

# Chapter 69

## The Skills of European ICT Specialists

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### **ABSTRACT**

*After a brief survey of the international literature on skill-related issues that may either support or threaten the further development of ICT-based applications, this chapter provides a picture of the state-of-the-art of the professional skills supplied by ICT specialists in 11 EU countries based on data from the OECD Survey of Adult Skills. The first part of the empirical analysis focuses on the skills profile of ICT personnel from EU countries and examines to what extent the higher skills displayed by ICT specialists depend on a different distribution of demographic characteristics and job characteristics compared to the rest of the workforce. The second part of the empirical analysis focuses on the relationship between skills and wages and tests whether employers recognize an occupation-specific wage premium to ICT specialists. The results of the proposed empirical analyses confirm the existence of significant differences between skill profiles and earnings determinants of ICT specialists compared to other workers.*

### **INTRODUCTION**

Specialists in Information and Communication Technologies (ICTs) are professionals “who have the ability to develop, operate and maintain ICT systems” and for whom “ICTs constitute the main part of their job” (OECD, 2004, p.219). ICT specialists play a crucial role in supporting the growth of the information society. However, some signals exist that in mature industrialized economies such as the European Union (EU) the supply of ICT specialists has been falling behind the demand and the evolution of their professional profile may not accompany the growing request for non-technical complementary skills (Eurostat, 2015a; Hüsing *et al.*, 2015).

After a brief survey of the international literature on skill-related issues that may affect the further development of ICT-based applications this article depicts the state-of-the-art of the professional skills supplied by ICT specialists in 11 EU countries based on data from the OECD Survey of Adult Skills.

DOI: 10.4018/978-1-5225-7368-5.ch069

The first part of the empirical analysis focuses on the skills profile of ICT personnel from EU countries and examines to what extent the higher skills displayed by ICT specialists depend on a different distribution of demographic characteristics and job characteristics compared to the rest of the workforce. The second part of the empirical analysis focuses on the relationship between skills and wages and tests whether employers recognize an occupation-specific wage premium to ICT specialists.

## **BACKGROUND**

Pervasiveness characterizes ICT solutions as general purpose technologies, i.e., technologies whose innovative applications impact everyday household life besides spanning across different business sectors (Jovanovic and Rousseau, 2005). This pervasiveness rose hopes that ICT-based innovations would stimulate cross-industry virtuous circles between investments, innovation, productivity, consumption, and employment able to solve the “jobless growth dilemma” apparent in the USA and the EU in the 1990s (Selhofer, 2000). However, the complementarities between existing and new technologies (Davis and Wright, 1999) and the lack of digital skills among ICT providers and end users soon pointed out risks that skill shortage may obstacle the achievement of expected benefits (Selhofer, 2000).

After twenty years of debate on the occupational effects of ICTs the picture is still unclear. Spiezia *et al.* (2016) suggest that ICTs cause a drop in labor content per unit, hence reducing the demand for labor, but at the same time they raise labor productivity, hence increasing the convenience of labor compared to other productivity factors. Overall effects on labor demand are expected to disappear in the long run, due to a reallocation of labor from traditional sectors to innovative, ICT-intensive ones. Nevertheless, the current framework is still undergoing adjustment processes. Investments in ICTs raised the demand for labor in OECD countries between 1990 and 2007, but reduced it afterwards (Spiezia *et al.*, 2016). In addition, after 2007 the decline in labor demand has been accompanied by polarization between high-skilled and poorly-skilled jobs at the expense of middle-educated workers (Michaels *et al.*, 2014). Job polarization happens because, due to their programmable nature, ICTs tend to substitute labor in case of routine tasks, which prevail among middle-skilled workers. In contrast, knowledge-intensive non-routine tasks concentrate among high-skilled employees whereas labor-intensive non-routine tasks, often concerning the provision of personal services, prevail among low-skilled workers (Autor *et al.*, 2003).

If the diffusion of ICTs has so far deluded the expectations of jobs growth in the whole economy, focus on ICT employment provides a more positive picture. According to Hüsing *et al.* (2015), the ICT professional workforce in Europe in 2014 comprised 7.5 million workers, or 3.5% of the European workforce, with United Kingdom, Germany, France, Italy, Spain, Poland, and the Netherlands accounting for three quarters of total EU ICT professionals. OECD countries present a similar share of ICT specialists (3.6% of workforce in 2014, OECD, 2016).

ICT specialists were not affected by the recent economic crisis. Eurostat (2016) reports a 4% annual growth rate between 2006 and 2014. OECD (2015) reports stable employment levels within the ICT sector in the last decade (2004-2013), which results in growth in the number of ICT specialists, who comprise at least 3% of total employment in most OECD countries, at the expenses of less professionalized roles.

If non-ICT workers are increasingly required to master ICT generic skills besides the core skills of their professional domain, ICT-specialists face the challenge of adding non-technical ICT-complementary

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