepreneurial teams and their ability to identify entrepreneurial opportunities and access to external resources.

This study has some limitations. Since this study observed one ethnic group, these findings can be specific to their contexts. The results might differ in other entrepreneurial teams from developed countries. In fact, human capital attributes and dimensions of social capital can be different across countries. Finally, in our study we restricted the analysis to internal factors of entrepreneurial team affecting the identification of entrepreneurial opportunities and the mobilization of external resources. However, there are other external factors to the entrepreneurial team such as the economic and political environment that may encourage or impede the detection and exploitation of entrepreneurial opportunities as well as obtain external resources.

Furthermore, apart from the empirical value contribution of entrepreneurial experiences in identifying entrepreneurial opportunities and mobilizing external resources, this study provides some theoretical contributions. First, we suggest that the specific human capital of entrepreneurial team members allows them to overcome the problems of resource evaluation. Second, our study shows the role of strong ties of entrepreneurs in the resources mobilization for the exploitation of entrepreneurial opportunities. Therefore, the problem of the necessary resources mobilization can be mitigating through prior experiences and informal social relations.

Future research on entrepreneurial teams can continue with our ideas to highlight the importance of human capital and social capital throughout the various phases of the entrepreneurial process, for example, to study the impact of human and social capital on the growth and success of entrepreneurial teams.

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Abstrakt (in Polish)

*Zespoły podejmujące działania przedsiębiorcze odgrywają niezwykle ważną rolę
w rozwoju każdego kraju, a zwłaszcza w krajach rozwijających się. Aby zrozumieć te
zespoły, które działają w tradycyjnych przemysłach, opartych na mniej zaawansowa-
nych technologiach, przeprowadzono badania dotyczące wpływu perspektyw siecio-
wej i związanej z zasobami ludzkimi na przedsiębiorczość. W artykule badamy w jaki
sposób kapitał społeczny i ludzki członków tych zespołów wpływa na ich zdolność roz-
poznawania szans przedsiębiorczych oraz mobilizacji zewnętrznych zasobów. Artykuł
poszerza wcześniejsze badania na dwa sposoby. Po pierwsze, wykorzystuje metodę
probit do pomiaru liczby zidentyfikowanych szans biznesowych na poziomie zespo-
łów przedsiębiorczych. Po drugie, zgodnie z naszą wiedzą, jest bardzo niewiele opra-
cowań, które teoretycznie i empirycznie analizowały zagadnienie mobilizacji zasobów
zewnętrznych, zwłaszcza w odniesieniu do działalności zespołów przedsiębiorczych.*
Słowa kluczowe: *zespół przedsiębiorczy, szanse przedsiębiorcze, zasoby zewnętrzne,
kapitał społeczny, kapitał ludzki.*

Customer Involvement in the Game Development Process[1]

Kaja Prystupa-Rządca[2], Justyna Starostka[3]

Abstract

The creative industry is a fast developing sector of economy in many countries. Growing competition in this area has led many companies to implement strategy of users' involvement in product development in order to deliver products that are more aligned with customers' needs. On the other hand, the attempt to align the customers' expectations with artistic creativity may create tensions. Therefore, the aim of the research is to examine the methods of users' involvement in product development and real impact of the users on project design. The obtained findings are based on two-year qualitative research project conducted in game development companies.

Keywords: *user involvement, game industry, new product development.*

INTRODUCTION

In recent years, creative industries have become increasingly important to the economies of countries. Creative industries include those creative enterprises that are oriented especially towards the market and engage in creation, production, distribution and/or transmission of creative goods and services through the media (DCMC, 2008). According to the European Commission, the future of Europe lies in leadership in the area of creativity and innovation, as it is "*an essential part of a post-industrial economy, which is increasingly demand-driven, user-centered and which is more focused on the experience taken out of products and services*" (Tera Consultants, 2010).

Companies that operate in these sectors are struggling with the challenge of how to combine creativity (i.e., artistic activity) with expectations and needs of the customers, whose voice must be taken into account. The process of identification of customer needs is becoming increasingly difficult (Cavusgil,

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Calantone & Zhao, 2003), as managers are facing a new generation of buyers who expect higher product value as well as a more precise fulfillment of their needs. As a result of these changes, one fast-developing trend is the growing importance and role of consumers in the activities of companies (Prahalad & Ramaswamy, 2004b; Ramaswamy & Gouillart, 2010). This is especially evident during activities related to new product development processes (Hoyer, Chandy, Doroti, Kraff & Singh, 2010; Janssen & Dankbaar, 2008).

Often, companies decide to "transfer" design/creative activity from the company to the customers. From the business perspective, this is a profitable solution (Hippel, 2006). Arguably, however, user involvement can be contradictory to the artistic spirit of a design team. Work in game development companies is a perfect example of such tension. On the one hand, game designers want to create a "masterpiece", demonstrating their creativity and artistry; on the other hand, the game has to meet the needs of users, so some trade-offs are necessary (Prystupa-Rządca, 2014).

Therefore, the purpose of this article is to examine how game development companies introduce users' involvement into the process of game development. We attempt to answer two research questions: (1) what are the methods of user involvement in the process of game development and (2) in what way the voice of the consumer affects the work of the design project team?

In the first part of the article, we present an overview of literature in the area of changing customer engagement in the new product development process. In the second part, we outline characteristics of the game development process. In the third part, we describe methods of our inquiry and our rationale for choosing particular cases. Finally, in the fourth part, we describe two organizations that have used users' involvement in game development process.

LITERATURE REVIEW

Role of users in new product development

The concept of co-creation is an emerging area of study in business, marketing and innovation research; it describes how customers and end users can be involved as active participants in the design and development of personalized products, services and experiences (Prahalad & Ramaswamy, 2004; Etgar, 2008; Payne, Storbacka & Frow, 2008). It is based on the development of customer participation platforms, which provide firms with the technological and human resources, tools and mechanisms to benefit from the engagement experiences of individuals and communities as a new basis of value creation

(Tanev et al., 2010). Currently, it is essential for companies to start engaging customers more actively (Prahalad & Ramaswamy, 2004, p. 7).

We can identify several emerging streams of discussion in the area of the value co-creation research. Of these, three seem to be the most common: (1) the general management perspective (Prahalad & Ramaswamy, 2000; Prahalad & Ramaswamy, 2004; Etgar, 2008; Payne et al., 2008; Ramaswamy & Gouillart, 2010); (2) the service-dominant logic (SDL) perspective (Vargo and Lusch, 2004; Vargo, 2008); and (3) the new product development perspective (Fang, 2008; Thomke & Hippel, 2002; O'Her & Rindfleisch, 2010). In this article, we contribute to the last of these perspectives, as we try to identify and explore the role of users in the new product development process. As we can identify in the literature, although the body of research is growing, relatively little is known about how customers engage in the co-creation of value (Payne et al., 2008).

Traditional ways of customer involvement

There are many forms of customer participation. Kaulio proposes three stages of customer development: design for, design with and design by (Kaulio, 1998). At the 'design for' level, customer data are the only input in the design process. At the 'design with' level, during market tests different solutions/concepts are shown to customers, allowing them to react to and select or reject different proposed solutions. Finally, the 'design by' level is the participatory stage, where customers actively participate in the design process (Kaulio, 1998). Other authors have shown that, during the new product development process, customers may play two distinct roles (Fang, 2008): (1) as information providers and (2) as co-developers.

In the traditional approach, customers are treated as a source of information. This concept can be understood in different ways. For example, using Kaulio's stages of customer development mentioned above, the design for and design with stages fall into this category (Kaulio, 1998). The main tool for collecting data about the needs and expectations of customers is marketing research, in which customers' role is limited to that of information providers who deliver feedback. The literature provides many different methods of market research that can be used during the NPD process, ranging from simple interviews or focus groups (Greenbaum, 1998) to more advanced techniques like conjoint analysis or SIMALTO (Green & Srinivasan, 1990; Orme, 2005). Many researchers also identify listening to complaints as a valuable source of information about customers' needs and expectations, especially those that are unmet (Resnik & Harmon, 1983; Tax, Brown & Chandrashekaran, 1998).

Although they are grounded in theory, these methods are often faced with criticism. The exchange of information between the company and the user is iterative in nature and may occur repeatedly until the product meets the expectations of the surveyed users. Some researchers show time extensions, increasing costs of product development, and limitation to a relatively small sample of the market as the major drawbacks of this approach (Mahajan & Wind, 1992, p. 143). The obtained information is inherently ambiguous, as consumers often are unable to articulate their needs clearly, or their needs may change as they proceed to use a given product (Rosenberg, 1982). Moreover, the perception of users is limited to current products and solutions, as they cannot imagine and give honest feedback about something they have not yet experienced (Leonard, 2002).

Co-creation with customers

The more advanced form of customer involvement is to treat them as co-developers. This trend is often called the democratization of innovation (Hippel, 2006). Companies have started to look for other ways to increase the efficiency and effectiveness of their innovation processes. For instance through active search for new technologies and ideas outside of the firm, but also through cooperation with suppliers and competitors, in order to create customer value. One example of this is the "Connect and Develop" strategy of Procter & Gamble, through which more than 50% of new product ideas come from outside the company (Huston & Sakkab, 2006; Sakkab, 2007).

Using the customers-as-innovators approach, a supplier provides customers with tools so that they can design and develop the application-specific part of a product on their own. This shifts the location of the supplier/customer interface, as the trial-and-error iterations necessary for product development can now be carried out by the customer only (Thomke & Hippel, 2002).

The most advanced method of customer involvement is to create a toolkit for user innovation (Franke & Piller, 2004). Such toolkits are coordinated sets of "user-friendly" design tools that enable users to develop new product innovations for themselves (Thomke & Hippel, 2002). They give users real freedom to innovate, allowing them to develop producible custom products via iterative trial and error. Through toolkits, users can create a preliminary design, simulate or prototype it, evaluate its function in their own user environment, and then iteratively improve it until they are satisfied. As a result, the construction and testing of the product shift from the company to the user, thus bypassing the lengthy process of "guessing" customer preferences within the company.

Hippel shows that most user-developed products and product modifications are developed by lead users. These are members of a user population with two distinguishing characteristics: (1) They are at the leading edge of an important market trend and thus are currently experiencing needs that will later be experienced by many users in that market, and (2) they anticipate relatively high benefits from obtaining a solution to their needs and thus may seek to innovate (Hippel, 2006, p. 38). The toolkit approach works at the individual user level. In many cases, however the consumer community can be developed. Many researchers indicate that individual users do not have to develop everything they need on their own; rather, they can benefit from innovations developed and freely shared by others (Hippel, 2006).

Role of users in game development

The game industry is a rapidly developing sector of world economy, which exceeded 79 billion dollars in 2012 (Gartner, 2013). This pace of development was induced by the emergence of online distribution and new gaming platforms (mobile and social platforms), which created a space for smaller organizations.

Game development is considered a risky business venture due to rapidly changing industry trends and nuanced customer preferences (Prato, Feijoo, Nepelski, Bogdanowicz & Simon, 2010). To minimize such risk, companies typically test their products prior to official launch. For small companies, the need for a rigorous testing phase is even more essential, as they depend much more on the success of each individual game than large corporations do. This is because they have much more limited financial and personal resources and thus are more prone to the risk of failure and bankruptcy (Dovey & Kennedy, 2011).

Often, small companies invite individuals from outside the organization to test their products, using different strategies of their implementation onto the project. They vary in their decisions regarding when and from where to engage outsiders, how to communicate with them, and how they should protect their product legally (Latusek & Prystupa-Rządca, 2014).

Smaller organizations with limited budgets that cannot afford to pay testers may decide to use innovation communities, which may be defined as "as a group of unpaid volunteers who work informally, attempt to keep their processes of innovation public and available to any qualified contributor, and seek to distribute their work at no charge" (Flemming & Waguespack, 2007, p. 166). The development of the Internet has allowed companies to maintain closer relations with their clients through forums and online communities (Kerr, 2011).

Game development is conducted in the same way as project development. There are various methodologies for the production process; however, the most common is Agile (Cohen & Bustamante II, 2010), which involves game development without a prior complete definition of a project's milestones. Therefore, it is possible to flexibly adjust the product to changing market trends. Initially, only a basic plan for the project implementation is constructed, and the details emerge later at each milestone. This methodology is based on project management with frequent supervision of requirements and solutions and with parallel processes of adaptation. The project is conducted in iterations, which means that, at each stage of production, the game is tested, appropriate requirements are collected and solutions are found. Game development is composed of four phases:

1) Concept development- decision about type of the game and targeted segments.
2) Preproduction – strategic plan of implementation, division of responsibilities, demo version.
3) Production.
4) Testing phase:
    a. Alpha: development of basic structure of the game.
    b. Beta: tests of a fully playable game.

Research methods

The aim of this study was to examine the role and nature of customer engagement in the game development through an innovation community. To gain deep knowledge and observations about the development process, we used an interpretative qualitative approach based on grounded theory (Glaser & Strauss, 1957) and the case study method (Yin 2003). According to the latter, the choice of the unit of analysis is subordinate to the purpose of the research; hence, it is not random but is a result of a conscious selection process. To achieve our main goal and to explore different approaches, we decided to conduct and compare two case studies. Basic characteristics of the companies are presented in Table 1.

The first case presents a small company called Cubicon, which, despite very limited financial resources and a lack of reputation in the occupied segment, was able to achieve immense success on a global scale with their first product. DAX is the opposite example, being a medium-sized company with a developed reputation and a large amount of financial resources, which allowed them to experiment with different testing tools.

Table 1. Basic characteristics of the examined organizations

Basic characteristics	Cubicon	DAX
Scale of export activity[4]	98%	40%
Age at the time of inquiry (in years)	1,5	7
No. of employees	4	30
Segment	Visual novels[5]	Hardcore social[6]

The techniques of data collection are presented in Table 2. Internet forums, blogs, Facebook pages, Twitter and YouTube were the means of communication between the companies and their consumers. Therefore, electronic data were indispensable for the inquiry.

Table 2. Data collection techniques

Data collection techniques	Cubicon	DAX
Semi-structured interviews	4	3
Blogs (pages)	129	0
Internet forums (posts)	2689	5600
Facebook pages of organizations (posts)	134	140
Twitter (posts)	4768	0
YouTube channels (videos)	7	0
Documentation (pages)	0	86
Notes taken during interviews (pages)	15	18
Literature indicated by interviewees	Gaming portals devoted to specific platforms and segments	
Press releases about investigated organizations	Industry reports, reviews, publications and press interviews with companies' employees	
Segment Participation in industry meetings	GameDay EXPO 2012 Game Industry Trends 2012	

The interviews were conducted in the period of April-June 2012, and the documents used in the analysis were from the period between 20-11-2006 and 29-07-2012 (approximately 643 pages of documentation).

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4 Scale of export activity was defined as percentage of turnover that comes from abroad.
5 Visual novel genre: Static game that resembles a multimedia novel or theatrical performance. Most of these offer statistics tracking, requiring the player to build his or her statistics in order to continue the story.
6 Hardcore social genre: Games that are targeted at skilled players but require less engagement than core games. They use social platforms as a vehicle for playing.

Data were coded and analyzed using the qualitative research software Dedoose. To maintain the credibility of the results, the authors used the data triangulation method. The identities of the interviewees in the text are coded according to the agreement between the researchers and the organization under its study.

ANALYSIS/STUDY

Case study 1: Cubicon
About the company

Cubicon was a small game development company that was launched in 2011 by a young Polish game designer named Greg and his former coworker, a graphic designer named Lena. In addition to its founders, it employed only two full-time contractors, both of whom worked with the company from a distance: a Norwegian programmer who had become acquainted with Greg through an online community devoted to Greg's first game, Wizzardy, and who had already had a chance to work on one project; and a British music composer who had also worked earlier with Greg and maintained contact with him through online community.

Means of users' involvement
Communication with users

Having limited experience in the development of visual novels, Greg decided to engage a gamers' community in the production process. The demo version of the game had been posted on the website and made freely available for download. To communicate with gamers, he used his website with the company's blog and online forum. On the blog, he detailed the game development and posted images from the game in order to get feedback. He started using the online forum after five months of productions. He announced the new thread about the game as follows:

Posted by Greg on Mon May 09, 2011 1:09 pm

"The Snow White should be out in just few months from now, so I think it's the right time to start a forum section about it. If you have any questions or suggestions regarding the game, please feel free to post them here. As always, I'll do my best to answer as soon as possible."

The forum was open to anyone interested in Greg's productions and required only simple registration. Forum participants originated from different countries (see Table 3). As the forum was primary dedicated to the genre of RPG games, the fans of visual novels started to join gradually.

Information about the new visual novel production began to spread through various online communities, where the participants who were interested in this genre constituted a rather small group of which most members knew each other through online interactions.

Table 3. Bios of some lead users

Participant	Description
A	Game producer with 12 years of experience in the industry; journalist of one of the biggest international game portals; winner of East Design Contest
B	23-year-old biology student; fan of RGP and visual novels living in the U.S. (California)
C	23-year-old American studying Japanese linguistics in Japan; fan of visual novels
D	18-year-old American; started playing RPG games; fan of visual novels
E	20- year-old American poetry lover; lives in the Eastern U.S.
F	Australian with a university degree in programming ; tried to develop games on his own

On the forum, a post calculator was installed that enabled tracking of the frequency of each member's participation in discussions. The number of posts written on the forum determined the rank of each participant. Thus, testers could easily determine the engagement of others participating in community discussions. Moreover, being active on the forum allowed participants to build a reputation among gamers.

Users' influence on product development
Game concept
Cubicon's team decided to design games for the visual novel niche genre, targeting the segment of well-educated women aged 20-35. Most clients from this niche were from the United States. The company's owners decided to choose this particular genre due to several advantages it offers, despite their lack of experience in developing such games. For example, visual novels have lower production costs and can be developed more quickly than other games. In order to compensate for their lack of knowledge and experience, the founders conducted extensive market research by reading different forums, blogs and playing games.

Preproduction
Following their research, the founder produced a demo version of a game which they published on the company's website and informed potential

customers through online forums devoted to visual novels. Additionally, they sent the demo to one of the most renowned game developer in the segment to ask him for his opinion and directions.

Production process

During the production process, Greg consulted with gamers about the game on a regular basis.

The founders planned to finish the first version in six months. Unfortunately, after seven months the company began to lack financial resources. After consulting with the gamers' community, Greg decided to launch pre-orders for the game. Pre-ordering allowed users to receive a preview version of the game, to participate in beta testing, and to receive the final game earlier than other gamers. This move allowed the company to continue to work on the game for several months. In addition, Greg began to recognize how many gamers were interested in his production.

Testing

When the first version of the game was completed, Greg invited the pre-order participants to test it. Volunteers received the activating token to the game via email. The beta testing phase was perceived as crucial in game development. As Lena stated:

"If someone claims that he doesn't need to conduct beta testing, he is completely mistaken. (…) Testers play and complain, but for us it is very helpful. Then we publish the product, which is more refined than if we had made it on our own. In my opinion, a good game cannot be produced without beta tests. The beta tests check the gamers' reactions rather than ours; we are often blind to issues because we developed the game."

For Greg, this phase was crucial. He had seen the failures of developers who did not spend adequate time on beta testing. For Cubicon, it brought additional benefits, as the company did not have experience in visual novel development. Through testing, they were able to gain valuable knowledge about the market specifics. The company lacked financial resources and time to develop software which would monitor gamers' behavior. Therefore feedback gathering was limited to online forum conversations.

The game had a number of problems. One of the most serious of these was that the game did not work on older PC computers and notebooks with an integrated graphics card (it was around 20% of the market). Greg found out that this was the fault of the game engine and needed the help of the programmers from the game engine supplier.

Each day, Greg read the forum and was working on proposed corrections. It took a lot of time and effort, as he tried to reply to everyone; he did not want any of the gamers who had devoted their time to helping with this project to feel ignored. However, he did not agree with all the suggestions. There were two main reasons for this. First, he knew that gamers are not always aware of what they want, as Greg highlights in the following quote:

"The tester says that he doesn't like the black knight. But the black knight is not the issue; it is the second scene (…) I have to move the second scene after the third one... and the problem disappears. Similarly, people think that they want to play difficult games and win at the same time. (…) this game has to appear to be difficult, but they need to be able to win. If they lost, they would throw the pad away and say that the game is [worthless]. But on the forum, they state that they want it to be difficult. (…) fans do not know what they want. Sometimes you need to read between the lines to understand the problem. With experience it comes easily; it is simply a professional issue."

Secondly, Greg was eager to introduce some innovations to the genre of visual novels, some of which were not understandable for all gamers. For instance, many people advised him to erase lip movement. It was not a standard option in visual novels, so it was not necessary, and it required a lot of extra corrections. However Greg wanted to include it in order to deliver a higher gaming experience.

On the 16th of August, 2011, the new version was ready for testing. The major bugs had been erased, and a tutorial for gamers had been added. Greg wrote on the forum which parts of the game had been changed and asked gamers to test the new version. This time, there were problems with the IOS version of the game, which was modified numerous times. Greg tried to solve this problem by asking the testers to send details about the device and the number of errors. He then corrected the relevant version and sent the corrected version back to the user. Then the tester played the game again and described the effects on the forum.

