

## Philip R Lane: Welcome address - “Challenges in the digital age”

Welcome remarks by Mr Philip R Lane, Member of the Executive Board of the European Central Bank, at the ECB conference on "Challenges in the digital age", Frankfurt am Main, 4 July 2019.

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It is a pleasure to welcome all of you to the ECB for this conference.<sup>1</sup> As a central bank, understanding the myriad implications of digitalisation for the economy is a high priority: the presentations at this conference will provide us with the latest thinking and new insights, helping us in our economic assessments. Of course, digitalisation is also reshaping financial systems and payment systems, while at the same time stimulating intense interest in concepts such as crypto-assets and central bank digital currencies. However, the focus of this event is on the real economy, so I will not dwell on these other topics today.

Let me mention just a few economic implications of digitalisation that require careful assessment by central banks. First, substantial investment is required to reap the benefits of digitalisation. A distinctive feature of digital technologies is their reliance on intangible capital. For instance, according to national accounts data, the share of investment devoted to intellectual property has almost doubled over the past two decades. This measure, however, is bound to underestimate the actual importance of intangible capital, since many of its components are not included in the national accounts.<sup>2</sup> There is some evidence that the weakness of physical capital investment over the past few years, if not longer, can to a large extent be explained by intangibles.<sup>3</sup> At the same time, the difficulty of measuring investment in intangibles points to a more general challenge in quantifying digitalisation and its implications. Furthermore, the global mobility of intangible assets means that it is also difficult to attribute the production and use of such assets to particular jurisdictions.<sup>4</sup>

The balance of evidence suggests that Europe is somewhat lagging behind its counterparts in the development of the digital sector. For example, according to OECD estimates, the share of the information and communications technology (ICT) sector in value added is less than 5% for most euro area countries, which compares with around 7% for the United States and 8% for Japan.<sup>5</sup> Similarly, when it comes to research and development (R&D) spending, the EU is now trailing both China and the United States, especially in the business sector.

Financing is one factor that may hold back R&D in the European digital sector. For instance, intangible investment is difficult to collateralise and therefore harder to finance in a conventional bank-centred financial system like the one prevailing in continental Europe. A deeper venture capital market (together with progress in developing a single pan-European market for digital products) could support the development of the tech ecosystem in the euro area, underlining the importance of capital markets union and the Single Market for goods and services.

In relation to labour market dynamics, the structural changes associated with digitalisation imply the contraction, or elimination, of some occupations but also the emergence of new types of jobs. Since the first industrial revolution, technology has always created more jobs than it has destroyed. Similarly, most advanced economies are currently enjoying the highest employment rates of the past three decades.<sup>6</sup> In addition, digital automation can spur productivity, as I will discuss shortly, and itself tends to create new employment opportunities.

Furthermore, digitalisation offers the possibility of reducing search costs in the labour market and making the search and matching process more efficient. Indeed, in tracking labour market conditions, central banks can also benefit from the high-frequency data generated by online job searches.<sup>7</sup>

Above all, the ongoing digital transformation holds the promise of large productivity gains. For

instance, a recent ECB survey of large euro area companies highlighted that firms see the potential for digital technologies to increase productivity growth, in particular by promoting knowledge sharing and enabling more efficient production processes.<sup>8</sup>

Productivity growth plays an important role in the conduct of monetary policy. In principle, higher productivity growth spurs investment, and expectations of higher future income encourage consumers to spend more today. Moreover, higher productivity growth increases the equilibrium real rate of interest, which is a central factor in calibrating monetary policy.

In practice, however, despite the promise of increased efficiencies thanks to digital technologies, the productivity growth that we have seen in Europe, and indeed most advanced economies, has been lacklustre for more than two decades. This weakness of productivity growth despite the substantial digital innovations remains a puzzle. How this puzzle will be resolved remains to be seen. What appears fairly clear, however, is that in the light of the overall disappointing productivity growth we have seen in recent years, the contribution that digitalisation is making to productivity appears, for the time being, relatively limited.

