



ELSEVIER

Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

Technovation 25 (2005) 213–222

technovation

www.elsevier.com/locate/technovation

Information and communication technology and geographical clusters: opportunities and spread

Nunzia Carbonara*

DIMEG, Politecnico di Bari, Viale Japigia, 182-70126 Bari, Italy

Abstract

The widespread adoption of information and communication technologies (ICTs) characterising the recent competitive scenario has been of great interest to researchers and practitioners. Many studies have been carried out to provide answers to different questions concerning, for example, the impact of ICTs on organisations, the role of ICTs in the economic development, the opportunities given by ICTs' adoption to SMEs.

In this paper, the opportunities provided by the adoption and implementation of ICT solutions in a particular SME-intensive productive environment, the geographical cluster, are examined. To this end, first the ICT capabilities and their effects on the value-creating processes characterising a generic supply chain are analysed. Subsequently, the analysis is contextualised to geographical clusters in order to identify the more appropriate ICTs for cluster firms.

Finally, the actual ICTs' spread within the Italian industrial districts is examined.

© 2003 Elsevier Ltd. All rights reserved.

Keywords: Information and communication technology; Geographical clusters; E-business models; Value-creating processes

1. Introduction

It is argued that the diffusion of the information and communication technologies (ICTs) is changing the way by which companies compete and succeed, the business models, and the value-creating processes. New opportunities are taking place both to create new ventures and to modify the existing businesses.

These changing processes are due to the ICTs' capability to transfer, collect, manage a great amount of information and to reduce the space and time barriers. Therefore, firms may reduce the transaction costs of information-intensive activities by resorting to ICTs. These opportunities may especially favour small and medium enterprises (SMEs) that in most cases operate in a dense network of inter-firm relationships and consequently manage a great amount of information.

However, recent data on the diffusion and adoption of ICTs show that the ICT penetration is still quite low among SMEs (Eurostat, 2002; IDC, 2000; OECD, 1998, 2001).

This paper explores the opportunities provided by the adoption and implementation of ICT solutions in a particular SME-intensive productive environment: the geographical cluster. The characteristics of this peculiar production model make it particularly appropriate for the use of ICTs and Internet-based solutions. In fact, as stressed by a large number of scholars (Becattini et al., 1992; Enright, 1995; Maillat et al., 1995; Piore and Sabel, 1984; Porter, 1998), clusters base their competitive advantages on two distinctive aspects: (1) the inter-networking processes and (2) the speed and easy circulation of information and knowledge. Thus, a cluster can be seen as an extended enterprise, where the different actors (the cluster firms) are usually specialised in single manufacturing phases, that require intense coordination, flexible relationships, and appropriate supporting tools to manage the networking activities.

Therefore, it may be possible to think that the new economy and ICTs provide geographical clusters with new development opportunities, drawing new possible trajectories of evolution.

The paper in particular is addressed to:

- recognise the opportunities of ICT applications in the value-creating processes;

* Tel.: +39-80-5962725; fax: +39-80-5962788.

E-mail address: ncarbonara@poliba.it

- analyse the implications of the ICT adoption for cluster firms, identifying the e-business models and ICT applications that best fit the characteristics of geographical clusters; and
- evaluate the actual trend of adoption and implementation of e-business models and ICT applications within clusters.

According to this, first the ICT capabilities and their role in modifying the processes of value creation are analysed (Section 2). In particular, the focus is placed on the following value-creating processes characterising the supply chain (Porter, 1985):

- logistic and networking, this process groups all the activities involved in three elements of the supply chain, namely the “inbound logistics”, “outbound logistics”, and “procurement”;
- marketing and customer relations, this process groups all the activities involved in two elements of the supply chain, namely “marketing and sales” and “after-sales service”;
- innovation development, this process corresponds to the “technology development” element of the supply chain.

For these value-creating processes, on the basis of the literature review, the effects of ICTs are identified.

Second, the strengths and weaknesses of geographical clusters are analysed (Section 3). A qualitative evaluation of the effects of such strengths and weaknesses on the value-creating processes within clusters is presented.

Third, starting from the above analysis, the ICT solutions and e-business models, suitable to both enhance the strengths and reduce the barriers to succeed in the global competitive context, characterising the geographical clusters are identified (Section 4).

Finally, in Section 5, the actual trend of the process of adoption and implementation of ICT applications and e-business models within some real cases of geographical clusters is discussed.

2. Information and communication technology capabilities

Recently, the development and widespread adoption of ICTs has given rise to an increasing number of theoretical and empirical studies on this field (Child, 1989; Davenport, 1993; Gurbaxani and Wang, 1991; Laubacher and Malone, 1997; Malhotra, 1993; Malone et al., 1987; Malone and Smith, 1988; Porter, 2001). These studies have dealt with different and complementary aspects, such as:

- the evaluation of the ICT effects on the organisations, the inter-organisational relationships, the market, and the social-economic systems;
- the ICT classification;

- the analysis of the organisational and managerial actions required to support the ICT adoption; and
- the interpretation of the enabled opportunities.

Regarding the studies focused on the evaluation of the ICT effects, three different streams of study can be identified: the organisational, the economic, and the strategic.

The first stream of study traces back the analysis of the ICT effects to the analysis of the ICT impact on the coordination mechanisms (Child, 1989; Malone et al., 1987; Malone and Smith, 1988). The economic studies deal with the impact of ICTs on the transaction costs (Gurbaxani and Wang, 1991). Finally, the studies adopting a strategic approach analyse the impact of ICTs on the value chain and on the value-creating processes (Porter and Millar, 1985; Rayport and Sviokla, 1995).

Regarding the ICTs’ classifications, the literature proposes several ways to classify them, each one based on different and complementary aspects of ICTs (Albino, 1998; Bartezzaghi et al., 1994; Ciborra, 1989; Rullani, 1997).

Particularly useful for this paper seems to be the classification that distinguishes ICTs into:

- *coordination technologies*: they help in the integration and coordination of the processes supporting the information transfer (LAN, WAN, database, shared elaboration systems, data modelling support systems, information flows modelling support systems, CASE, group working support systems, EDI, groupware, Internet, ERP, DSS, MRP, CAD/CAM, etc.);
- *process technologies*: they concur in the transformation of the inputs in output (CNC, FMS, CAM, AGVS, GT, etc.);
- *knowledge management technologies*: they support the processes of problem solving and organisational learning, as well as the relationships and integration among individuals and among different organisations (Lotus Notes, software agents, groupware, Internet).

Independent of their classification, thanks to the capabilities of reducing the time and costs of processing and communicating information; storing and elaborating great amount of data and information; making the access to data and information easy and fast; organising and structuring data and information on the basis of the user needs, ICTs allow data, information, experiences, and the knowledge owned by individuals and organisations instantaneously available and enable easier sharing.

In Table 1, the main capabilities of ICTs and the related advantages on the organisational processes are reported (Child, 1989; Davenport and Short, 1990; Malone and Smith, 1988; Timmers, 1999).

Therefore, the adoption of ICTs in the business can improve the performance of the organisational

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات