

2 The Effects of Innovation Activities in SMEs in the Republic of Croatia *

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Abstract

The ultimate goal of innovation activities is the improvement of business results. Although a number of studies have dealt with innovation in SMEs, few have investigated results of innovation development. As these results depend on the innovating firm, our goal in this paper is to explore the firm-specific factors that have impact on innovation results. These factors include not only classic features like firm ownership, proportion of highly educated employees, and the market in which the firm operates, but also the firm's market orientation and its readiness to implement strategic and management changes. The paper seeks to contribute to the extant literature by exploring how firm-specific factors impact innovation results.

Keywords: innovation results, innovation, SME

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1 Introduction

Under modern business conditions, innovation activities are considered as the driving force behind business success and overall economic development. It is for this reason that the literature often highlights such activities as the ones leading to enterprise progress. Small and medium-sized enterprises give a strong boost to employment and economic growth precisely due to their innovation activities (Keizer et al., 2002). Accordingly, it is in the interest of both individual enterprises and the economy as a whole to create favourable conditions for the implementation of innovation activities.

SMEs primarily owe their business success and growth to the development of innovations, which gradually effect their transformation into large enterprises. Innovations can include new products, services and ideas, as well as new enterprise processes (e.g. production process, procurement process, etc.), new organisational structures and administrative processes.

Numerous studies have dealt with innovativeness in SMEs. Although obtaining many important results, most have failed to analytically link the effects of innovation activities, e.g. profitability and market share, to innovation inputs (Hoffman et al., 1998). As the exact purpose of an innovation is to improve business performance, it is very important to explore the effects of innovation activities. This paper seeks to contribute to the extant literature by examining this topic.

With the effects of innovation activities depending on firm-specific characteristics, this paper aims to explore which factors are crucial for achieving good results. The examination involves the firm's ownership structure, the proportion of highly educated employees and the market in which it operates. As these variables in themselves do not give sufficient proof of the firm's real capabilities, the market orientation variable and the variables describing the firm's "dynamism" through its readiness to implement new strategic and organisational models were also taken into account. By exploring the impacts of these variables on innovation effects, our paper aims to clarify the role of innovations in SMEs and thus contribute to the extant literature.

The paper is organised as follows: Section 2 gives an overview of literature, Section 3 explains the conceptual model, Section 4 describes the research methodology and variables, Section 5 presents the results of the regression analysis and Sections 6 contains the conclusion.

2 Literature Review

There is an ample and diverse literature on SMEs. This paper refers only to the literature dealing with innovations in SMEs. The literature contains various approaches to innovations, with the majority of the related studies being limited to exploring structural characteristics (Hoffman et al., 1998). The recent years have seen a new line of research claiming that SMEs are not simply small versions of large enterprises, but that they operate following a specific set of rules (Hausman, 2005).

Most of the existing studies focus on exploring success determinants of innovation activities. Some of these studies, for example, seek to identify key success factors for innovation strategies in SMEs (Riedle, 1989; Dogson and Rothwell, 1991; Bowen and Ricketts, 1992), while others aim at specifying successful technological and innovation practices (Rinhol and Boag, 1987; Bracker et al., 1988; Boag and Rinholm, 1989; Craland et al, 1989; Radosevic, 1990; Oakey and Cooper, 1991; Berry, 1996). It has been established so far that innovation activities correlate with a large number of factors, subsumable under a few significant variables (Keizer et al., 2002). Keizer et al. (2002) discovered that innovativeness derives from a well-considered innovation policy and that the most innovative SMEs share three basic characteristics: they have links with knowledge centres, access to financing and ample research and development budgets.

Some SMEs studies explore the variables that are considered as responsible for innovation diversity in organisations (Rothwell, 1989; Rothwell and Dogson, 1991; Noteboom, 1994). For example, large and small enterprises are very often shown as taking diametrically opposed approaches to innovation, with large firms finding their advantage in disposable resources and small firms in flexibility (Rothwell, 1985).