The gamers suggested adding such functionalities as the possibility of faster scene scrolling and a description of awards and the exact time of their obtainment, Moreover, there was a long discussion on the forum about the tutorial. The experienced visual novel gamers did not like it, claiming that it spoiled the mood. However, they agreed with Greg that it was a helpful solution for the inexperienced players. Finally, the programmer gave the game to his mother to test it. It was the first electronic game she had ever played, and the tutorial was very helpful for her. Greg wanted to broaden the range of possible clients; therefore, he added the tutorial as an option.

The new version appeared in January 2012.

Table 4. Summary of the project development and the users involvement in Cubicon case study

Production phase	Description of the phase	Users' involvement	Type of data acquired	Examples of implication
Concept development	The founders developed the initial game concept based on available information about market and their ideas	None	None	None
Preproduction phase	The team developed the demo of the game which was published on the website and sent to specialists from the segment	At the end of this phase users commented on the demo and proposed changes.	Customers' expectations, Subjective quality, Technical quality	· Ways of speeding up the dialogues, music in crucial parts of the game
Production	Greg divided work into milestones and the team started to implement it gradually	Greg was taking advice from users about issues the team had doubts about.	Customers' expectations, Subjective quality, Artistic creation[4]	· Presenting two types of dress of the main character
Testing	Greg and the team were implementing changes that were suggested by the players (selectively)	Purchasers of pre-order had full access to the latest game version. They were playing and delivering feedback to Greg via forum.	Customers' expectations, Technical quality, Subjective quality, market trends	· A special icon signalizing that the action could follow the other way; · Small icons for each character distinguish them to more clearly; · Awards for finished levels visible in the main menu; · An auto play option; · The option of faster reading, which was strongly suggested by the readers; · New visual and sound effects

The involvement of gamers in the development process brought significant changes to the game. In the end, the game became much more detailed and sophisticated that it was envisioned to be in the first phase of concept development. Greg analyzed the final version of the game in comparison to the initial plan and outlined a number of changes that were made thanks to users' involvement in testing. For instance, there was a major

change of the nature of the main character. The testers suggested that she was too neutral, so Greg decided to shape her character through decisions made during the game. She could become cruel and calculating or warm and kind depending on earlier player decisions.

To sum up, in the Cubicon case study, users were involved in the preproduction, production and testing phases of the new game development process. However, different types of users (specialists or lead users; everyone with open access via the forum; and users who bought the pre-order version of the game) were involved in different ways (see Table 4).

Case study 2: DAX
About the company

DAX was launched by four former employees of a large IT consulting company who saw the potential in the market of mobile games. Primarily, they focused on localization games (i.e., games that use the localization function of mobile telephones). Games were dedicated to the segment of core gamers. After a few years of functioning, they started to collaborate with the biggest Polish game development studio, DevTa, on a mobile game that aimed at worldwide promotion of their well-known game title in Poland. This experience made DAX visible to publishers on the international market and opened possibilities to participate in various contests. However, when the segment of games produced by DAX slowed down its pace of development, the company struggled with financial instability and finally decided to conduct a strategic shift focusing on the newly emerging segment of social games.

The founders had not previously worked in the gaming industry, so they lacked the necessary experience to effectively develop games.

Means of users' involvement
Communication with gamers

DAX used an Internet forum and Facebook page as the main forms of communication with users. The forum was divided according to products that were developed by the company. The company's website was barely used by DAX – the data had not been refreshed for two years. The forum required only simple registration with basic user information and no personal data provided about the gamers. From the off-topic conversations it could be deduced that most of the users were core gamers. Similar to Cubicon, a post calculator was used.

Users' influence on product development
Preproduction

From the beginning, DAX management planned to offer the game in "free-to-play" mode, which meant that the basic version of the game was available for free but additional functionalities (i.e., weapons, bullets or other equipment) required in-game purchases. The logic of this selling option differed from the one used by the company previously. It was not only important to attract many gamers but also to strongly involve them in playing so that they would constantly play and purchase additional functionalities. One of the company managers reflected on this as follows:

"What we were interested in was to keep the player for 1,2 or even 3 months in the game. The longer we keep him, the longer he plays and the greater the possibility that he will buy something. It is like the supermarket. It is one thing to make people come and another to get them to pack a basket and pay when they leave."

The game concept was based on a Polish board game, which had previously been physically published by the publishing house Portal, with which DAX collaborated in the past. The game was called Daniello.

However, DAX was initially unable to start the development phase, as the company did not have sufficient financial resources. Most of its products were realized together with partners. That was the case of Daniello as well. A few weeks after the initial game concept development, the managing director, Bart, was informed about a competition organized by the global publisher Monelion with a prize of $1 million. There were 114 companies registered from 25 countries. DAX sent its application at the very last moment. In two days, they were informed about winning the competition.

DAX used a formalized development process divided into two phases: pre-production and production.

The aim of the pre-production stage was to create a game concept and explore the risk analysis connected with the game development. Moreover, the team was able to verify whether the game was responding to market demands, because the company was presenting the idea to the customers. Feedback collected from gamers allowed the company to save time and finance resources. During this stage, a team of selected employees and company management were formed. The creative director was responsible for market analysis and business risk analysis. The game designer, along with a graphic designer, were responsible for the risk analysis of the gameplay and graphic style.

As part of the market analysis, DAX sometimes conducted interviews with lead users (i.e., the most devoted fans of the company). As noted in an internal company document:

"The most reliable method of market analysis is that of in-depth interviews with gamers conducted in accordance with qualitative methodology (…) If there is no possibility of conducting them, you need to answer questions prepared for an interviewee using your knowledge and knowledge built from benchmarks."

The subjects of the interviews were gamers' preferences, motivation and skills. After the interviews, a report with detailed analysis was prepared, and the first prototypes were designed. Prototypes were made with minimal effort designed to verify only the specific issues. For instance, designers created a simple flash game interface in order to present game mechanics. Often several prototypes were developed simultaneously. For instance, if potential problems were identified with the server performance (technology), the climate of the game (aesthetics) and the main mechanism of the game (gameplay), then three prototypes were built to verify these issues.

Prototypes were displayed to users and then a series of observations and in-depth interviews were carried out. Earlier inquiry would have been impossible, as noted by the lead designer:

"You cannot ask the user earlier about the product. (…) Methods that are frequently used by companies, such as focus tests before the creation of a product, do not work here."

After receiving feedback, the team conducted brainstorming sessions and made more conscious decisions about methods of product development. The pre-production usually lasted for two to three weeks, and it was estimated that at least three team meetings with prototypes presentation and market verification were needed.

Production

The primary objective of the production phase was to launch the product to the market. The pre-production aimed at ensuring the accomplishment of project objectives set in the pre-production phase.

The production process was structured similarly to the pre-production process; it was iterative in nature, with verification of progress after each milestone. Only slight changes in the game concept were introduced in order to ensure stability of the project. In the production phase, despite regular contact with gamers, the company consulted on finished parts of the game with participants, publishers or other game development studios – the specialists/lead users.

The management saw the need for frequent verification of the game project with market needs, as the trends were dynamically changing:

"For social or mobile games, one year is a lot. (…) We conduct tests all the time. Every two weeks, we have a playable version of a game, and we show it frequently to the audience."

In DAX, the team experimented with innovative methods of user research, such as brain waves analysis, to examine gamers' reaction to their products. In this way the company was able to gather substantial quantitative data about gamers' reaction to each scene of the game. Those methods, however, did not prove to be more effective than those previously applied. According to the managing director, the company was not able to use the full potential of such tools.

The lead designer emphasized that in order to acquire useful information from gamers, it was necessary to ask precise and adequate questions:

"We don't ask whether they like it or not. (…) you can get relatively little information from such inquiries. (…) each gamer would have a million ideas and each wouldl be different. It won't be knowledge of high quality. The best approach is to choose one thing you want to test – for instance, whether the mechanism used in fights is intuitive and gives the gamers a sense of control and fun."

After the whole game was completed, the product was given to 100 lead users for beta tests, which lasted two months. This approach allowed the developers to receive immediate feedback and introduce initial necessary changes. The beta testing group was collected from DAX's fans who voluntarily enrolled for tests on the company's forum. In the case of Daniello, the company was mostly concerned with the new mechanics of network infrastructure that it was using for the first time. In the next step, the game was passed on to further beta tests, which were available to a larger audience.

The following is an example of communication between the company's representative and a gamer:

"Gamer: The tutorial is very modest – one short film, so you have to learn almost everything from trial and error. It would be better to do it in the form of a first, short mission during which the gamer tries all the basic options.

The representative: Tutorials will be changed and improved. Ultimately they will be integrated with the game." (09.09.2012)

Another example:

"Gamer: While exploring the buildings there are many symbols (gas mask, a symbol of the atom bomb, rat). Nowhere is it explained what they mean."

The company opened a special system for collecting suggestions, which was available on a separate website, where gamers voted which changes should be made first.

In DAX, users were involved in the production process at the very early stage of the game concept development. Similar to the case of Cubicon, three types of users could be distinguished: (1) specialist lead users (from the gaming industry); (2) lead users (fans of the company); and (3) all interested gamers (via open access). See Table 5.

Table 5. Summary of the project development and the users' involvement in DAX case study

Production phase	Description of the phase	Users' involvement	Types of data acquired	Examples of application
Preproduction phase	The team composed of regular employees and managing director prepared few prototypes of the game concept based on available information about market from different online forums and online press, benchmarking and interviews with gamers	Users were consulting with company about the prototypes and were source of information about market trends.	Market trends, Business objectives, game vision, Subjective quality; Customer expectations Game vision	The company chose the segment for which they developed the game. Users selected from prototypes preferred graphic style, of hardcore social
Production	the game designer divided work into milestones and the team started to implement it gradually	Users were delivering feedback after each completed milestone – on average every two weeks.	Technical quality Market trends Customers' expectations	Game mechanics; Reward mechanisms; motorics during fights
Testing	The managing director and the game designer were deciding about changes to be implemented and advised by gamers and the team was implementing them	In the first round of tests (2 months) limited group of gamers were conducting beta tests. In the second round of tests the game was available tor everyone for tests.	Technical quality Customers' expectations Subjective quality.	mechanics of network infrastructure grammar mistakes additional functionalities balance of game costs. Tutorial Explanation of symbols

Discussion

There are many forms of customer participation. Fang (2008) discusses that, during the new product development process, customers may play two distinct

roles (Fang, 2008): of (1) information providers and (2) co-developers. At the same time the "transfer" of design/creative activity from the company to the customers can be contradictory to the artistic spirit of a design team. On the one hand, game designers want to create a "masterpiece", demonstrating their creativity and artistry; on the other hand, the game has to meet the needs of users, so some trade-offs are necessary (Prystupa-Rządca, 2014).

Therefore, the purpose of this article was to examine how game development companies introduce users' involvement into the process of game development. We attempted to answer two research questions: (1) what are the methods of user involvement in the process of game development and (2) in what way the voice of the consumer affects the work of the design project team?

In regard to the first research question about methods of user involvement, we found out that both game development companies applied the perspective of users as information providers. Interestingly, the recent research (Fang, 2008) postulates for more advanced methods of user involvement. The tools used to gather feedback varied between the companies, due in part to their financial situation. See Table 6.

Table 6. The comparison of methods of users' involvement

Area of customer involvement	Methods used by Cubicon	Methods used by DAX
Feedback gathering	Internet forum	Internet forum, special website, brainwave analysis
Ways of overcoming the drawbacks of applied approach	Filtration of information by experts	Precise questions
Primary user involvement	Demo version of the game	First graphics
Free access to test the product	Demo version	2nd stage of beta tests

Cubicon had only an Internet forum at its disposal, whereas DAX, in addition to information acquired from the forum, had a special website where gamers could vote on the order of implementation of proposed changes and used brainwave analysis.

Both companies were aware of the drawbacks of this approach (i.e., increasing costs of product development (Mahajan & Wind, 1992) and problems with articulation of users' needs (von Hippel, 1986). The management tried to overcome these problems using different techniques. Cubicon specialists, aware that sometimes users do not know what they want,

emphasized that it was very important to listen and gather feedback, but also to analyze what was "the real message" sent by the users. They pointed out that, in order to acquire valuable information from the opinions of users, it was necessary to have experience – that is, tacit knowledge (Polyani, 1967). Meanwhile, DAX specialists highlighted that it was necessary to ask precise questions about features for which they wanted to get feedback, as general questions such as whether a user liked the product or not, were not valuable during the development process.

In game development, the presentation of the idea of the game was insufficient to gather feedback, as the gaming experience was a necessary condition for feedback (Leonard, 2002). Therefore, both companies involved users at the early stages of game development (Cubicon – demo version; DAX – first graphics) and asked users to take an active part in the development process. Thus, companies were able to implement suggestions on regular basis.

In both companies, lead users played an important role in the game development process. Both market specialists and engaged gamers (fans of the company) were invited to product consultation at the beginning of the development process. In later stages of game development, the product was confronted with a larger audience through an open access mode. In the case of Cubicon, a demo of the game was freely available at the company's website and the full version of the game was available to all purchasers of the pre-order. In the case of DAX, open access was available at the second stage of the beta-testing to further develop the game.

In reference to the second research question about the level of customers' impact on the work of the design project team, we found that customers' suggestions were taken into consideration only in regard to some game features. The results of the inquiry revealed that application of such approach stems from the nature of the game development process (Figure 1). On the one hand, it is an artistic product in which designers' "gut feeling", game vision, artistic creation, and a sublime, subjective vision of quality ("flow of the game") is developed. On the other hand, it may be perceived as a commercial product in which the business objectives, customer expectations, technical quality (understood as the "lack of errors") and market trends play the most important role.

Users' involvement was more useful in 'the game as commercial product' area, as they delivered feedback about various errors, some unclear processes or the game's meeting their expectations. In the area of game development as an artistic product, users' involvement was taken into consideration to a smaller extent. Their feedback was analyzed and sometimes filtered/rejected by the designers. For example, as noted by Greg from Cubicon, while users

indicated that they wanted the game to be difficult, it was necessary for the developers to make the game appear to be difficult while still enabling users to win. The research revealed that such precise division was made in order to avoid tensions between designer's artistic aspirations and customers' ideas in game development process.
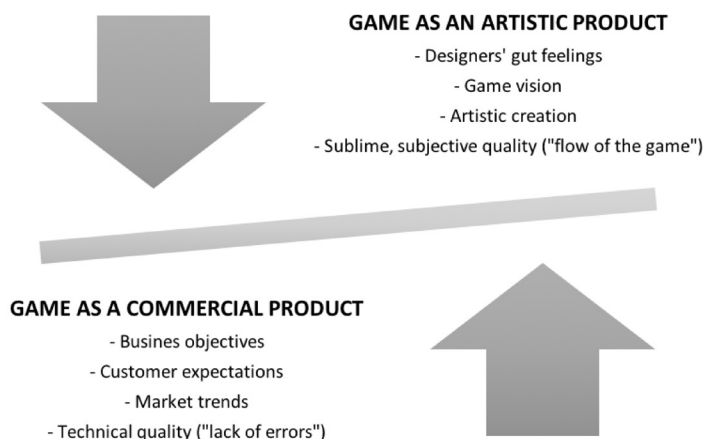
GAME AS AN ARTISTIC PRODUCT
- Designers' gut feelings
- Game vision
- Artistic creation
- Sublime, subjective quality ("flow of the game")

GAME AS A COMMERCIAL PRODUCT
- Busines objectives
- Customer expectations
- Market trends
- Technical quality ("lack of errors")

Figure 1. Game development: Artistic versus commercial product

The separation of the creative aspect of game development from the business-oriented approach also provides some explanation about the application of less advanced methods of users' involvement. The application of the co-developers' approach would deprive designers of their artistic privileges by giving too much freedom to the users.

Our research contributed to the new product development literature in two ways. First of all, our research results differ from the indications of Hippel (2006) who indicated that customers-as-innovators approach increases efficiency and effectiveness. In case of game development, however, it might cause additional tension in the development team. Furthermore, they indicate the importance of taking into consideration the industry characteristics and company's culture while selecting the type of users' involvement in NPD. In the second area, we propose a model distinction of two ways of understanding the process of game development process: artistic versus commercial product, which may create specific challenges during the process. Our research clearly indicated that the user involvement was the most useful in the second understanding – game as commercial product.

Conclusion

In the literature, various models of user engagement are presented. Recent research has indicated that more advanced techniques, which approach users as co-developers, ensure a better fit to customers' needs (von Hippel, 2006), giving the product a greater chance of success on the market. However, our research pointed out that, in the case of creative industries, market alignment is not the only premise in the selection of the model of user involvement. The balance between artists' creativity and the commercial character of a product has to be found as well, and more advanced techniques of user engagement may interfere with it. Therefore, in the case of companies presented in the article, the management preferred to implement a traditional approach to users' engagement by engaging users as information providers. Being aware of shortcomings of the traditional approach (i.e., problems with understanding consumer needs), they employed experienced designers who were able to 'read between the lines'.

Due to the qualitative nature of this research, the applicability of the obtained results is limited, as they do not allow for statistical generalization. However, they should serve as the basis for more elaborated research that would examine the methods of users' engagement in different sectors of the creative industries.

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Abstrakt (in Polish)

Przemysł kreatywny jest szybko rozwijającym się sektorem gospodarki w wielu krajach. Rosnąca konkurencja w tej dziedzinie skłania wiele firm do wdrażania strategii wykorzystującej zaangażowanie użytkowników w rozwój produktów w celu dostarczania produktów lepiej dostosowanych do potrzeb klientów. Z drugiej strony, próba pogodzenia oczekiwań klientów z twórczością artystyczną może generować napięcia. Dlatego celem tej pracy jest zbadanie sposobów zaangażowania użytkowników w rozwój produktów i rzeczywistego wpływu użytkowników na projektowanie rozwiązań. Uzyskane wyniki są oparte na danych zgromadzonych w ramach dwuletniego projektu badań jakościowych prowadzonego w firmach tworzących gry.

Słowa kluczowe: *zaangażowanie użytkowników, przemysł gier, rozwój nowych produktów.*

Patent Licensing in Selected European Countries

Rafał Wisła[1], Tomasz Sierotowicz[2]

Abstract

The issue of the commercialization of patents, as an exemplification of the industrial property, is mostly considered at the microeconomic level. Patent commercialization belongs to the innovation management process, which takes place in innovative organizations. Such microeconomic research approach does not take into account the phenomenon of the intellectual property simultaneous spread and use of scientific and technical knowledge in the economy. These observations lead to undertaking research on the commercial use of patents in the economy. The aim of this paper is to present the research results of the patent licensing as one of the forms of commercialization in the selected European countries in the long time period. The main purpose of undertaken research was to identify and measure the patent licensing dynamics, which is part of the one of the major research related to identify and structure recognition of patents commercialization stream. To achieve this purpose, the collection of patent metadata for the member states of the European Patent Office was used, as well as the author's own concordance IPC→NACE table. As a result of the research, some of the European countries were identified as leading, in terms of the number of licensed patents, the dynamics spread of patent property in the European economy that was set, and the branches were established, in which the emerging new industrial solutions are the subject of commercialization with the use of license contracts.

Keywords: *patent, patent licensing, intellectual property commercialization.*

INTRODUCTION

New knowledge and new or improved technical solutions, in order to be effectively implemented in manufacturing processes, require the fulfillment of at least two conditions (Bell & Pavitt, 1993). The first one, of an institutional nature, is an efficient system of the commercialization of the results of research and development activities (R&D). The second is characterized as

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widely understood capabilities of creation and absorption of knowledge, and technological competencies; for example, those factors that allow to begin the process of diffusion of knowledge and technology.

The intellectual property commercialization belongs to the innovation management process, which encompasses all the activities undertaken in order to bring the idea to the form that allows its use in the economy (Chesbrough, 2003; Degraff & Quinn, 2007). The commercialization of the results of R&D activities is a complex and multidimensional process. It covers not only implementation, but also the sale of property rights and licensing (Schaufield, 2015). It consists of a series of business and legal activities related to the commercialization of generated solutions. It is an integral element to the innovative activities of the market entities. The investigation of the mechanism of commercialization of patents, as an exemplification of industrial property, is a process that must be carried out in the following dimensions: (1) the technological area; (2) the branch of producing new/improved technical solutions; and (3) the branch utilizing the emerging solutions.

The research on commercialization is conducted in two main and long-term directions. The first, concerns the stream of intellectual property commercialization, its structure recognition and dynamics. The second is related to measuring the influence of the intellectual property commercialization stream on the economic growth (Greenhalgh & Rogers, 2010). Hence, the measure of the dynamics of the intellectual property licensing is one of the components of the intellectual property commercialization stream structure recognition in the long-time period.

At the macroeconomic scale, in international comparative studies, testing this process seems to be possible only with the use of patent databases. Patent information gives relatively the greatest possibilities in this regard. It runs deep in the process, in comparison to alternative methodological approaches. The main advantage of the patent information is the high flexibility of aggregation and disaggregation of researched processes.

