



# ICT skills are highly valued in European labor markets

POLICY BRIEF  
SEPTEMBER 2015

Oliver Falck  
University of Munich  
and Ifo Institute  
Germany

Simon Wiederhold  
Ifo Institute Munich  
Germany





## IMPRESSUM

Copyright by LLLightinEurope Research Consortium

Coordinated by  
Zeppelin University  
Am Seemoserhorn 20  
88045 Friedrichshafen  
Germany

Authors:  
Dr Simon Wiederhold  
Prof. Dr. Oliver Falck

Graphics, Design and Layout:  
Maren Sykora

Multimedia and Website:  
Urs Boesswetter, Spooo Design

Video Production:  
Sascha Kuriyama

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 290683.





# ICT SKILLS ARE HIGHLY VALUED IN EUROPEAN LABOR MARKETS

## About the authors

### Simon Wiederhold

Since September 2011, Dr Simon Wiederhold is working as an economist at the Ifo Institute for Economic Research, Ifo Center for the Economics of Education. He is also the guest coordinator of CESifo, the world's third largest, Europe-based research network in economics.

Simon Wiederhold received his Ph.D. in Economics from the University of Jena. His main research interests are labor markets, economics of education, and economics of innovation. He has published in leading international journals, such as the European Economic Review and the American Economic Journal: Macroeconomics. From 2014-2015, he spent six months on a research visit at Harvard University.

### Oliver Falck

Prof Dr Oliver Falck is the Ifo Professor of Empirical Innovation Economics at Ludwig-Maximilians-University (LMU) Munich, Germany, and Director of the Center for Industrial Organization and new Technologies at the Ifo Institute, Germany. He is also the Program Director of CESifo, the world's third largest, Europe-based research network in economics.

Oliver Falck received his Ph.D. in Economics from Technical University of Freiberg in 2006, and received his Habilitation from LMU in 2011 on innovation and regional economic development. He has extensive experience in applied innovation and entrepreneurship research and is co-editor of the best-selling Handbook of Research on Innovation and Entrepreneurship. Furthermore, he has published in leading international journals. He has extensively advised corporates and governments on innovation and growth strategies, and has been principal investigator on various studies for German federal ministries, the local government, foundations and companies for the last nine years.

Please cite this publication as follows: Falck, O., Wiederhold, S. (2015): ICT skills are highly valued in European labor markets. Policy Brief, proceedings of LLLight'in'Europe research project.  
Retrievable at: [www.lllightineurope.com/fileadmin/lllightineurope/download/LLLight\\_Returns ICT Skills\\_policybrief\\_C4\\_20150922](http://www.lllightineurope.com/fileadmin/lllightineurope/download/LLLight_Returns ICT Skills_policybrief_C4_20150922)

## Introduction

### No evidence on the labor-market effects of ICT skills

“The new literacy” is the notion that Neelie Kroes, Vice President of the European Commission, uses to describe an individual’s skill to master information and communication technology (ICT). She justifies this powerful choice of words by arguing that “the online world is becoming a bigger part of everything we do. No wonder these [ICT] skills are becoming central in the job market.”<sup>1</sup> Indeed, the Internet has made available a virtually unlimited number of sources of information, and modern labor markets increasingly require the ability to access, locate, extract, evaluate, organize, and present digital information.

However, although there is the widespread belief that digital skills matter for labor-market outcomes, empirical evidence on the wage effects of ICT skills has yet to be provided. The main reason for this lack of research is the unavailability of data measuring ICT skills consistently within and across countries. The new PIAAC survey provides internationally comparable data on individuals’ ICT skills across 19 countries, offering for the first time the opportunity to investigate the wage returns to ICT skills.

Together with Alexandra Heimisch, we exploit the PIAAC data to show that ICT skills are highly valued in modern labor markets (Falck, Heimisch, and Wiederhold, 2015). One mechanism driving the positive wage returns to ICT skills is that the proliferation of computers complements workers in executing nonroutine abstract tasks, which use and reinforce ICT skills. We also show that ICT skills are developed by performing ICT-related tasks, while having access to the Internet is a precondition for this type of learning-by-doing.

---

<sup>1</sup> See <http://www.getonlineweek.eu/vice-president-neelie-kroes-says-digital-literacy-and-e-skills-are-the-new-literacy/>; accessed July 19, 2015.

