Exploring moderating effects of proactivity on the relationship between market information and innovation performance

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Abstract

Entrepreneurship scholars often emphasize how important it is for firms to scan their market environments to keep up with changing demands of their customers and competitors. Despite its salience, the relationship between market information and innovation performance has seldom been investigated in SMEs, much less in multiple-country settings. Given the limited body of knowledge on this important topic, the question of why some entrepreneurs use market information better than others for the purpose of innovation has yet to be answered. In this study we propose that entrepreneur’s proactivity influences the effectiveness of market information in the innovation process. We propose a conceptual model and test it on a large cross-cultural sample of SMEs from US and Slovenia. Our empirical findings support proposed moderations effects of proactivity on the relationship between market information and innovation performance. The implications of these results in relation to entrepreneurship theory and practice are discussed.

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Introduction

Due to the important role which SMEs play in economic and technological development, their innovation performance has received much interest in literature (Rosenbusch et al., 2010, p. 4). The vast research effort devoted to understanding innovation in SMEs reflects both the importance of the issue and the controversy that still surrounds the nature of the phenomenon (Tether, 1998). Literature suggests that SMEs innovate in specific ways, different from the innovation process in large firms (Kaufmann and Tödtling, 2002, p. 147). As several scholars argue, SMEs have limited resources and capabilities for conducting in-house R&D activities (e.g. Hausman, 2005; Massa and Testa, 2008). Innovation in SMEs is associated with entrepreneurial features and the capabilities of the workforce (Romijn and Albaladejo, 2002, p. 147). In addition, small firms seldom innovate in isolation but instead rely heavily on external sources of information (Avermaete et al., 2004, p. 474). Yet, in the knowledge-driven economy the determinants of successful innovation are ever changing (Bullinger et al., 2004, p. 3337). The complexity of innovation processes has intensified with increasingly riskier odds of commercial success due to frequent changes in customers’ demands, “first to the market” pressure, and other technology related challenges (Kaminski et al., 2008, p. 29). In such circumstances researchers (e.g. Keh et al., 2007, p. 597) emphasize that market information, specifically information pertinent to firm's customers and competitors is as a powerful knowledge resource (Narver and Slater, 1990). However many researchers (e.g. Kawakami et al., 2012, p. 275) emphasize that acquiring market information is a challenge for SMEs due to limited resources and market research capabilities they avail. More and more information is freely available, but the decision regarding what information should be utilized and what should be ignored has become more complicated (Varis and Littunen, 2010, p. 129).

Despite the growing knowledge on the impact of market information on innovation in SMEs we identified the following literature gaps. First, there is still little published research directly investigating the impact of market information on innovation performance in SMEs despite the seminal work by Brush (1992), Mohan – Neill (1995) that underscored the importance of scanning the marketing environment and researchers (e.g. Soh, 2003; Low et al., 2007) that highlight importance of market information for innovation. Several studies (e.g. Keh, Nguyen et al., 2007; Parry and Song, 2010; Song et al., 2010) have explored the impact of market information on other aspects of SMEs performance (e.g. sales growth, market share, profitability). An overall review of the literature demonstrates that existing empirical evidence has not yet determined a clear relationship between market information generation and SMEs innovation performance; findings from existing research are somewhat ambiguous. While some studies (Keh, Nguyen et al., 2007) conclude that information generation and firm’s new product performance are not significantly correlated, others (e.g. Brockman and Morgan, 2003; Soh, 2003) find significant and positive relationship between these two variables. Second, availing market information is a necessary but not a sufficient condition for innovation performance (Song, Wang et al., 2010), information needs to be productively used. While Kickul and Walters (2002, p. 296) stress that proactivity is the personal trait that may serve as a critical link in determining whether the firm uses new opportunity information for innovations they do not go as far as to provide empirical evidence about specific influence of entrepreneur’s proactivity on the relationship between market information generation and innovation. Grant and Ashford (2008, p. 20) emphasize that in order to gain a full understanding of effects of proactive behaviour, researchers need to explore its moderating role. Third, while the bulk of empirical studies focus
on innovation performance of large-scale organizations in western/developed countries, less is known about effectiveness of use of market information in SMEs (Keskin, 2006) and innovative performance of SMEs in transition economies.

