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The Next Production Revolution and the Digital Transformation: Setting the Scene

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## A wide range of new production technologies are emerging



# ....underpinned by digital technologies.



# Digital technologies, in particular, are a potential game-changer, ...



Quarterly shipping trends of smartphones, 2010-13



Sources: NBC News, St Peter's Square: <u>http://instagram.com/p/W2FCksR9-e/</u> and OECD Broadband Portal

# ...., and data-driven innovation is affecting all parts of the economy, ...



Public Admin.



Health

IJL



Retail

**Transportation** 



### Agriculture



### **Science & Education**

### Manufacturing



### I don't need a car, I need mobility.



### I don't need the post office, drones can deliver my goods.



### I can afford this house, by renting it out.



## I don't need a bank, I can use blockchain.



# ...., and providing new opportunities for SMEs and start-ups



## Virtual marketplace





## Crowd financing



# The possible productivity benefits of new technologies are urgently needed ...

### Contribution to potential per capita output growth (% pts unless otherwise noted)



The possible productivity benefits of new technologies are urgently needed ...

ed)

-Output and productivity in US firms that adopt data-driven decision making are 5% to 6% higher than expected given those firms' other investments in ICTs

- (Brynjolfsson, Hitt and Kim, 2011).

-The Internet of Things reduces costs among industrial adopters by 18% on average.

- (Vodatafone, 2015).

-Autonomous mine haulage trucks could increase output by 15-20%, lower fuel consumption by 10-15% and reduce maintenance costs by 8%.

- (Citigroup-Oxford Martin School, 2015).

# ... although there is a growing concern that only some firms benefit



Note: "Frontier firms" is the average labour productivity (value added per worker) of the 100 or 5% globally most productive firms in each two-digit industry. "Non-frontier firms" is the average of all firms, except the 5% globally most productive firms. Source: OECD preliminary results based on Andrews, D., C. Criscuolo and P. Gal (2016), "Mind the Gap: Productivity Divergence between the Global Frontier and Laggard Firms", OECD Productivity Working Papers, forthcoming; Orbis database of Bureau van Dijk.



### Internet users, by age, 2014 As a percentage of the population in each age group



Source: OECD Science, Technology and Industry Scoreboard 2015, <u>www.oe.cd/sti-scoreboard</u>, based on OECD, ICT Database; Eurostat, Information Society Statistics Database; ITU, World Telecommunication/ICT indicators Database and national sources, July 2015. Data at: <u>http://dx.doi.org/10.1787/888933274795</u>.

### ... and the intensity of ICT use still differs across OECD countries ...

The diffusion of selected ICT tools and activities in enterprises, 2015 Percentage of enterprises with ten or more persons employed



Source: OECD, ICT Database; Eurostat, Information Society Statistics Database and national sources, April 2016.



## ... notably for small firms

**Enterprises using cloud computing services, by size, 2016** As a percentage of enterprises in each employment size class



Source: OECD, ICT Database; Eurostat, Information Society Statistics Database and national sources, January 2017.

# Many jobs will be affected by the next production revolution ...

Jobs with high and medium potential for automation Percentage of jobs with 70 % and between 50 % et 70 % of substitutable tasks



Source: Survey of Adult Skills (PIAAC); Arntz et al (2016)

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Complex aspects of the work of software engineers can be performed by algorithms (Hoos, 2012).

A version of IBM's *Watson* can act as a customer service agent (Rotman, 2013).

Computer-based managers are being trialled. These allocate work and schedules (Lorentz *et al*, 2015).

The *Quill* programme writes analytic reports and *Automated Insights* can draft text from spreadsheets.

Recent softwares interpret some human emotion better than humans (Khatchadourian, 2015).

## ... and new skills will be needed

Individuals who judge their computer skills to be sufficient if they were to apply for a new job within a year, 2013 (as a percentage of all individuals)



Source: OECD Measuring the Digital Economy: A New Perspective, 2014, http://dx.doi.org/10.1787/888933148354.

# Key policy issues for the NPR and the digital transformation (1)

- <u>Access, use and innovation</u>:
  - Access and technology diffusion, e.g. for SMEs –could benefit from new institutions, e.g. technology extension services.
  - Continued investment in science and innovation
- <u>Regulation and competition</u>:
  - Adjusting regulation and removing **unnecessary barriers**
  - Addressing market concentration & barriers to competition.
  - Address barriers to business dynamism
  - New issues related to intellectual property
- Enhance <u>trust</u> in new technologies, by:
  - Addressing privacy and security concerns
  - Improving consumer protection
  - Public engagement

# Key policy issues for the NPR and the digital transformation (2)

- Inclusion and new job creation:
  - **Fostering access and inclusion**, e.g. through support for the spread of broadband networks to all households and regions
  - **New opportunities** for innovation & entrepreneurship
- Jobs and skills:
  - Strengthening skills for the population as whole, for those using new technologies and for those requiring specialist skills this is not just about technological skills
  - Facilitating adjustment through appropriate labour market and social policies
  - Redesign of labour market and social policies?

## We are also in need of a more coherent approach to the NPR and digitalisation

- <u>Critical thresholds</u> have been crossed in recent years which have led to "ubiquitous computing" and have raised the profile of the NPR and digitalisation on the policy agenda
- Shift from an <u>economic focus to socio-economic</u> as the impacts spread to society and additional sectors;
- <u>Huge potential</u>: innovation, productivity, transparency, sustainability, better public services, greater inclusiveness;
- Realisation that technology induced structural change can be <u>disruptive</u>, especially if it occurs over a compressed time period.
- <u>Technology 4.0, Policy 1.0</u>: A coherent policy approach is necessary to harness the benefits of the NPR and digitalisation for inclusive growth and wellbeing, and address global challenges

## New OECD Project: Going Digital – Making the Transformation work for Growth and Wellbeing

- Development of <u>whole-of-government</u> perspective on the digital transformation
- Provide strategic guidance on how to be <u>pro-active</u>, not <u>reactive</u>, in responding to the digital transformation and seizing its benefits
- Develop practical tools and policy guidance learn from experience across the world
- More detail: <u>http://oe.cd/goingdigital</u>

## Thank you





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