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**Article**

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*Oliver Falck, Valentin Lindlacher and Simon Wiederhold*

## Elderly Left Behind? How Older Workers Can Participate in the Modern Labor Market

### KEY MESSAGES

- **Digital skills are positively related to employment prospects and productivity of older workers**
- **They also enable older workers to work in high-paying jobs**
- **Fortunately, digital skills can be acquired and honed at all ages**
- **Policymakers should incentivize employers to offer more training for the elderly and fund training programs in higher-education institutions**
- **At present, the elderly show huge international differences in digital skills, larger than those for younger groups**

In her 2021 State of the Union address, European Commission's President Ursula von der Leyen announced that "[the EU] will invest in 5G and fiber. But equally important is the investment in digital skills." Indeed, the EU Recovery and Resilience Facility, which runs until 2026, has earmarked substantial funds to tackle the digital divide, in acknowledgment of the fact that the EU is not only missing ICT specialists but also that many Europeans do not have sufficient digital skills to thrive in today's society and labor market. Many observers argue that older workers in particular lack digital skills, suffering more often from computer anxiety and showing lower computer self-efficacy (Czaja et al. 2006). This lack of skills hampers their employability and productivity in a technologically fast-changing world. Furthermore, given that societies in the industrialized world are aging, equipping older workers with the necessary skills to remain active

and productive in the labor market has become a key challenge.

In this article, we first document to which extent OECD countries are succeeding in equipping workers of different ages with basic digital skills. Focusing on workers aged 55–65 years, when then show the labor market consequences of insufficient digital skills. While this evidence is based on simple country-level correlations, the strength of the relationships clearly suggests the importance of providing training opportunities in digital skills, especially to older generations. In fact, we show that older workers in countries with more on-the-job training opportunities possess systematically higher digital skills. Our analysis relies on data from the OECD's Programme for the International Assessment of Adult Competencies (PIAAC). The key advantages of these data are that digital skills were assessed in an internationally comparable manner and that a rich background questionnaire provides information on labor market outcomes for adults up to 65 years.

### LARGE INEQUALITIES IN DIGITAL SKILLS

PIAAC provides an assessment of adults' proficiency in problem-solving in technology-rich environments, which we refer to as digital skills. We use survey data from the 27 countries that participated in PIAAC's digital skill assessment between 2011 and 2015. All countries participating in PIAAC are developed countries, mostly from the OECD.

In the following, we focus on whether an individual has at least some basic digital skills, that is, whether she was able to participate in PIAAC in a computer-based mode. There are three reasons for why individuals may lack basic digital skills in PIAAC (see Falck et al. 2021): (i) individuals had no prior computer experience; (ii) individuals failed a



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computer core test, which assessed basic digital competencies such as using a keyboard/mouse or scrolling through a web page; (iii) individuals refused to take part in the computer-based assessment. For the sake of exposition, we use the term “individuals with basic digital skills” instead of “individuals with at least basic digital skills” in the remainder of the article.

Figure 1 depicts a country’s share of individuals with basic digital skills for three age groups: 25–44, 45–54, and 55–65 years. We observe a clear age ranking of basic digital skills in all countries: the youngest group always has the highest share of individuals with basic digital skills, while the oldest group always has the lowest share. On average across countries, the digital skill gap between the youngest and oldest age groups amounts to 35 percentage points. While PIAAC only covers adults up to 65 years, it is likely that the gap would be even wider when considering individuals aged over 65.

Figure 2 below shows that countries also differ considerably in the size of the digital-skill gap between the youngest versus the oldest age group. Unsurprisingly, countries that are better able to equip younger workers with digital skills also tend to have higher-skilled workers in the older generation: in the United Kingdom, Norway, the Netherlands, the United States, Sweden, Denmark, and New Zealand, the share of individuals with basic digital skills in the youngest age group exceeds 90 percent, while the gap with the oldest group amounts to only 13 to 20 percentage points. However, a considerable number of countries show large inequality in digital skills by age group. Most striking is South Korea, where almost 90 percent of younger workers but less than 30 percent of older workers have basic digital skills, leading to a skill gap of a whopping 60 percentage points! Other countries in which the youngest and oldest age group are very unequally equipped with basic digital skills are Singapore and Central and Eastern European countries such as Slovenia, Lithuania, and the Czech Republic.