## Key Observations

### Returns to ICT skills around the world

The Programme for the International Assessment of Adult Competencies (PIAAC) is the first-ever study that provides consistent international data on ICT skills of the adult population. PIAAC is the product of collaboration between participating countries through the Organization for Economic Co-operation and Development (OECD), and uses leading international expertise to develop valid comparisons of skills across countries and cultures. The survey was conducted between August 2011 and March 2012 in 22 OECD economies, the Russian Federation, and Cyprus, which represent about 75 percent of the worldwide GDP.

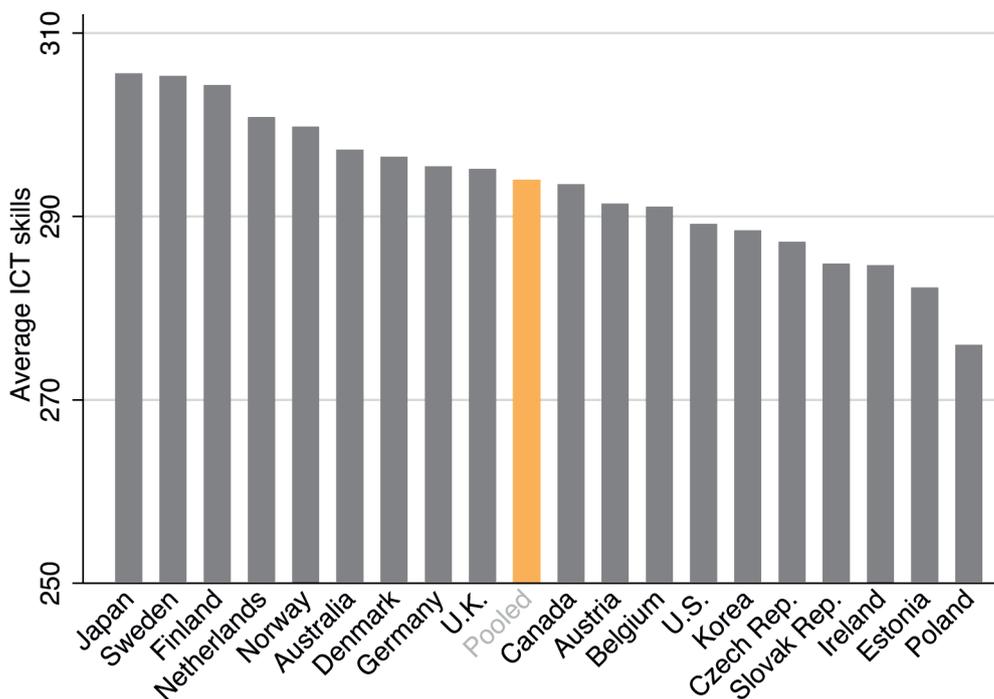
PIAAC was designed to provide representative measures of cognitive skills possessed by adults in three different domains, each measured on a 500-point scale: numeracy, literacy, and ICT (called “problem solving in technology-rich environments” in the survey).<sup>2</sup> Having skill data from various domains offers a unique opportunity to test whether observed wage differentials between workers with high versus low ICT skills are just a reflection of differences in workers’ general ability.<sup>3</sup>

<sup>2</sup> Four countries (Cyprus, France, Italy, and Spain) did not participate in the ICT skills assessment and are thus excluded from the analysis. The Russian Federation is also excluded because, according to OECD (2013), data for the Russian Federation are preliminary, may still be subject to change, and are not representative of the entire Russian population.

<sup>3</sup> For further information on the PIAAC data, see Thematic Report “Macroeconomic Growth and Lifelong Learning”

Figure 1 shows how the ICT skills of the EU population compare to the skills of other countries at roughly the same stage of economic development. Many EU countries perform close to the average of the OECD participants (of 294 PIAAC points). But even the EU top performers of Sweden (305), Finland (304), and the Netherlands (301) fall short of the international top performer Japan (306). At a worrying level, Poland (276), Estonia (282), Ireland (285), and the Slovak Republic (285) fall substantially short of the international performance and constitute the bottom of the international league tables. Moreover, the countries performing most poorly in the PIAAC assessment in numeracy and literacy (i.e., France, Italy, and Spain) did not even participate in the ICT skills assessment.<sup>4</sup>

Figure 1: ICT skills around the world



Average ICT skills across countries. Sample: employees aged 20-49 (no first-generation migrants).

