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# Literature analysis on determinant factors and the impact of ICT in SMEs

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## Abstract

Nowadays the use of ICT in enterprises is very important, especially in SMEs, that are the majority of companies operating in the world. The adoption and use of ICT can bring benefits in terms of efficiency, effectiveness, innovation, growth and competitive advantages. In this paper we analyse, in depth, the literature on determinant factors that stimulate the adoption and use of ICT and the impact on organizations. For good business performances it is important to align organizational and productive processes with ICT tools; adequate conditions favour the best ICT implementation.

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*Keywords:* ICT, new technologies, SMEs, determinant factors, organizational impacts

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## 1. Introduction

There is a low diffusion of ICT in Small-Medium Enterprises (SMEs) (Assinform, 2010). SMEs are not fully exploiting the potential of ICT like large companies. This is partly due to the fact that SMEs have limited resources, technology and capabilities although the less complicated structure allows smaller firms more flexibility to changes (Al-Qirim, 2004; Girgin, Kurt & Odabaşı, 2011).

The inhibitor factors, that do not stimulate investments in ICT are the following:

- financial: high initial investment and difficulty in the access to credit
- infrastructural: power, bandwidth and reliable Internet connection
- organisational: lack of skilled staff and coherent strategy
- technological: evolution of technology not very “user friendly” without adequate training

To stimulate the ICT investment in SMEs it is important the development of public policies to eliminate the digital divide, provide free internet access with a high bandwidth and support the training.

In the next section we analyse, in-depth, the literature on determinant factors and in the third section, the impacts of ICT on organizations. At the end some discussions and conclusions are drawn.

## 2. Determinant factors of ICT adoption

In literature there are a lot of contributions on the adoption of ICT in small-medium enterprises. We can classify the determinant factors in 5 groups (Skoko et al., 2007)(Figure 1): individual, organizational, environmental, technological, economical. The literature review is shown in Table 1.

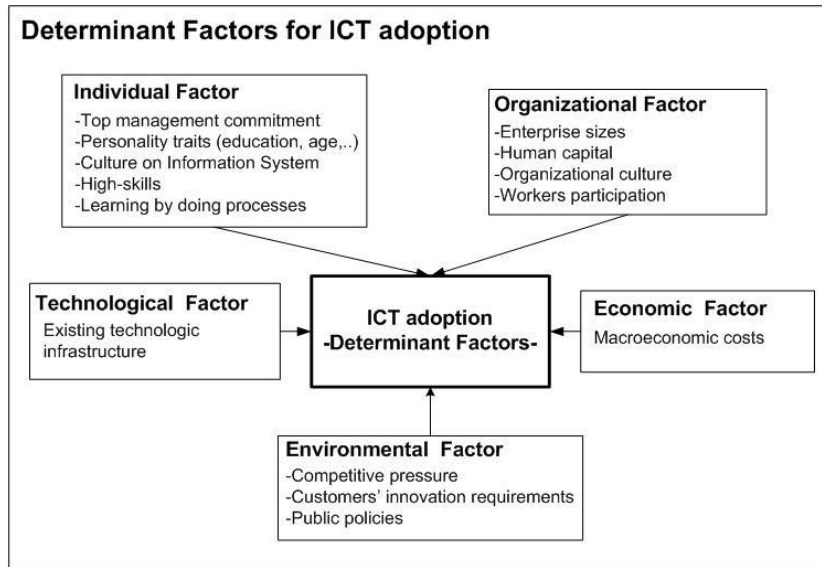


Figure 1. Determinant factors for ICT adoption. Source: Skoko et al.,2007, modified by author

Table 1. Literature review on determinant factors. Source:own.

Group	Topic	Authors
Individual	Top Management Commitment	Damaskopoulos & Evgeniou, 2003; Cragg & Zinatelli, 1995
Individual	Personal traits (education, age,...)	Barba-Sanchez et al., 2007; Zahra, 2005; Chun,2003
Individual	Culture on Information System	Leidner & Kayworth, 2006
Individual	High-skills	Bayo-Moriones & Lera-López, 2007; Fabiani et al., 2005; Falk, 2005
Individual	Learning by doing processes	Jovanovic & MacDonald, 1994; Jovanovic & Lach, 1989
Organizational	Enterprise sizes	Morgan et al., 2006; Fabiani et al., 2005; Lefebvre et al., 2005; Love et al., 2005; Hollenstein , 2004
Organizational	Human capital	Fabiani et al., 2005; Caselli and Coleman, 2001
Organizational	Organizational culture	Fried & Linss, 2005; Mahmood and Mann, 2000
Organizational	Workers participation	Caroli & van Reenen, 2001
Environmental	Competitive pressure	Bayo-Moriones & Lera-López , 2007; Hollenstein, 2004; Porter, 2004
Environmental	Customers' innovation requirements	Blomquist & Wilson, 2007; Mehrtens et al., 2001; Iacovou <i>et al</i> , 1995
Environmental	Public policies	Ulrich & Chacko, 2005; Fuller & Jenkins,1995
Technological	Existing technology	Cesaroni, Consoli, & Sentuti 2011; Wen et al., 2009
Economic	Macroeconomic costs	Cesaroni, Consoli & Demartini, 2010

### 3. ICT impacts on organizations

The benefits/advantages of ICT occur only after a period of adoption. They depend on the type of business, internal changes (e.g. re-engineering process, personnel retraining) and suppliers-customers interaction. We can classify the benefits in 4 groups: performance, growth, expansion and new products. For best performances it is important to align ICT investments with internal capabilities and organizational processes.

