

4.11.2019

Digitalisation and investment in intangible capital: the Spanish case within the EU

Banco de España-European Investment Bank

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Ladies and gentlemen,

Let me start by welcoming you to Banco de España for the conference *Digitalisation and Investment in Intangible Capital: The Spanish Case within the EU*, jointly organised with the European Investment Bank. For the Banco de España it is a great pleasure to collaborate with the European Investment Bank in co-organising a conference for the second time. Before going any further with my intervention, I would like to thank all of you for your attendance here today.

The topic of this conference is very timely and appropriate. Digitalisation is a key development that is increasingly affecting all the sectors of the economy with the ability to significantly transform the functioning of companies and markets and the structure of the economy more generally. However, the final impact of digitalisation on various dimensions is highly uncertain.

Digitalisation

Digitalisation refers to the adoption of digital technologies such as big data, cloud computing, E-commerce, artificial intelligence, robotics, the Internet of Things and 3D printing.

The impact of digitalisation on firms and the general economy comes through various factors. First, digitalisation reduces search, transportation and verification costs¹. Second, it leads to increased automation of routine operations. Third, it enables new ways of organising production. Fourth, it may change the structure of the market, potentially affecting competitive pressures in some sectors.

There is an overall consensus that digitalisation can potentially boost firms' productivity through several channels. First, technical progress in the production of digital products leads to new, better and cheaper products generating productivity gains in the sectors producing these products. Second, other sectors may benefit from cheaper inputs encouraging a higher use of those inputs as investment goods, resulting in productivity gains for the firms in these sectors. Third, digital technologies enhance product and process innovations leading to new production and organisational processes, new business models and new or superior products. Finally, information and communication technologies (ICT) are seen as reducing the cost of sharing and acquiring knowledge, potentially increasing the diffusion of innovation and new knowledge.

However, digitalisation may also entail some challenges. First, while some argue that digitalisation leads to more intense competition, others fear increasing market concentration in some sectors on the back of digitalisation². Second, some studies find evidence that ICT and automation are related to labour market polarisation³, where mid-skilled jobs either lose value or disappear, while there is an increase in demand for high-skilled job-profiles linked to digital technologies. This can lead to more income inequality or at least to big transition

¹ Goldfard, Avi and Catherine Tucker (2019). "Digital Economics", *Journal of Economic Literature*, vol 57(1), pages 3-43

² OECD (2018): "Maintaining competitive conditions in the era of digitalisation". OECD report to G-20 Finance Ministers and Central Bank Governors.

³ Michaels, G., Natraj, A. and Van Reenen, J. (2014): "Has ICT Polarized Skill Demand? Evidence from Eleven Countries over Twenty-Five Years", *Review of Economics and Statistics*, 96(1), pp. 60-77

costs for certain groups of workers. Third, cybersecurity threats pose another challenge, given the vast amount of valuable information created and stored in the digital economy.

Digitalisation may potentially lead to significant changes in the structure of most sectors of the economy. Among them, the possible impact on the financial sector is especially relevant for the Banco de España given our role as banking prudential and conduct supervisor and central bank. In particular, new technologies may imply efficiency gains and may also facilitate the entry of new companies offering financial services. For customers this may entail benefits in terms of cost savings and financial inclusion. For the incumbent banks technological change involves both challenges and opportunities. On the one hand, the entry of new competitors such as Fintech or Bigtech companies may threaten the market shares of incumbents. But on the other hand, innovation may lead in the long run to efficiency gains in the provision of financial services for incumbent banks, although in the short term it probably implies an increase in costs necessary to adapt to the new technologies.

Given our limited understanding of the impact of digitalisation on the economy, the use of surveys to firms can be a useful tool to enhance our knowledge of specific aspects of digitalisation such as adoption rates, barriers and impact on firm performance. In this regard, I would like to summarise the main findings of two recent surveys undertaken, respectively, by the EIB and the ECB.

The EIB Investment Survey, which is run annually, included in 2018 some questions on firms' demand for skills and digitalisation activities in the EU and the US. More specifically, 888 firms in the EU and 800 firms in the US were surveyed⁴. This survey shows that EU firms lag their US peers in terms of adoption rates in the services sector whereas adoption rates in the manufacturing sector are similar on both sides of the Atlantic. It also shows that larger firms are more likely to adopt digital technologies than smaller ones.

The ECB Digitalisation Survey is an ad-hoc survey which interviewed 74 very large non-financial companies from the euro area⁵. This survey shows that among large companies the take-up of digital technologies is very high, with big data and cloud computing being the most widely adopted.

When it comes to the impact of digitalisation on firm performance, the results of both surveys are highly consistent. They find that digitalisation has a positive impact on firm productivity, driven by the possibility of sharing knowledge more easily and more efficient production processes. It also has a positive effect on sales mainly due to better access to customers. Digital firms invest more, especially in intangible assets, and innovate more than non-digital firms. As regards perceived obstacles, digital firms report difficulties at recruiting and retaining highly skilled ICT staff. In addition, digitalisation was regarded by firms as replacing low and medium-skilled jobs but not high-skilled jobs.

⁴ For more information, see European Investment Bank (2019): Investment Report 2018/2019. Retooling Europe's Economy.

⁵ For more information, see ECB (2018): "Digitalisation and its impact on the economy: insights from a survey of large companies", ECB Economic Bulletin, Issue 7/2018

Intangible assets

Today's conference deals not only with digitalisation but also with intangible assets. Intangible assets are non-monetary assets without physical substance encompassing ICT, research and development (R&D), innovation, design, creativity, image and brand, organisation and human capital formation.