A patent, in its economic nature, is a collection of accumulated scientific and technical knowledge. It has the ability to influence the course of management processes. In a legal sense, a patent is a set of exclusive rights to use a new solution of technical nature. It is considered to be one of the most powerful rights of intellectual property. In scientific terms, it is the culmination of R&D activities. In economic terms, it is one of the stages of the innovation process. From the point of view of the entity that owns the patent, it is a resource and potential market value. It has a relatively high ability to transform into a production factor. It is a resource rather easily yielding to commercialization. The properties of a patent description and

exclusive rights, cause the patent information to serve as a bridge between R&D results and its economic potential exploitation.

Patent description, statistics and databases were considered a priori as the source for large-scale datasets of primary data. Patent information can describe the following example features of the innovative activity: the novelty level of the results of conducted R&D activities; the types of developed innovations; technological competence; innovation sources; the intensity of knowledge and technology spread (using citations of patent descriptions); and what the authors of the study suggest – the scope and dynamics of the commercial exploitation of the solutions protected by the patent monopoly, using the license information.

The literature of the subject is dominated by the microeconomic dimension of commercialization, with particular emphasis on: how to make decisions, the legal aspects of concluded license contracts, and the expected economic benefits.

Previous studies have failed to take in the problem of size and variability of the commercialization stream of patents; that is, the spread of new solutions protected by the patent monopoly in various sectors of the economy. Hence, the main aim of this article is to present the results of research on the size and dynamics of changes in the spread of patents, as an exemplification of the industrial property, in the economy, by means of license contracts, which are deemed to be one of the most frequently used forms of the commercialization of R&D results.

LITERATURE REVIEW

The methodological discussion on the scope and methods of using patent statistics in economic research (Archibugi, 1992; Basberg, 1987; Griliches, 1990; Hinze & Schmoch, 2005; Pavitt, 1985) is not broad when compared to the methodological discussions in the areas of innovation and bibliometrics.

The method, based on the extension of the patent monopoly, is the classic and still used evaluation approach to the quality and economic usefulness of industrial knowledge, embodied in the new technical solution. It can be assumed that it is economically justified to maintain the patent monopoly in a typical business situation. The longer the monopoly is maintained, the (theoretically) harder the protected solution incorporates the economic value. Such an assumption is accepted by: Baudry and Dumont (2006); Bessen (2008); Lanjouw (1998); Lanjouw and Schankerman (1997; 2004); Pakes (1986); Schankerman (1998); and Schankerman and Pakes (1986).

Hall, Jaff & Trajtenberg, (2005) propose an approach that uses the market valuation of the patent's portfolio, in correspondence with the

intensity of their citation in other patent descriptions. They formulate definite conclusions, which in fact are the reflection of their many years of research using patent information: (1) the number of citations of patent claims in another patent description is a more important event than the increase in patent applications or granted rights; (2) the number of citations of patent in another patent description affects the market estimate of its holder (in practice, the shares of a listed company); and (3) the citation of a patent is a quantifiable manifestation of industrial spread of knowledge. So far, the unused attribute of patent metadata is the information about granted licenses.

Commercialization of patents is the area consisting of many interrelated legal and business processes (Webster & Jensen, 2011). It is closely related to the commercialization of generated solutions. It is an integral and indispensable element of open innovation, based on collaboration, in terms of both R&D activities and commercialization (Bogers, 2011; Chesbrough, 2003; Chesbrough et al., 2011; Degraff & Quinn, 2007).

Cohen et al. (2000, 2002) have found that in complex industries one of the most important reasons for patenting is the use of patents in negotiations (including cross-licensing negotiations). Giuri & Torrisi (2010) have found that cross-licensing is much more important motivation for patenting in complex product industries than in other industries.

The literature on the subject lists various forms of commercialization. Studies in this area concentrate on the presentation of commercialization paths, and ways to efficiently and effectively carry them out, in terms of R&D results developed by both the business and science sectors (Foley, 2012; Thursby & Kemp, 2002; Touhill & Tuhill, 2008). One of the main forms of commercialization is licensing (Baldwin & Clark, 1997; Campbell, Powers, Blumenthal, Biles, 2004; Dratler, 2001; Granstrand, 2011).

Studies relating to the licensing of R&D results, concentrate on the license typology (Granstrand, 2011), legal aspects of license agreements (Bogers, 2011; Dratler, 2001; Hanel, 2006; Lichtenthaler & Ernst, 2007; Ziegler, Ruether, Bader & Gassman, 2013), and the business value of such contracts (Bogers, Bekkers & Granstrand, 2012; Read, 2005).

Studies that have tried to explain the reasons for using the licensing market have focused on the supply side of the market and by highlighting the role of additional factors such as patent value, the generality of the patented technology, the scientific content of the patent and distance from the patentee's core technology, and the competitive environment (Arora et al., 2003, 2006; Gambardella et al, 2007). On PatVal-EU II, PatVal-US and PatVal-JP developing and collecting novel, systematic and more adequate science and technology indicators (Gambardella, 2011). The idea of this

PatVal project arise from the need to answer some key questions in science, technology and innovation. The question which factors determine the rate of commercialization of inventions is one of them.

Data collections which build on the PatVal-EU survey were conducted in 2003-2005 by team members of the project (see: Giuri et al. 2007 for details). The most important findings of these studies are: on average 53.05% of patented inventions are used commercially, 5.47% of patents are sold to independent owners, 4.57 % of patents have been used to found a new company, and about 8% of patents are licensed (Gambardella, 2011). The survey makes use of a questionnaire in order to get data from the respondents. The results are static. The main aim of this article is to present results of the research on the size, dynamics of change and differences of license contracts of patents in the economies of all European Union countries in the fifteen years (1999-2013) wich used patent information database of the European Patent Office (EPO).

The conclusion of a license contract is preceded by a thorough analysis and evaluation of the business potential of the contract subject. A license contract, on the one hand, is the use of a solution protected by the patent monopoly in the real economy. On the other hand, it is the licensee's response to perceived potential demand. Hence, it is justified to claim that concluding a license agreement testifies to the real possibility of obtaining economic benefits for the licensee, as well as constituting a measure of the spread of using new solutions in the real economy.

RESEARCH METHODS

Data

The entity, while seeking a patent protection, chooses the procedure based on which the proceedings will take place. These procedures can be divided into: national, regional and international. The procedure of European patent application was selected to implement and achieve the defined research goal. Its formal basis is the European Patent Convention, to which 38 European countries have signed up (as of the end of 2014).

The collection of patent metadata for the countries covered by the research was extracted directly from the patent information database of the European Patent Office in January 2015.

In order to obtain direct access to the EPO database, the Thomson Innovation provider was used. Hence, for the research, the EPO database was used as the source of data.

EPO database selection criteria are unified: application form, procedure for granting patents and extent of protection for applicants from all countries covered by the research. EPO database contains licensing patents data. The study uses patent information available at the end of 2013.

The years 1999-2013 are accepted as the research period. The following three considerations were crucial to choosing the research period. Firstly, the availability and completeness of patent data in the EPO mode. Secondly, the period of 15 years is long enough to capture the processes of commercialization through the licensing of patents. Thirdly, the relatively long period allows the use of basic statistical tools.

Method

Among the 38 countries belonging to the EPO, the countries for which the information about granted licenses is available were identified. These countries represent a group subject to the research in a sequence of three stages. At first, the annual value of the patent licensing efficiency ratio was set, separately for each surveyed country, according to the following equation:

$$lce = \frac{L_{ci}}{P_{ci}} = \frac{\sum_{i=1}^{n} l_{ci}}{\sum_{i=1}^{m} p_{ci}} \tag{1}$$

where:

lce – the annual value of the patents licensing efficiency ratio,

Lci – the annual, aggregated number of licenses granted by the country under examination,

Pci – the annual, aggregated number of patents covered by the licenses of the country under examination,

lci – another granted license,

pci – another licensed patent,

n – the number of granted licenses under aggregation,

m – the number of licensed patents under aggregation,

i – another observation in time series,

c – another country covered by the research.

The presented indicator is a measure of the patents spread in the economy, through licensing. The indicator can assume values greater than, or equal to, 1. If the indicator value is greater than 1 then more license contracts per licensed patent.

The second stage of the analysis defines the dynamics of change of the efficiency ratio value, of licensing patents in the economy (Freedman, Pisani & Purves, 2007):

$$log \bar{y}_c = \frac{1}{n-1} \sum_{i=2}^{n} log \frac{lce_i}{lce_{i-1}} \qquad (2)$$

$$Ach_c = (\bar{y}_c - 1) \times 100 \qquad (3)$$

where:

Achc – the average change rate of the efficiency ratio value of patents licensing for another country surveyed, throughout the study period,

ȳc – the geometric mean of chain indices of the efficiency ratio value of patents licensing for another surveyed country,

n – the number of observations in time series (that corresponds to the number of years of the research period),

i – another observation in time series,

c – another country covered by the research,

$\frac{lce_i}{lce_{i-1}}$ – the value of the next chain index.

The value of the average change rate indicates the dynamics of patents spread by means of licensing contracts, in the given research period.

In the third stage of the research, the author's concordance table was used, as well as the IPC→NACE binomial relationship (Okoń–Horodyńska, Wisła & Sierotowicz, 2012); that is, to assign International Patent Classification (IPC) to The Statistical Classification of Economic Activities in the European Community (NACE). This tool allows identifying the branches from which licensed patents derive.

Patent documentation is a rich source of engineering information, information on current trends in research and invention activity, and the innovation and competitive potential of the economy and its entities. Its hierarchical structure combined with a great number of documentations (objects) form a foundation of applying specific methods intended to discover unknown dependencies, schemes and rules.

Both classification systems (NACE and IPC) have different goals and uses; hence the areas described on specific levels of these classifications are different. This applies both to specific levels of NACE and IPC, as well as to the two classifications as a whole. As a result, the task of mapping individual

IPC codes into NACE required considering the most detailed division in both classification systems, i.e. operation on their lowest levels.

Each NACE subsection is attributed with specific classes, subclasses, groups and subgroups of the IPC. Mapping was carried out with an assumption that only one of the following: class and/or subclass and/or group and/or subgroup can be assigned to a given subsection (industrial branch) of NACE. This approach is the result of the assumption on the creation of new or improved technical solutions by enterprises operating in the field which coincides with the branch (subsection) to which the enterprises belong according to NACE and their domestic counterparts (e.g. PKD in Poland).

Limitations

The first limitation is related to the data source. The licensing statistics are not recorded by the national statistical offices. Information about granted patent licenses is not mandatory also in the EPO database. This makes the examined phenomenon a broader range than results obtained from the research, which makes these results less accurate.

The second limitation is related to the IPC/NACE concordance table. Attribution to NACE on the fifth and the most detailed level required an insight into the complete spectrum of IPC codes (ca. 70,650 codes). For each NACE level and code on the fifth level the entire IPC spectrum was analysed horizontally, i.e. in each section, as well as vertically, from IPC classes to IPC subgroups. The purpose was to identify the classification codes which most precisely represent the area defined by a NACE code. It is judged that such an analysis warrants the most precise representation of a given NACE code by relevant IPC codes. The consequence of the work method described here is a list of IPC codes derived from various sections and the levels of this classification which most truly represent the given NACE code. The wide variation in both classifications, despite the diligence of preparing the concordance table, causes some mistakes in assigning patents to certain groups of NACE.

The statistical technique used in the research, the average rate, requires a time series composed of sufficiently large number of observations, which constituted limitations in the source data use. Hence, the main goal of the research was to identify dynamics changes of the patent licensing in the long time period.

ANALYSIS

Among the 38 countries belonging to the EPO, 16 countries were ultimately identified, for which information about granted licenses is available. The total

number of licenses granted in the accepted research period for the selected countries, is 822 (Table 1).

Table 1. The number of licensed patents (1999–2013)

Country	The number of licensed patents	The number of granted licenses	The share of licensed patents (730=100%)	The share of granted licenses (822=100%)	The ratio of the number of granted licenses to the number of licensed patents
Switzerland	10	10	1.37 %	1.22 %	1.00
Sweden	45	54	6.16 %	6.57 %	1.20
Spain	6	8	0.82 %	0.97 %	1.33
Norway	3	3	0.41 %	0.36 %	1.00
Netherlands	18	18	2.47 %	2.19 %	1.00
Italy	18	21	2.47 %	2.55 %	1.17
Ireland	4	4	0.55 %	0.49 %	1.00
Iceland	1	1	0.14 %	0.12 %	1.00
United Kingdom	199	226	27.26 %	27.49 %	1.14
Germany	30	34	4.11 %	4.14 %	1.13
France	371	408	50.82 %	49.64 %	1.10
Finland	1	1	0.14 %	0.12 %	1.00
Denmark	11	21	1.51 %	2.55 %	1.91
Czech Republic	1	1	0.14 %	0.12 %	1.00
Belgium	7	7	0.96 %	0.85 %	1.00
Austria	5	5	0.68 %	0.61 %	1.00
Total	730	822	100 %	100 %	

In the analyzed set of metadata information about patents (Table 1), which were granted in the European application mode, and for which licenses were granted at the same time using the criterion of the number of licenses issued per one patent, the leader of the research group is Denmark (1.9 license for one technical solution protected by patent monopoly). Next are: Spain (with the index value of 1.3); Sweden (1.2); Italy (near 1.2); the United Kingdom, Germany and France (1.10-1.15).

Taking into account the share of licensed patents of a given country of the total number of licensed patents of all 16 states, France becomes the leader (with a share of nearly 51% of the licensed patents in the researched group). The United Kingdom is second (with a share of 27.3%), the third is Sweden (6.2% share), and Germany is fourth (4.1% share). The total share of these four countries of the number of licensed patents of the 16 countries, is 88.4%. In the later part of the analysis, these countries are deemed to be the leading ones, and therefore they alone are the subjects of further analysis.
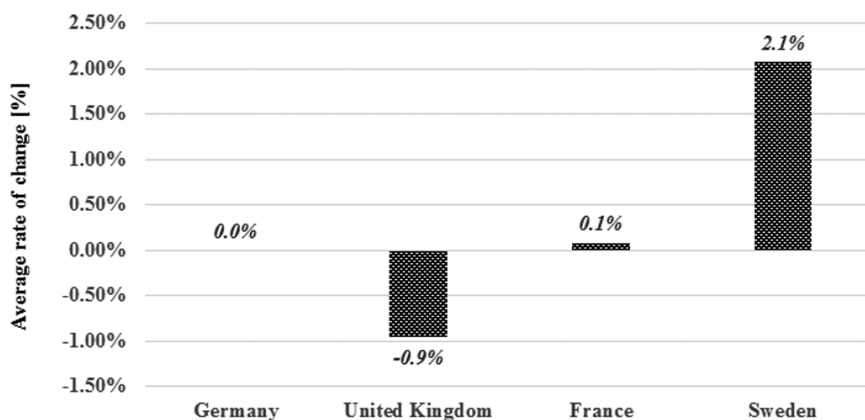

Figure 1. Average change rate of the efficiency ratio value
of patents licensing

The highest positive value of the average change rate of the efficiency ratio value of patents spread in the European economy, through the licensing of patents, was calculated for Sweden (2.1%). It means that the number of granted licenses to the number of licensed patents in Sweden increased year to year, average on the 2.1% in the entire research period. A tendency similar in direction, though having a poor growth dynamic, can be seen in France (0.1%). It means that the number of granted licenses to the number of licensed patents in French increased year to year, average on the 0.1% in the entire research period. Comparing these two countries, the number of licenses granted to the number of licensed patents increased in year to year, average of 21 times faster in Sweden than in France. The opposite tendency was identified in United Kingdom, where the number of granted licenses to the number of licensed patents decreased year to year, average on the 0.9% in the entire research period. It means that the licensing spread in United Kingdom economy shrank throughout the entire study period. In the case of Germany, there is a constant spread number of granted licenses to the

licenses patents. In other European countries taken under research, there was insufficient data series in order to identify above-mentioned direction of licensing patents spread.

Using the binomial relationship IPC→NACE, it was possible to identify branches in the group of four leading countries, which produce new product and process solutions that are the subjects of the most intense licensing. The results are presented in Table 2.

Table 2. The share of licensed patents in the branches of economies

Statistical Classification of Economic Activities in the European Community	Germany (%)	United Kingdom (%)	France (%)	Sweden (%)	Total (%)
Agriculture, hunting and related service activities	0.00%	0.50%	1.08%	0.00%	0.78%
Forestry, logging and related service activities	0.00%	0.00%	0.00%	0.00%	0.00%
Fishing, fish farming and related service activities	0.00%	1.01%	0.27%	0.00%	0.47%
Mining of coal and lignite; extraction of peat	0.00%	0.00%	0.00%	0.00%	0.00%
Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	0.00%	1.51%	0.00%	0.00%	0.47%
Mining of metal ores	0.00%	0.00%	0.00%	0.00%	0.00%
Other mining and quarrying	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacture of food products and beverages	6.67%	10.55%	5.12%	2.22%	6.67%
Manufacture of tobacco products	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacture of textiles	0.00%	1.01%	0.81%	0.00%	0.78%
Manufacture of wearing apparel; dressing and dyeing of fur	0.00%	0.00%	0.81%	0.00%	0.47%
Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.00%	0.50%	0.81%	2.22%	0.78%
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.00%	0.00%	0.81%	0.00%	0.47%
Manufacture of pulp, paper and paper products	13.33%	0.00%	1.08%	0.00%	1.24%
Publishing, printing and reproduction of recorded media	6.67%	1.01%	1.89%	20.00%	3.10%
Manufacture of coke, refined petroleum products and nuclear fuel	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacture of chemicals and chemical products	23.33%	21.61%	15.90%	4.44%	17.21%
Manufacture of rubber and plastic products	0.00%	0.50%	1.62%	0.00%	1.09%

Statistical Classification of Economic Activities in the European Community	Germany (%)	United Kingdom (%)	France (%)	Sweden (%)	Total (%)
Manufacture of other non-metallic mineral products	3.33%	1.01%	5.66%	0.00%	3.72%
Manufacture of basic metals	0.00%	1.01%	0.54%	0.00%	0.62%
Manufacture of fabricated metal products, except machinery and equipment	0.00%	6.53%	3.50%	0.00%	4.03%
Manufacture of machinery and equipment not elsewhere classified	13.33%	6.53%	10.24%	0.00%	8.53%
Manufacture of office machinery and computers	0.00%	3.52%	0.27%	57.78%	5.27%
Manufacture of electrical machinery and apparatus not elsewhere classified	20.00%	3.02%	3.50%	0.00%	3.88%
Manufacture of radio, television and communication equipment and apparatus	3.33%	6.03%	2.70%	0.00%	3.57%
Manufacture of medical, precision and optical instruments, watches and clocks	3.33%	25.63%	11.86%	4.44%	15.19%
Manufacture of motor vehicles, trailers and semi-trailers	0.00%	1.01%	12.13%	0.00%	7.29%
Manufacture of other transport equipment	6.67%	2.01%	5.39%	0.00%	4.03%
Manufacture of furniture; manufacturing not elsewhere classified	0.00%	2.51%	1.35%	0.00%	1.55%
Recycling	0.00%	0.00%	0.81%	0.00%	0.47%
Construction	0.00%	3.02%	11.86%	8.89%	8.37%
Total	100%	100%	100%	100%	100%

The largest number of new solutions is created in the research group of four countries, in the manufacture of chemicals and the chemical products branch. The solutions are the subject of further commercialization through licensing (17.2% of all licensed patents). The individual branches display the following characteristics: the manufacture of medical, precision and optical instruments, watches and clocks (15.2%); the manufacture of machinery and equipment (8.5%); construction (8.4%); the manufacture of motor vehicles, trailers and semi-trailers (7.3%); the manufacture of food products and beverages (6.7%); and the manufacture of office machinery and computers (5.3%). The share of licensed patents in other branches is below 5%.