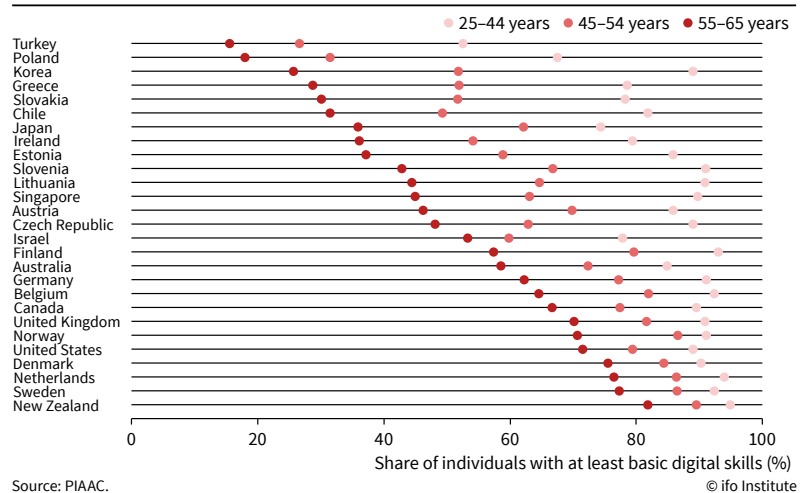
Across the three age groups considered, the cross-country differences in the share of individuals with basic digital skills are by far the largest in the oldest age group. While in Turkey and Poland not even one-fifth of the oldest age group has basic digital skills, the share exceeds 75 percent in New Zealand, Sweden, the Netherlands, and Denmark. Generally, richer countries are better able to equip elderly individuals with basic digital skills. This is not true, however, in very rich Asian countries, particularly South Korea and Japan, where the share of individuals with basic digital skills in the oldest age group is below 40 percent.

### DIGITAL SKILLS MATTER FOR LABOR MARKET OUTCOMES OF THE ELDERLY

In the remainder of the article, we focus on individuals aged 55–65 years. Using cross-country variation,

Figure 1

#### Basic Digital Skills by Country and Age Group



we investigate whether labor market outcomes of the elderly are systematically related to their digital skills, relying on PIAAC’s rich information on employment status, hourly wages, and the abstract-task content of a worker’s occupation.<sup>1</sup>

#### Digital Skills and Employment of the Elderly

We start by assessing the relationship between digital skills and employment of older workers. We find that their employment prospects are systematically higher in countries where such workers are better equipped with basic digital skills (upper panel of Figure 2). A country’s share of older workers with basic digital skills explains as much as 30 percent of the international variation in employment chances for the elderly. Interesting outliers are Chile, Japan, Singapore, and South Korea, where elderly workers have relatively good employment chances despite low basic digital skills. Elderly individuals in countries such as Austria, the Czech Republic, and Belgium have rather low employment opportunities despite reasonable digital skills, while elderly individuals in Southern as well as Central and Eastern European countries, such as Turkey, Greece, and Slovenia, are bleak regardless of their digital skills.

#### Digital Skills and Hourly Wages of the Elderly

Next, we focus on employed elderly workers and examine the relationship between basic digital skills and (PPP-adjusted) hourly wages as an important measure

<sup>1</sup> Hourly wages are based on purchasing power parities and exclude the self-employed. PIAAC does not report hourly wage information for Singapore and Turkey, so the number of countries shrinks to 25 in the middle panel of Figure 2 - see Hanushek et al. (2015) for further details on the wage data in PIAAC). The abstract task measure is taken from Goos et al. (2014), and incorporates managerial and interactive tasks as well as mathematical and formal reasoning requirements. PIAAC does not provide occupational information at the two-digit ISCO level for Austria, Canada, Estonia, and Finland, so the number of countries shrinks to 23 in the bottom panel of Figure 2.

of individuals' productivity (middle panel of Figure 2). We find a strong positive association: elderly workers earn significantly higher average wages in countries where the share of older workers with basic digital

skills is higher. In fact, a country's proportion of older workers possessing basic digital skills explains almost 44 percent of the international wage variation. Elderly workers in South Korea, Japan, and Ireland are paid relatively well despite having low digital skills, while Central and Eastern European countries (e.g., Slovakia, Estonia, Slovenia, Lithuania, and the Czech Republic) pay their elderly workers relatively little in relation to their digital skills.