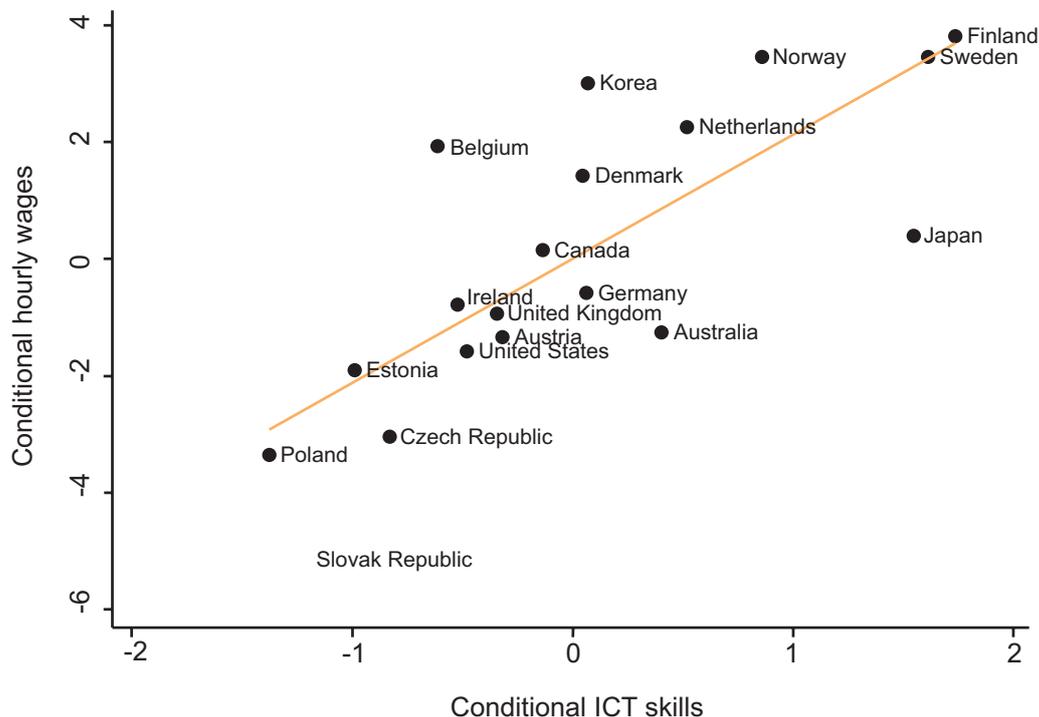
Source: Falck, Heimisch, and Wiederhold (2015).

<sup>4</sup>For an international comparison of numeracy skills, see Hanushek et al. (2015).

## ICT skills and wages are positively correlated

We now turn to the question how modern knowledge-based labor markets reward ICT skills. Figure 2 depicts the country-level relation between ICT skills and wages (both after taking out effects of work experience, gender, and educational attainment). It is directly visible that there is a very close relationship between the two, with countries that do well in the PIAAC assessment of ICT skills systematically having higher wages than countries with poor ICT skills achievement. In fact, such a simple model can account for more than three quarters of the total cross-country variation in wages. Moreover, the figure suggests a quite strong effect: For every 10 points increase in ICT skills on the PIAAC scale (e.g., the difference in average ICT skills between Finland and Germany) a country's wage rate is 27 percent higher.

Figure 2: Returns to ICT skills: country-level analysis



Added-variable plot of a regression of hourly wages on ICT skills and the following control variables: quadratic polynomial in work experience, female indicator, and years of schooling. All variables are aggregated to the country level. "Conditional" refers to variation in wages and ICT skills, respectively, purged for variation in the control variables. Sample: employees aged 20-49, no first-generation migrants.

