

19th International Conference Enterprise and Competitive Environment 2016, ECE 2016, 10–11
March 2016, Brno, Czech Republic

Innovation Life Cycle

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Abstract

The paper is based on previous research of authors in which the effects of technical innovations in economic performance of business entities has been proved. Nevertheless, this effect is limited by time, i.e. innovation profit is limited as well. Limited innovation profit has been already noted by Schumpeter (1934) in his initial works. However, innovations influence all the enterprises processes as well as the life cycle of a company. From this point of view, innovations are an important factor of value drivers' development, more over it might be possible to suppose them to be independent value driver. Objective of the submitted paper is to determine the probable length of technical innovation's life cycle regarding to value drivers. In the frame of previous researchers, the authors have also proved that the effect of innovations is among others limited also by the branch of economic activities of a business entity.

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Peer-review under responsibility of the organizing committee of ECE 2016

Keywords: Financial performance; Innovation; Life Cycle; Small and Medium-sized enterprise; Survival Analysis

1. Introduction and applied methodology

Objective of this paper is to determine probable length of life cycle of a technical innovation with regard to limited innovation profit that has been already noted by Schumpeter (1934, 1964). The authors build the outcomes of the paper on results of their previous work on the issue where they have proved that technical innovations' life is differing substantially in dependence on the field of business activity of a company. This was the length of probable innovation life is defined separately for three groups of business entities, i.e. for production companies, service companies and trade companies while three variables influencing the value drives are used.

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As the look of society on innovation, their importance and contributions has been developing in a course of time, the methods assessing the effects of innovations on their users has been developing as well; since the beginning of society when the main innovations have consisted in the sphere of defense, through the time of industrial revolution when the innovation effect has been regarded mainly through novelty of products, through the second half of the 20th century till the beginning of 21st century when non-financial (managerial) approaches to evaluation of innovations' effects have been developing (Tabas, 2013) .

Evaluation of innovation effectiveness can be regarded from different angles while approaches to assessment of effectiveness of innovation processes are principally divided into two basic directions which are non-financial approaches and financial approaches (for more see Tabas, Beranová & Polák, 2012; Tabas, Beranová & Polák, 2011; Tabas, Beranová & Polák, 2010; Tabas, Beranová & Vavřina, 2011). With regard to the fact that small and medium-sized enterprises are mostly marked as drivers of innovations activities (MPO ČR 2006, 2012), this paper is focused on measurement of innovations' financial effects in these companies. Most of the financial methods are first based on the same grounds as evaluation of investments, and second are applied ex post, i.e. after realization of innovation.

In order to determine the effect of technical innovations in the financial performance of small and medium-sized enterprises, comprehensive research has been conducted. The statistical sample has consisted of 300 of small and medium-sized enterprises which are established and are doing their business activities in the Czech Republic, and have realized product-process (technical) innovation in the 2010 at latest. In accordance to kind of business activities, these companies are then divided into three sub-samples. These are:

- Production companies (51.3 per cent),
- Service companies (31.9 per cent),
- Trade companies (16.8 per cent).

In the statistical sample, trade companies represent the smallest sub-group. It is obvious because the product-process (technical) innovations are less usual in this type of business entities. Here, mainly marketing innovations are realized, nevertheless these innovations are not a subject of this paper.

Each business entity in the statistical sample is described with defined variables, which are:

- Deviation of the gross production power ($ROA = EBIT/A$) from the industrial average in the five-years period, which is defined as $t-2$ to $t+2$, where the t represents the year when the technical innovation has been realized;
- Deviation of the rate of growth of sales from the industrial average, also in the five-years period of $t-2$ to $t+2$;
- Effect of innovation in sales, which is evaluate on the scale 1–5, where the value 1 means significant increase in sales and the value 5 represents significant decrease in sales, value 0 was used as well, and it is in cases when the effect is not possible to determine;
- Rate of growth of production cost, also in the five-years period of $t-2$ to $t+2$.

Evaluation of innovation's effect ex post is useful nevertheless, from the dynamic point of view of innovation processes management, it is not enough. For this purpose, it is desirable to add a predictive part to models of evaluation of innovation effectiveness. Objective of the predictive part of a model, presented in this paper, is to provide estimation whether the technical innovation would have a positive effect in financial performance of business entity or not. For this purpose the event history analysis has been applied while the survival functions are defined.

Previous researches of the authors and their outcome have already proved that technical innovation has an effect in company's financial per of different length in dependence on a branch of business activity. Then, the survival functions have been derived separately for every business branch. At observing the length of positive effect of innovation, i.e. period when the values of analysed variables have been higher than before innovation, the tree new variables are defined. These are:

- Length of innovation effect in deviation of gross production power;
- Length of innovation effect in deviation of rate of growth of sales;
- Length of innovation effect in production cost.

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