**Digital Skills and Type of Jobs Performed by the Elderly**

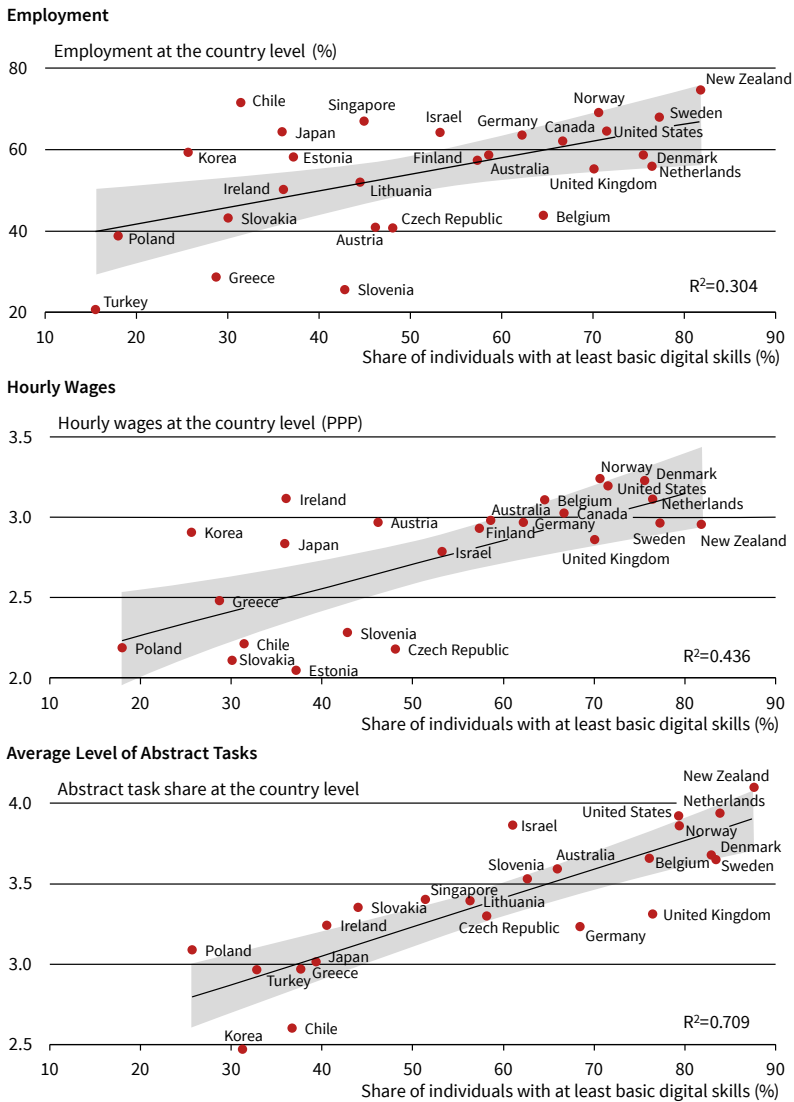
To shed light on why older workers with higher digital skills earn wage premia, we investigate the tasks these workers perform in their jobs. We conjecture that workers need at least some basic digital skills to perform cognitively complex, abstract tasks. This is in line with the idea that recent technological change amplifies the comparative advantage of those workers engaged in abstract tasks. Specifically, Autor et al. (2003 and 2008) show that computers substitute for routine tasks (those that can be accomplished by following explicit rules) and are complementary to nonroutine abstract tasks (such as problem solving, adaptability, and creativity). The underlying reasoning is that routine tasks embody explicit knowledge that can be programmed relatively easily, which is not the case for abstract tasks. Moreover, an increase in the supply of codifiable tasks increases the marginal productivity of employees who engage extensively in abstract tasks.

Our results suggest an important role for occupational selection in explaining the returns to basic digital skills. We find a very strong association between the share of older workers with basic digital skills and the average level of abstract tasks older workers perform in their jobs (bottom panel of Figure 2). In fact, basic digital skills explain more than 70 percent of the international variation in abstract tasks. Thus, having basic digital skills appears to be a prerequisite for benefitting from the wage premia that abstract jobs pay.