The following figures show the results of using the IPC→NACE table, separately for each country included in the research (Figure 2).
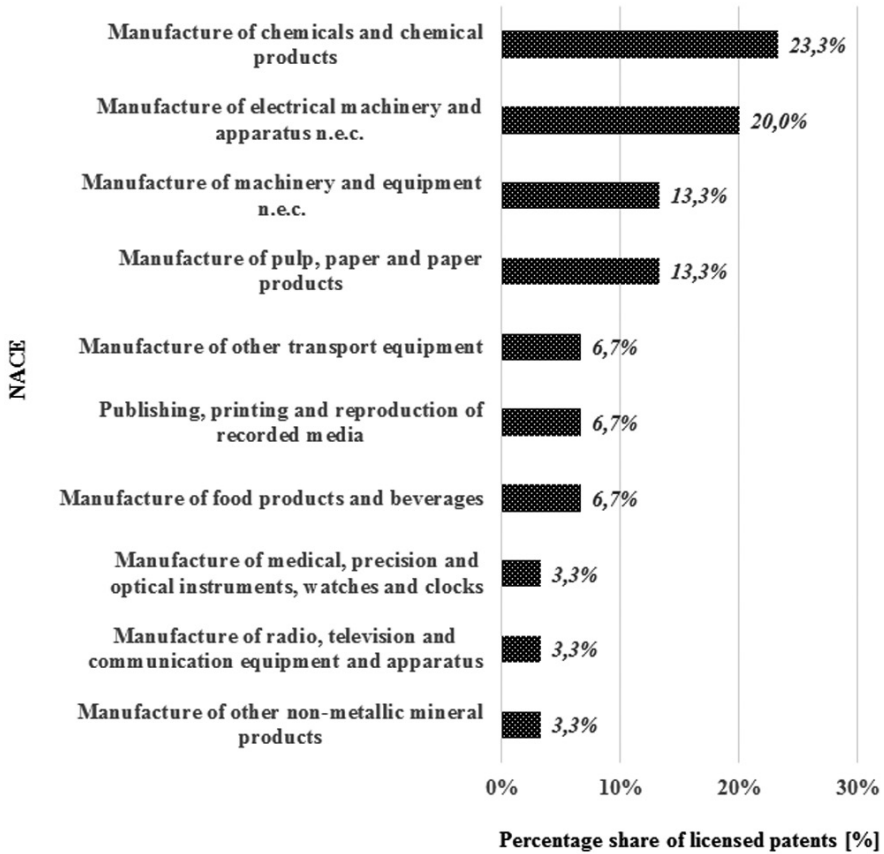
Figure 2. The structure of licensed patents according to the branches of the German economy

In the case of the German economy, four branches emerge where the new solutions are the subject of licensing. These are: the manufacture of chemicals and chemical products (23.3% of all the licensed patents in the researched group); the manufacture of electrical machinery and apparatus (20%); the manufacture of machinery and equipment, and of pulp, paper and paper products (13.3%).
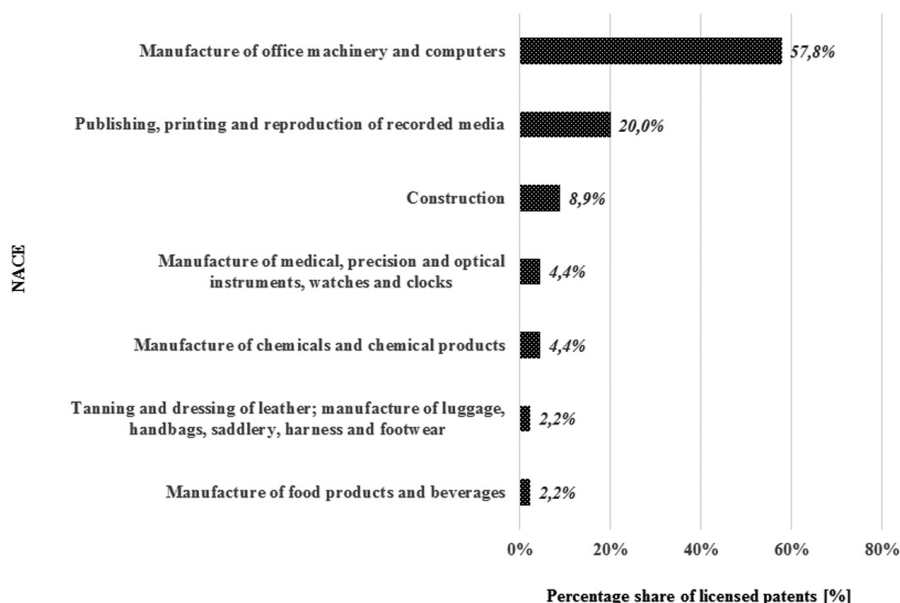
Figure 3. The structure of licensed patents according to the branches of the Swedish economy

In the case of the Swedish economy (Figure 3) the manufacture of office machinery and computers (57.8%) is the leader. Attention should also be paid to publishing, printing and the reproduction of recorded media (20%).

In the case of the United Kingdom (Figure 4), the largest number of licensed patents include the following branches: the manufacture of medical, precision and optical instruments, watches and clocks (25.6%); the manufacture of chemicals and chemical products (21.6%); and the manufacture of food products and beverages (10.6%). The share of the other branches is below 10%. Results for France are shown in Figure 5.

In the case of the French economy (Figure 5), the distribution of the share of licensed patents on the individual branches, substantially coincides with the distribution for the whole group of the researched countries. These are: the manufacture of chemicals and chemical products (15.9%); the manufacture of motor vehicles, trailers and semi-trailers (12.1%); the manufacture of medical, precision and optical instruments, watches and clocks, and construction (11.9%); and the manufacture of machinery and equipment (10.2%). The share of the other branches is below 10%.
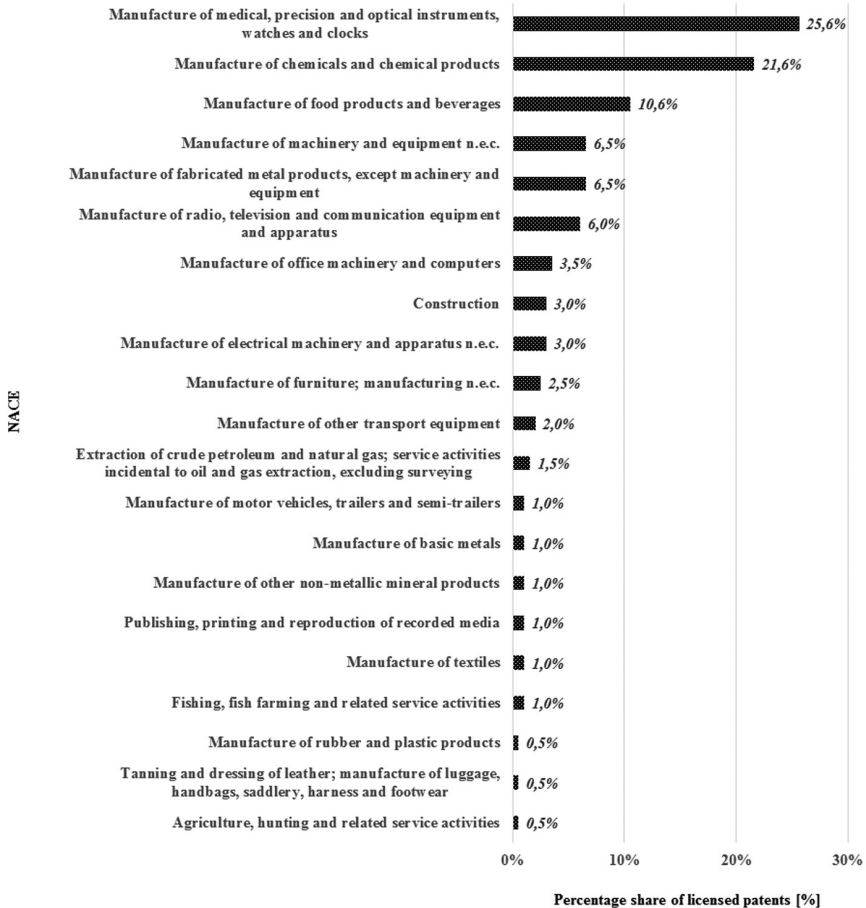
Figure 4. The structure of licensed patents according to the branches of the U.K. economy
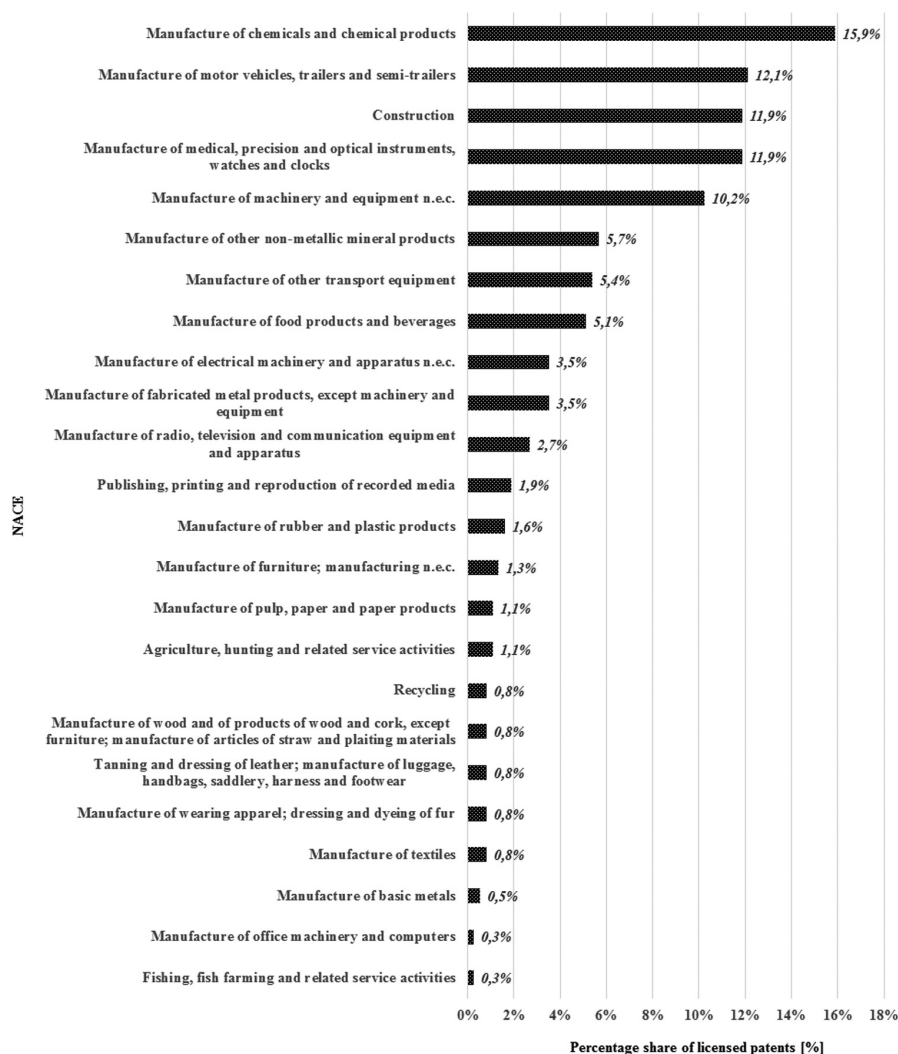
Figure 5. The structure of licensed patents according to the branches of the French economy

CONCLUSION

The research problem of this article was to identify changes and spread of patent licensing in European countries, in the fifteen years (1999-2013). The research results, based on performed literature research and calculations, allow to formulate the following conclusions:

1) In the literature on the commercialization of patents, as an exemplification of the industrial property, the microeconomic dimension of this process

is dominant. Especially highlighted are: the method of making a decision, legal and business aspects of the concluded license contracts, and the assessment methods of the expected economic benefits.

2) The examined licensing contracts identified in the EPO database, covering a period of fifteen years, were concluded for new solutions, representing the following branches: the manufacture of chemicals and chemical products; and the manufacture of medical, precision and optical instruments, watches and clocks.

3) Taking into account the share of licensed patents of a given country of the total number of licensed patents of all 16 states, France is the leader (with a share of nearly 51% of the licensed patents in the researched group). The United Kingdom is second (with a share of 27.3%), the third is Sweden (6.2% share), and Germany is fourth (4.1% share). The total share of these four countries of the number of licensed patents of the 16 countries, is 88.4%.

4) The average change rate of the efficiency ratio value, defined as the annual number of licenses granted in the country under examination to the annual number of licensed patents in this country, indicates the increase or decrease of licensing patents spread through the economy of this country. Based on the performed calculations, the highest value of the average change rate of the efficiency ratio was identified in Sweden: 2.1%. It means that the number of granted licenses to the number of licensed patents in Sweden increased year to year, on average by 2.1% in the entire research period.

   The similar tendency in direction was identified in France (ratio of 0.1%). It means that the number of granted licenses to the number of licensed patents in French increased year to year, on average by the 0.1% in the entire research period. Comparing these two countries, the number of licenses granted to the number of licensed patents increased year to year, on average 21 times faster in Sweden than in France. The opposite tendency was identified in United Kingdom, where the number of granted licenses to the number of licensed patents decreased year to year, average on the 0.9% in the entire research period. It means that the licensing spread in United Kingdom economy shrank throughout the entire study period. In the case of Germany, there is a constant spread number of granted licenses to the licenses patents. In other European countries taken under research, there was insufficient data series in order to identify above-mentioned direction of licensing patents spread.

5) The major challenges to the public databases of patent information and their commercial suppliers include collecting information about the codes of economic classification of entities applying for patent protection (which will lead to an increase in the efficiency of sectoral research), and annotations on granted licenses and changes of the patentee (which enables research on the secondary market of industrial property trade).

Decisions on patent licensing are influenced by many factors, both macroeconomic and microeconomic. It is important to notice that such decision is taken by the inventor or patent owner.

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Abstrakt (in Polish)

Zagadnienie komercjalizacji własności przemysłowej jest rozpatrywane najczęściej w ujęciu mikroekonomicznym. Komercjalizacja stanowi ważny element procesu zarządzania innowacjami. Dotychczasowe badania w tym obszarze nie uwzględniają zjawiska jednoczesnego rozprzestrzeniania i wykorzystania wiedzy naukowo-technicznej w gospodarce. Spostrzeżenia te skłaniają do podjęcia badań nad komercyjnym wykorzystaniem własności przemysłowej w gospodarce. Celem opracowania jest prezentacja wyników badań licencjonowania własności przemysłowej, jako jednej z form komercjalizacji, w wybranych krajach europejskich. Identyfikacja dynamiki zmian w zakresie skali licencjonowania własności intelektualnej wpisuje się w jeden z głównych kierunków badań dotyczących identyfikacji i rozpoznania struktury strumienia komercjalizacji. Dla realizacji tego celu wykorzystano zbiór metadanych patentowych dla krajów członkowskich Europejskiego Urzędu Patentowego oraz autorską tablicę łącznikową IPC→NACE. W wyniku przeprowadzonych badań zidentyfikowano wiodące pod względem liczby licencjonowanych patentów kraje Europy, wyznaczono dynamikę rozprzestrzeniania własności przemysłowej w gospodarce europejskiej oraz ustalono branże, w których powstające nowe rozwiązania przemysłowe są przedmiotem komercjalizacji z wykorzystaniem kontraktów licencyjnych.

Słowa kluczowe: *patent, licencjonowanie patentów, komercjalizacja własności intelektualnej.*

Developing a Social Enterprise Performance Scale and Examining the Relationship Between Entrepreneurs' Personality Traits and Their Perceived Enterprise Performance

Chao-Tung Liang[1], Li-Pei Peng[2], Shu-Nung Yao[3], Chaoyun Liang[4]

Abstract

On the basis of the lack of measurement tools and the research gap regarding social entrepreneurship, three studies were conducted to develop a new measure of social enterprise (SE) performance that is empirically valid and easy to administer. The purpose of this measure was to examine the relationship between entrepreneurs' personality traits and their perceived SE performance. The results indicated that SE performance can be assessed using four dimensions: personal issues, social aspects, business elements, and service programmes. Extraversion positively influenced service programmes, and openness negatively affected service programmes. Neuroticism and conscientiousness positively predicted personal issues and service programmes, and agreeableness positively predicted all dimensions of perceived SE performance. The results also demonstrated the curvilinear relationship of the U-shaped curve between neuroticism and personal issues and the social aspects of SE performance. Furthermore, the results showed the curvilinear relationship of the inverted U-shaped curve between agreeableness and the four dimensions of SE performance.

Keywords: *performance assessment, personality traits, scale development, social enterprise, social enterprise performance scale.*

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INTRODUCTION

Social entrepreneurship has captured the attention of non-profit organisations, philanthropists, and academics in recent years. Social enterprises (SEs) are businesses intended primarily for social benefit. They are innovative agents that engage the market and harness its wealth-generating powers to serve disadvantaged social groups and achieve social transformation (Pelchat, 2005). SEs use business methods to advance their social, environmental, and human-justice agendas (Vitiello & Wolf-Powers, 2014). They create non-profit-sector jobs, foster workforce development, and assist people in generating supplemental income, often by strengthening ties between entrepreneurs and the formal economy and building social capital.

Although SEs are common in Europe and the United States, they are new to Asia. Before 2007, most people in Taiwan perceived a social contribution as a traditional public service such as fundraising for philanthropic organisations, assisting with natural disaster relief, or teaching children in remote areas (Lin, 2009). At that time, non-profit organisations adopted business strategies to solve social problems even though they did not identify themselves as SEs. The development of SEs in Taiwan remains at an early stage and is facing numerous challenges. In addition to the lack of governmental support, Lin (2009) indicated that minimal support from academia has also hampered the progress of SE development in Taiwan. Without systematically analysing the functioning of SEs, potential supporters should not invest in SE development because they would lack knowledge regarding the sustainable operation of SEs.

Previous studies have determined that entrepreneurs are a key factor in understanding the operation of a SE (Bird, Schjoedt & Baum, 2012), and the personality traits of entrepreneurs predict their job performance (Zhao and Seibert, 2006). Furthermore, thus far, the social impact or organisational performance of a SE have been analysed mainly through the case study method combined with a social return on investment (SROI) (Krlev, Münscher & Mülbert, 2013). However, the data collected from case studies cannot necessarily be generalised to the wider population, and a precise cause-and-effect-relationship is difficult to construct on the basis of this data. Moreover, an SROI investigation typically involves sensitive financial and operational issues, creating research difficulties. To fill the aforementioned research gap, the research team conducted a series of studies to develop a new self-report measure of SE performance that is empirically valid and easy to administer to test the relationship between entrepreneurs' personality traits and their perceived SE performance.

This article presents the findings of three studies. The first study was conducted to develop a self-report scale to assess SE performance; the second

study was conducted to confirm the factor structure of this scale and test the degree of measurement invariance of this scale across genders; and the third study was conducted to examine the relationship between entrepreneurs' personality traits and their perceived SE performance. The personality traits were assessed using the widely accepted five-factor model (FFM) (Goldberg, 1992; Thompson, 2008), which refers to the traits of extraversion, openness, neuroticism, conscientiousness, and agreeableness. The results of this study could make the assessment of SE performance much more practical than before and clarify the influence of entrepreneurs' personality traits on their perceptions of SE performance.

THEORETICAL FRAMING OF RESEARCH ISSUES

Social entrepreneurship

A SE is perceived as a venture intended primarily for social benefit, the surpluses of which are principally reinvested for social purposes rather than maximising profit for shareholders and owners (DTI Social Enterprise Unit, 2003, p.6). In other words, a SE is an organisation intended to resolve social issues through entrepreneurial action. SEs are increasingly compelled to engage in the market economy, and SEs share characteristics with earned-income ventures initiated by conventional non-profits because both are driven by the dual goals of social benefit and trade revenues (Katre & Salipante, 2012).

Generally, any business activity that contributes to the resolution of social problems constitutes social entrepreneurship. Therefore, social entrepreneurship can refer to innovative activities with social objectives in either the for-profit or non-profit sector, or across sectors, such as businesses that combine for-profit and non-profit structures (Austin, Stevenson & Wei-Skillern, 2006). The narrower definition of social entrepreneurship includes only environmentally sustainable services provided by SEs that can contribute to resolving socioeconomic problems (York & Venkataraman, 2010). SEs have been modelled on the tenets of 'not-for-profit' charitable organisations that have community-oriented motives. Additionally, SEs have used their community-spirited motives to attract human and social capital and engendered survival strategies premised on grant dependency. Chell (2007) argued that SEs should be self-sustaining in the long term. Furthermore, the definition of entrepreneurship should be modified to include the creation of 'social and economic value', which may be applied to private, entrepreneurial ventures as well as SEs.

SE performance

With the increasing use of managerial practices, optimisation has become crucial for organisational performance (Hall, Daneke & Lenox, 2010). The issue of performance measurement in SEs has gained increasing relevance among researchers and practitioners. Prior research indicated that performance measurement for social enterprises must include both organisational performance and social impact (Arena, Azzone & Bengo, 2014; Hadad & Găucă, 2014). Previous studies also suggested that entrepreneurs themselves, management teams, and service programmes provided by SEs play critical roles in the performance of SEs (Boluk & Mottiar, 2014; Smith, Bell & Watt, 2014; York & Venkataraman, 2010). Therefore, in the current study, the performance measurement of SEs is discussed by four categories: personal issues, social aspects, business elements, and service programmes.

Regarding personal issues, Hockerts and Wüstenhagen (2010) suggested that in the early stages of an industry's sustainability transformation, new entrants are more likely than incumbents to pursue sustainability-related opportunities. Marshall and Beachy (2010) also emphasised the importance of human resources in a SE. By asking 32 technology entrepreneurs how they generate creative ideas for developing innovative products, Gemmell, Boland & Kolb, (2012) found that the highest ideational productivity occurs when 'trusted partners' exchange and refine ideas through a form of shared cognition. In addition, several studies identified the crucial aspects of human resources in a SE, including internal knowledge, entrepreneurial orientation, and entrepreneurial intensity (De Clercq et al., 2013; Kreiser, Patel & Fiet, 2013).