Dealing mostly with innovation activities and efforts and their success in creating an innovation (Hoffman et al., 1998), these studies lack an attempt to relate the existence of an innovation to its ultimate goal - business performance improvement. This paper aims to contribute to the extant literature by analysing the effects of innovation activities.

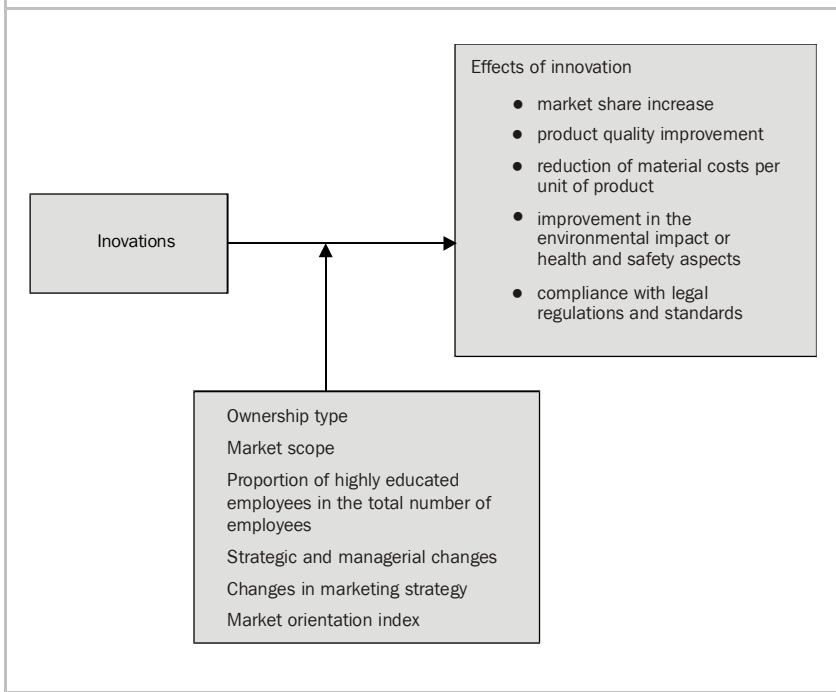
3 Conceptual Model

The ultimate goal of innovation efforts is to improve business performance. As seen from a comparison of innovative enterprises, some of them are much better at capitalising on innovations than their counterparts. While it is undoubtedly essential for creating a competitive advantage and for the firm's survival, innovation is also an activity that carries a large amount of risk (Urban and Hauser, 1993) and requires a substantial and ongoing investment of both financial and human resources. That is why it is important to establish which enterprise types have better innovation effects.

As innovation effects depend on a firm itself, this paper aims at establishing the determinant factors of innovation effects. Of those analysed, the ownership structure and the proportion of highly educated employees are classical factors, while market orientation and the implementation of strategic, management and marketing changes are the factors that are supposed to reflect the firm's capabilities and orientation. The market in which an enterprise operates is also included in the analysis, as it can also have an influence on innovation and innovation effects. In other words, this paper explores the manner in which some characteristics of an innovative enterprise impact innovation effects. The following are considered as innovation effects: increased market share, improved product quality, reduced material costs per unit of product, improved ecological, safety and health aspects and compliance with legal regulations and standards. It can be expected that all these results lead to a profitability increase by spurring product demand or by lowering production costs.

The conceptual model is shown in Figure 1.

Figure 1. **Conceptual Model**



In the section below, we explain why these factors are included and why they are expected to impact innovation effects.