In order to address research gaps identified above the objectives of present research are twofold. First, we aim to examine the moderating role of entrepreneur’s proactivity on the relationship between market information generation and SMEs innovation performance (defined as the number of product and process innovation and the proactive or reactive character of those innovations). We use term market information generation to refer to processes of acquisition, collection and gathering of market information (Harmancioglu et al., 2010). These variables were selected for inclusion on the basis of a thorough review of prior research, which strongly suggests their relevance to SMEs. In our study we are mainly interested in the size of the firm (small to medium-sized) and simple model of governance (entrepreneurial/owner-managed). Our respondents in the empirical study were entrepreneurs that we define as those individuals who have started or purchased a small business, and are still managing the business they started or purchased (Becherer and Maurer, 1997). The second goal of this paper is to explore the extent to which these relationships vary in different cultural contexts.

The remainder of our paper is organized as follows. After reviewing the relevant literature we provide theoretical grounds for moderation effects of proactivity on the relationship between market information generation and innovation performance and present our theoretical model and research hypotheses. We then describe our sample, methods and measures used, and results. We conclude by discussing implications of our findings for theory and practice, limitations and suggestions for possible directions for future research.

**Literature review and hypotheses development**

**Market information and innovation**

Researchers (e.g. Avermaete, Viaene et al., 2004, p. 476) emphasize that SMEs need external sources of information because of limited availability of their internal resources. Indeed, De Propris (2000) goes so far to define external information as a ‘missing input’ that explains small firm’s innovation performance. Forthcoming practical and research evidence emphasizes that many SMEs are interested in information on their customers and competitors in order to differentiate their offerings and positioning (Keh, Nguyen et al., 2007, p. 593). Empirical studies (e.g. Low, Chapman et al., 2007; Prodan et al., 2010; Varis and Littunen, 2010) argue that both new products and services success and firm innovation performance are increasing functions of the degree to which firms collect and utilize market information. Meanwhile Madrid-Guijarro et al. (2009) in their research among 294 Spanish SMEs find that lack of market information represents a barrier for innovation in SMEs.

When examine the direct effects of market information on SME’s innovation performance several researchers (e.g. Prodan, Ahlin et al., 2010; Varis and Littunen, 2010) have focused on types and source of information. Prodan et al. (2010) have in their study among 497 Slovenian SMEs find that customer and competitor’s information have a positive influence on product and process innovation. Varis and Littunen (2010) in their study among 264 SMEs in Finland find that different freely accessible sources of information (such as fairs, exhibitions, media, Internet, etc.) were positively associated with the introduction of novel product innovations in firms. In the
case of the introduction of novel process (production methodology/technology) innovations, an association was found with the information acquired from the different financial organizations (Varis and Littunen, 2010). Yet, findings have been oftentimes mixed. While Brockman and Morgan (2003) and Soh (2003) find that acquiring information could result in greater new product performance, a results of a study by Moorman (1995) show that information acquisition is not related to new product performance (Keh, Nguyen et al., 2007).

Scholars in organizational literature (e.g. De Luca and Atuahene-Gima, 2007; Harmancioglu, Grinstein et al., 2010) recognized that the impact of market information on innovation performance is not direct and is influenced by other variables. For example, Harmancioglu et al. (2010) in their study among 97 Israel business-to-business firms find that impact of top management team involvement in market information collection on firm innovativeness is moderated by firm size and industry context (i.e., high-technology versus low-technology) and is stronger for small firms than for large ones and for high-technology firms than for low-technology ones (Harmancioglu, Grinstein et al., 2010). Results of De Luca and Atuahene-Gima (2007) study show, that market knowledge depth has an indirect effect (through knowledge integration mechanisms) on product innovation performance (De Luca and Atuahene-Gima, 2007, p. 105). However, to our best knowledge no prior empirical study directly investigated potential moderators of the impact of market information on SMEs innovation performance.

Moreover, in circumstances when a weak or inconsistent relationship between a predictor and outcome (e.g., a relation holds in one setting but not in another, or for one subpopulation but not for another) occurs, Baron and Kenny (1986, p. 1178) propose that it is appropriate to search for moderators. Building from mixed findings on the relationship between market information and innovation performance and methodological guidance by Baron and Kenney (1986) we expect that the relationship between market information and innovation performance in SMEs might be moderated by other variables.