The development of the digital economy has certainly contributed to a notable increase in investment in intangible assets, as digital firms tend to both invest and innovate more than non-digital firms. Also digital technologies have increased the demand for high-skill workers, increasing in this way the investment in intangibles. Partly as a result of digitalisation, the relative importance of intangible assets has been increasing in most economies⁶.

But measurement of intangible assets is not straightforward, and their definition in the national accounts has gradually broadened. The current national accounts systems include as intangible assets computerised systems (software and databases), R&D, mineral exploration and entertainment, literary or artistic originals. Nevertheless, some authors⁷ claim that a broader range of assets should be included in the definition of intangible assets. In this regard, it is worth mentioning that Cotec Foundation for Innovation and The Valencian Institute of Economic Research (IVIE, by its Spanish abbreviation⁸) provide estimates of the gross fixed capital formation in intangible assets in Spain for a broader range of assets than those included in the national accounts. Data are available since 1995 with a regional and sectorial breakdown. These data are very helpful to improve our understanding of the role played by intangible assets in the Spanish economy.

Investment in innovation is widely recognised as a key driver of firm productivity. But financing intangible assets can be more challenging than financing tangible assets. In particular, the specific nature of intangible assets makes them less easy to be used as collateral. In addition, returns from innovation are generally riskier. All these elements made debt financing less suitable to finance innovation. Hence, innovative firms tend to rely more on internal sources to finance investment, as well as equity and, in particular, venture capital⁹. This can be particularly challenging in countries such as those of the European Union, including Spain, in which these markets are relatively less developed than in the United States.

The public sector often plays an important role in supporting innovation through various ways such as directly investing, granting subsidies or tax credit and financing projects. In this regard it is worth mentioning the activities of the Instituto de Crédito Oficial (ICO) in Spain as a key provider of venture capital, either directly or indirectly, through FOND-ICO Global, a "fund of funds" whose goal is to promote the creation of private venture capital funds that invest in Spanish companies. At the European level, the European Investment

⁶ For recent evidence in the euro area, see ECB (2018): "Investment in intangible assets in the euro area". ECB Economic Bulletin, Issue 7/2018

⁷ C. Corrado, J. Haskel, C., Jona-Lasino and M. Iomni (2018), "Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth", Journal of Infrastructure, Policy and Development, Volume 2 Issue 1.

⁸ Cotec Foundation for Innovation-Ivie (Instituto Valenciano de Investigaciones Económicas). Intangible assets: database for Spain and its autonomous communities (1995-2014). April 2017. Database available at: <http://informecotec.es/activos-intangibles/>.

⁹ Brown, J. R., Fazzari, S. M. and B. C. Petersen (2009): "Financing Innovation and Growth: Cash Flow, External Equity, and the 1990x R&D Boom", The Journal of Finance, Vol. LXIV, No. 1

Bank Group also supports innovation through different instruments such as guarantees, SME loan securitisation and venture capital.

The public sector can also play a relevant role in supporting innovation through the education system since a key element of innovation is the supply of high-skilled workers. An improvement of the quality and functioning of the education system can therefore have a positive contribution to innovation.

Spain's global position in terms of innovation and digitalisation

Now let me give you some figures on Spain's relative position in terms of innovation and digitalisation. According to Eurostat¹⁰, R&D expenditure as a percentage of GDP stood at 2% in the EU in 2017, below the target of 3% of GDP set at "Europe 2020 strategy" and also below US levels (2.8%). Spain's investment in R&D was lower than the EU average. It only accounted for 1.2% of its GDP in 2017 despite having been growing for the previous three years.

According to COTEC¹¹, Spanish companies fund the majority of their investment in R&D, around two thirds, with internally generated resources. Regarding external funding sources, venture capital and private equity are the most relevant ones.

Another key element for innovation is the supply of human capital, i.e., the availability of high-skilled workers such as researchers. In this dimension, there is also an important gap between Spain and the EU average. In particular, according to Eurostat¹², in 2017 Spain had 0.27 researchers per 100 employees in the private sector, while the EU average was 0.45.

Regarding digitalisation, Spain is gradually improving its global position. According to the Digital Economy and Society Index, published by the European Commission¹³, that tracks the evolution of EU member states in digital competitiveness, Spain ranks 11th among the 28 countries of the European Union. The index comprises five indicators: connectivity, human capital, use of Internet services, integration of digital technology and digital public services. Spain ranks above EU averages in 4 out of 5 of these indicators. In particular, Spain ranks 4th in the digital public services which focuses particularly on e-Government and e-Health services. In sharp contrast, Spain ranks in 17th position in the Human Capital dimension, which measures the skills needed to take advantage of the possibilities offered by digital technologies.

All in all, these figures suggest that there is room to improve the global position of Spain in terms of both innovation activities and digitalisation, especially as regards human capital. This is especially relevant for the Spanish economy, which show low levels of firm productivity in comparison with their European peers.

Let me conclude by saying that I am sure that the presentations in this conference will be the basis of fruitful discussions on key aspects of digitalisation and investment in intangible assets in Spain, such as its evolution and drivers, the existence of barriers and the best way to support those activities. These discussions will be very useful to enrich the policy debate

¹⁰ Eurostat (2019): Statistics on research and development

¹¹ COTEC (2019): Informe COTEC. Innovación en España

¹² Eurostat (2019): Statistics on research and development

¹³ European Commission (2019): The Digital Economy and Society Index 2019

around these highly relevant issues. With this expectation, I wish you a very pleasant and constructive conference.

Thank you for your attention.