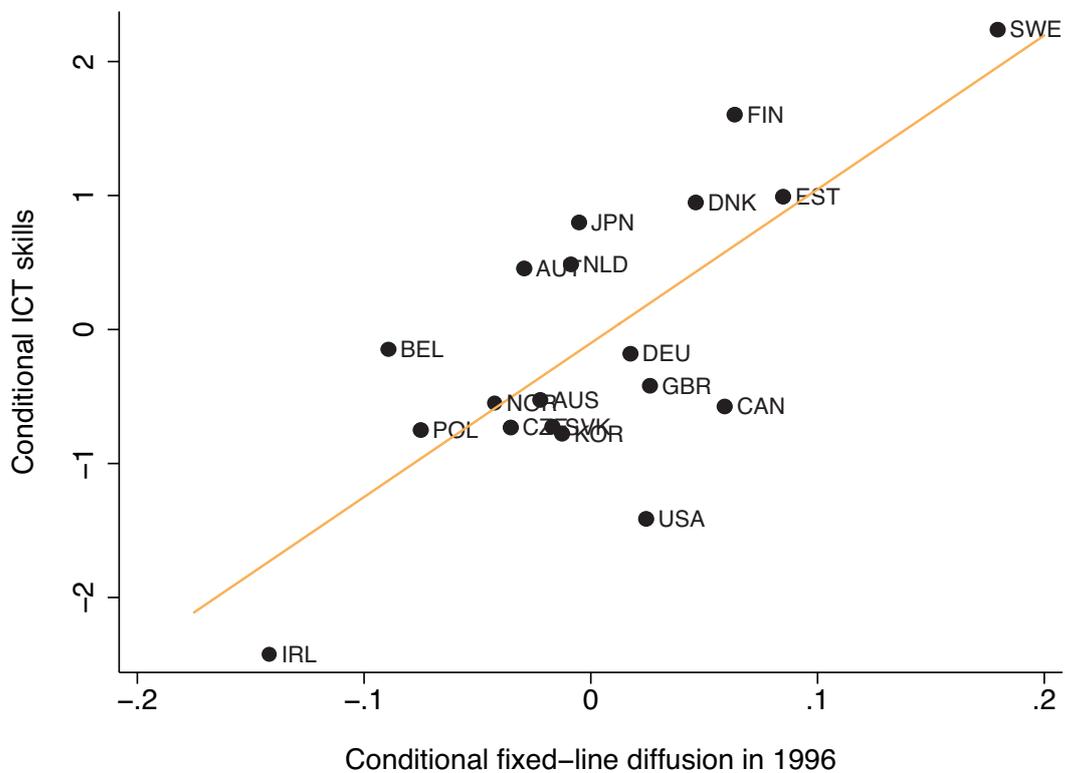
Source: Falck, Heimisch, and Wiederhold (2015).

## ICT skills are developed through learning-by-doing

However, a major empirical challenge is to assess whether such positive association between ICT skills and wages indeed depicts a causal effect of skills on wages. A prime concern is that more able people may be more likely to accumulate ICT skills and may independently receive higher earnings because of their higher ability. For example, an influential paper by DiNardo and Pischke (1997) shows that computer users at work possess unobserved skills which might have little to do with computers per se but which increase their productivity and wages. They strikingly demonstrate this by showing that positive wage effects can also be found for pencil use at work that are similar in magnitude to the wage effects of computer use. Based on this nonsensical finding, they conclude that returns to computer and pencil use at work must be biased due to unobserved skills of the users.

In Falck, Heimisch, and Wiederhold (2015), we propose a novel approach to get around such bias by exploiting the extent of the traditional voice-telephony networks, which were upgraded in most countries to provide fast Internet access by means of the so-called DSL technology. The underlying idea is that ICT skills are developed through learning-by-doing for which Internet availability is a precondition. Indeed, Figure 3 shows that individuals living in countries with a higher technologically determined probability of having access to the Internet develop ICT skills through learning-by-doing faster. In terms of magnitude, the estimates suggest that an increase in the pre-existing voice-telephony penetration rate from 17 percent (Poland) to 68 percent (Sweden) is associated with an increase in ICT skills of about 49 PIAAC points.

Figure 3: Past fixed-line diffusion



Added-variable plot of a regression of ICT skills (standardized to standard deviation 1 across countries) on fixed-line diffusion (in 1996) and the following control variables: GDP per capita (in 1996), average wage level in the country, quadratic polynomial in work experience, female indicator, and years of schooling. Except for fixed-line diffusion and GDP per capita, all variables are measured in 2011/12. “Conditional” refers to variation in ICT skills and fixed-line diffusion, respectively, purged for variation in the control variables. Sample: employees aged 20-49, no first-generation migrants.