The proactive entrepreneur and the small firm

Proactive personality is important in entrepreneurship. Proactivity captures the idea of individuals taking an active role within their environments by initiating and creating changes as opposed to simply reacting and acquiescing to the demands of their surroundings (Bateman and Crant, 1993). Entrepreneurs have to be self-starting and influence their environment by founding new organizations and by identifying and acting upon opportunities (Rauch and Frese, 2007, p. 359). In entrepreneurship Rauch et al. (2009) describe proactivity as an opportunity-seeking, forward-looking perspective characterized by the introduction of new services and products ahead of the competition and acting in anticipation of future demand. Proactive behavior is future-focused (Frese et al., 1997). Individuals are thinking, deliberating, planning, calculating, and acting in advance with foresight about future events before they occur (e.g. Karniol and Ross, 1996; Gollwitzer, 1999; Bandura, 2006; Little et al., 2007; Grant and Ashford, 2008).

Although Bateman and Crant (1993) explicitly stated that not all proactive behaviors are beneficial, the majority of research focuses on the benefits that proactiveness accrues to individuals, groups, and organizations (Grant and Ashford, 2008, p. 21). Empirical evidence in entrepreneurship suggests that individual’s proactiveness is related to entrepreneurial intentions and entrepreneurial action in terms of their firm’s ability to compete and grow (José Acedo and Florin, 2006, p. 53). For example, Crant (1996) examined the relationship between the proactive
personality scale and entrepreneurial intentions. Results of his study show that proactive personality is positively associated with entrepreneurial intentions. Becherer and Maurer (1999) in their study find significant relationships between the small firm president’s proactivity and the firm’s competitive posture and growth in sales. Kickul and Gundry (2002) find a significant relationship between proactive disposition of small business owners and the level of innovation of their implemented strategies. Proactive individuals anticipate and envision a future outcome, and select and modify situations in order to create that outcome (e.g. Buss, 1987; Aspinwall and Taylor, 1997; Gross, 1998; Grant and Ashford, 2008).

Nevertheless, only a few scholars (e.g. Kickul and Walters, 2002; Allen and Weeks, 2005; Grant et al., 2011) have so far recognized the moderating role of proactivity. For example, Allen et al. (2005) proposed that proactivity moderates the relationship between employee turnover intentions and turnover such that the relationship is stronger for more proactive individuals than it is for less proactive individuals (Allen and Weeks, 2005, p. 982). However the results of their research are not significant and do not support their hypothesis. Recently Grant’s et al (2011) show that employee’s proactivity moderates the effect of leader extraversion on employees’ perceptions of leader receptivity in such a way that employees only perceive highly extraverted leaders as less receptive under conditions of high proactivity (Grant, Gino et al., 2011). In entrepreneurship Kickul and Walters (2002) in their research among 107 SMEs in the US find that the relationship between new ideas and opportunities and e-commerce innovations is moderated by the proactive personality of the internet entrepreneur. But no empirical evidence exists so far about the influence of entrepreneur’s proactivity on the relationship between market information generation and innovation. Taking altogether, existing research on proactivity suggests that proactivity can explain how challenging situations in the innovation process are overcome.

**Hypotheses development**

Given that customer needs and expectations continually evolve over time (Kohli and Jaworski, 1990) product lifecycles are becoming increasingly short. Consequently firms are forced to bring new products and services to the market frequently (Hoffmann and Soyez, 2010, p. 778). Market scanning and interpreting environment enables firms to act innovatively (Day and Nedungadi, 1994; Sinkula, 1994; Slater and Narver, 1995; Wei and Wang, 2011). Firms that generate more information have a better chance of identifying market opportunities and implementing innovation actions (Wei and Wang, 2011, p. 270). As Sinkula et. al (1997, 308) state market information generation is the most important element of market information processing because without it there is no opportunity for the firm to keep abreast of its customer and competitor environments. However generated market information are not automatically converted into positional advantages (Harmancioglu, Grinstein et al., 2010, p. 34). Market information can increase the number of decision options (Song, Wang et al., 2010’), but unless the generated information is used, it does not provide any tangible benefit (Keh, Nguyen et al., 2007, p. 594). In addition, the outcomes of information generation are uncertain as they depend on many other influencing factors (Keh, Nguyen et al., 2007, p. 597); for example Song et al. (2010, p. 557) emphasize that generated information are often discounted or ignored by decision makers.

