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## Investigating the Effects of Government Interventions on the Firms' Innovative Performance: A Case Study of Knowledge-Based ICT firms

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### Extended Abstract

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### Introduction

The high-technology sector plays an important role in improving economic performance by helping to expand markets and improving productivity and industrial competitiveness. Therefore, the impact of policies on economic development depends on the high-tech sector response to these policies (Wu, 2008).

The law for supporting knowledge-based firms (KBFs), which was ratified in 2010, created a new approach for supporting high-tech firms in Iran. Based on this Act, incentives are offered to firms and institutions that are evaluated as “knowledge-based”. These firms are largely in high-tech fields of nanotechnology, biotechnology, pharmaceuticals, advanced materials and chemical products, advanced equipment and machinery, medical devices, electrical and electronic engineering, and information and telecommunications technology (ICT). Sales tax exemption for 15 years and long or short-term low-interest or no-interest loans for production costs, supply or adoption of innovation and technology are the most important incentives of the Act. It is expected that these incentives should impact firm performance indicators. This study addresses Iranian high-tech ICT firms and tries to respond following main questions:

How are the main and interaction effects of tax exemption and funding on Iranian high-tech firms?

### **Objective**

It seems the law will lead to the establishment of many firms based on new technologies, but the problems of adopting such policies should also be considered. For example, firms may change their investment and hiring patterns or change their location to become eligible or may not seek other financing and growth opportunities (Unctad, 2016). Therefore, it is necessary to evaluate the impact of the Act over time.

The main purpose of this study is to evaluate the impact of tax exemption and financial incentives offered by the “Innovation and Development Fund” on the performance of small knowledge-based firms in the ICT category.

### **Data/Methodology**

The statistical population of the study is the type 1 producer knowledge-based firms in information and communications technology (ICT) (123 firms). Data comes from the database used for assessment and qualification of knowledge-based firms in Iran’s Vice Presidency for Science and Technology (VPST) and is verified by its evaluators.

Since this study intends to evaluate two policy instruments (i.e. two factors), a factorial design is used. Factorial design is used to reduce the total number of experiments, time and overall process cost in order to obtain the best response (Mason et al., 2003). It is the most effective method for such experiments because a system can be simultaneously studied to evaluate the main and interaction effects of different factors (Montgomery, 2012). Moreover, the design determines important factors as well as how the effect of one factor varies given the level of the other factors. The most popular experimental design for estimating main effects as well as interaction effects is the  $2^k$  factorial design in which each variable is investigated at two levels (Kavak, 2009). This study uses the  $2^2$  factorial design because there are two factors at two levels (receipt or non-receipt of incentives).

### **Results/Findings**

In this study, we measured the effects of funding and tax exemption on innovation activities of SMEs in  $2^2$  factorial design models.

Funding improved the number of R&D employees in ICT firms, which supports the results of the studies carried out by Radas et al. (2015). Small high-technology firms are usually more dynamic and focus more on research and development. Furthermore, the existence of competition in attracting and retaining researchers has led to using part of this financial support to retain R&D human resources (Carvalho, 2011).

Our empirical data on innovation outputs revealed that the number of new products in ICT firms significantly increased after receiving both tax exemption and funding. However, Iranian knowledge-based firms that received both tax exemption and funding introduced more new products than the firms which resorted to either tax exemption or funding alone. This supports the findings of the study carried out by Berube and Mohnen (2009) for Canadian firms.

## **Implications**

Results show that tax exemption did not have considerable impact on firm performance indicators. While tax incentives in other countries is usually based on R&D, the law for supporting knowledge-based firms offers tax exemption based on “sales”, which may explain the different results of this study in comparison with the literature. Therefore, changing the approach of providing this incentive in the law to R&D can make this tool more effective in knowledge-based firms.

The results of this research also regarding “funding” effective on R&D employment are in line with existing studies. It is obvious that knowledge-based firms have used part of this support to retain skilled researchers because they are usually more dynamic and have greater focus on R&D. Therefore, adding incentives with focus on R&D employees in the supporting for knowledge-based firms' law can, to some extent, shift firms' expenses to increase key R&D and production activities.

***Keywords:** Knowledge-Based firms, R&D employees, New Products, Sales, Additionality effect.*

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