


ICT Uses and Innovation Types

An Empirical Investigation Based on Algerian Manufacturing Organizations

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ABSTRACT

ICTs play an essential role in the development of organizations' innovation level both for large organizations and SMEs and improve their competitiveness. However, there is a lack of empirical studies of the impact of ICTs in Algeria and especially their effect on innovation. That is why this empirical studies are of interest of the relationship between innovation and ICT focusing on how the evolution of ICTs empowering different types of innovation. The study validates a conceptual framework extending existing literature to analyze this impact using a quantitative approach, in which data is collected based on the survey strategy to address the different level of the study. Statistical tools were used to analyze the collected data. Correlation and factor analysis research results indicate that ICTs have a significant impact on the different types of innovation. This study also provides some implication, limitations, and suggestions for further research.

KEYWORDS

Algerian Organizations, Information and Communication Technologies, Innovation, Manufacturing Sector

INTRODUCTION

It is widely recognized that innovation is of critical importance for the competitiveness and growth of firms, and therefore of sectors and countries; not only in the advanced economies but also in the emerging ones as well, innovation can be a very good way to enhance competitiveness, diversify activities and move towards higher added value activities (Buesa et al., 2010). Several studies have examined the factors and sources of innovation, paying particular attention to the technological and organizational capacities needed to develop the innovation process in the company (Schumpeter, 1942; Dosi, Nelson and Winter, 2000).

Innovations present a new way of organizing a business that can be significantly improved by ICTs usage (Haseeb, 2015). In this context, several researchers, academics and practitioners of business and computer science, have considered the information and communication technology an essential element in the development of innovation activities (Corso & Paolucci, 2001; Xu Sharma & Hackney, 2005). So the companies that have adopted and implemented in their daily activities,

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have achieved better results and a higher level of innovation of its products and services (Ismail & Mamat, 2012). Therefore, the most developed and innovative organizations are those developing and using ICTs to facilitate and drive innovations in business processes and in products and services (Arvanitis, Loukis, & Diamantopoulou, 2013).

While previous studies mainly have focused on ICT in relation to productivity (Cardona et al., 2013), the direct link between ICT and innovation has gained substantially less attention in the research literature. A few recent studies based on European firm-level data suggest that ICT use has a positive and significant impact on firm innovation (Spiezia, 2011; Aoun & Dubrochard, 2012; Rybalka, 2012). With the potential of reducing transaction costs, improve business processes, facilitate coordination with various actors and disseminate information ICT involves substantial efficiency gains which in turn encourage innovation (Koellinger, 2005).

The development and usage of ICTs have particularly increased in the last decades, while at the same time showing great potential to improve the efficacy of business processes, facilitate and drive innovations, and therefore increase competitiveness. Most previous empirical studies suggest that ICT facilitate firm innovation and affect innovation types. The studies differ in terms of methodology, country and they explicitly investigate the direct effect of ICT. Cardona et al., 2013 moreover describe ICT as “a special case of new technologies that serve as enabling technologies leading to even further innovations”, which is what this study aims to investigate.

However, the relationship between ICT and innovation has gained less attention in the research literature in Algeria. That is why this study was aimed to analyze the impact of ICT on innovations activities of manufacturing organizations in Algiers, Algeria. In this sense, the study is a contribution to ICT impact on innovation literature. It analyzes, by an empirical investigation, the mechanisms through which ICT value is created and consequently its effects on innovations types. The authors by this investigation, attempt to determine the impact of these technologies on different types of innovation within 68 manufacturing organizations which are geographically near (situated in Algiers), but substantially different according to their size, level of innovation and ICT investment and uses.

The paper is structured as follow. The paper is structured into five sections. The first section discusses the literature review examining the impact of ICT on innovation activities and its types. Then, the second section presents research methodology and data. The state of art of ICT intensity and innovation realized by organizations are defined in the third section. The results are presented in section 4. Finally, the last section concludes with a discussion of the implications, limitations, and directions for future research.

LITERATURE REVIEW

After computers were invented their applications broadened very quickly. They gradually became an inevitable part of a business and ICT investment became a routine for managers. In the 80s the impact of ICT on firm performance was questioned. A new body of literature was created in order to analyze the so-called “productivity paradox”. Despite the numerous contradicting results, possible explanations have been provided. The existence of paradox is not yet definite and literature has been focused on ICT value creation. With understanding how ICT creates value, many questions will be answered. Since the Nobelist Solow (1987) wrote his article, there has been a huge debate on the impact of information and communication technologies (ICTs) on economic performance and, particularly, on productivity and innovation.

Furthermore, ICT can also directly drive ICT-based innovations in firms’ processes, products, services, and even business models (Brynjolfsson and Hitt 2000; Bresnahan et al. 2002). Brynjolfsson and Saunders (2010) argue that ICT can directly drive and enable new products and services, and increased products’ and services’ variety and personalization, which would not be operationally and economically feasible without ICT, and also significant quality improvements, improved timeliness, and other quality characteristics highly valued in the modern economy.

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