In the Figure 2, we represent the impacts on organizations classified in different groups and in Table 2 the literature review.

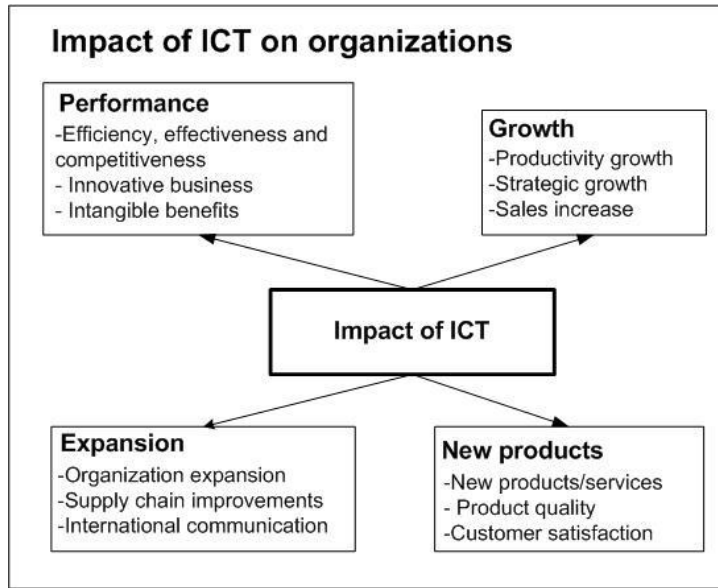


Figure 2. Impacts of ICT on organizations. Source:own

Table 2. Literature review on impacts of ICT on organizations. Source:own.

Group	Topic	Authors
Performance	Efficiency, effectiveness and competitiveness	Hamilton & Asundi, 2008; Johnston et al., 2007; Southwood, 2004; Mahmood & Mann, 2000
Performance	Innovative business	Zhu & Kraemer, 2003; Levy et al., 2001
Performance	Intangible benefits	Mueller-Falcke, 2002; Weil & Olson, 1989
Growth	Productivity growth	Black & Lynch, 2001; Matteucci et al., 2005; Bassanini & Scarpetta, 2002; Timmer & van Ark, 2005
Growth	Strategic growth	Ordanini, 2006; Maguire et al., 2007
Growth	Sales increase	Qiang et al., 2006; Raymond, 2005
Expansion	Organization expansion	Matthews, 2007; Bernadas & Verville, 2005
Expansion	Supply chain improvements	Wen et al., 2009; Bayo-Moriones & Lera-López, 2007; Macpherson et al., 2002
Expansion	International communication	Raymond, Bergeron & Blili, 2005
New products	New products and services	Hollenstein, 2004; Carlsson, 2004; Becchetti et al., 2003
New products	Product quality	Boca D.G. & Daraba, D, 2010
New products	Customer satisfaction	Yadav & Varadarajan, 2005; Bernadas & Verville, 2005

#### 4. Discussion and conclusions

Companies, over a period of time, innovate their information systems for different reasons like the inadequacy of their management software, lack of data integration, the membership to a group where a renewal process is implementing, etc... Only a few companies adopt a more proactive approach, encouraging and supporting the replacement of the system, with a greater long-term strategic vision.

In a previous research on SMEs, in our department, we noticed the importance of the location of the enterprise and the customer computerization as determinant factors in ICT adoption. A customer asked the company to implement the electronic invoice according to the protocol Electronic Data Interchange (EDI). The company integrated, with some difficulty, inside its ERP, the module that executes this function. In many cases enterprises

use the same ERP as neighbouring companies. The reason can be attributed to two affecting factors: word of mouth (WOM) and the strength of the commercial suppliers of software solutions.

The process of adoption of ICT (Dyerson and Spinelli, 2011) is complex and it is stimulated by the occurrence of the following conditions: *business conditions* (sensitivity and commitment of the top strategic management), *organizational conditions* (the presence of an ICT Pivot: entrepreneur, manager, IT department employee or external consultant/vendor), *management conditions* (an appropriate presidium of ICT tools by skilled human resources). The analysis of factors of ICT adoption and the impacts on organizations are very important to understand how to stimulate in SMEs the process of investment in new technologies to acquire competitive advantages and good business performances.

In this sense, it is important to create a framework to measure the readiness of a company in the ICT adoption. The use of ICT must be described in a business plan and aligned with the corporate strategy and the internal organization to fully exploit the technological potential. Two extreme cases are possible: the top management is not favourable to invest in technologies or he/she is very enthusiastic about investment in ICT but the corporate structure and strategic plan are not adequate. The framework is useful to outline the characteristics of enterprises and so to implement a more efficient and effective process of adoption (Vega et al., 2008).

In the world there are a lot of best practices that show how SMEs, which have heavily invested in ICT, increase the turnover and market share hence becoming successful companies.

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