One of the factors analysed as predictors of innovation effects is the ownership type - a variable that affects enterprise operation in general. For example, a study by Shipley et al. (1998) shows that in Poland privately owned enterprises achieve better financial results and market positions. Similarly, it is shown that while private enterprises in transition countries (specifically in Poland and Romania) grow at the same pace as Spanish enterprises, which have not undergone the transition, the government-owned enterprises even reduce their output (Carlin et al., 2000). Considered the driving force behind enterprise growth and successful business performance, innovations in privately and foreign-owned enterprises are expected to lead to a market share increase, product quality improvement and reduction in material costs per unit of product. Due to organisational sluggishness, probable lack of expert knowledge and entrepreneurial spirit, often typical of

government-owned enterprises, expectations are that the impact of these enterprises' innovations on the said effects of innovation activities will be less marked. As private and foreign-owned enterprises show a stronger inclination towards adjusting to market trends, innovations in these enterprises are expected to positively affect the environmental impact and health and safety aspects.

The market in which an enterprise offers its products can be a predictor of the effects of innovative activities. Strengths and weaknesses of competitors, demands raised by consumers, legal regulations, as well as ecological, health and other standards, motivate enterprises to develop products taking into account the situation in a particular market. Enterprises often find themselves having to modify their products sold on the international market, not only to achieve outstanding business performance and competitive advantage, but also to enter the market in the first place and to remain in it. Accordingly, the market range can have an impact on the effects of innovative activities. It is to be expected that the more present an enterprise is in the international market, the more oriented its innovation activities are towards improving product quality, ecological and health aspects, as well as towards complying with legal standards and various regulations.

The research done so far has emphasised human capital as an important innovation factor (Mohnen and Rölller, 2001) and lack of required knowledge and skills as the most serious impediment to innovation. In the modern view of innovation, employee knowledge is no longer vital only to research and development, but rather to all functions of the firm (Leiponen, 2005). However, while highly educated employees are generally considered as the most important source of ideas and the main initiators of innovative activities, an innovative idea is just a segment of a successful development of new products and processes. In order to develop such an idea into an efficient new technology or a commercially viable product, an enterprise needs technical, marketing and "integrative" competencies (Iansiti, 1995; Kogut and Zander, 1992). As has been shown, employee knowledge and skills bring about a rise in enterprise profit (Leiponen, 2000). It is therefore to be expected that a larger proportion of highly educated employees will positively impact innovation effects.

In order to optimally exploit required knowledge, an enterprise must have in place an adequate organisational structure. The studies done so far suggest that a

continuous adjustment of the organisation is one of the thirteen basic functions of innovation management (Tomala and Senechal, 2004) and that innovation is unavoidably linked to organisational changes (Leonard-Barton, 1988). These strategic and organisational changes are aimed at creating the best possible conditions for the implementation of innovation activities within an enterprise. Enterprises in transition countries very often undergo such changes due to their adjusting to new business conditions. While they need not be directly focused on innovation activities, strategic and organisational changes are expected to be conducive to them, as their purpose is to improve the enterprise conditions and discover new techniques and methods aimed at enhancing its business performance.

In addition to the enterprise strategy, the marketing strategy is also included as a factor impacting innovation effects. Teece (1986) showed that profiting from innovation depends on the extent to which an enterprise has access to complementary skills, especially to marketing and distribution, crucial for commercialising an innovative idea. The marketing strategy thus features as an important component in deriving benefit from innovations. Firms that are willing to adjust their marketing strategies can expect to achieve better innovation results.

Market orientation as a business culture leads to business performance improvement, as proved by numerous studies (Narver and Slater, 1990; Slater and Narver, 2000; Cano, Carrillat and Jamarillo, 2004; Tse et al., 2003; Hooley et al., 2000). It is precisely product innovation that is considered as a moderator of the link between market orientation and successful business operation (Kohli and Jaworski, 1990; Deshpandé, Farley and Webster, 1993; Slater and Narver, 1994; Atuahene-Gima, 1996; Langerak, Hultink and Robben, 2004). Innovations have a positive impact on business performance by leading to a market share increase and/or cost reduction and, in turn, a profit rise. Market oriented enterprises deliver superior quality products to their customers while complying with ecological, health and safety standards as well as with legal norms. Accordingly, market orientation is expected to produce a significant positive impact on all analysed effects of innovative activities.