With respect to the social aspects of SEs, previous studies have indicated that a SE focuses on obtaining entrepreneurial rents while simultaneously improving local and global social and environmental conditions (Cohen & Winn, 2007; Dean & McMullen, 2007; Zahra et al., 2014). Corner & Ho (2010) studied opportunity identification in the social entrepreneurship literature and found that SE practitioners tend to perceive a social need and prospective ideas for addressing it. Korsgaard & Anderson (2011) held that the social conditions of entrepreneurs, as well as the social nature of market opportunities, affect the entrepreneurial process. Therefore, understanding that enterprises are socially situated is useful. Moreover, according to Casson & Giusta (2007), although the government is afforded the major role of trust-broker, its reputation may be undermined if it lacks the competence to intervene effectively.

Regarding business elements, Meyskens, Robb-Post, Stamp, Carsrud & Reynolds (2010) indicated that substantial relationships existed amongst partnerships, financial capital, innovativeness, organisational structure, and knowledge transferability. Parrish (2010) engaged in an intensive

empirical study investigating the organisational design expertise necessary for sustainability-driven entrepreneurs to succeed in a competitive market and identified five crucial principles of organisational design. These findings suggested that the expertise required for the success of a venture differs depending on entrepreneurial values and motives. De Clercq et al. (2013) further indicated that higher levels of internal knowledge sharing related to stronger entrepreneurial orientation. Furthermore, De Clercq et al. (2013) found that higher levels of knowledge sharing resulted from higher levels of trust and goal congruence.

In addition, programmes provided by SEs are considered critical activities of SEs (Marshall & Beachy, 2010). York and Venkataraman (2010) suggested that SE practitioners contribute to solving environmental problems by assisting extant institutions in achieving their goals and creating new and sustainable products, services, and institutions. Kreiser et al. (2013) indicated that an increase in the strength of social ties is negatively associated with founding activities, whereas an increase in the number of social ties is positively associated with founding activities. Kreiser et al. (2013) also asserted that entrepreneurial intensity mitigates the negative relationship between an increase in tie strength and founding activities and that social competence reinforces the positive relationship between an increase in the number of ties and founding activities.

Personality traits

The FFM (Goldberg, 1992) is a widely accepted personality model (Ariani, 2013), which allows researchers to organise various personality traits into a meaningful set of constructs to identify consistent relationships (Zhao & Seibert, 2006). In developing the 100-item model structure, Goldberg (1992) noted that relatively small sets of variables could serve as FFM adjective markers. Subsequently, Saucier (1994) developed the 40-item Mini-Marker subset of variables, which were similar to the prototypical cores of the FFM of personality. Thompson (2008) then developed the International English Big-Five Mini-Markers (IEBFMM) and confirmed the invariance of the FFM structure across several cultures. The FFM structure comprises the five dimensions of extraversion, openness, neuroticism, conscientiousness, and agreeableness.

Extraversion has been described as sociable, talkative, and self-assured behaviour (McCrae & Costa, 1991). Extraverts are likely to share their ideas with others, thereby enabling the occurrence of idea cross-fertilisation. People exhibiting high degrees of extraversion are typically cheerful and optimistic, enjoy interacting with people and large groups, and seek excitement and stimulation (Lin, Liang, Chang and Liang, 2015). They are competent in

developing networks (Zabelina, Robinson & Anicha, 2007), but can suppress the expression of excessive ambition and impulses that are socially inappropriate (Wolff & Kim, 2012). By contrast, people who exhibit introversion prefer to process information internally and frequently withhold ideas because they fear negative evaluation (Van Der Molen, Schmidt & Kruisman, 2007). They are typically reserved, independent, and consistent (Zhao & Seibert, 2006).

Open people are generally described as having a preference for variety, aesthetic sensitivity, intellectual curiosity, active imaginations, and independent judgment, and are attentive to inner feelings, broad-minded, reflective, flexible, autonomous, and unconventional (Ariani, 2013; Rothmann & Coetzer, 2003). People having high openness scores have more varied perspectives and an enhanced ability to absorb and combine new information. They typically seek new experiences as well as explore novel ideas and should, therefore, be effective at the cognitive exploration and cross-fertilisation of ideas (Baer, Oldham, Jacobsohn & Hollingshad, 2008). However, research has shown that strong openness can render people unable to focus on tasks that require intense concentration because of their intellectual curiosity, which is easily piqued by novelty (Rose, Fogg, Helmreich & McFadden, 1994). By contrast, a person exhibiting a low degree of openness can be characterised as having a narrow range of interests and behaving in a conventional and unanalytical manner (Rothmann &Coetzer, 2003; Zhao & Seibert, 2006).

Neuroticism is a tendency to experience negative emotional states, such as anxiety, depression, fear, sadness, hostility, anger, guilt, disgust, and vulnerability. Neurotic people are typically insecure, irritable, easily disturbed, and lacking in self-confidence. They are generally impulsive and have been observed to undermine the social fabric of teams (Denissen & Penke, 2008; Rothmann & Coetzer, 2003). People exhibiting high levels of neuroticism are prone to irrational thought, impulsive behaviour, and applying poor coping strategies in stressful situations (Rothmann & Coetzer, 2003). However, people with high levels of neuroticism are likely to provide others with candid feedback regarding their ideas, which can stimulate additional ideas or cause members to elaborate on their ideas, increasing a team's creativity (Baer et al., 2008). By contrast, people with low neuroticism scores are typically self-confident, calm, relaxed, and able to face stressful situations without becoming upset (Zhao & Seibert, 2006). In addition, a previous study observed a stronger relationship between neuroticism and job performance when the levels of neuroticism were in the mid-range than when the trait was at either extreme (Le, Oh, Robbins, Ilies, Holland & Westrick, 2011).

Conscientiousness refers to a person's degree of organisation, persistence, self-control, hard work, active planning and performance of tasks, and motivation to accomplish goals (Barrick & Mount, 1993; Zhao & Seibert, 2006).

People with high conscientiousness scores are purposeful, responsible, reliable, ambitious, determined, and achievement-oriented. However, people exhibiting strong conscientiousness can focus excessively on task accomplishment, causing them to disregard novel ideas and adhere rigidly to established thoughts and behaviours (Le & Pine, 2003). High degrees of conscientiousness can lead to behaviours that are considered annoying, such as fastidiousness, compulsive neatness, or workaholism (Ariani, 2013). People with low conscientiousness scores do not necessarily lack moral principles, but they are less exacting in applying such principles (Rothmann & Coetzer, 2003). In addition, several studies have provided evidence of a positive curvilinear relationship between conscientiousness and performance, and the conscientiousness trait benefits performance in high-complexity tasks, such as creative thinking and unstructured work (Le et al., 2011; Penney, David & Witt, 2011).

Agreeable people are described as altruistic, considerate, friendly, caring, compassionate, gentle, warm, and willing to cooperate in conflict situations, and they prefer positive interpersonal relationships (Lin, Liang, Chang & Liang, 2015). Because highly agreeable people are unlikely to compete for limited resources or be preoccupied with avoiding confrontations and conflicts, they can be excessively self-effacing (Bernardin, Cooke, Villanova, 2000) and might not claim credit for their contributions (Ilies, Johnson, Judge & Keeney, 2011). In other words, this trait can inhibit the willingness to negotiate aggressively, protect self-interest, and influence or manipulate others for personal gain (Zhao & Seibert, 2006). By contrast, a person exhibiting low levels of agreeableness can be characterised as manipulative, self-centred, ruthless, egocentric, sceptical of other people's intentions, and competitive rather than cooperative (Rothmann & Coetzer, 2003). Disagreeable people are typically selfish. Their scepticism regarding the motives of others often causes them to be suspicious, unfriendly, and uncooperative (Costa & McCrae, 1992). Therefore, they are unlikely to establish a supportive network or form meaningful social exchange relationships with others (Michel et al., 2011). Recent metaanalytic studies have reported strong associations between personality traits and entrepreneurship (Brandstätter, 2011; Zhao & Seibert, 2006). Costa & McCrae (1992) described sales persons as prototypical extraverts. Entrepreneurs typically adopt the roles of salespersons, whether they persuade a venture capitalist to support their proposed idea or convince a client to purchase their services (Zhao & Seibert, 2006). In addition, prior research has shown that openness is related to successfully adapting to change (Yap, Anusic & Lucas, 2012). Entrepreneurs often need to explore new ideas, use their creativity to solve problems, and apply innovative approaches to developing products, services, and business strategies (Zhao & Seibert, 2006). Moreover, entrepreneurs have been described as highly self-confident

(Chen, Greene & Crick, 1998) and having strong beliefs in their abilities to control outcomes (Simon, Houghton & Aquino, 2000); these traits define low levels of neuroticism.

Furthermore, previous studies have indicated that entrepreneurs are highly motivated to achieve goals (Stewart & Roth, 2004; Wang & Liang, 2015). In other words, they exhibit high levels of conscientiousness. Furthermore, entrepreneurs typically operate with less access to legal protection and a thin financial margin of error because of limited resources, and they tend to be self-centred and competitive. In other words, they exhibit low levels of agreeableness (Zhao & Seibert, 2006). Several meta-analytic studies have shown that entrepreneurs typically have high extraversion, openness, and conscientiousness scores and comparatively lower neuroticism and agreeableness scores (Brandstätter, 2011; Zhao & Seibert, 2006). Based on the aforementioned studies, the research team proposed the following seven hypotheses:

H1: Extraversion, openness, and conscientiousness positively predict SE performance.

H2: Neuroticism and agreeableness negatively predict SE performance.

H3: The relationship between extraversion and SE performance is curvilinear, which can be illustrated by an inverted U-shaped curve.

H4: The relationship between openness and SE performance is curvilinear, which can be illustrated by an inverted U-shaped curve.

H5: The relationship between neuroticism and SE performance is curvilinear, which can be illustrated by a U-shaped curve.

H6: The relationship between conscientiousness and SE performance is curvilinear, which can be illustrated by an inverted U-shaped curve.

H7: The relationship between agreeableness and SE performance is curvilinear, which can be illustrated by an inverted U-shaped curve.

STUDY 1: EXPLORATORY FACTOR ANALYSIS

Method

Participants. The participants in this study were either leaders or high-level managers of SEs in Taiwan. These participants served as the calibration sample for testing the number of factors in the data by using an exploratory factor analysis (EFA). The most appropriate structure of the SE performance scale (SEPS) was determined by the EFA results. Of the 196 participants, 190 completed all parts of the study. The majority (61.05%) were male; 25.26% did not have bachelor's degrees, 34.21% had bachelor's degrees, and 40.53%

had master's (and above) degrees; 23.68% ranged in age from 20 to 30 years, 25.26% ranged from 31 to 40 years, 30.00% ranged from 41 to 50 years, and 21.06% ranged from 51 and above.

Measure. Based on previous studies (Arena et al., 2014; Smith et al., 2014; York and Venkataraman, 2010), a 37-item SE performance assessment was developed by the research team, which was scored using a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). The research participants were instructed to determine the level of agreement with each SE performance item. Regarding the face validity of the assessment, five experts of agricultural extension were invited to provide feedback in selecting items and constructing the scale to fulfil the aim of assessing SE performance. This scale was then completed by approximately 50 social entrepreneurs to test its readability and flow.

Procedures. The paper-and-pencil survey was administered during three conferences on social entrepreneurship held in Taipei during October 2014. Identical procedures were followed during each assessment. Furthermore, the assessments were conducted by the researchers directly. Therefore, any problems faced by the participants when answering the questions could be resolved. The participants were asked to express their agreement levels regarding how they successfully operate SEs. The questions in this study did not include sensitive items that may have caused the respondents to represent themselves dishonestly because of a desire for social acceptability. In addition, participation was voluntary, confidential, and anonymous to reduce the possibility of social desirability bias. Participants had the right to review the results of their responses.

Results

Descriptive analysis. Data were analysed using SPSS Version 17.0. The measured items were organised by item analysis on the mean range of SE performance (4.22 to 5.24), standard deviation (0.627 to 1.019), skewness (-0.998 to 0.253), and kurtosis (-1.846 to 1.315) of the data acquired during the formal survey. In determining the reliability of the scale, Cronbach's alpha reliability coefficient was analysed ($\alpha > .6$). To calculate the item discrimination, the means of the participants involved in the 27% bottom-top groups were compared through an independent samples t test, indicating the significance level achieved. An item-total correlation test was then performed to check if any item in the scale was inconsistent with the averaged behaviour, also indicating the significance level achieved. The results of the aforementioned analyses showed that the measured items were appropriate.

Exploratory factor analysis. The Kaiser–Meyer–Olkin measure in this study was 0.855. Bartlett's test of sphericity was significant (χ^2 = 4317.146, df = 666, p = .000). Both analyses showed that the sampling was sufficient to proceed to the factor analysis. A Principal Axis Factoring (PAF) analysis with promax rotation was conducted to determine the dimensionality of the SEPS. Based on the proven criteria, four-factor solutions (eigenvalues greater than 1) with explained variables of 47.502% provided the optimal factor structure, conceptually and statistically. Factor 1 included items related to entrepreneur and human resources and was labelled personal issues. Factor 2 included items related to social problems, contributions, and supports and was labelled social aspects. Factor 3 included items related to organisational structure, resources, and operations, and was labelled business elements. Factor 4 included items related to the design and delivery of service programmes and was labelled service programmes.

The Cronbach's α value of Factor 1 was 0.850; the value of Factor 2 was 0.870; the value of Factor 3 was 0.896; and the value of Factor 4 was 0.859. The high value of internal consistency showed that the developed scale had appropriate reliability estimates. The M, SD, and PAF results of Study 1 are listed in Table 1. The correlation coefficients between the four different factors ranged from 0.384 to 0.547.

Table 1. The PAF loading, M, and SD of the SEPS (n = 190)

Factor/item	PAF	M	SD
Personal issues			
1. Social entrepreneurs have a driving force to improve human society.	.678	4.58	.811
2. Social entrepreneurs have concrete resolutions in dealing with particular social problems.	.451	4.54	.821
3. The charisma of social entrepreneurs leads to their enterprises being supported by the public.	.633	4.51	.919
4. A social enterprise represents its operator's aspirations and career goal.	.786	4.45	.845
5. Social entrepreneurs consider realistic profit.	.578	4.54	.852
6. The greater members' understanding of the meaning of social enterprises is, the greater organisational development is.	.811	4.85	.931
7. The greater the members' understanding of the concept of social enterprises is, the greater the contribution of innovative development is to the organisation.	.397	4.95	.831
8. All members generate positive energy because of the operation mode of a social enterprise.	.493	4.65	.760
9. Recruiting experienced social enterprise operators is beneficial for the development of a social enterprise.	.348	4.94	.821

Factor/item	PAF	M	SD
Social aspect			
10. Causing positive societal changes is the contribution towards promoting social enterprises.	.678	5.17	.722
11. Providing improvement methods for specific social problems is the contribution towards promoting social enterprises.	.451	4.83	.669
12. Providing public education for specific social problems is the contribution towards promoting social enterprises.	.633	4.62	.826
13. Shaping public service ethos is the contribution towards promoting social enterprises.	.786	4.65	.754
14. Gaining public recognition and support is the contribution towards promoting social enterprises.	.578	4.60	.747
15. Gaining media attention and creating a social movement is the contribution towards promoting social enterprises.	.811	4.37	.903
16. Providing an innovative operation model that can be extended or learned is the contribution towards promoting social enterprises.	.397	4.68	.929
17. Improving cooperation networks among business sectors is to the contribution towards promoting social enterprises.	.493	4.62	.888
18. Innovative strategies for social (or environmental) changes are necessary for the operations of social enterprises.	.428	4.91	.843
Business elements			
19. Social enterprises must set a clear target market.	.503	4.96	.835
20. Social enterprises must have a clear business model for commercial gain.	.803	4.83	.883
21. Social enterprises must consider the basic profit and the cost structure of the organisation.	.791	5.04	.819
22. Social enterprises must recruit appropriate manpower.	.478	4.96	.765
23. Social enterprises must improve financial management to reduce organisational risks.	.708	5.24	.627
24. Social enterprises must have an organisational structure that can support healthy functioning.	.667	5.01	.749
25. Social enterprises must have cooperation networks among business sectors.	.695	4.91	.784
26. Social enterprises must be legally established.	.702	4.77	.884
27. Social enterprises must have a thorough plan for resource fundraising.	.608	4.73	.803
28. Social enterprises must make effective investments.	.350	4.22	1.019
29. Social enterprises must have a feasible procedure for using enterprise resources.	.577	4.97	.759
30. Social enterprises must research and develop innovative service programmes that have social value.	.383	4.99	.816
31. Social enterprises must have a thorough marketing plan for service programmes.	.591	4.98	.709

Factor/item	PAF	M	SD
Service programmes			
32. Recruiting volunteers, interns, or disadvantaged groups to participate in service programmes is a crucial task of social enterprises.	.576	4.66	.899
33. Creating service programmes with disadvantaged groups is a crucial task of social enterprises.	.623	4.82	.805
34. Gaining public recognition for service programmes is a crucial task of social enterprises.	.733	4.86	.818
35. Creating and promoting service programmes compatible with the parent organisation or institution is a crucial task of social enterprises.	.874	4.70	.848
36. Creating and promoting service programmes by revitalising the existing organisation is a crucial task of social enterprises.	.903	4.76	.832
37. Improving interaction among the community, customers, and enterprise is a crucial task of social enterprises.	.480	4.91	.919

Discussion

The four-factor model of the SEPS was applicable to Taiwanese SEs, concurring with previous studies (Arena et al., 2014; Dean & McMullen, 2007; De Clercq, Dimov & Thongpapanl, 2013; Kreiser et al., 2013; Meyskens et al., 2010; Smith et al., 2014; York & Venkataraman, 2010). According to the results, personal issues refer to the motivation, leadership, and charisma of entrepreneurs, as well as the shared knowledge, orientation, and intensity of human resources in a SE.

Social aspects refer to the contributions of a SE in improving local and global environmental conditions and creating positive social changes by addressing particular societal needs, promoting public awareness and social movements, and creating innovative and sustainable products, services, and institutions. Social aspects also refer to the assistance of external institutions in achieving their goals by amplifying cooperation networks amongst businesses.

Business elements refer to the organisational capacity that facilitates the resolution of particular social problems. This dimension includes human resources (e.g., innovation and knowledge transferability), financial resources (e.g., financial plans and systems), organisational structures (including infrastructures), organisational cultures, business models, operational strategies (including target markets and marketing plans), external relations, and legal and regulatory environments.

Finally, service programmes refer to the design and delivery of service programmes that contribute to resolving social problems by increasing social ties amongst enterprises, customers, communities, and the public.

STUDY 2: CONFIRMATORY FACTOR ANALYSIS AND MEASUREMENT INVARIANCE

Method

Participants. The participants in Study 2 were either leaders or high-level managers of SEs in Taiwan. These participants served as the validation sample for verifying the established structure of the SEPS, using a confirmatory factor analysis (CFA). Of the 247 participants, 236 completed all parts of this study. The majority (61.86%) were male; 24.15% did not have bachelor's degrees, 33.48% had bachelor's degrees, and 42.37% had master's (and above) degrees; 15.68% ranged in age from 20 to 30 years, 33.49% ranged from 31 to 40 years, 29.66% ranged from 41 to 50 years, and 21.17% ranged from 51 and above.

Procedures. In Study 2, a web-based SEPS was developed and administered by the research team during November 2014. The Survey Monkey tool was chosen to host this study because the program was easy to use and economical. The disadvantages of the Internet survey included contacting the individuals in the targeted population as well as persuading those individuals to complete the survey once they had been contacted. To minimise these possible disadvantages, the survey web address was sent by email, which provided a convenient and immediate means of response for the participants. A list of over 1,000 SEs was obtained from the Ministry of the Interior in Taiwan. The participants were asked to express their agreement levels regarding how they successfully operate SEs. Participation was voluntary and confidential. The results were delivered in aggregate and anonymous form and the data remained private, but could be shared with others if the researchers consented. In addition to the CFA, a series of invariance tests were conducted by the research team across genders.

Results

Confirmatory factor analysis. CFA with a maximum likelihood estimator was performed using LISREL 8.80 to test the factorial validity of the four-factor solution of the SEPS. The indicators recommended by Tabachnick and Fidell (2001) were used by the research team to assess the goodness of model fit. Regarding the SEPS, the four-factor solution yielded an acceptable fit (χ^2 = 1694.90, df = 623, p < .005, RMSEA = .086, SRMR = .090, CFI = .93, NFI = .89, TLI = .92). The results of the CFA are illustrated in Table 2. The tests of reliability and validity of the SEPS are reported in Table 3.