Literature (e.g. Kaufmann and Tödtling, 2002, p. 147) suggests that dynamics of innovation processes in SMEs differs from that in large firms. Schumpeter (1935) early emphasized the existence of a strong link between innovation and entrepreneurs. Therefore researchers (e.g. Marcati et al., 2008; Morris et al., 2009) suggests that we should focus on entrepreneurs when we
are investigating innovation in the context of SMEs, due to the entrepreneur’s role in fostering innovation. As an illustration of the pivotal role of the entrepreneur, North and Smallbone (2000) report that for 85 percent of the firms in their study, the owners of the firms played a central role in the initiation and development of innovations and in many cases they were the only persons involved in the innovation process. Furthermore, small firms seldom innovate in isolation but, instead, rely heavily on external sources of information (Avermaete, Viaene et al., 2004, p. 474). Empirical studies (e.g. Brockman and Morgan, 2003, Soh, 2003) have emphasized importance of market information. Supporting evidence comes from several scholars (e.g. Mohan-Neill, 1995; Lei et al., 2004) who argue that SMEs are often faced with constraints, in terms of available human and financial resources for market information and knowledge acquisition. While large firms typically have the resources to conduct extensive market research to gather such information (Keh, Nguyen et al., 2007, p. 594), small firm usually do not have marketing specialist (Verhees and Meulenburg, 2004, p. 137). Sarasvathy (2001) also argues that formal market information collection processes are not the primary focus of entrepreneurs. This implies that in SMEs entrepreneurs must take initiative in order to collect market information. As Crant (2000, p. 437) suggests, proactive people actively seek information and opportunities for improving things; they do not passively wait for information and opportunities to come to them.

In dynamic environments a heavy reliance on established routines can limit the organizational search for new cognitive pathways (Levitt and March, 1988) and constrain the ability to promptly react to any environmental changes (Magni et al., 2009, p. 1045). Innovation requires the vision to predict what the market may become (Baker and Sinkula, 1999) and fewer adherences to established routines. In other words innovation requires understanding of latent market needs (Morone, 1993). Therefore proactiveness (acting in advance of a future situation) rather than reactiveness is needed (Grant and Ashford, 2008, p. 8).

Based on discussion above we think that entrepreneur’s proactivity could play an important role in explaining why some entrepreneurs use market information better than others for the purpose of innovation. While innovation requires information about competitors and customer needs, entrepreneurs also need to forecast ongoing trends. Drawing from existing studies in that domain, we suggest that the link between market information and innovation performance is moderated by entrepreneur’s proactivity. Bearing in mind that research by Fritsch and Meschede (2001) shows that SMEs allocate more resources to product than process innovations and results of Nieto and Santamaria's (2010) study show, that the impact of collaboration in SMEs is more significant for product than process innovations, we will analyze the moderating impact of proactivity separately for product and process innovations. By not having types of innovation outcomes divided, these could confound results. We propose the following hypothesis:

**H1:** the relationship between market information and product innovation is moderated by entrepreneur’s proactivity, such that more proactive individuals will use market information better which will have a positive impact on the innovation output.

**H2:** the relationship between market information and process innovation is moderated by proactivity, such that more proactive individuals will use market information better which will have a positive impact on the innovation output.

The proposed relationships are depicted in Figure 1.
Figure 1: Moderating effect of proactivity

Methodology

Questionnaire development, sampling, and data collection process
Hills and La-Forge (1992) stressed the importance of conducting entrepreneurship research in international contexts. For the purpose of cross-cultural generalization of our findings we collected survey data in 2 countries: the US and Slovenia. The same data-collection procedure (mail survey and online version of questionnaire) was used in both surveys by the same researchers to secure measurement equivalence across cultures (Sekaran and Martin, 1982; Sekaran, 1983; Antončič and Hisrich, 2001). Dillman’s (2007) tailored design method was applied during data collection process.