4 Methodology

The data presented in this paper were compiled within the CIS 3 project implemented in 2004. The sample units were chosen by random selection from the "Business Croatia" database, according to two criteria: the main activity and the number of employees. The sample covers mining, manufacturing and service enterprises, i.e. 498 manufacturing and service enterprises with 10 to 250 employees, i.e. small (10 to 49 employees) and medium sized (about 50 to 250 employees) enterprises. This research does not include enterprises with fewer than 10 employees (the so-called micro enterprises). Service enterprises account for 48.99 percent of the sample and manufacturing enterprises for 51.01 percent. Small enterprises make up the largest share of the sample, 66.67 percent, while the share of medium sized enterprises is 33.33 percent.

The data were collected by means of a mail survey. The entire CIS survey had a response rate of 15 percent. The results are related to innovative activities and their effects in the period from 2001 to 2003. The research is done based on data on innovative activities in a time interval, as it takes a period of time for these activities to be realised and produce certain results.

The research includes the following variables: ownership type, market scope, proportion of highly educated employees in the total number of employees, strategic and organisational changes and market orientation index. These variables represent the factors that impact the effects of innovation activities in small and medium sized enterprises.

For the purposes of this study, innovation is defined as a new or significantly improved product offered to the market, or a new or significantly improved process implemented in an enterprise, based on new technological developments, new combinations of the existing technology or the use of knowledge acquired in the enterprise. Accordingly, included are the innovations of physical products, services and processes, regardless of their degree of innovation.

The effects of innovative activities are measured by the following variables: market share increase, increase in production capacities, reduction of material costs per

scale (Narver and Slater, 1990). The scale used for measuring market orientation covers the areas shown in Table 1.

Market orientation component	
Customer orientation	<ul style="list-style-type: none"> • monitoring customer satisfaction level • customer satisfaction related business objectives • strategy based on understanding customer needs • business strategy oriented towards creating superior customer value • measuring customer satisfaction • focusing on after-sale services
Competitor orientation	<ul style="list-style-type: none"> • rapid response to competitor actions • information provision by sales staff • managers discuss competitor strengths and strategies • targeting customers to gain competitive advantage
Interfunctional coordination	<ul style="list-style-type: none"> • integrating all business functions to meet customer needs • all business functions are responsible to one another • top managers communicate with existing and potential customers • free dissemination of information on both positive and negative customer experiences across business units

Variables Relating to Strategic and Organisational Changes

In order to examine strategic and organisational changes, we asked the interviewees whether, in the period from 2001 to 2003, they implemented a new or a significantly changed

1. business strategy,
2. management technique,
3. organisational structure,
4. marketing strategy, or
5. whether they changed a product's aesthetic appearance or design (since aesthetic changes are not considered as product innovation).

The responses were given on a scale from 0 to 3, where 0 represented "no impact", 1 "a low impact", 2 "a medium impact" and 3 "a high impact".

As the responses to some questions were correlated, we decided to reduce the data using the factor analysis. The factor analysis including varimax rotation produced

two factors, the first consisting of changes of the strategy, management technique and organisational structure and the second comprises changes of the marketing strategy and the product's aesthetic appearance and design. Having divided the variables into two groups by the factor analysis, each corresponding to one factor, we defined two binary variables:

1. strategic and management changes
2. marketing strategy changes.

The value of the "strategic and management changes" variable is 1 if either strategic, management technique or organisational changes were made, otherwise the variable value is 0. The value of the "marketing strategy changes" variable is 1 if any changes were made either to the marketing strategy or to a product's aesthetic appearance or design, otherwise it is 0.

Variables Relating to the Effects of Innovation Activities

The effects of innovation activities in the period from 2001 to 2003 were measured by the perception of the impact of these activities on the following five variables:

- market share increase,
- reduction of material costs per unit of product,
- quality improvement,
- improvement in the environment impact and health or safety aspects,
- compliance with legal regulations and standards.