Source: Falck, Heimisch, and Wiederhold (2015).

Since the extent of the traditional voice-telephony networks basically reflects a country’s technological availability of broadband Internet in the first decade of the 2000s, it should affect only the ICT skills of individuals who have used the Internet during this decade in the respective country. Reassuringly, the extent of a country’s traditional voice telephony network is not related to the ICT skills of first-generation immigrants who are unlikely to have acquired ICT skills in the PIAAC test country.

Moreover, the predictive power of the traditional voice-telephony network for ICT skills is strongest for individuals aged 20-49, i.e., an age group in which individuals were old enough to use the Internet in the first decade of the 2000s, but still young enough to be open to this new technology. These two additional pieces of evidence provide further support for the existence of a learning-by-doing channel in the accumulation of ICT skills.

---

### ICT skills have a causal effect on wages

Using only variation in ICT skills that is induced by cross-country differences in the technologically determined probability of having Internet, we find that better ICT skills are systematically related to higher wages. Across countries, an increase in ICT skills by 10 PIAAC points leads to an increase in wages of 9 percent. This figure pertains to a sample of natives and second-generation migrants aged 20-49, who likely have accumulated their ICT skills in the PIAAC test country during the early phase of broadband availability. These estimates account for differences in wages due to gender, work experience, and educational attainment, as well as for general economic conditions before widespread broadband rollout and even a country's average wage level today.<sup>5</sup> The IV estimate on the returns to skills of 9 percent is considerably smaller than the estimate from the country-level analysis in Figure 2, suggesting that naive OLS regressions overestimate the true returns to skills.

The impact of ICT skills on wages proves immensely robust to including additional controls at the individual level or at the country level. Moreover, a placebo test, showing that pre-existing fixed-line networks cannot predict numeracy or literacy skills, suggests that our estimations insulate the wage effect of ICT skills from that of a person's general ability.

<sup>5</sup> First, controlling for past GDP per capita captures any direct positive economic effect of the fixed-line voice-telephony network (Röller and Waverman, 2001). Including this variable also controls for the fact that richer countries had a better-developed fixed-line infrastructure prior to broadband rollout and pay higher wages today. Second, controlling for a country's current wage level accounts for direct productivity-enhancing effects of early high-speed Internet availability (Czernich et al., 2011; Forman, Goldfarb, and Greenstein, 2012).

Finally, returns to ICT skills are also sizable when we use a different source of identifying variation by exploiting technological peculiarities of the pre-existing voice-telephony network in Germany that effectively excluded many municipalities from the early access of high-speed Internet. These within-country results reveal that returns to ICT skills are especially pronounced for Germany.

---

What explains the positive wage returns to ICT skills?

A task-based interpretation

The skill structure of developed economies changed in a remarkable way since the second half of the 20th century. Educational upgrading was a prevalent trend and much evidence points toward increases in skill premia (e.g., Goldin and Katz, 2009) and increases in wage inequality (e.g., Autor, Katz, and Kearney, 2008; Dustmann, Ludsteck, and Schönberg, 2009; Autor, 2014). In a seminal study, Autor, Levy, and Murnane (2003) relate the changes in the labor structure since the 1960s in the United States to the proliferation of computers at the workplace. The basic idea put forward in their work is that computers substitute for routine tasks (that can be accomplished by following explicit rules) and are complementary to nonroutine abstract tasks (such as problem-solving and coordination). The underlying reason is that routine tasks embody explicit knowledge that can relatively easily be programmed and replaced by technology, which is not the case for nonroutine tasks. Recent evidence suggests that such skill complementarity of personal computers is also present in Europe (Akerman, Gaardner, and Mogstad, 2015).<sup>6</sup>

However, previous studies on the task-based approach to skill-biased technological change could never observe individuals' ICT skills directly. By allowing us to combine ICT skills data with information on the frequency of computer use at work, PIAAC offers the opportunity to shed new light on the question whether recent technological change is complementary to nonroutine abstract tasks.