Table 2. The confirmatory factor analysis of the SEPS (n = 236)

Item/Factor	Personal issues	Social aspect	Business elements	Service programs
1	0.52	0.52	0.61	0.51
2	0.55	0.63	0.57	0.50
3	0.65	0.74	0.70	0.78
4	0.71	0.69	0.56	0.87
5	0.50	0.68	0.74	0.80
6	0.74	0.55	0.74	0.65
7	0.64	0.72	0.71	
8	0.68	0.67	0.39	
9	0.60	0.52	0.63	
10			0.45	
11			0.61	
12			0.59	
13			0.60	

Table 3. The composite reliability, convergent validity, and discriminant validity of the SEPS (n = 236)

Factors	Composite reliability	Measurement errors	Convergent validity (factor loadings)	Discriminant validity (confidence intervals)
1. Personal issues	.8513	.45 ~ .75	.50 ~ 74	ϕ1,2: .6816 ~ .8384; ϕ1,3: .5524 ~ .7876;
2. Social aspect	.8606	.46 ~ .73	.52 ~ .74	ϕ1,4: .3828 ~ .6572; ϕ2,3: .4924 ~ .7276;
3. Business elements	.8853	.45 ~ .85	.50 ~ .74	ϕ2,4: .4524 ~ .6876; ϕ3,4: .3924 ~ .6276;
4. Service programs	.8471	.24 ~ .75	.50 ~ .87	

According to the data, the analysis of the composite reliability estimates demonstrated that the SEPS had a strong internal consistency. In Study 2, the construct validity was examined in terms of convergent validity and discriminant validity. The convergent validity of each factor was tested by examining the standardised factor loadings. Factor loadings should be .50 or higher for the convergent validity to be achieved. The discriminant validity in this study was tested using confidence interval tests. If the confidence intervals did not include a value of one, discriminant validity was demonstrated. The results reported in Table 3 suggested that convergent and discriminant validity were assured and therefore that the construct validity was also achieved.

Measurement invariance

The degree of measurement invariance of the SEPS across genders was further tested by the research team using the steps proposed by Vandenberg and Lance (2000). As shown in Table 4, configural invariance was supported. Whether different degrees of measurement were invariant across genders was then examined by the research team, including factor loadings (metric invariance), response tendency (scalar invariance), factor covariance, factor variance, and error variance. Except for χ^2 and $\Delta\chi^2$, which are sensitive to large samples, other goodness-of-fit indices, including ΔCFI, which was proposed to test the measurement invariance, indicated that all models assuming different degrees of invariance were acceptable. The SEPS attained a high degree of measurement invariance across genders. The relationships of covariates with the four SEPS factors were also found to be invariant (structural invariance).

Table 4. The measurement invariance tests of the SEPS (n = 236)

Problem	χ2	Δχ2	df	RMSEA	TLI	CFI	ΔCFI
Configural Invariance	4217.1688		1246	0.1140	0.8308	0.8417	
Metric Invariance	4256.4417	39.2729	1279	0.1130	0.8348	0.8414	-0.0003
Scalar Invariance	4313.0191	56.5774	1312	0.1119	0.8377	0.8401	-0.0013
Factor Covariance Invariance	4331.5431	18.524	1318	0.1121	0.8378	0.8395	-0.0006
Factor Variance Invariance	4341.5808	10.0377	1322	0.1121	0.8379	0.8391	-0.0004
Error Variance Invariance	4448.3431	106.7623	1359	0.1141	0.8387	0.8354	-0.0037
Structural Invariance	4464.1861	15.843	1363	0.1140	0.8386	0.8348	-0.0006

Discussion

A confirmatory factor analysis was conducted to verify the established factor structure in Study 1. The results of the CFA confirmed the four-factor solution of the SEPS. Based on the satisfactory results of internal consistency and cumulative explained variance in Study 1, the reliability and validity of the ESPS were continually examined by the research team in this study. As a result, the composite reliability and construct validity analyses also supported the effectiveness of the ESPS. Additionally, in this study, the four-factor model of the ESPS was confirmed across genders in Taiwanese SEs to ensure the quality of the assessment.

STUDY 3: HYPOTHESIS TESTING AND MODEL BUILDING

Method

Participants. A list of SEs was obtained by the research team from the Taiwanese government. Excluding the sample used in Study 2, the web-based SEPS was continually administered during December 2014. The survey web address was sent by email to invite SE leaders to participate in Study 3. Of the 292 participants, 280 completed all parts of this study. The majority (61.79%) were male; 20.36% did not have bachelor's degrees, 32.14% had bachelor's degrees, and 47.5% had master's (and above) degrees; 19.64% ranged in age from 20 to 30 years, 28.93% ranged from 31 to 40 years, 31.43% ranged from 41 to 50 years, and 20% ranged from 51 and above.

Measure

In addition to the SEPS, Study 3 adopted the 40-item IEBFMM (Thompson, 2008), which were measured using a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). The IEBFMM items consisted of short phrases that were used to assess the traits typically associated with each of the Big-Five dimensions: extraversion (e.g., talkative, energetic, outgoing), openness (e.g., creative, intellectual, artistic), neuroticism (e.g., envious, anxious, jealous), conscientiousness (e.g., efficient, systematic, organised), and agreeableness (e.g., kind, cooperative, warm). Before the survey was composed, this scale was translated from English to Chinese and then back into English by three independent bilingual researchers to ensure equivalency of meaning (Brislin, 1980).

Procedures

The procedure of Study 3 was similar to that of Study 2. A total of 755 emails were sent, followed by reminders 2 weeks later. Phone numbers and email addresses were provided on the scales. Therefore, problems encountered by participants when answering the scales could be resolved directly. All participation was voluntary and anonymity was guaranteed. No particular incentives were offered for participation, accounting for the low participation rate (292/755 = 39.6%). Of the returned emails, 280 were valid.

Results

Confirmatory factor analysis. CFA with a maximum likelihood estimator was again performed to examine the factorial validity of the four-factor solution of the SEPS and the five-factor solution of the IEBFMM. Regarding the SEPS,

the four-factor solution yielded an acceptable fit (χ^2 = 2325.34, df = 623, p < .005, RMSEA = .086, SRMR = .087, CFI = .93, NFI = .90, TLI = .93). The results of the CFA indicated that the loadings of personal issues ranged from .51 to .69; those of the social aspects ranged from .52 to .75; those of the business elements ranged from .50 to .78; and those of service programmes ranged from .55 to .81. Discriminant and construct validity were assured.

Regarding the IEBFMM, the four-factor solution yielded an acceptable fit (χ^2 = 363.47, df = 80, p < .005, RMSEA = .098, SRMR = .066, CFI = .95, NFI = .93, TLI = .93). The results of the CFA indicated that the loadings of extraversion ranged from .90 to .93; those of openness ranged from .61 to .99; those of neuroticism ranged from .79 to .95; those of conscientiousness ranged from .91 to .96; and those of agreeableness ranged from .75 to .78. Discriminant and construct validity were also achieved.

Structural equation model. Structural equation modelling combined with maximum likelihood estimation was performed using LISREL 8.80 to test the effects and structural model. In addition to the direct effects of personality traits on perceived SE performance, the data revealed curvilinear relationships between neuroticism and perceived SE performance as well as between agreeableness and perceived SE performance. The data suggested that extraversion, openness, and conscientiousness partially predicted perceived SE performance, which partially supported H1. Neuroticism and agreeableness had positive, direct effects on perceived SE performance, indicating that H2 was not supported.

The data also suggested curvilinear relationships of the U-shaped curve between neuroticism and two dimensions of SE performance (personal issues and social aspects), which partially supported H5. The data also suggested curvilinear relationships of the inverted U-shaped curve between agreeableness and the four dimensions of SE performance, which partially supported H7. Furthermore, the results suggested that the hypothesised curvilinear relationships between extraversion, openness, and conscientiousness and the perceived SE performance did not exist, indicating that H3, H4, and H6 were not supported. The curvilinear effects of neuroticism and agreeableness on the four dimensions of perceived SE performance are illustrated in Figures 1, 2, 3, and 4.
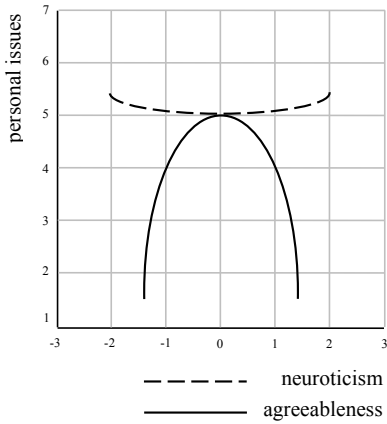
Figure 1. The curvilinear effects
of neuroticism and agreeableness
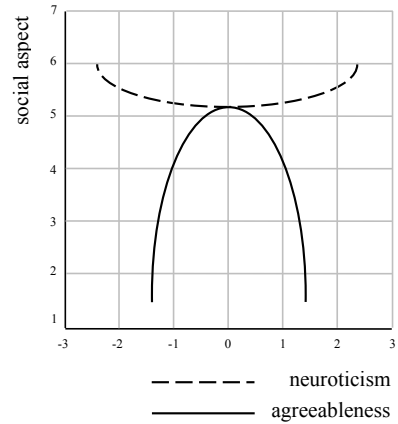on the dimension of personal issues
(n = 280)

Figure 2. The curvilinear effects
of neuroticism and agreeableness
on the dimension of social aspect
(n = 280)

Figure 3. The curvilinear effect
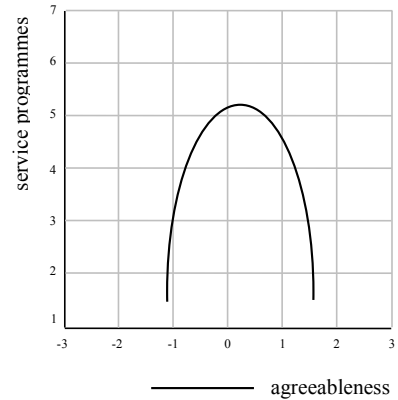of agreeableness on the dimension
of business elements (n = 280)

Figure 4. The curvilinear effect
of neuroticism on the dimension of
service programmes (n = 280)

The structural models were initially supported, but not all the variables were significantly associated with the four dimensions of perceived SE performance. The research team removed paths that were nonsignificant and subsequently revised the structural model (Figure 5). The revised model

produced a model fit comparable to that of the initial model (χ^2 = 6480.20, df = 1929, p < .005, RMSEA = .085, SRMR = .097, CFI = .86, NFI = .81, TLI = .85). In addition to the aforementioned curvilinear effects, extraversion positively predicted the service programmes. Openness negatively predicted the service programmes. Neuroticism and conscientiousness positively predicted personal issues and service programmes. Finally, agreeableness positively predicted all dimensions of perceived SE performance.
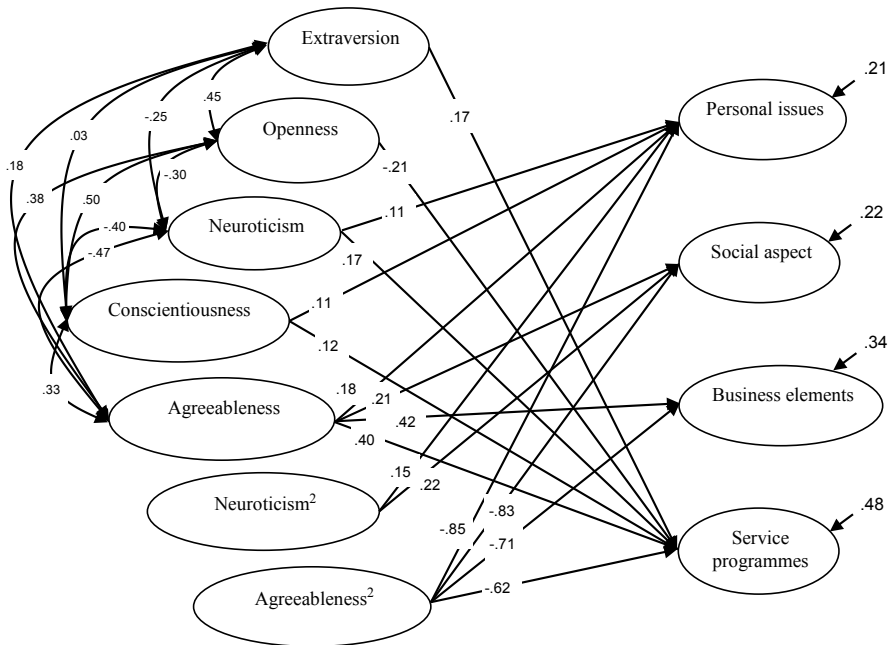

Figure 5. The structural model of personality traits on the perceived SE performance (n = 280)

Discussion

Extraversion is a robust predictor of team-based performance (Zabelina et al., 2007), which explains why this trait can predict the service programmes dimension, particularly the delivery of service programmes and the increasing of social ties. People possessing openness have difficulty focusing on tasks that require intense concentration or patience (Rose et al., 1994), which explains why this trait negatively influences the service programmes dimension, as most social problems cannot be resolved overnight. People exhibiting high levels of neuroticism tend to provide others with candid feedback regarding their actions, which can stimulate additional ideas or

increase team performance (Baer et al., 2008). This trait thus has a positive impact on personal issues and service programmes. Conscientious people tend to be responsible, ambitious, and achievement-oriented. This trait is considered a reliable predictor for entrepreneurs, explaining why it positively influences personal issues and service programmes. Agreeableness is also a robust predictor of team-based performance (Lin et al., 2015), which is particularly crucial for social entrepreneurship. This trait had a strong influence on the dimensions of business elements and service programmes in the current study.

Regarding curvilinear effects, people with high neuroticism scores tend to be insecure and vulnerable (Rothmann & Coetzer, 2003), which may cause them to agree upon teamwork (personal issues) and social problems (social aspects). However, people with low neuroticism scores tend to be self-confident and calm (Zhao & Seibert, 2006), which may cause them to appreciate entrepreneurship (personal issues) and social contributions (social aspects). In addition, people possessing high levels of agreeableness can be excessively self-effacing and avoid conflicts (Bernardin et al., 2000), which may diminish social contributions (social aspects) and performance at team or organisational levels (personal issues, business elements, and service programmes). By contrast, people possessing low levels of agreeableness typically prioritise self-interest over cooperating with others (Costa & McCrae, 1992), which is harmful for any organisation and society as a whole.

GENERAL DISCUSSION

As previously mentioned, thus far, SE performance has been measured primarily through the case study method with the social return on investments (SROI). Because of limited data collection methods, this study developed a new self-report measure of SE performance that is empirically valid and easy to administer. This measuring tool is convenient and can be used either for self-assessment or client evaluation purposes. Departing from the results, this study considered the following questions regarding future research: how can the measure developed in this study be linked to SROI? What specific factors should be considered in using the SEPS in various domains (e.g., agriculture, social welfare, community services)? What are the implications of these differentiations? What factors influence these differentiations? How do the functioning and influence of these factors differ at the individual, team, organisational, societal, and global levels? The research team anticipates that answering the aforementioned questions may yield valuable insights into the development and operation of SEs.

According to the results obtained, a SE performance can be assessed using four major dimensions: personal issues, social aspects, business elements, and service programmes. Personal issues refer to the motivation and leadership of entrepreneurs as well as the orientation and intensity of human resources in a SE. Social aspects refer to the contributions of SEs in improving socioenvironmental conditions through addressing the needs of the public, proposing solutions to public issues, promoting public awareness, stimulating social movements, and creating innovative products, services, and institutions. Business elements refer to the organisational capacities, resources, strategies, and operations that facilitate the resolution of social problems. Finally, service programmes refer to the design and delivery of sustainable services and activities to resolve social problems. The extent to which each dimension may be applied warrants further investigation. For example, compared with business elements, the application of service programmes seems to be narrow in focus. The effectiveness of integrating these two dimensions could be analysed in the future.

Openness had only a minor influence on the perceived SE performance, and neuroticism had a positive effect on the SE performance. Although possible explanations and inferences were provided, many open questions require clarification, particularly regarding the contribution of intrinsic characteristics in shaping entrepreneur behaviour and social entrepreneurship. For example, in addition to the dual goals of social entrepreneurs, addressing social issues and generating revenue through trade, what other factors differentiate social entrepreneurs from general entrepreneurs? How do intrinsic characteristics, such as personality traits, influence these differences? How can these influences enhance the job performance of social entrepreneurs? What other intrinsic characteristics (e.g., motivation, emotions, or self-efficacy) affect their performance? What are the major contextual factors interacting with these intrinsic characteristics, and how do they interact? All of these questions warrant future investigation.

Accordingly, the agreeableness trait had dominant influences on all dimensions of the perceived SE performance. Although this result is not entirely compatible with previous entrepreneurship studies (Brandstätter, 2011; Zhao & Seibert, 2006), it may illustrate the need to re-examine the relationships between personality traits and entrepreneurship in specific domains (e.g., social entrepreneurship). Several uncertainties, including the lack of influences of extraversion and openness on personal issues, the indistinguishable effects of openness and conscientiousness on social aspects, and the minor impact of most traits on business elements, warrant investigation beyond the current study. Information regarding which traits or capacities can benefit which performance dimensions is crucial to the optimal deployment of human

resources within a SE, which can maximise the contributions of a SE. The answers to these questions can provide insights into employee recruitment, development strategies, and retention policies in SEs.

Before presenting the broad conclusions of this study, some limitations should be acknowledged. First, the samples collected in this series of studies were not large enough to be generalised. Because of this limitation, the research team was unable to analyse data more precisely. For example, establishing various structural models for the various SE domains (e.g., agriculture, social welfare, community services) and examining the possible mediating or moderating models could benefit academia and industry. A second limitation was the feasibility of using SEPS in various contexts, particularly in the field of international entrepreneurship (IE) to address global sustainability. Most IE research has been based primarily on assumptions of the recognition, evaluation, and exploitation of economic opportunity (Zahra et al., 2014). However, well-being is a multidimensional concept. Whether the SEPS applies to diverse cultural contexts was not the focus of this study but warrants further investigation.

CONCLUSION

Despite the aforementioned limitations, the results of the current study provide a new understanding of how SE performance can be assessed more practically than before and how the personality traits of social entrepreneurs predict various dimensions of the SE performance. According to the results, the SE performance can be assessed using four dimensions: personal issues, social aspects, business elements, and service programmes. The newly developed SEPS can be a reliable measure of the SE performance. Regarding the impact of entrepreneurs' personalities, this report concluded that extraversion positively influenced service programmes, whereas openness negatively influenced service programmes. Neuroticism and conscientiousness positively predicted personal issues and service programmes. Agreeableness positively predicted all dimensions of the perceived SE performance. In addition, the results demonstrated curvilinear relationships of the U-shaped curve between neuroticism and two dimensions of the SE performance (personal issues and social aspects). The data also suggested curvilinear relationships of the inverted U-shaped curve between agreeableness and the four dimensions of the SE performance.

The development of SEs in Taiwan is still at an early stage. People who have been working in the field of SEs can initiate a larger movement, educating and inspiring Taiwanese society. The research team believes that Taiwan will follow in the footsteps of successful SEs in the West and enable innovators to make a social impact across Asia, contributing to a globally sustainable society.

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Abstrakt (in Polish)

Wobec braku narzędzi pomiaru oraz istnienia luki badawczej w zakresie przedsiębiorczości społecznej, przeprowadzono trzy badania mające na celu opracowanie nowego sposobu pomiaru wyników przedsiębiorczości społecznej, który byłby trafny empirycznie i łatwy do zastosowania. Opracowane narzędzie pozwala na badanie relacji między cechami osobowości przedsiębiorców i postrzeganiem przez nich wyników w zakresie przedsiębiorczości społecznej. Wyniki wykazały, że przedsiębiorczość społeczna może być oceniana w czterech wymiarach: aspektów osobistych związanych z przedsiębiorcą, aspektów społecznych, elementów biznesowych, oraz świadczonych usług. Ekstrawersja pozytywnie wpływa na świadczone usługi, natomiast otwartość ma na nie wpływ negatywny. Neurotyczność i sumienność wykazywały pozytywny związek z aspektami osobistymi przedsiębiorcy i świadczonymi usługami, a ugodowość miała pozytywny związek z wszystkimi wymiarami postrzeganych wyników przedsiębiorczości społecznej. Wyniki badań wykazały również krzywoliniowy związek w kształcie litery U pomiędzy neurotycznością i aspektami osobistymi przedsiębiorcy oraz aspektami społecznymi wyników przedsiębiorczości społecznej. Ponad-

to, zaobserwowano krzywoliniową, U-kształtną zależność pomiędzy ugodowością a czterema wymiarami wyników przedsiębiorczości społecznej.

Słowa kluczowe: *ocena wyników, cechy osobowości, budowa skali pomiarowej, przedsiębiorstwo społeczne, skala pomiaru wyników przedsiębiorstwa społecznego.*

Farm Entrepreneurs' Intentions to Develop Pluriactive Business Activities in Finland

Tarja Niemelä[1]

Abstract

We contribute to the entrepreneurial intentions literature by applying the theory of planned behaviour and resource-based views to the model of active entrepreneurs' intention to develop their pluriactive businesses. Using our 2012 survey data from farm firms in Finland, we address the limited focus on active entrepreneurs and their intentions to develop on-going income-generating, off-farm related business activities. We found that attitudinal proxy antecedents such as innovation, cooperation and growth for pluriactivity differ for active and non-active entrepreneurs and with respect to the entrepreneurs' age and production line and innovation behaviour.
Keywords: *entrepreneurial intentions, off-farm related business, pluriactive entrepreneurs, theory of planned behaviour, resource-based view*

INTRODUCTION

Substantial literature has addressed the concept of entrepreneurial intentions, viewing much of entrepreneurship as an intentional behaviour and the formation of a new venture creation process (Bird, 1988; Bird, 1992; Kolvereid, 1996; Krueger, Reilly & Carsrud, 2000). However, some researchers have debated whether intentions can predict entrepreneurial behaviour (Douglas 2013; Douglas & Shepherd, 2002). It has also been stressed who will develop the business activities (or not) in terms of entrepreneurial intentions (Shane, 2009). Little is known about the farm entrepreneurs' intentions to develop their existing business activities. We want to fill this gap by examining pluriactive farm entrepreneurs' intentions to develop their existing business activities.