Questionnaires were mailed to 3,400 small and medium sized firms in the U.S. and 4,000 firms in Slovenia (with 5 to 249 employees; micro firms were excluded from the survey sample since many of them are dormant firms). A variety of industries were included (e.g. manufacturing, professional, scientific and technical, electricity, gas, steam and air conditioning supply, information and communication, construction, etc). Firms and top executive names for the U.S. sample were randomly selected from the Reference USA research database. Firms for the Slovenian sample were randomly selected from the Business directory of Republic of Slovenia (PIRS), which includes addresses of all Slovenian business. To improve the response rate, follow-up e-mails were sent to remind and encourage participants of completing the questionnaires. For those participants who preferred to complete the questionnaire online the e-mail contained also the internet link and personal access code of the online survey, which was posted on a special web site.

Of the original 4,000 intended survey recipients in the U.S., 60 (1.5%) questionnaires were undelivered, reducing the sample population to 3,940. No systematic pattern was observed among undelivered surveys. There were 108 (2.7%) blank questionnaires returned by respondents who were unwilling to participate. Two questionnaires were excluded due to the high proportion of missing data (20 % or more). To focus exclusively on entrepreneurs and the entrepreneur-led
firms, only respondents who had started or purchased their businesses were included in this study, therefore 47 questionnaires were excluded. During the 2-month process of collecting the questionnaires 314 useful representative responses were obtained, yielding a 12% overall response rate and 8% valid response rate. This response rate is comparable to other studies conducted among SMEs in the U.S., such as Patel and Cardon (2010) with 5% response rate and Ozgen and Baron (2007) internet survey with a response rate of 6.5% and Sullivan and Marvel (2011) with a response rate of 10.3%. As researchers (e.g. Dennis, 2003; Patel and Cardon, 2010) emphasize response rates around 10% are typical for SMEs in US.

From 3,400 sent questionnaires in Slovenia, 24 (0.7%) questionnaires were undelivered. There were 1,194 questionnaires returned by respondents; 152 questionnaires were returned blank, 5 questionnaires had a high proportion (more than 20%) of missing data and were therefore excluded, 124 questionnaires were excluded since the SMEs were not entrepreneur-led, 913 useful representative responses were obtained. This represents a 35.4% overall response rate and a 27% valid response rate. This response rate is comparable to other surveys conducted in Slovenia, such as Antončič and Hisrich (2001) with a response rate of 29% and Prodan et al. (2009) with 24% response rate, Markič et al. (2011) with 10%.

Operationalization and measure validation
To measure the constructs in our model we adopted existing measures in the literature. The English version of the questionnaire was first designed and then translated into Slovenian language. The Slovenian version was then back-translated according to the steps suggested by Brislin (1970) and Sekaran (1983). The back-translated English version was checked against the original English version for accuracy (Feng et al., 2010). To further ensure the content and face validity of the measures (Zheng Zhou, 2006, p. 397), the survey instrument was pre-tested on a sample of 20 top executives of selected Slovenian small firms to collect their feedback and experience of filling in the questionnaire. Their comments were incorporated in designing the final questionnaire.

To measure proactivity we used Seibert et al. (1999) 10-item version of Bateman and Crant (1993) of proactive personality scale. Respondents were asked to indicate their degree of certainty on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"), how strongly they agree or disagree with such items as "No matter what the odds, if I believe in something I will make it happen", "I am constantly on the lookout for new ways to improve my life", "I can spot a good opportunity long before others can" and "If I see something I don’t like, I fix it". Cronbach’s alpha for this scale was 0.90 for US sample and 0.87 for Slovene sample, which is above the recommended value of 0.70 (Hair et al., 2010).