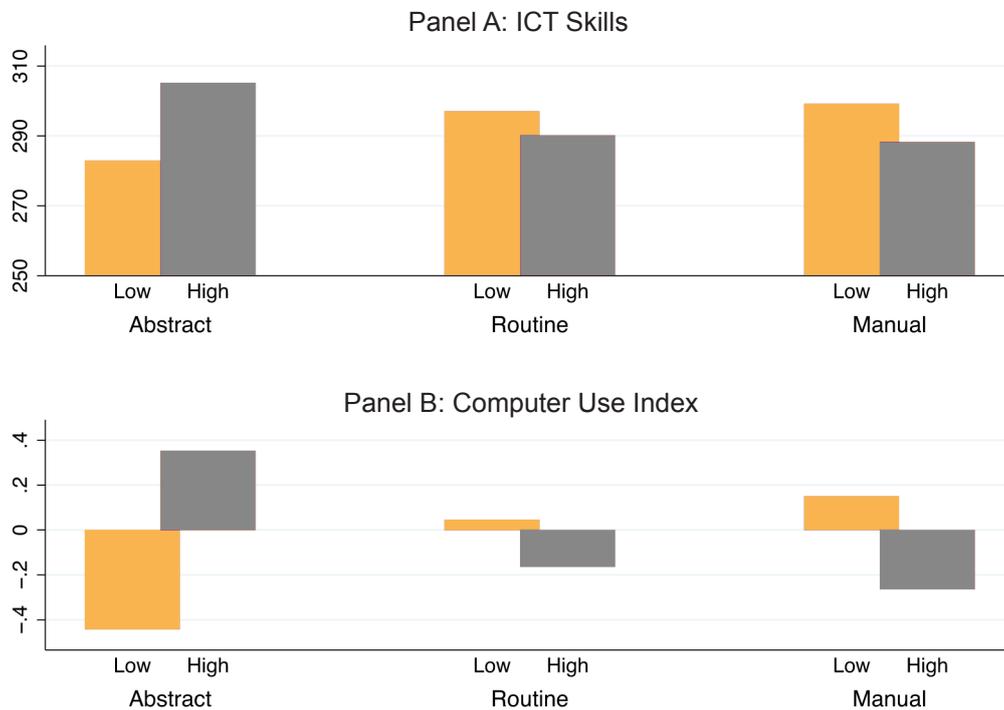
<sup>6</sup> See Acemoglu and Autor (2011) for a detailed overview of the task-based approach to skill-biased technological change.

Figure 4 shows that ICT skills (Panel A) and the frequency of computer use (Panel B) are systematically higher in occupations that require high abstract tasks. For instance, the difference in ICT skills between occupations with a high vs. low abstract task intensity (22 PIAAC points) is as large as the difference in average ICT skills between Estonia (282 points), one of the worst performing countries in the international ICT skills test, and the top performer Japan (306 points). In contrast, workers in jobs that are pervasive in routine or manual tasks have lower ICT skills and use computers less often than their peers in jobs that involve only little routine or manual tasks.

These results have two important implications: First, they support the idea that the upsurge of computers in recent decades complements workers in executing nonroutine abstract tasks, and substitutes for workers in performing routine and manual tasks. Second, they suggest an important mechanism behind the positive wage returns to ICT skills in modern labor markets. Having high ICT skills seems to be a necessary prerequisite to enter jobs which are pervasive in abstract tasks, and these jobs pay substantial wage premia.<sup>7</sup>

<sup>7</sup> In our sample, jobs which are pervasive in abstract tasks pay on average 25 percent higher wages than jobs that involve relatively little abstract tasks.

Figure 4: ICT Skills and Computer Use by Occupational Task Content



Comparison of ICT skills (Panel A) and computer use (Panel B) between occupations with different task content. Sample: employees aged 20-49, no first-generation migrants. To distinguish between “high” and “low” task intensities, the population median in abstract, routine, and manual tasks, respectively, is used. Task measures are taken from Goos, Manning, and Salomons (2014) and are defined at the two-digit level of the International Standard Classification of Occupations (ISCO). Computer use index is based on questions in PIAAC indicating how often a person performs the following activities at work: create or read spreadsheets, use word-processing software, use programming language, and engage in computer-aided real-time discussions; answers are combined to a single index following the procedure described in Kling, Liebman, and Katz (2007).

