

# Technology policy for the knowledge economy: Public support to young ICT service firms

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## Abstract

Public intervention in high-tech sectors is often advocated to resolve market imperfections that may possibly limit the viability of young high-tech enterprises. Although some European countries have adopted national government support policies that explicitly target this type of firm, in Italy and in other EU countries, there are no national support measures specifically designed for them. The paper focuses on the information and communication technologies (ICT) services sector in Italy. It aims to investigate whether both horizontal general-purpose direct support mechanisms at the national level and financial support measures provided by local administrative entities (which rarely have been specific to the ICT sector) permit an efficient allocation of public funds.

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## 1. Introduction

The development of information and communication technologies (ICTs) plays a key role in contributing to improved productivity of labor and capital and in fostering economic growth, especially in advanced economies (OECD, 2002, 2004; Schreyer, 2000). High-tech startups in ICT-related activities have represented the fundamental engine of this process (Acs, 2004), and many young US firms (e.g., Microsoft, Cisco, Yahoo!, Google, Amazon) have attained worldwide leadership in the ICT sector, in both the manufacturing and service sectors, in a short period of time. Even if ICTs are defined as general-purpose technologies, there is growing evidence that the emergence and consolidation of a strong national ICT sector are a fundamental prerequisite for rapid “digitalization” of a country (Guillen & Suarez, 2001) and have a positive impact on the performance of the whole national economy (Daveri & Silva, 2004; Gordon, 2000). Europe has traditionally lagged behind the United States both in the creation of ICT startups and in the number and size of young high-growth firms in this sector (the so-called “gazelles”).<sup>1</sup> The favorable ecosystem in terms of innovation, entrepreneurial culture, functioning of capital and labor markets, and level of human capital in which new US

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<sup>1</sup>The only young European ICT service firm to have achieved results comparable to those achieved by American high-tech startups is the German SAP firm, a worldwide leader in the production of enterprise resource planning (ERP) software.

high-tech ventures grow to maturity certainly contributes to explaining this difference in performance. As a result, public intervention to favor high-tech entrepreneurship is often advocated in Europe to overcome possible market imperfections and to sustain the creation and development of new ICT ventures that can compete in the global arena.

Basically, economic analysis has developed two main rationales for public sector support to new technology-based firms. First, the socially optimal level of R&D expenditures may be higher than the optimal level for private individuals because of the presence of R&D spillovers. Young, small firms may invest less than the social optimum because they are unable to defend innovation and extract most of the rents in the product market (Griliches, 1992; Jaffe, 1996; Teece, 1986). Secondly, a large body of empirical literature on entrepreneurship has pointed to the presence of financial constraints on new firms (Black, de Meza, & Jeffreys, 1996; Blanchflower & Oswald, 1998; Evans & Jovanovic, 1989; Evans & Leighton, 1989; Holtz-Eakin, Joulfaian, & Rosen, 1994a, b; Meyer, 1990). Access to the credit market is considered to be problematic, especially for high-tech ventures (Carpenter & Petersen, 2002; Storey & Tether, 1998; Westhead & Storey, 1997; see also Colombo & Grilli, 2007 and Grilli, 2005 for the Italian context). Many obstacles to external financing for this type of enterprise stem from the inability of banks and other financial institutions to distinguish good projects from “lemons” in sectors usually characterized by highly skewed returns, asymmetric information, both *ex-ante* and *ex-post* (e.g., hidden information and hidden actions), and a lack of inside collateral to secure debt (Carpenter & Petersen, 2002). On the other hand, even though for high-tech startups private equity financing has advantages over debt (Carpenter & Petersen, 2002), this mode of financing may still present problems related to *ex-ante* asymmetric information (Myers & Majluf, 1984) and high transaction costs (Asquith & Mullins, 1986; Lee, Lochhead, Ritter, & Zhao, 1996) that inhibit access to seed and startup equity capital for most new high-tech ventures.

Both arguments lead to the same conclusion: valuable innovative projects may be disregarded and remain unrealized because of spillover problems or lack of sufficient funds. Naturally, from a social point of view, these are missed opportunities calling for public intervention. But which form of public intervention is most suitable for sustaining young ICT service firms while avoiding distortions,<sup>2</sup> reducing the risk of wasting public resources, and consequently maximizing social well-being?

Policymakers have a wide spectrum of measures at their disposal. First, it is important to understand whether young ICT service firms need specific, customized programs (i.e., a vertical technology policy) or whether they may be effectively supported through horizontal programs with more general objectives (e.g., a program targeting support to innovation or entrepreneurship). Secondly, the question also arises whether national centralized governmental bodies or local ones are best suited to provide public support to this type of firm. Thirdly, it is also important to understand whether direct assistance programs or indirect ones (i.e., support to institutions that provide financing and other services to new high-tech ventures) are more efficient.

As was recently suggested by Siegel, Wessner, Binks, and Lockett (2003), assessment of the efficiency of public policy measures designed to promote innovation in high-tech firms and to resolve market inefficiencies has become a key policy issue. If evaluation methodologies present many issues and are a challenging field of research (see European Commission Joint Research Centre, 2002 for a comprehensive treatment of the issue, and also Lerner, 1999, 2001), there is less disagreement on the characteristics which a program should possess to be truly efficient. First, the program should avoid generating *substitution effects* in the target sector (Santarelli & Vivarelli, 2002). These occur when inefficient subsidized firms, because of the public aid they receive, have an artificial advantage over potentially more efficient but nonsubsidized ones. Under these circumstances, public intervention may end up distorting market process dynamics, hindering selection, and even promoting artificial incumbency of inefficient firms to the detriment of potentially more efficient competitors and new entrants. Secondly, the program should limit the risk of directing subsidies to

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<sup>2</sup>Several contributions have emphasized the distortions that may result from public subsidies. As articulated by Holtz-Eakin (2000) and Santarelli and Vivarelli (2002), failure rates are naturally high among new, small firms, and public support may only disturb and delay the competitive selection process, subsidizing inefficiencies. First, screening difficulties may be magnified for policymakers, and second, politicians may seek to direct subsidies in a manner that creates political consensus and benefits themselves rather than citizens (see Lerner, 2002 and the literature mentioned there).

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