Market information generation was assessed using the market information generation scale by Wei and Wang (2011). Market information generation were measured with four items: (1) "Our firm gets to know changes in customers' needs in a timely manner," (2) "Our firm frequently asks for customers' opinions on our products and services," (3) "Our firm pays constant attention to changes in the industry (competitive, technological, legislative, etc.)," and (4) "Our firm regularly investigates the potential effects of market conditions (e.g., legislative and economic situations) on our customers." Seven-point Likert scale was used. Cronbach’s alpha for this scale was 0.76 for US sample and 0.80 for Slovene sample.
We measured two major areas of innovation: product and process, on the basis of the criteria which were conceptualized and used in previous empirical studies regarding innovation. Product innovation were measured with 3 items adopted from Yang et al. (2009). Product innovation include the number of new products/services firm has introduced to the market, the number of firm’s new products that are first-to-market (or early market entrants) and the speed of firm’ new product/services development. For process innovation we used Jiménez-Jiménez and Sanz-Valle (2011) 3-item measure. Process innovation include number of changes in process introduced, introduction of new process that are first-to-market, clever response to new processes introduced by others companies in the same sector. Like in recent studies (e.g. Yang, Wang et al., 2009; Jiménez-Jiménez and Sanz-Valle, 2011) we ask respondents to evaluate the firm’s innovation performance against the major competitor in the industry. This approach, as affirmed by Kraft (1990) and Prajogo and Ahmed (2006), was used to minimize a bias from subjective answers. Answers were given on a seven-point Likert scale ranging from 1 ("much worse than competitors") to 7 ("much better than competitors"). All Cronbach’s alphas were above the threshold of 0.70 (US sample: 0.88 for product innovation and 0.87 for process innovation, Slovene sample: 0.84 for product innovation and 0.89 for process innovation).

Five control variables were included in analysis. At the individual level, entrepreneurs' gender, previous experience, and business tenure were controlled. Previous experiences were measured with the total number of years of employment. Business tenure was measured by means of the number of years the respondent has been working in the current business. At the firm level firm size and firm age were included as control variables. Firm size was measured by the number of current employees in the firm and firm age was measured as the number of years since the firm had been established.

**Data analyses**

To examine the possible non-response bias and the representativeness of the participating firms, we compared the early and late responses on number of employees (Feng, Sun et al., 2010), firm size and firm age (Song, Wang et al., 2010). The results were not significant, suggesting that non-response bias is not a concern in the data.

Our data could suffer from common method bias, since we collected both independent and dependent variables from the same respondent. Harman’s one-factor test was conducted to test the presence of common method effect based on the guidelines of Podsakoff et al. (2003)..

Results indicate that there is no common method bias problem in our data. Questionnaire items were analyzed in terms of missing values. Because there was no pattern in the missing data spread across variables we considered the missing data to be missing completely at random and not to be influential (Rubin, 1976; Hair, Black et al., 2010). The following combined imputation was used: person mean substitution for each case if there were less than 30% missing values within a particular construct, otherwise mean item score (item mean imputation).

For each of the measures discussed above we assessed reliability using Cronbach’s alphas and unidimensionality of the scales (Narasimhan and Jayaram, 1998). We performed all empirical evaluations of the measurement scales on both samples for cross-national comparison according to recommendation of Singh (1995). Exploratory factor analysis was performed using SPSS Version 16.0 for Windows and using the Maximum Likelihood extraction method and Direct Oblimin rotation. Confirmatory factor analysis using Lisrel 8.51 was performed to assess the
convergent, discriminant, and nomological validity of the scale items and latent constructs (Swink and Song, 2007).

In order to verify the accuracy of the distinction between product and process innovation we conducted an exploratory factor analysis. The results (shown in Table 1) confirmed the existence of two innovation factors. Moreover, we conducted a confirmatory factor analysis. The analyses were executed out using the covariance matrix and model parameters were estimated using the maximum likelihood method. We first formed a one-factor and then a two-factor model. Then we examined the model fit of each. Results showed that the 2-factor model (reflecting product and process innovation) fit the data better than the one-factor model.

### Table 1 The innovation dimension’s item factor loadings

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<th>Construct / Items</th>
<th>US sample</th>
<th>Slovenia sample</th>
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<td>Product</td>
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<td><strong>Product innovation</strong></td>
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<tr>
<td>Number of new products/services introduced</td>
<td>0.99</td>
<td>0.69</td>
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<td>Pioneer disposition to introduce new products/services</td>
<td>0.67</td>
<td>0.31</td>
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<td>The speed of development of new products/services</td>
<td>0.60</td>
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<td><strong>Process innovation</strong></td>
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<tr>
<td>Number of changes in process introduced</td>
<td>0.57</td>
<td>0.63</td>
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<tr>
<td>Pioneer disposition to introduce new process</td>
<td>0.51</td>
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<tr>
<td>Response to new processes introduced by others companies</td>
<td>0.46</td>
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**Results**