Source: Falck, Heimisch, and Wiederhold (2015).

A task-based explanation for the positive returns to ICT skills is further supported by recent work from Patt (2015) and Nedelkoska, Patt, and Ederer (2015).<sup>8</sup> The authors develop a model in which the abstract intensity of tasks that people perform at the job determines the speed of skill accumulation through learning-by-doing. The idea is that learning-by-doing is faster when there is substantial novelty and challenge in the scope of everyday activities undertaken by employees.

<sup>8</sup>For further information, see also Thematic Report “Macroeconomic Growth and Lifelong Learning” (Section 5.5).

Thus, an economy whose production is composed of intellectually complex activities has a better chance of developing a highly skilled workforce in the longer run. Patt (2015) empirically tests this model using U.S. state level data. He finds that more than half of the real per capita income growth in the United States over the period 1980-2010 resulted from an increased abstract task content of jobs, while just about one-third came from growth in average years of schooling. Historically, the increased pervasiveness of abstract tasks was fueled by the growth of such industries as health, finance, and professional services, which heavily involve problem-solving, complex communication, and information-intensive tasks.

---

## Policy Recommendations

### What can policy learn from our results?

Our result that modern knowledge-based labor markets highly reward ICT skills demonstrates that new digital developments such as “Industry 4.0” have important labor-market implications.<sup>9</sup> A substantial worry associated with the technological advances in data processing and application is that certain knowledge and skills suddenly become less valuable or even obsolete. At least as important is that the expected macro-level shifts in the labor market toward computers substituting job tasks previously performed by humans that are routine or machine-codifiable in nature will require high levels of employee flexibility and the need to regularly update skills. The mirror-image of these developments is that ICT skills are becoming an indispensable requirement for an increasingly large part of the workforce.

In light of these developments, the rather lackluster performance of some European countries in the PIAAC assessment of ICT skills signals a dire need for reforms.

<sup>9</sup>This has for instance been recognized by the German labor ministry, which has recently launched an initiative called “Labour 4.0.” See <http://www.bmas.de/DE/Themen/Schwerpunkte/Arbeiten-vier-null/inhalt.html> for further information on this initiative.

This puts the focus on policies for skill development at all levels – from the education provided before and in school to lifelong learning opportunities on and off the job – and on policies that ensure that skills are effectively retained and used. However, our results show that individual’s ICT skills also accumulate by regularly practicing them at home or at work. Thus, policies aiming at the development of ICT infrastructure also play a role in determining a population’s level of ICT skills.

In particular, the fact that the former Communist countries (i.e., Czech Republic, Estonia, Poland, Slovak Republic) tremendously lack behind other OECD countries with regard to broadband rollout may not only be detrimental to the productivity of firms relying on broadband Internet directly, but may also have negative long-run consequences for the population’s capacity to build up ICT skills and to adapt to future changes in skill demand.

In view of this, the EU’s Digital Agenda explicitly aiming at the further development and extension of broadband coverage in Europe (<https://ec.europa.eu/digital-agenda/en/broadband-strategy-policy>) may prove even more beneficial than previous research would suggest. However, it is important to note that the variation in ICT skills that we use in our empirical analysis comes from the first two decades of extensive Internet diffusion and it is not a priori clear whether the intensive diffusion (e.g., Internet access with bandwidths of up to 100 Mbit/s) will generate learning-by-doing effects of a similar magnitude.