Innovation activities primarily aim to improve enterprise business performance and lead to an increase in profit. The impact on the profit increase was measured by the market share increase, which leads to a rise in revenues, and by the reduction of material costs, which has a positive impact on total profit.

In addition to producing a direct impact on the increase in profit by boosting revenues and reducing expenditures, indirect innovation results can lead to business performance improvement. For instance, environment friendly products with improved health and safety aspects better suit the demands of increasingly

more sophisticated consumers. It follows that innovation activities which are primarily related to improving a product's environmental impact and health and safety aspects lead to its acceptance by customers, creating a positive image and, in turn, improving business performance.

Product quality improvement has a similar impact, as it spurs sales and has a positive effect on customer satisfaction. Finally, by improving its products to make them comply with strict legislation on product manufacture and sale, an enterprise secures its survival and provides for continued operation. That is why this study measures the impact of enterprise characteristics and strategic and organisational changes on these results. The impact is measured by a four-degree scale providing for a high, medium, low and nonexistent impact of innovation activities.

5 Results

The data were analysed by the multiple linear regression, with the dependent variables representing innovation effects and the independent variables relating to the firm's characteristics and strategic and organisational changes. Five different models were observed, one for each innovation effect. All models are significant at the 10 percent level and three of the models at the 0.2 percent level. Table 2 shows the results of the regression on the impact of analysed enterprise characteristics and strategic and organisational changes on the effects of innovative activities.

Variable	Market share increase	Product quality improvement	Reduction of material costs per unit of product	Improvement in the environmental impact, health or safety aspects	Compliance with legal regulations and standards
Intercept	-0.56**	-0.03	-0.97**	-1.57*	-0.66
Private ownership	0.001	0.002	0.0001	0.001	-0.002
Government ownership	-0.26*	-0.08	-0.005	-0.38*	-0.03
Foreign ownership	0.26*	0.8	0.008	-0.38*	0.03
Market range	0.06	-0.02	-0.03	0.05	-0.07
Proportion of highly educated employees in the total number of employees	-0.03	0.24**	-1.01*	-0.56*	-0.78*
Strategic and managerial changes	0.07	-0.04	0.13	-0.12	0.02
Marketing strategy changes	0.14**	-0.03	0.02	0.29**	0.15
Market orientation index	0.21*	0.21*	0.32*	0.45*	0.35*
L.Ratio Chi 2	27.31	14.05	14.06	29.66	24.79
p	0.000625	0.080596	0.080243	0.000243	0.00169

Note: * $p < 0.05$; ** $p < 0.10$.

The analysis of the results shows that government and foreign ownership, marketing strategy changes and market orientation index have a significant impact on the market share increase. Private ownership is not a significant predictor of the market share increase. As expected, foreign ownership is conducive to the market share increase caused by the commercialisation of a new product. It is different with government ownership, which can be said to be generally non-stimulative to innovation activities.

Marketing strategy changes are conducive to the market share increase, which is understandable because they provide for an improved adjustment to customer demands in the market. These changes are thus the predictors of the impact of innovation activities on the market share increase. The market orientation index is also a significant factor for the market share increase. The essence of market orientation is in the positive impact on business performance achieved by affecting numerous enterprise activities, as well as its behaviour and strategies, which eventually produces better business results. One among these activities is the

development of new products that are better suited to customer demands and superior to existent competitive products. This correlation, as proved by numerous studies and by this analysis, results in business performance improvement.

The only significant predictors of the product quality improvement are the proportion of highly educated employees in the total number of employees, at the 10 percent level, and the market orientation index. Enterprises having a higher proportion of highly educated employees also have at their disposal a wider range of required knowledge, which makes it possible for them to innovate with a view to improving quality standards. It is also not unexpected that market orientation is an important predictor of product quality. Given the focus of market-oriented enterprises on the creation of superior customer value, ongoing quality improvements are completely expected. The orientation towards customer needs being a component of the market orientation index, and quality a major customer demand, it is not surprising that a high market orientation index is a predictor of quality improvement.

