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.

- Additive manufacturing (3D printing)
- Autonomous machines and systems
- Human-Machine integration
- Simulations
- Artificial Intelligence
- System integration
- Big data
- Cloud computing
- Internet of Things
Digital technologies, in particular, are a potential game-changer, ...

Quarterly shipping trends of smartphones, 2010-13

Sources: NBC News, St Peter’s Square: http://instagram.com/p/W2FCksR9-e/ and OECD Broadband Portal
..., and data-driven innovation is affecting all parts of the economy, ...
... providing new opportunities and enabling new business models, ...

I don’t need a car, I need mobility.

I can afford this house, by renting it out.

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

I don’t need a bank, I can use blockchain.
...., and providing new opportunities for SMEs and start-ups

Virtual marketplace

Crowd financing

Global reach

Pay as you go
The possible productivity benefits of new technologies are urgently needed ...

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

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Pre-crisis: MFP story
Post-crisis: K story
The possible productivity benefits of new technologies are urgently needed ...

- 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.
  - (Vodafone, 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

The productivity gap between the globally most productive firms and other firms has widened

Index 2001 = 100

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.

There are still gaps in technology use by age, gender, education and income level ...

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

... 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

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


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

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**Tasks that lower risk of automation:**
- Presenting
- Influencing
- Reading books and/or professional publications
- Writing articles
- Using programming language
- Training others

**Tasks that increase risk of automation:**
- Exchanging information
- Selling
- Using fingers or hands

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

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

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

• **Access, use and innovation:**
  – **Access** and **technology diffusion**, e.g. for SMEs – could benefit from new institutions, e.g. technology extension services.
  – **Continued investment in science and innovation**

• **Regulation and competition:**
  – Adjusting regulation and removing **unnecessary barriers**
  – Addressing **market concentration** & barriers to competition.
  – **Address barriers to business dynamism**
  – **New issues related to intellectual property**

• **Enhance trust** 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

- Critical thresholds 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 economic focus to socio-economic as the impacts spread to society and additional sectors;
- Huge potential: innovation, productivity, transparency, sustainability, better public services, greater inclusiveness;
- Realisation that technology induced structural change can be disruptive, especially if it occurs over a compressed time period.
- Technology 4.0, Policy 1.0: 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 whole-of-government perspective on the digital transformation

• Provide strategic guidance on how to be pro-active, not reactive, in responding to the digital transformation and seizing its benefits

• Develop practical tools and policy guidance – learn from experience across the world

• More detail: http://oe.cd/goingdigital
Thank you

Coming soon (10 May)!

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