---

## Literature

- Acemoglu, Daron, and David H. Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." *Handbook of Labor Economics* (Orley Ashenfelter and David Card, Eds.), Vol. 4, Amsterdam: Elsevier: 1043-1171.
- Autor, David H. 2014. "Skills, education, and the rise of earnings inequality among the 'other 99 percent'." *Science* 344, no. 6186: 843-851.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2008. "Trends in US Wage Inequality: Revising the Revisionists." *Review of Economics and Statistics* 90, no. 2: 300-323.
- Autor, David H., Frank Levy, and Richard J. Murnane. 2003. "The Skill Content of Recent Technological Change: An Empirical Exploration." *Quarterly Journal of Economics* 118, no. 4: 1279-1333.
- Czernich, Nina; Oliver Falck; Tobias Kretschmer and Ludger Woessmann. 2011. "Broadband Infrastructure and Economic Growth." *Economic Journal* 121: 505-532.
- DiNardo, John E., and Jorn-Steffen Pischke. 1997. "The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too?" *Quarterly Journal of Economics* 112, no. 1: 291-303.
- Dustmann, Christian, Johannes Ludsteck, and Uta Schönberg. 2009. "Revisiting the German Wage Structure." *Quarterly Journal of Economics* 124, no. 2: 843-881.
- Falck, Oliver, Alexandra Heimisch, and Simon Wiederhold. 2015. "Returns to ICT Skills." Mimeo.
- Forman, Chris, Avi Goldfarb, and Shane Greenstein. 2012. "The Internet and Local Wages: A Puzzle." *American Economic Review* 102, no. 1: 556-575.
- Goldin, Claudia, and Lawrence F. Katz. 2009: *The Race between Education and Technology*. Harvard University Press, Harvard.
- Goos, Maarten, Alan Manning, and Anna Salomons. 2014. "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring." *American Economic Review* 104, no. 8: 2509-2526.

- Hanushek, Eric A.; Guido Schwerdt; Simon Wiederhold and Ludger Woessmann. 2015. „Returns to skills around the world: Evidence from PIAAC.“ *European Economic Review* 73: 103-130.
- Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz. 2007. “Experimental Analysis of Neighborhood Effects.” *Econometrica* 75, no. 1: 83-119.
- Nedelkoska, Ljubica, Alexander Patt, and Peer Ederer. 2015. “Learning by problem-solving.” Mimeo.
- OECD. 2013. “OECD skills outlook 2013. First results from the survey of adult skills.” Paris: Organisation for Economic Co-operation and Development.
- Patt, Alexander. 2015. “Conceptual Framework for the Estimation of Growth Consequences of a Shift in Task Complexity.” Mimeo.
- Röller, Lars-Hendrik, and Leonard Waverman. 2001. “Telecommunications Infrastructure and Economic Development: A Simultaneous Approach.” *American Economic Review* 91, no. 4: 909-923.

## Project Identity

LLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level; educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

Coordinator	Zeppelin University
Project Director	Peer Ederer
EU Project Officer	Monica Menapace
EU Contribution	€ 2,695,000
EU Project #	290683
Project Duration	January 2012 – September 2015



## Supervisory Board

### **Xavier Prats Monné**

Director-General, Directorate-General for Education and Culture, European Commission

### **Andreas Schleicher**

Director for Education and Skills, and Special Advisor on Education Policy to the Secretary-General at OECD

### **Iain Murray**

Senior Policy Officer responsible for Policy on Learning and Skills, Educational Policy, and Regional Government and Devolution,  
Trades Union Congress (TUC), United Kingdom

### **Oskar Heer**

Director Labour Relations, Daimler AG Stuttgart

### **Roger van Hoesel**

Chairman of the Supervisory Board at Startlife and Managing Director at Food Valley

## **zeppelin universität**

zwischen  
Wirtschaft Kultur Politik

Zeppelin University  
Germany  
Ljubica Nedelkoska



University of Nottingham  
United Kingdom  
John Holford



University of  
Economics Bratislava  
Slovakia  
Eva Sodomova



Department of Education  
(DPU), Aarhus University  
Denmark  
Ulrik Brandt



University of Luxembourg  
Luxembourg  
Samuel Greiff



China Center for Human  
Capital and Labour  
Market Research China  
Haizheng Li



Wageningen University  
Netherlands  
Thomas Lans



ifo Institute  
Germany  
Simon Wiederhold



Innovation & Growth  
Academy  
Netherlands  
Silvia Castellazzi



Leuphana University Lüneburg  
Germany  
Alexander Patt



Institute of Forecasting of the  
Slovak Academy of Sciences  
Slovakia  
Martina Lubyova



Ruprecht-Karls-University  
Heidelberg  
Germany  
consortium partner in 2012

This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

01	Resources of society for learning
02	Institutions of learning
03	Circumstances of learning
04	<b>Role of transversal skills</b>
05	Role of job-specific skills
06	Productivity of skills
07	Outcomes of skills

This policy brief discusses findings related to **Role of transversal skills** at the analysis level **country**. For further publications and multimedia material related to the project, please visit [www.lllightineurope.com](http://www.lllightineurope.com)