There may also be interactions between technology and trade. Digital technologies, together with trade liberalisation, have facilitated the growth of global value chains. This has been associated with both an increased synchronicity of global inflation<sup>9</sup> and a dampening effect on domestic inflation. That said, results for the euro area are less conclusive.<sup>10</sup>

In addition, digitalisation may affect price-setting behaviour through a variety of mechanisms. Digital pricing algorithms may also alter the nature of price-setting, at least in some sectors of the economy. For instance, by taking into account shifts in demand and supply more readily, such algorithms may accelerate the responsiveness of prices to shocks.<sup>11</sup>

The expansion in online sales also facilitates price comparisons and alters market structures. Of course, the impact is much broader than just actual online sales, since online prices also affect brick-and-mortar prices.<sup>12</sup> At the same, digitalisation may foster the rise of “superstar” firms that acquire a dominant market position on the back of the constellation of high fixed costs and low variable costs associated with many digital ventures. The market power of such firms may have long-term implications for price dynamics.

Current estimates point, however, to the rise of e-commerce having relatively modest effects on inflation. A recent ECB study found that e-commerce has reduced non-energy industrial goods inflation by 0.1 percentage points annually since 2003. Studies by other central banks have found similarly small effects.<sup>13</sup> This does not preclude the possibility that we will see larger effects in the future, as online commerce grows further in size and scope.

I am sure that these topics will feature in your discussions over the next two days: I look forward to learning from your contributions.

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<sup>1</sup> I would like to thank Filippos Petroulakis for his contribution to this speech.

<sup>2</sup> Human capital, knowledge in databases, organisational capital and brands are examples of assets not covered in the national accounts. See also Andersson, Malin and Saiz, Lorena (2018), “[Investment in intangible assets in the euro area](#)”, *Economic Bulletin*, Issue 7, ECB, November; and speech by Luis De Guindos (2018), “[Investment, technological transformation and skills](#)”.

<sup>3</sup> See Crouzet, Nicholas and Eberly, Janice (2018), “[Understanding Weak Capital Investment: the Role of Market Concentration and Intangibles](#)”, Jackson Hole Economic Policy Symposium.

<sup>4</sup> See Avdjiev, Stefan, Everett, Mary, Lane, Philip R. and Shin, Hyun Song (2018), “Tracking the international footprints of global firms”, *BIS Quarterly Review*, March 2018.

- <sup>5</sup> Source: OECD Factbook, [ICT Value Added](#) (% of total value added).
- <sup>6</sup> Source: OECD Labour Force Statistics.
- <sup>7</sup> See Adrjan, Pawel and Lydon, Reamonn (2019), “Clicks and jobs: measuring labour market tightness using online data”, *Central Bank of Ireland Economic Letter*, Vol. 2019, No 6.
- <sup>8</sup> See Elding, Catherine and Morris, Richard (2018), “[Digitalisation and its impact on the economy: insights from a survey of large companies](#)”, *Economic Bulletin*, Issue 7, ECB, November.
- <sup>9</sup> Auer, Raphael, Levchenko, Andrei and Sauré, Philip (2017), “International inflation spillovers through input linkages”, *NBER Working Paper*, No 23246.
- <sup>10</sup> See Andrews, Dan, Gal, Peter and Witheridge, William (2018), “A Genie in a Bottle? Globalisation, Competition and Inflation”, OECD Economics Department Working Paper, No. 1462, and ECB (2017), “Domestic and global drivers of inflation in the euro area”, *Economic Bulletin*, Issue 4, June.
- <sup>11</sup> See Cavallo, Alberto (2018), “More Amazon Effects: Online Competition and Pricing Behaviors”, NBER Working Paper No 25138.
- <sup>12</sup> Ibid.
- <sup>13</sup> For the euro area, see Cicarelli, Matteo and Osbat, Chiara (2017), “Low inflation in the euro area: causes and consequences”, *Occasional Paper Series*, No 181, Box 3, ECB; for Canada, see Charbonneau, Karyne, Evans, Alexa, Sarker, Subrata and Suchanek, Lena (2017), “Digitalization and inflation: a review of the literature”, *Bank of Canada Staff Analytical Note*, 2017–20; for Sweden, see Sveriges Riksbank (2015), “Digitisation and inflation”, *Monetary Policy Report*, February, pp. 55–59.