Pluriactive farm entrepreneurs may give us an important insight into entrepreneurship research (Carter & Ram, 2003) as portfolio entrepreneurs and owner-managers. By identifying pluriactive entrepreneurs with

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entrepreneurial intentions, and following the idea of Douglas (2013), governments can make use of public funding and private investments most efficiently by steering them toward people who start new businesses or develop their on-going pluriactive businesses because these businesses can impact rural economies, wellbeing and wealth creation for individuals (Alsos, Carter, Ljunggren & Welter, 2011; Kinsella, Wilson, De Jong & Rentig, 2000) and their families.

There exist only a few studies that include farm entrepreneur' intentions to develop their existing pluriactive, off-farm related business activities (Haugen & Vik, 2008; Niemelä & Häkkinen, 2014) Our study addresses this gap by investigating the intentions of active (income-generated) and non-active ("hobbyist") entrepreneurs to develop their off-farm related, pluriactive business activities focusing on the literature of entrepreneurial intentions (Davidsson & Wiklund, 2001) and the theories of planned behaviour (Ajzen, 2011; Ajzen & Fishbein, 1980), models of entrepreneurial events (Shapero & Sokol, 1982), resource-based views (Barney, 1991; Wernefelt, 1984) and entrepreneurial orientation (Wiklund & Shepherd, 2003).

Accordingly, our main research question is what differentiates active and non-active farm entrepreneurs in terms of pluriactivity and their intentions to develop their pluriactive business activities? More specifically, we want to examine whether the active pluriactive entrepreneurs who have the intention to develop their pluriactive business activities are younger, whether their educational level is higher and whether their attitudes towards pluriactivity are more innovative, cooperative and growth-oriented compared to non-active pluriactive farm entrepreneurs.

By investing these issues, we contribute to the entrepreneurial intentions literature. We further develop the theories of entrepreneurial intentions by integrating personal characteristics, insofar as they help to explain entrepreneurs' behaviour and attitudes towards pluriactivity, with theories of resource-based views, insofar as they help to explain the firm-level behaviour of pluriactive farm firms, into the model of intention to develop pluriactive business activities. Second, we demonstrate that different attitudinal antecedents can explain intention to develop pluriactive business activities. Third, we show that several usual suspects of thought to determine entrepreneurial intention appear to hold only for pluriactive farm firms and for active pluriactive entrepreneurs.

We begin with the theoretical background of our research. We then describe our sample and collection of primary survey data from 460 farms. After the methods section, we operationalize our constructs, present hypotheses for the empirical study and deliver the results of the empirical study. We conclude with a discussion of the key findings in light of previous

literature and suggest recommendations for entrepreneurship educators, policy makers and future research.

Literature Review

Focus on entrepreneurial intentions

Prior studies indicate that intentions are the best predictor of any planned behaviour, including the creation of new ventures (Bagozzi, Baumgartner & Yi, 1989; Bird, 1988; Krueger, 1993; Krueger et al., 2000; Schjoedt & Shaver, 2004). In entrepreneurship research, some scholars have casted doubts on whether intentions predict actual entrepreneurial behaviour (Douglas & Shepherd, 2002). Several intentions models in the field of entrepreneurship have been developed over the years, such as the theory of planned behaviour (Ajzen, 1991, 2011) and the earlier formulation of the theory of reasoned action by Ajzen & Fishbein (1980), as well as the model of entrepreneurial event theory that gained support as an explanation of entrepreneurial behaviour (Shapero & Sokol, 1982). These approaches can be traced back to the theory of social learning introduced by Bandura (1977).

The theory of planned behaviour (TPB) posits that beliefs about the three cognitive antecedents of intentions, i.e., attitude, control and norms, influence behaviour (Ajzen, 1991; Ajzen, 2011). Attitude is one's own evaluation of behaviour (whether favourable or unfavourable) in question. Perceived behavioural control reflects perceptions that behaviour is personally controllable. Subjective norms, in turn, refer to social pressure to either engage or not engage in a particular behaviour. The entrepreneurial event model explains intentions based on perceived desirability, perceived feasibility, and the propensity to act. Scholars in the field of entrepreneurial intentions (Krueger & Brazeal, 1994; Krueger & Carsrud, 1993; Linan & Chen, 2009) have agreed that entrepreneurial intentions depend on perceived desirability (motivation to exploit) and perceived feasibility (means required to exploit) of an opportunity, assuming that opportunity has been recognized previously. The perceived feasibility has been usually measured by self-efficacy (Douglas, 2013; McGee, Peterson, Mueller & Sequeira, 2009) and perceived desirability by the individual attitude to income, risk, and decision-making autonomy (Krueger et al., 2000; McGee et al., 2009). Some authors have argued that the opportunity identification process relates to self-efficacy (Bandura, 1977; Krueger & Brazeal, 1994) because self-efficacy leads to increased initiative and persistence, increasing the likelihood of succeeding with the intended action. The TPB has also been applied in agricultural

studies to analyse the adoption of a new technology (Lynne, Casey, Hodges & Rahmani, 1995) and innovations (Borges, Folett & Vanderson, 2015).

Approaches to pluriactivity

Pluriactivity has been referred to as a survival strategy for farm households that need to find a sufficient income to survive but also a wealth accumulation strategy facilitating further development of the income (Bowler, Clark, Crockett, Ilbery & Shaw, 1996) for farming families, as remedies for insufficient farming income, as well as a source of growth (Grande, Madsen & Borch, 2011). Considering pluriactivity from the resource-based view (Barney, 1991), the motivation to pluriactivity enhances rare, inimitable or otherwise valuable resources and capabilities that can provide sustainable competitive advantage for farmers (Alsos et al., 2011), innovative activities (Zhou, Yim & Tse, 2005) and cooperation between firms (Niemelä, 2004). We may also see pluriactivity as a farmer's entrepreneurial orientation towards growth in terms of practices and decision-making styles (Wiklund & Shepherd, 2003). Some scholars have found that pluriactivity is a way to enhance farmers' access to information, experience, and knowledge as well as various business-related ties, all of which result in improving the potential to grow farmers' businesses (Alsos et al., 2011). Whether farmers who expect low profits from the traditional farm business are more likely to diversify as a means of spreading the risk and the effect of farm resources on starting another business (McNally, 2001) have also been considered. We propose that pluriactivity can be viewed also as a strategic direction and exploitation of new-born knowledge but also as opportunities resulting in better performance in pluriactive business.

Considering pluriactivity from the opportunities perspective, previous experience such as knowledge and skills gathered has been identified to be linked to entrepreneurs' motivation to discover new business opportunities (Alsos et al., 2011; Grande, 2011a; Grande, 2011b). Thus, entrepreneurs learn from both their experiences and others; whether successes or failures (Gibb, 2000; Minniti & Bygrave, 2001), their previous business experiences strengthen the ability to discover and exploit opportunities as well as run one's own business (Politis, 2005). It has been argued that farmers desire independence, self-esteem or personal identity together with the flexible employment as identified reasons to engage in more than one income generation activity (De Silva & Kodithuwakku, 2011). We may propose that motivational factors influence farmers' decisions to be pluriactive. Thus, pluriactivity serves as a context for this study; we consider pluriactivity as a diversification between on- and off-farm related businesses and their varying dependencies on agriculture.

Research Methods

Sampling, data collection and procedures

Our sample consists of 460 farms in Central Finland. We obtained the names and addresses of 3435 farm firms from the Information Centre of the Ministry of Agriculture and Forestry IACS (Integrated Administration and Control System) support register of 2010.[1] We collected the data through a questionnaire sent by e-mail as well as by surface mail to entrepreneurs, whose email addresses were out of order or not mentioned in the IACS register between the 15th December, 2011 and the 10th January, 2012. One reminder was sent to those respondents who did not respond to our first survey questionnaire.

Our questionnaire for all farms included questions on farmers' personal, family and farm data, transfers to descendants and the economic foundation of their farm. Furthermore, we directed questions to only those farms that have created new business activities other than traditional farming (i.e., secondary and ancillary business activities, incorporated business activities). We included questions concerning the nature of new business activities, various assessments concerning their attitudes towards pluriactive business activities, networking and co-operation relationships, vocational training, public sector support and advisory system as well as the nature of rural areas as business environments (Niemelä et al., 2005; Niemelä & Häkkinen, 2014).

We consulted and tested the questionnaire on three farm firm entrepreneurs and four agribusiness experts in December 2011. Based on the feedback, we finalized the survey. The questionnaire was sent to all farms in Central Finland (N=3435), of which 460 were returned, reflecting a 13.4 % effective response rate. This response rate is moderately low but consistent with other studies focusing on farm firms in Central Finland (Niemelä, Heikkilä & Meriläinen, 2005) and in Finland (Rantamäki-Lahtinen, 2009). An explanation for the generally low response rates when farm entrepreneurs are targeted is that entrepreneurs prefer to use their time effectively, avoiding non-useful paperwork, as the surveys might seem to them (Carter, 1998).

We excluded some of the respondents' data from the analyses because of incomplete or partially completed survey questionnaires. Non-responses (n=2975) were analysed further: not answered (n=2909), of which: incomplete survey (n=30), refused to answer (n=6), and other reasons (n=30). In the category of other reasons (n=30), there were diverse explanations for non-responses: 1) we are not actively farming anything (n=15), 2) farm owner or farm hostess has retired (n=5), 3) farm firm has sold or its facilities (i.e.,

fields, machines, production, buildings) have been rented to other farms or otherwise (n=6), and other (n=4) reasons.

To test our hypotheses, we limited our sample to those farm firms, which were identified as pluriactive farm businesses (n=189) out of a total of 460 farms. These farm businesses reported having new business activities that are diversified from traditional farming and core production and incorporated as businesses on their own. We employed a broad conceptualization of pluriactivity[2] that branches out beyond traditional agriculture and forestry, which is the case of many Finnish farms. The final sample of 189 pluriactive farm firms consists of 124 family firms and 48 non-family farm firms (N=172) and farms that were over 100 years old (established since 1880). Thus, the final sample comprises 143 responses on pluriactive farm firms, of which 108 firms indicated active and 35 firms' non-active pluriactive businesses. Based on this definition of pluriactive farms, the effective response rate was 31 % (143 retained surveys out of 460).

Because we are interested in active entrepreneurs' intentions to develop their pluriactive business operations and we have divided pluriactive farm firms into active and non-active ones, we are convinced that the intention approach is a useful research strategy in our case (Orser, Hogarth-Scott & Wright, 1998). We describe our data in more detail in the analyses and results section.

Measures

To capture the theoretical constructs and to examine the entrepreneurial intention of pluriactive farm entrepreneurs, we relied on self-reports and single tailor-made items that we developed in our earlier studies when investigating farm firms and farm firms' pluriactivity (Niemelä et al., 2005). Although the previous research in entrepreneurship yielded support for the reliability and validity of the self-reported measures (Lechner, Dowling & Welpe, 2006), we are confident that our approach is valid because we have addressed concrete attributes that can be measured using single items. Our data were collected (Appendix A) on variable scales (scale, continuous) that have restricted our choices for analysis methods. We then used variable specific and logistic regression analyses as research methods because they allowed us to use nominal scale variables. We used proxies as linkages between the constructs and measures to test our hypotheses.

We were interested in the possible differences within active and non-active pluriactive farm firms. In general, we set up the following hypotheses:

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2 Prior research has defined pluriactivity as a concept that can be considered both as a source of livelihood of farm households (Kinsella et al., 2000) as well as a source of growth (Grande et al., 2011).

(H1) entrepreneurs' intention to develop pluriactive business may mostly be explained by entrepreneurs' attitudes towards pluriactivity, (H2) active pluriactive entrepreneurs with intention to develop pluriactive business activities are younger, and their educational level is higher (H3). Moreover, other more detailed but very tentative hypotheses are possible about personal and firm characteristics and intention to develop pluriactive business activities despite quite conflicting prior results concerning entrepreneurial intentions.

Personal characteristics

In general, demographic variables such as age, gender, and entrepreneur's prior education have been shown to affect entrepreneurial intentions in previous studies on entrepreneurship (Shane, 2003), as individual characteristics of the owner (Markantoni, Strijker & Koster, 2013). We included entrepreneurs' age because it (continuous) has been associated with impacting the entrepreneurial process and outcomes related to firm development (Shane, 2003) and the extent and type of pluriactivity (Carter, 1998). We also included gender because it was considered an antecedent of entrepreneurial behaviour (Hill, 2000). Some authors have found that gender is not a key predictor of growth (Storey, 1994) and that men were significantly more likely than women to expand their businesses (Rosa, Carter & Hamilton, 1996). Education, in turn, is one of the most frequently examined components of human capital (Ucbasaran et al., 2009). Some authors have found a positive relationship between education and growth (Wiklund & Shepherd, 2005); however, other authors have failed to find significant influence of education on growth (Barkham, 1994). Thus, we may suppose that entrepreneurial intentions to develop pluriactive business are dependent on the entrepreneurs' age, educational level and gender.

Firm characteristics

The characteristics of small firms influence the development of pluriactive business activities as well as growth. Factors such as the size of the firm (e.g., number of employees), type of ownership, sources of capital, collaboration and the availability of land and space collectively comprise a set of predictors that are crucial to farm firms' success (Atterton & Affeleck, 2010). It is also clear that larger firms, because of their access to resources and services, are expected to grow more than smaller firms (Wiklund & Shepherd, 2003). Thus, we may suppose that the intention to develop pluriactive business is influenced by the size of the firm. To capture the farm's location, representing the regions in which the pluriactive farm businesses mostly act and are

sited, we accounted for potential differences in rural areas per se[3] and the entrepreneurial environment, which may influence the entrepreneurial activities of small businesses (Busenitz, West, Shepherd, Nelson, Chandler & Zacharakis, 2003).

Prior studies have revealed that rural firms can respond actively to unfavourable environments (North & Smallbone, 1996) such as small-scale markets, limited numbers of customers and underdeveloped infrastructure, by using their rural qualities such as land and space (Markantoni et al., 2013). Moreover, business opportunities are more numerous in urban locations, and urban areas may also provide ease of access to customers and necessary resources (Rotefoss & Kolvereid, 2005). Given the focus on firms' locations in rural areas, urban centres and their direct surroundings, we may suppose that entrepreneurs' intentions to develop pluriactive business activities are influenced by the location of the pluriactive farm firm business.

Entrepreneurs' intentions

As Ajzen and Fishbein (1980) stated, intentions directly impact entrepreneurial behaviour that results from the personal attitudes towards specific behaviour and the social pressure to engage in certain types of behaviour. Accordingly, we have used attitudinal proxies such as innovation, cooperation and growth for measuring entrepreneurs' intention to develop their pluriactive business activities.

Innovativeness can be characterized on both firm and individual levels and facilitate explorative and exploitative innovations. Prior studies have shown that innovativeness is accompanied by both creativity and commitment to new ideas and progress, but at the same time also generates new ideas and facilitates the development and implementation of new inventions and products (Lumpkin & Dess, 2005). Furthermore, innovativeness embodies the capability to realize any type of new opportunity and contributes to improving and refreshing the presence of the firm in existing markets and businesses.

Cooperation can be characterized by entrepreneurs' capability to accumulate resources and construct new favourable configurations of resource dependencies and learn from these interactions. Entrepreneurs use their evolving network relationships to meet their demands as their business needs new opportunities for growth or development (Granovetter, 1973; Ozcan & Eisenhardt, 2009). Entrepreneurs' human capital, such as

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3   Finland is one of the most rural countries within the OECD (http://www.oecd.org/finland/oecdruralpolicyreviewsfinland. htmrural). Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, though so are others such as forests. Different countries have varying definitions of "rural" for statistical and administrative purposes, as does Finland.

learning, have been related to entrepreneurial success and the successful development of their ventures (Davidsson & Honig, 2003) and joint ventures (Niemelä, 2004). From the perspective of entrepreneurial learning, entrepreneurs, especially those in small owner-managed businesses, learn by means of experimentation from other entrepreneurs, from customer feedback, by adapting and copying, by solving problems and by grasping different opportunities (Gibb, 2000; Sullivan, 2000).

Growth can be characterized by both internal factors such as entrepreneurs' age, skills and experience, and external factors such as the age and size of the firm, which are related to growth of the firm (Storey, 1994). Wiklund and Shepherd (2003) found that non-economic motives are more important in explaining growth than the opportunity of individual economic gain and loss. Other studies have shown a positive relationship between growth motivations and business growth (Bellu & Sherman, 1995; Kolvereid & Bullvåg, 1996; Orser et al., 1998). Thus, we may suppose that entrepreneurs' intention to develop pluriactive business activities is dependent on the entrepreneurs' attitude towards, innovation, cooperation and growth.

Next, we will describe the measures used in this study. Because of the challenges of our empirical data collection in our research setting, we have collected the empirical data also for the purposes of practice (rural policy makers and enterprise development organizations): Accordingly, we chose to collect data on independent and dependent variables in the same survey. We only controlled the variable of pluriactive farm firms. Considering the combat common method variance as suggested by Chang, van Witteloostuing and Eden (2010), we used different scale types as described in the measurement scale items (Appendix A). We have used entrepreneurs' attitude towards pluriactive farm businesses, such as innovation, cooperation and growth, as a proxy for assessing their intention to develop their pluriactive business activities. To capture the attitude towards pluriactive businesses, our questionnaire consists of items on a 5-point Likert-type scale ranging from 5= extremely well to 1=not well.

Innovation was assessed using sample items: "In our field of industry other entrepreneurs often seek to learn in their own operations from us" (n=169), "We constantly seek new ideas and opportunities to develop our business" (n= 169), and "We have often noticed to be the first experimenter in our field" (n=169). The reliability statistic (Cronbach's alpha) for this scale suggests that the scale is reliable at α =.759 (Nunnally, 1978). Cooperation was assessed using sample items: "We are often the initiator of the cooperation and networking" (n=168), "We are actively seeking more cooperation partners" (n=168) and "We are constantly seeking more and more cooperation possibilities with our existing co-partners" (n=168). The reliability statistic

(Cronbach's alpha) for this scale suggests that the scale is reliable at α =.841 (Nunnally, 1978). Finally, Growth was assessed using sample items: "We consider growth as the pivotal target in our business (n=169) and "Growth and profitability go hand in hand" (n=169). The reliability statistic (Cronbach's alpha) for this scale suggests that the scale is reliable at α =.750 (Nunnally, 1978). Pluriactive farm firm was operationalized using a dummy variable that was coded as 0 if a firm is a non-pluriactive farm, 1 if a firm is pluriactive, reflecting if a farm firm focuses mainly on their primary production (e.g., milk or grain production), on ancillary or supplementary business activities, or on incorporated business activities beyond traditional farming. Further, Active pluriactive farm firm was operationalized by a dummy variable coded as 1 if a firm is an active pluriactive firm. We used two items such as "Primary and most important source of income" and "Provides extra income but is not related to traditional farming" reflecting the economic significance of pluriactive business activities, i.e., respondents' pluriactive business activities involve income generation and motivation to develop pluriactive business activities. Non-active pluriactive farm firm was operationalized by a dummy variable coded as 0 if a firm is a non-active pluriactive farm firm. We used items such as "Mainly a hobby" and "Provides extra income but is a natural supplement for basic agriculture" reflecting that entrepreneurs who refer to their pluriactive business as a hobby implied that the motivation is not economic reward per se (hobby) or their main source of income but is instead related to a lifestyle need and a need for supplementary income. Farm's size (continuous) was included as a variable to measure resources as the area of cultivated fields and forest (we asked entrepreneurs to estimate the area of cultivated fields and forest in hectares) reflecting the resources and opportunities for the development of the pluriactive business activities. The entrepreneurs' age (continuous) and education level as well as gender were measured as independent variables in the model because they might impact on entrepreneurs' intention to develop pluriactive farm firm businesses. Entrepreneurs' age was coded as follows: 1=50 years old, 2=51 to 64 years old, 3=over 65 years and above. Education was coded as 1=lower education (includes middle school and elementary school degrees, vocational school degree, vocational courses) 0=higher education (includes high school, polytechnic and university level degrees, advanced training). Gender was coded as 1= female, 2=male.

ANALYSIS/RESULT

Our study aimed to answer the following questions: First, what factors separate the pluriactive and non-pluriactive farm firms regarding their

entrepreneurship and its prevailing and future domains? Second, what differences are there between the active and non-active pluriactive farm entrepreneurs classified according to their intention to develop pluriactive business operations? Before proceeding to testing our hypotheses, we examined the characteristics of our scale variables.