Our conceptual model suggests that proactivity moderates relationship between market information and innovation performance (Figure 1). To test our moderation hypotheses, we followed the moderated regression procedures recommended by Aiken and West (1991) and Cohen et al. (2003). The hierarchical procedure allows us to examine whether adding the predictor variables and the interaction terms increased the statistical power of the model (Kotabe et al., 2011). In the first step the control variables were entered. In second step market information generation and proactivity were added. Before testing the moderating effects of proactivity we centred the independent variables to increase the interpretability of the interaction variable (Aiken and West, 1991). In the final step the interaction terms of proactivity with market information generation was added. The descriptive statistics and inter-correlations of the variables that were used in the study are presented in Table 2. Table 3 exhibit results of moderated regressions for product and process innovations.
Table 2: Descriptive statistics and inter-correlation matrix

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<td>1) Product</td>
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<td>2) Process</td>
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<td>3) Market</td>
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<td>4) Proactivity</td>
<td>5.55</td>
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*a* Logarithm. Items were transformed because of extreme skew and kurtosis

Note: Correlations higher than 0.14 are significant at the 0.01 level. Correlations higher than 0.10 are significant at the 0.05 level.

To rule out the possibility of any effect derived from multicollinearity, we first examined that all values of variance inflation factor were below 2 (Belsley, 1991) (the highest VIF in US sample was 1.4 and in Slovene sample 1.6) and all values of tolerance were higher than 0.40 (Allison, 1999) (the lowest tolerance in US sample was 0.69 and in Slovene sample 0.52), which indicated no threat to validity of our results (Hair, Black et al., 2010, p. 204).

The base models analyzed the effects of the control variables and explained 5% of the variation in product innovation for US sample and 1% for Slovene sample (Table 3). Control variables explained 3% of variance in process innovation in US sample and 1% in Slovene sample. The base model showed that business tenure had a significant negative impact on product innovations and firm size on both product and process innovation for US sample. In Slovenian sample none of control variables had a significant impact on product and process innovations. The independent effects model showed both market information and proactivity to be significant and positively related to product and process innovation. This model contributed an increase in the explanation of variance, over and above the base model for both product innovation ($\Delta R^2=0.23$ for both samples) and process innovation ($\Delta R^2=0.20$ for both samples).
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<sup>a</sup> Logarithm
<sup>b</sup> Market information × Proactivity
* p < 0.05
** p < 0.01
*** p < 0.001
Finally, the full model incorporated the moderating effect of proactivity on the relationship between market information and innovation performance. Hypothesis 1 stated that entrepreneur’s proactivity had a positive moderating effect on the linkage between market information and product innovation. The results of hierarchical regression analysis (see Table 4) showed that the beta coefficients that correspond to the new independent variable (market information × proactivity) were positive and statistically significant for both samples (US: $β=0.12$, $p<0.01$, Slovenia: $β=0.13$, $p<0.01$), suggesting that moderating effect was indeed present. Hypothesis 1 was supported. Hypothesis 2 stated that entrepreneur’s proactivity had a positive moderating effect on the relationship between market information and process innovation. The results of the hierarchical regression analysis (see Table 3) indicated partial support for Hypothesis 2. The moderating effect of proactivity was positive and significant for the Slovene sample ($β=0.14$, $p<0.05$), while beta coefficient for US sample was positive but non-significant.

**Discussion and implications**

This study makes several contributions to the literature in the field of innovation in SMEs, proactivity and market information by underscoring the importance of entrepreneur’s personality characteristics for innovation performance of SME’s.

This study seeks to contribute to current efforts of entrepreneurship researchers (e.g. Baron and Tang, 2011, Hmieleski, 2009, Magni, 2009) to relate individual level entrepreneur’s trait (proactivity) to important firm-level output (innovation performance). Our first contribution lies in identifying an important boundary condition when market information generation leads to better innovation performance. Results of our study confirmed that a particular group of entrepreneurs (those who are more proactive) use market information better for the purpose of innovation. This finding is interesting since the majority of the previous research has focused on the direct effect of market information on innovation performance without addressing that this effect perhaps depends on the entrepreneur’s capability to take an active role by initiating and creating changes. Second, our study also contributes to the current research on proactivity in entrepreneurship. Even though the role of proactivity has been the subject of interest in the entrepreneurship literature, until now only a few researchers have focused on its moderating role. By investigating the moderating effects, our study addresses recommendations by Grant and Ashford (2008, p. 20) who propose that if we wish to gain a complete understanding what effects proactivity has, researchers can use moderating effects. Our results showed that entrepreneurs who are more proactive are more responsive to new information than others; which has a positive influence on SMEs innovation performance, process innovation in specifics.

