SMEs Characteristics and Technological Innovation
- In the Case of Manufacturing SMEs in Daegu Region -

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Abstract: Technological innovation is widely recognized to be essential for the survival and growth of individual firms, and also for the sustainability of national and regional economic growth. There is strong evidence in the literature to support the view that technological innovation in manufacturing companies is one of the main reasons for industrial competitiveness and national development. According to several specialists, innovation is now unavoidable for companies which want to develop and maintain a competitive advantage and gain entry into new markets. Also, technological innovation is key to the economic performance of firms. Innovative firms grow more quickly and make higher profits.

If nonetheless many firms do not dare to innovate, this has to do with several types of risks and uncertainties that lead to high failure rates. The undeniable importance of innovation for contemporary companies justifies the increasing interest that researchers are taking in it. However, if the number of papers on the topic has evolved exponentially during the last decades, there is still no precise prescription for successful technological innovation.

Hence, the questions as to why some firms are technologically innovative and others are not, and what factors affect a firm’s ability to innovate are fundamental to management research and practice. Namely, what determines SMEs’ technological innovation?

Several researchers have tested the effect of a large number of technological innovation-related variables. However, even though they tested similar variables, they discovered differing degrees of association with the rate of technological innovation. This dispersion of outcomes may have several reasons. One may be the heterogeneity regarding samples as well as methods. Samples differ as some studies investigate one specific industry whereas others cover several industries. Methods differ, as some studies are qualitative while others adopt a quantitative approach.

A more general problem is that success or failure of projects is likely to have an impact on personal careers. People responsible for a successful project may tend to give the credits primarily to themselves, while in the case of failed projects one may try to shift responsibilities to others. The innovation process is thus still poorly understood and the current state of the literature contributes little to improving our understanding of the phenomenon. Accordingly, there is an obvious need to assess more systematically factors behind success of technological innovation.

The purpose of this study is to analyze the effects of firm characteristics (firm age, CEO’s entrepreneurship,
ownership structure, firm size, and innovative capability) on technological innovation using the firm level data in the case of manufacturing SMEs in Daegu region. In addition, this study will identify the relationship between technological innovation and financial performance.

This study suggests that firm age, CEO's entrepreneurship, ownership structure, firm size, and innovative capability have significant and positive effects on technological innovation of small and medium-sized firms and that technological innovation have significant and positive effects on financial performance. A questionnaire was developed to measure the characteristics of SMEs and technological innovation performance.

To test the hypotheses, data were collected from the small and medium-sized firms located in Daegu region. In order to increase the response rate, follow-up letters, emails and phone calls were used. A total 300 questionnaires were mailed. The survey data of 185 firms were collected and integrated as the empirical base for testing the hypotheses. Most respondents were from the managers.

Hierarchical multiple regression analyses were used to examine the hypotheses. Major results are as follows: Firstly, firm age was not significantly related to technological innovation. Thus, this research support neither of the previous claims, that firm age has a positive impact on technological innovation or that it has a negative impact on technological innovation. However, future research in the SMEs of other region is needed to verify whether similar results hold true.

Secondly, CEO's entrepreneurship had significant and positive effects on technological innovation. Namely, the more CEO is innovative, the more successful technological innovation will be. This study confirmed previous research result that CEO's entrepreneurship has a significant positive influence on SMEs' technological innovation. Therefore, SMEs that want to introduce successful technological innovation should have to encourage their CEO's innovativeness.

Thirdly, ownership structure had significant and positive effects on technological innovation. In other words, CEO stock ownership, employee stock ownership, foreign investors ownership, and venture capital ownership were positively related to SMEs' technological innovation. This result is similar with most of previous researches dealing with corporate governance structure and organizational innovation. Hence, SMEs should have to diversify their ownership structure to carry out technological innovation.

Fourthly, firm size had significant and positive effects on technological innovation. The debate on the effect of size on technological innovation goes back to Schumpeter's fundamental work in which he proposes two contradictory assumptions. In 1934, he states that entrepreneurs and start-ups represent the foremost source of new ideas and technologies. However, in 1942, he suggests that innovation actively increases more than proportionally with firm size. The debate was thereby launched and size became one of the variables most studied as a determinants of technological innovation. But, this research result showed that firm size has a positive effect on technological innovation. This means that large SMEs companies have more resources to innovate and support risky activities than do small SMEs.

Fifthly, innovative capability had significant and positive effects on technological innovation. The role that internal resources such as human resource play as an innovation determinant is varied. It helps companies to create, exploit and transform new knowledge into new products and/or processes. It also helps them to absorb (i.e. acquire, assimilate, transform, and exploit) new technologies appearing on the market and to attract collaborative partners. Also, doing innovation internally is particularly important for technological innovation in new-technology settings where it is very costly and particularly difficult, even impossible, to acquire new technologies produced by competitors. This research results suggested that staffing SMEs with highly educated, technically qualified and experienced personnel with diverse background is an important determinant of technological innovation. According to this research, excellent human resources help SMEs to create new technologies and absorb outside-developed ones.