As in the case of quality improvement, only the variables representing the proportion of highly educated employees in the total number of employees and the market orientation index show a significant impact on the reduction of material costs per unit of product. An interesting result is that a higher proportion of the highly educated employees in the total number of employees results in a lower impact of innovation activities on the reduction of material costs per unit of product. This could lead to the conclusion that firms with many highly educated employees lay their emphasis on product innovation, rather than on the innovation of the processes changing the production method. This is because most SMEs opt for market niche specialisation. In other words, these small enterprises, incapable of adequately capitalising on economies of volume, concentrate on niches, where it is more important to meet special customer needs, than to produce at lower costs. It is interesting that a higher market orientation index is the predictor of a stronger impact on the reduction of these costs. It is certain that this result comes from the component of the market orientation index involving competitor orientation. Should the competitor reduce production costs, our enterprise will have to do the same, for instance, by purchasing technology.

A significant impact on the improvement of environmental impact or health and safety aspects is recorded in government and foreign owned enterprises. Both ownership types have a weaker impact on the improvement of a product's ecological and health aspects. The same tendency is observed in the proportion of highly educated employees in the total number of employees. Enterprises with changed marketing strategies produce a stronger impact of innovation activities by improving ecological, health and safety aspects of a new product. To recapitulate, in market-oriented enterprises innovations contribute to improvements in terms of ecological, health and safety standards. This confirms that enterprises that base their operation on market orientation principles aim their innovation activities towards an enhanced compliance with market demands. These aspects, to be exact, are closely related to modern trends and customer preferences.

A significant impact of innovation activities on the compliance with legal regulations and standards is observed in market-oriented enterprises. In addition, the proportion of highly educated employees is a significant predictor of a strong impact of innovation on the compliance with legal regulations. Contrary to expectations, the higher that proportion, the weaker the impact.

6 Conclusion

The SMEs account for a substantial share of every country's economy. The importance of that segment of the economy calls for an examination of these enterprises' performance. The fact that the SMEs performance strongly relies on their innovativeness attaches vital importance to the analysis of innovation activities and their effects.

The ultimate goal of innovation is to improve business performance. Numerous studies have dealt with innovativeness in SMEs, but few have analysed the effects of innovation activities. This paper aims to contribute to the extant literature by analysing this topic.

The paper explores which factors are crucial for innovation results. Some of the factors observed are standard, as the ownership structure and the proportion of

highly educated employees, while others are the factors that supposedly reflect the capabilities and orientation of a firm, that is, market orientation and the implementation of strategic, management and marketing changes. The market in which an enterprise operates is also included in the analysis, as it can have an impact on innovation and innovation effects, too. The observed innovation effects were the market share increase, product quality improvement, reduction of material costs per unit of product, as well as the improvement of ecological, safety and health aspects and compliance with legal regulations and standards.

It is important to emphasise that the most significant predictor of positive innovation effects is the market orientation index, which is compiled from customer orientation, competitor orientation and interfunctional coordination. Accordingly, we can conclude that firms with a strong market orientation also have much better effects of innovation activities.

The proportion of highly educated employees also proves to be a significant variable, with a higher number of highly educated employees positively related only to quality improvement and negatively to the reduction of costs, environmental impacts and regulation compliance. In view of the previous research (which for the most part have not expressly included SMEs), this unexpected result can partly be explained by the fact that SMEs are essentially different from large enterprises and partly by the specific conditions of the transition environment wherein the research was conducted.

It is interesting that strategic and management changes fail to strongly impact innovation effects. One explanation for this is that these changes take time to take hold and produce good results. It can thus be expected that in the next CIS research strategic and management changes could be correlated to innovation results.

As for the ownership structure, we have found out that it is in most cases irrelevant, which is in support of the findings of Carlin et al. (2000). It is only in relation to government and foreign ownership that the ownership structure is significant.

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