In an increasingly globalizing business world, researchers (e.g. Xie et al., 1998, Kawakami, 2012) recognize the need to test theories in the contexts of different cultures. Our study show varied results across cultures. The model of moderating effect was tested on datasets from two very diverse and contrasting economies: USA and Slovenia. Slovenia differs markedly from the US in terms of its level of economic development, entrepreneurship practice and size, suggesting the possibility of differences in the entrepreneurial context between these countries. The main effects model showed that both market information and proactivity were significantly and positively related to product and process innovation in both countries. When moderating effect of proactivity was added to the model, it was found to be positively and significantly related to
product innovation in both samples, while the moderating effect of proactivity was positively and significantly related to process innovation only for Slovene sample (for US sample it was not significant). This may be explained by Ornaghi’s (2006) finding that product improvements have a larger technological diffusion and may be simpler to learn than process innovations, which are often linked to the skills of individuals. On the other hand researchers (e.g. Nieto and Santamaria, 2010, p. 47) also emphasize that SMEs tend to concentrate their efforts more on product than process innovations. Results of Wolff and Pett’s (2006) research shows that product improvement orientation is positively associated with growth and profitability in SMEs, whereas no relationship was found with process improvement orientation. As Nieto and Santamaria (2010) emphasize product innovations are better instruments for entering markets than process innovations since their characteristics enable them to answer client needs more quickly and capture new markets before competitors. In contrast, process innovations possess advantages that usually lead to productivity gains and cost reductions that indirectly affect market position.

Insights from our study bear several implications for business practitioners. As results of our study have shown, only proactive use of generated market information increases innovation of SMEs. Being proactive means thinking and acting ahead - this means using foresight, therefore entrepreneurs should not only take time to scan the competitive environment, more importantly entrepreneurs should vision future by predicting oncoming trends. However, it should be underlined that by visioning the future, entrepreneurs should not neglect the present. The knowledge of the present (e.g. about industry, costumers, competition) is namely required for forecasting future events. Entrepreneurs can also build a proactive organization within their firm to foster innovativeness of all employees. Building of a proactive organization will enable SMEs not only to overcoming difficulties, by proposing innovative solutions, but also of preventing them before their occurrences, thanks to qualities such as mind-openness, long-term vision, and intuition (Marcati, Guido et al., 2008, p. 1588). Entrepreneurs can improve flexibility in their companies by encourage proactive behavior of their employees (for example, through giving more delegation of responsibilities or through education) or by recruiting appropriate human resources.

Limitations and future research opportunities

As in any study, there are several limitations of this research that open avenues for future research. First, despite the fact that this study was conducted in two distinct countries at different stage of development in the U.S. and Slovenia it would be interesting to compare the findings of this research to findings in other contextual venues, such as one of the BRIC countries (Brazil, Russia, India and China) which are positioned in the forefront of global growth. Second, although the model was carefully designed, it did not examine other potential moderators of the relationship between market information and innovation aside from proactivity. Despite empirical evidence indicating that proactivity moderates the relationship between market information and innovation performance, proactivity may also influence innovation through other mechanisms not specifically investigated here. Third, the results show differences between countries. Moderating effect of proactivity on process innovation was in US sample positive, but not statistically significant, while it was in Slovene sample positive and significant. Further research can provide more explanations by considering additional country-specific variables that determine SME innovation performance. Fourth, future studies should also include type of industry as one of the firm characteristic variables so that one can compare differences across industry types.
References


Prodan, I., Ahlin, B., and Slavec, A. (Year) of Conference, The influence of entrepreneurial creativity, work experiences, customer’s and competitor’s information, and scientific
information on product and process innovations. Paper presented at PICMET, Phuket, Thailand.