Which factors separate pluriactive and non-pluriactive farm firms?

At the first phase of our study, we wanted to get a more holistic view on all farm firms (N=448) to find out what differences there were between pluriactive farms and non-pluriactive farms regarding their farm business activities. Furthermore, we wanted to test which factors influence whether a business is pluriactive or not.

Our full sample (N=460) showed us that 50.5% of the pluriactive farms were located in urban centres and their direct surroundings, whereas 61.5% of the non-pluriactive farms are located in rural areas. In turn, 44.4% of the pluriactive farm firm entrepreneurs were men and 29.3% were women. Of the entrepreneurs under 50 years old, 48.6% had pluriactive farm business activities, whereas 43.2% of the entrepreneurs between 51 and 64 years old had pluriactive farm business activities. In turn, only 24.8% of the entrepreneurs over 65 years old had a pluriactive farm business. Only 28.8% of the entrepreneurs with a lower level of education had a pluriactive business, whereas 45% of the entrepreneurs with higher level of education had a pluriactive farm business. In addition, 44.1% of the grain as a primary production line producers had a pluriactive business activity, and 40.1% of non-grain as a primary production line producers had a pluriactive business activity. Moreover, 31.1% of the milk producers had a pluriactive business activity, and 43.8% of non-milk producers had a pluriactive business activity.

The results of our full sample indicated that the gender of the entrepreneur (χ^2 (2, N=446) =6.782, p<0.009) and entrepreneurs' age had a significant influence on whether a farm firm is pluriactive or non-pluriactive (χ^2 (2, N=448) =15.32, p<0.000). The older entrepreneurs have a smaller proportion of pluriactive entrepreneurs. Additionally, the entrepreneurs' level of education has a significant influence on whether a farm firm is pluriactive or non-pluriactive (χ^2 (1, N=458)=9.04, p<0.003.) Similarly, the results of the firm characteristics of the pluriactive farm firms indicated that grain production as a primary production line seem not to influence whether the farm firm has a pluriactive business or not (χ^2 (1, N=444)=0.68, p<0.429). However, milk production as a primary production line seems to some extent to have influence on whether the farm firm has a pluriactive business or not (χ^2 (1, N=444)=4.094, p<0.052). The location of the farm firm (χ^2 (1,

N=448) =4.562, p<0.05) has a significant influence on whether a farm firm is pluriactive or non-pluriactive.

Table 1 reports the means, standard deviations and Pearson's correlation coefficients between every pair of variables for the full sample (N=460).

Table 1. Means, standard deviations, correlations for the full sample (N=460)

Correlations	N	Mean	SD	1	2	3	4	5	6	7
1. Entrepreneur's age	448	1.91	.74	1						
2. Location	448	1.78	.41	-.070	1					
3. Education	458	.76	.43	-.348**	-.079	1				
4. Grain	433	.38	.49	-.027	.064	.018	1			
5. Milk	444	.17	.37	-.103*	.015	.039	-.315**	1		
6. Gender	430	1.79	.41	-.091	-.009	-.066	.095*	-.057	1	
7. Farm size	437	124,27	168,21	-.188**	-.015	.163**	-.023	.040	.031	1

**p<.01;*p <.05; (two-tailed), Pearson's (τ) correlation coefficients

To sum up, for the six independent variables, the largest coefficients between entrepreneur's age and education were -0.348 (p<0.01), which is moderately high, followed by -0.315 (p<0.01), the coefficient between milk as a primary production and grain as the production line. Only location does not significantly correlate with other variables. However, other variables were significantly correlated and were in line with the χ^2 test results.

Regarding the differences between pluriactive and non-pluriactive farm firms, we found that five factors, namely age, gender, education, location of farm firm, and milk production as the primary production line, seemed to determine whether a farm firm is pluriactive or non-pluriactive. We also found that the entrepreneurs' age and education have a significant and high negative correlation, showing that older entrepreneurs have a lower level of education. Additionally, milk production and grain production have a negative correlation, which may show us that those farmers who are focusing on milk production (as their primary production line) are not grain producers (as their primary production line). We conclude that no single indicator of pluriactivity is reliable or sufficient; rather, we believe here that there are multiple factors and outcomes that have influenced the entrepreneurial process towards pluriactivity.

Which factors separate active and non-active pluriactive business activities?

At the second phase of our analysis, we wanted to get a deeper understanding of the pluriactive farm firms (N=189) and to find out what differences there are between the active and non-active farm firms regarding their pluriactive business activities. Furthermore, we want to test which factors influence whether the pluriactive business is an active or non-active business for entrepreneurs.

Our active and non-active pluriactive farm firms sample showed that 25.2% of the active pluriactive farms are located in urban centres and their direct surroundings, whereas 74.8% of the active pluriactive farms are located in rural areas. In turn, among the active pluriactive entrepreneurs, 84.7% were men and 15.3% were women. Among the active entrepreneurs, 16.3% had a lower level of education, and 83.7% of the active entrepreneurs had a higher level of education. Among the active entrepreneurs, 39.3% were under 50 years old, whereas 51.9% were between 51 and 64 years old. In turn, 8.9% of the active entrepreneurs were over 65 whereas 29.8% of the non-active entrepreneurs were over 65 years old. Furthermore, 56.8% of the active pluriactive farms are non-grain as primary production producers, and 43.2% of the active pluriactive farms are grain producers. In addition, 90.6% of the active farms are non-milk as primary production producers, and 9.4% of the active pluriactive farms are milk producers. Finally, 72.5% of the active farms are family firms and 29.3% are not family firms.

Regarding the differences between active and non-active pluriactive farm firms, we found that entrepreneur's age and milk production as a primary production line are the only factors that determine if the pluriactive business is active or non-active. However, farm size seemed not to influence whether the pluriactive business is active or non-active. One explanation can be that the existing premises for pluriactive business activities do not influence pluriactivity, although in small business contexts firms often use their existing resources (Storey, 1994; McNally, 2001). Table 2 reports the means, standard deviations, reliabilities and correlations for every pair of variables.

We found a strong connection between pluriactive entrepreneurs' innovativeness and cooperativeness, and cooperativeness and growth. Our findings may indicate that pluriactive entrepreneurs who are likely innovators are also cooperation-oriented, and entrepreneurs who are likely cooperation-oriented are also growth-oriented. Our findings concerning the innovation, cooperation and growth may refer to separate but correlated variables of attitudes towards pluriactivity, which are also predictors of the outcomes of the entrepreneurs' intention-behaviour. The Cronbach's alphas and reliabilities of all constructs exceeded the recommended threshold level

of 0.70, suggesting satisfactory reliability for the innovation, cooperation and growth variables (Nunnally, 1978). We also examined the inter-item correlations between items of innovation, cooperation and growth to ensure discriminant validity and to control for common method biases. After the chi-square and correlation tests, we conducted a sophisticated and robust multivariate analysis. By using multivariate analysis we examined more accurately if there were differences in the average of the measured variables such as farm size as well as innovation, cooperation and growth between active and non-active pluriactive farm entrepreneurs.

Table 2. Means, standard deviations, correlations for the variables for the pluriactive farm firms sample (N=189)

Correlations	N	Mean	SD	1	2	3	4	5	6
1. Innovation	192	3.02	1.06	1	(.76)				
2. Cooperation	187	2.87	1.07	.698**	1	(.84)			
3. Growth	186	3.17	1.06	.356**	.351**	1	(.75)		
4. Gender	185	1.85	0.36	.221**	.165*	-.037	1		
5. Education	191	0.83	0.38	.010	.060	.017	-.066	1	
6. Entrepreneur's age	186	1.76	0.69	-.109	-.154*	-.214**	-.091	-.348**	1

**p<.01;*p <.05; (two-tailed)
Pearson's (τ) correlation coefficients:
Note: Scale Reliabilities (Cronbach's alpha) are on the diagonal; in parentheses; bolded)

Table 3 reports means, standard deviation, mean squares, F-values, significance, Eta-squared in active (income generated) and hobbyist (non-active) farm entrepreneurs. We found a statistically significant difference in innovation attitude between the active and non-active entrepreneurs, i.e., active entrepreneurs were more innovative than non-active entrepreneurs. Accordingly, the entrepreneurs' innovation attitude towards pluriactive business activities explained 4.3 % of the variance of the innovation attitude. Entrepreneurs, i.e., active entrepreneurs, have a more positive attitude towards cooperation. The entrepreneurs' attitude towards pluriactive business activities explained 5.4 % of the variance of the cooperation attitude. We found also a statistically significant difference in cooperation attitude between active and non-active entrepreneurs. Similarly, we found a statistically significant difference in the attitude towards growth between active and non-active entrepreneurs. Active entrepreneurs have a more positive attitude towards growth. The entrepreneurs' attitude towards pluriactive business activities explained 5.4 % of the variance of the growth

attitude. To sum up our findings regarding the differences between active and non-active farm entrepreneurs, we found that active pluriactive farm entrepreneurs seemed to be more innovative, cooperative and growth-oriented than non-active pluriactive entrepreneurs.

Table 3. Means, Standard Deviations (SD), Means Squares, F-values, Significance and Eta Squared in Active-Oriented and Hobby-Oriented Pluriactive Farm Entrepreneurs (N=169)

	N	Means	SD	Mean square between groups	F-value	Sig.	Eta2
Farm Size				66040.14	1,14		
Hobby	45	121.79	87.34			.286	.006
Active	135	166.02	272.37				
Total	180	154.97	240.37				
Innovation				5.42	7,45	.007**	.043
Hobby	43	2.71	.68				
Active	126	3.12	.90				
Total	169	3.01	.86				
Cooperation				6.52	7,79	.006**	.045
Hobby	42	2.52	.89				
Active	126	2.97	.91				
Total	168	2.86	.93				
Growth				8.11	9,45	.002**	.054
Hobby	43	2.79	1.01				
Active	126	3.29	.89				
Total	169	3.16	.94				

p<.001***; p<.01 **; p<.05*
F>1

Logistic regression analysis

The conceptual model and the hypotheses were tested using logistic regression analysis using SPSS version 23. The factors separating active entrepreneurs from the non-active were further used as independent variables. In entrepreneurship studies with smaller sample sizes are common (Short, Ketchen, Combs & Ireland, 2010). The results of the logistic regression results are displayed in Table 4.

Table 4. Logistic regression model of variables associated with intention to develop pluriactive business activities

Independent variables	Intention to Develop Pluriactive Business Activities	
	Model β	Exp(β)
Personal characteristics		
Entrepreneurs' Age		
Entrepreneurs' Age1	1.562*	4.769
Entrepreneurs' Age2	1.632*	5.116
Education(1= lower level education)	.773	2.166
Gender (1= women)	1.087	2.965
Attitude towards pluriactive business		
Innovation	.789*	2.200
Cooperation	-.133	.876
Growth	.304	1.355
Farm firm's characteristics		
Farm size	.001	1.001
Location 1 Jyväskylä urban region	.048	1.049
Production line 1 (Milk) non-primary production	1.460*	4.308
Production line 1 (Grain) non-primary production line	-.283	.754
Constant	**-4.502**	**.011**
Model χ^2	25.410	
Model significance	.008	
-2 log likelihood	133.749	
Overall predictive accuracy	81.1%	
Cox and Snell R^2	.163	
Nagelkerke R^2	.242	
Number of firms	143	

*$p < .05$; ** $p < .01$; ***$p < .001$

Hypotheses in bold are supported. 1=Active entrepreneurs, 0=Non-Active entrepreneurs.

To avoid issues of model fit that can be problematic with the use of structural equation modelling in small data sets such as this sample of pluriactive entrepreneurs and their farm firms, it is common to use logistic regression analysis. (Kline, 2005).

We want to test whether younger (under 50 years old) entrepreneurs who are not focusing on milk production as a primary production line and who have a positive attitude towards innovation, cooperation, and growth are more likely to be active pluriactive entrepreneurs.

The significance of the individual variables was established by using the Wald (χ^2(1)=33,56). The overall goodness of fit of logistic regression model was evaluated using the chi-square test, the predictive accuracy of the estimated model, the Cox and Snell r-square coefficient and Nagelkerke r-square. Coefficients of the independent variables, such as production line milk, entrepreneurs' age, and innovation were entered into the model to test our hypotheses and were significant at the 0.05 level (95% confidence level). The overall model is a statistically significant at the .008 level according to the chi-square test (χ^2(1, N=189) =25.41, p<0.05). The Cox and Snell is R^2 = 0.163 and Nagelkerke is R^2 = 0.242. This means that the independent variables explain 24.2 % of that probability of belonging to the category "active pluriactive entrepreneurs". The model predicts 81.1 % of the responses correctly.

For the entrepreneurs 51-64 years old, the probability of being an active pluriactive entrepreneur is quadrupled (Exp(β)=4,7) compared to the under 50 years and over 65 years old entrepreneurs. The effect was positive and statistically significant at the p<0.05 level. Again, for the 51-64 years old and those over 65 entrepreneurs, the probability of being active pluriactive entrepreneurs will quintuple (Exp(β)=5,1) compared to entrepreneurs under 50 years. The effect was positive and significant at the 0.05 level. Age is statistically significantly and positively related to entrepreneurial intention (β =0.40; p<0.05; β=0.025; p<0.50; β=0.015; p<0.50; β=0.050; p<0.50;), supporting the hypothesis (Cox and Snell R^2 = 0.163). Our analysis shows that aging increases the probability for intentions to be an active pluriactive entrepreneur. This means that aging decreases the risk of intentions to develop pluriactive business.

Respondents who did not produce milk as the main production line and who have an intention to develop pluriactive farm business were more likely to be active pluriactive entrepreneurs. The effect was positive and statistically significant at p<0.05. For respondents who did not produce milk as the main production line, the probability of being an active pluriactive entrepreneur quadruples (Exp(β)=4,31) compared to the milk as the main production line producers. Milk production decreases the probability of being an active pluriactive entrepreneur. This means that milk production as a primary production line decreases the risk of intention to develop pluriactive business.

Entrepreneurs who were innovation-oriented and who had the intention to develop pluriactive farm business were active pluriactive entrepreneurs. For innovation orientation, the probability of being an active pluriactive entrepreneur doubles (Exp(β)=2,2) compared to non-active entrepreneurs. The effect was positive and significant at the 0.05 level. Innovation increases the probability of intention to develop pluriactive business operations. This

means that innovation increases the probability of intention to develop pluriactive business. Other variables seem not to be significant in this model. A replication of this study with larger samples of entrepreneurs intending to develop their pluriactive business activities may reveal a greater number of significant relationships. The results of the model indicate that the active pluriactive entrepreneurs (n=103) were likely not to be milk as the main production line producers and to be innovation-oriented and slightly diversified by their age because some of them were 51-64 years old or younger (under 50 years) and only a few were over 65 years old. Our logistic regression model confirmed our hypotheses because the regression coefficients were statistically significant and in the hypothesized direction ($\beta=0.021$; $p<0.05$; $\beta=0.040$; $p<0.50$; $\beta=0.025$; $p<0.50$; $\beta=0.015$; $p<0.50$; $\beta=0.050$; $p<0.50$, respectively).

CONCLUSION

The purpose of this study was to study what differentiates active and non-active farm entrepreneurs in terms of pluriactivity and their intentions to develop their pluriactive business activities? More specifically, we wanted to examine whether the active pluriactive entrepreneurs, who have the intention to develop their pluriactive business activities, are younger, whether their educational level is higher and whether their attitudes towards pluriactivity are more innovative, cooperative and growth-oriented compared to non-active pluriactive farm entrepreneurs.

With respect to entrepreneurs intention to develop their pluriactive farm business, active and non-active entrepreneurs showed more distinct profiles and our hypotheses were only partly supported. The active entrepreneurs' intention to develop their business activities was explained by the entrepreneurs' age, milk as production line and innovation behaviour.

Active entrepreneurs were more likely to be younger than non-active entrepreneurs, particularly in the age groups of under 50 years and 51-64 years. However, in the age group of over 65 years, non-active entrepreneurs were more likely to intend to develop their pluriactive businesses than active entrepreneurs. It seemed to us that age decreases the intention to develop pluriactive business activities, but the results are not that conclusive. Our model predicted that the probability for a small portion of older entrepreneurs to be active pluriactive entrepreneurs will grow. Our results indicate that there are diversifications within age groups between the active and non-active entrepreneurs (Carter, 1998, Carter & Ram, 2003) and that the entrepreneurs' age is impacting the entrepreneurial process and outcomes related to firm development (Shane, 2003). Milk producers were not likely

to be active pluriactive entrepreneurs, and they did not have the intention to develop pluriactive farm business activities. As regards the pluriactivity, it can be expected that different types of farm business activities have impact on intention to develop pluriactive business just as different business sectors do. We also found that active entrepreneurs were more likely to be innovative than non-active entrepreneurs. The results of this explorative study may not generalize across the regions, countries or cultures. Another limitation is the low explanatory power of the regression model. Our sample of 189 pluriactive farm firms may be too homogenous to make distinctions within the group of pluriactive entrepreneurs.

This study establishes that intentions for active and non-active pluriactive entrepreneurs are different. The constructs associated within and between pluriactivity vary and that attitudes towards pluriactivity such as innovation, cooperation and growth have a differential effect on entrepreneurial intentions as determinants (or not) of the type of pluriactive business (whether active or non-active pluriactive business activities). The innovation attitude appears to be related only to the intention to develop pluriactive business activities, whereas cooperation and growth attitudes, which are generally supposed to be strong drivers of development and growth (Bird & Jelenik, 1988; Granovetter, 1973; Markatoni et al., 2013; Ozcan & Eisenhardt, 2009) were more likely to be non-significant with respect to intention to develop pluriactive business.

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Abstrakt (in Polish)

Praca wnosi wkład w badania nad intencjami przedsiębiorczymi poprzez zastosowanie teorii planowanego zachowania i podejścia zasobowego w odniesieniu do modelu przedsiębiorców zamierzających rozwijać gospodarstwa rolne o zróżnicowanych profilach działalności (ang. pluriactivity). Korzystając z danych sondażowych zebranych w 2012 roku w firmach rolniczych w Finlandii, koncentrujemy się na aktywnych przedsiębiorcach rolnych i ich intencjach dotyczących rozwijania działalności o profilu odmiennym od rolnego. Badania wykazały zróżnicowany wpływ na wieloprofilową działalność przedsiębiorców aktywnych i nieaktywnych zmiennych takich jak innowacyjność, współpraca, rozwój, jak również różnic w zakresie wieku przedsiębiorcy, profilu gospodarczego firmy oraz zachowań pro-innowacyjnych.

Słowa kluczowe: *intencje przedsiębiorcze, działalność gospodarcza niezwiązana z rolnictwem, przedsiębiorcy prowadzący gospodarstwa wieloprofilowe, teoria planowanego zachowania, podejście zasobowe*

Appendix

A. Descriptive statistics of the explanatory variables and measurement scale items (with p-values for the full Sample (N=448, all farms) and for the pluriactive sample (N=189)

Variables	Scale	Items	All farms p-value	Pluriactive p-value
Location	1,2	The location of the farms: 1 = Jyväskylä region, (n= 97) 2 = other areas in Central Finland (n=351), N =448	.036*	.443

Sum Farm Size	Continuous	Sum variable including the area of cultivated fields and forest (ha): 0–10, 11–30, 31–60, 61–120, 101–180, 181–300, 301– (N = 438)	only mean value reported	only mean value reported
Production Line	1,2	Production line: 1 = grain, (n=444) 2 = milk, (n=444) (1=primary production line, 2) secondary production line)	.429 .052*	.229 (Grain) .038** (Milk)
Entrepreneur's Age	continuous	The age of the respondent in years: 1= under 50 (n=144), 2=51-64 (n=199), 3=over 65 years (n=105) N=448	.000***	.001***
Sum Education	1,2	Sum variable including the basic education of the respondent and the spouse (high school = 1, other = 0) and vocational education and training (1 = post-secondary level, polytechnic or university, 0 = other) (N=458).	.003**	.658
Gender	1,2	1=female (n=92), 2 =male (n=354), N=446	.009**	.813
Innovation	continuous	Statements regarding respondents relationship to pluriactive business: 1) In our field of industry other entrepreneurs often seek to learn in their own operations from us (n=169) 2) We constantly seek new ideas and opportunities to develop our business (n= 169) 3) We have often noticed to be the first experimenter in our field (n=169)	not surveyed	.000***
Cooperation	continuous	Statements regarding respondents relationship to pluriactive business 1) We are often the initiator of the cooperation and networking (n=168) 2) We are actively seeking more cooperation partners (n=168) 3) We are constantly seeking more and more cooperation possibilities with our existing co-partner (n=168)	not surveyed	.012**
Growth	continuous	Statements regarding respondents relationship to pluriactive business 1) We consider growth as the pivotal target in our business (n=169) 2) Growth and profitability go hand in hand(n=169)	not surveyed	.338

p<.001***; p<.01 ** p<.05* statistical significance. Note: innovation, cooperation and growth variables were not surveyed/measured concerning traditional farms, i.e., those who did not have pluriactive business activities.