**POLICY CONCLUSION: BASIC DIGITAL SKILLS CAN BE ACQUIRED AT ANY AGE**

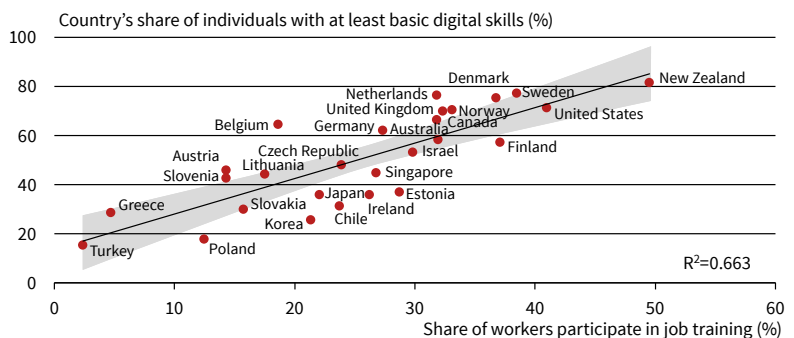
We have shown that an elderly workforce with basic digital skills has substantially better employment chances, earns higher wages, and is less susceptible to being replaced by technology. Thus, fostering the formation of digital skills among the elderly is a key measure for creating inclusive labor markets that can accommodate older workers. Can job training equip older workers with these basic digital skills? To study this question, we again rely on PIAAC, which asked whether individuals had participated in training in the 12 months prior to the survey. Our definition of job training includes both training on the job (i.e.,

Figure 2  
Basic Digital Skills and Labor Market Outcomes of Individuals Aged 55–65 Years



Note: The gray-shaded area marks the confidence interval at the 95% level. R<sup>2</sup> refers to the share of variance in employment, wages, and abstract tasks, respectively, that is explained by the share of individuals with at least basic digital skills. Source: PIAAC. © ifo Institute

Figure 3  
Job Training and Basic Digital Skills of Individuals Aged 55–65 Years



Note: The gray-shaded area marks the confidence interval at the 95% level. R<sup>2</sup> shows how much variation in the share of elderly individuals with digital skills is explained by the share of elderly workers who participated in job training. Source: PIAAC. © ifo Institute

organized sessions for on-the-job training or training by supervisors or co-workers) and any other training measures that were job-related. Figure 3 shows that basic digital skills of workers aged 55–65 years are systematically higher in countries with a higher share of elderly workers participating in job training. The high relevance of job training for developing digital skills of older workers is suggested by the fact that differences in training participation among the elderly explain almost two-thirds of the international variation in the share of older workers with at least basic digital skills.

Hence, it is vital for governments to promote adequate training and lifelong-learning opportunities on labor markets that are rapidly changing (Vona and Consoli 2015). In particular, structural and technological change will likely raise the demand for expertise in digital tasks in the future. On the one hand, training opportunities must be provided on a continuing basis, especially for older workers, as these workers possess lower digital skills than their younger counterparts (see Figure 1). Multivariate evidence from the PIAAC data shows that job training is effective in increasing digital skills for all age groups (Falck et al. 2022). However, elderly workers exhibit a considerably lower training participation rate than their younger peers. Across the 27 PIAAC countries, training participation rates are 47 percent (43 percent) for individuals aged 25–44 years (45–54 years), but only 27 percent for those aged 55–65 years. At the same time, survey evidence from a German follow-up study to PIAAC, PIAAC-L suggests that the share of individuals wishing to have training in information and communications technology (ICT) is by far the largest among the oldest worker generation: while 32 percent of workers aged 55–65 years wish to receive ICT training, only 18 percent (22 percent) of individuals aged 25–44 years (45–54 years) do so.

These findings provide a strong case for policymakers to incentivize employers to offer more training measures for the elderly, who often have lower access to training. Recent programs for developing digital skills at the European level aim at addressing this issue. For instance, the Recovery and Resilience

Facility mandates that all national plans must devote at least 20 percent of resources to foster the digital transition, such as by investing in connectivity, human capital, and digital services.<sup>2</sup> Likewise, the Digital Europe Programme earmarks EUR 7.4 billion for the deployment of digital technologies and EUR 580 million for courses and training in key digital technologies in higher-education institutions, research centers, and firms.<sup>3</sup>

Digital skills do not only affect labor market success, but also participation in society more generally. This was shown very starkly during Covid-19, when non-grocery shopping was often only possible online. Other prominent examples are the provision of digital public services and Internet voting. Thus, being unable to master digital skills in an ever more digitalized environment may eventually become a question of social participation.

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<sup>2</sup> See [https://economy-finance.ec.europa.eu/eueconomyexplained/recovery-and-resilience-facility\\_en](https://economy-finance.ec.europa.eu/eueconomyexplained/recovery-and-resilience-facility_en).

<sup>3</sup> See <https://digital-skills-jobs.europa.eu/en/about/digital-europe-programme>. The Digital Skills & Jobs Platform also provides a collection of training opportunities and best practices from various EU countries.