Industry 4.0 in 'factory economies'

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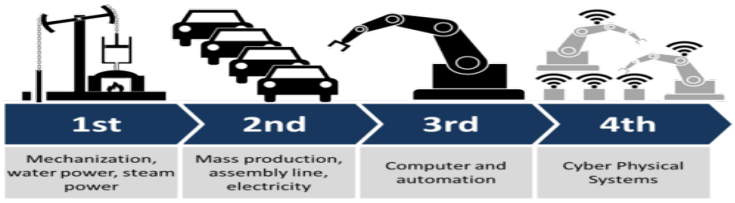
ETUI – ETUC conference
Shaping the new world of work
Brussels, 27-29th June, 2016

Motivation: contribute to the debate about the impact of new technologies



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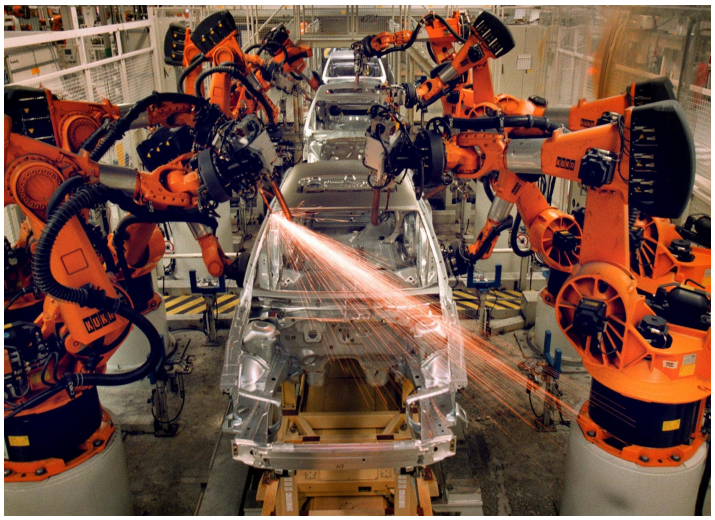
Reshoring to advanced economies?



3

Investigation methods

1. Conceptual analysis based on overview of science and engineering and business literature on the attributes of individual technologies

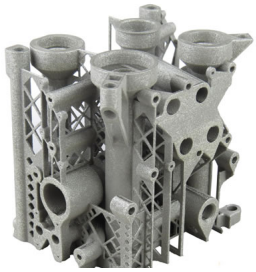
e.g. Journal of Mechanical, Industrial Science and Engineering; IFAC Papers, CIRP Annals-Manufacturing Technology; CIRP Journal of Manufacturing Technology; Robotics and Computer-Integrated Manufacturing; Virtual and Augmented reality applications in manufacturing – Springer; etc.

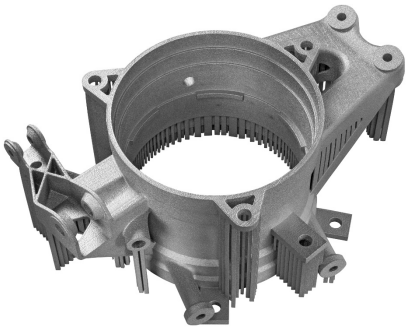
2. Interviews with MNC subsidiaries and research institutions specialised in industry 4.0 solutions

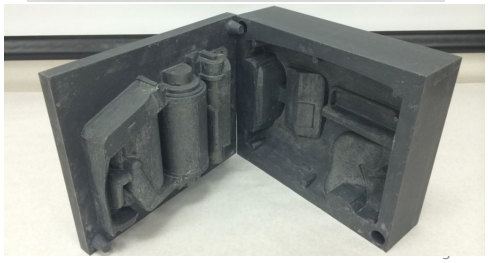
   7+2 interviews (so far)

4

Conceptual analysis: 3D Printing & tooling





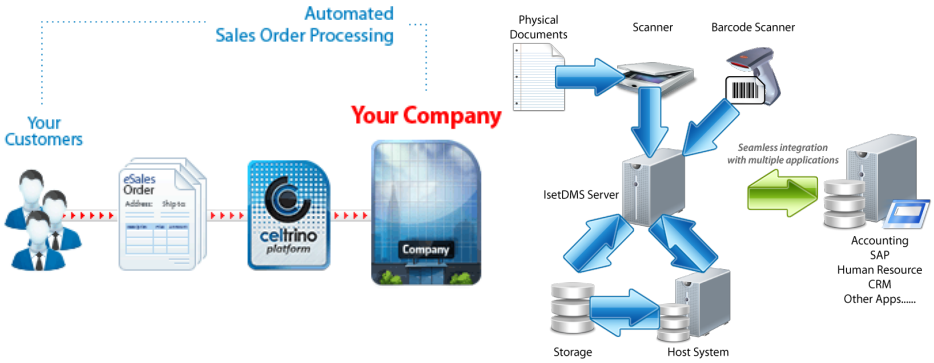


Virtual reality powered collaborative engineering

7

Automation of knowledge work and functional upgrading

- accounting, order processing, payroll management, operational procurement



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Automation of knowledge work and functional upgrading

layout planning and process configuration; production planning and scheduling; investigation of the machinability of new product designs; process development ↔ big data, smart algorithms, simulations, modelling, automated production scheduling

9

Interview results

- Gradual, evolutionary journey
- **Local showcases of 'factory of the future'** → MNCs apply global corporate standards (standardised systems architecture, standardised technology modules and standardised work practices)
- **Factory economy**: digitising the shop-floor (making factories smart) is easier than transition to platform competition, entry in new industries, business model innovation, innovative digital services provision
- **Purpose**: solution of specific challenges: shop-floor technological problems, overview of complex processes, customer requirements, + quest for operational excellence + !! labour shortage !!

10

Interview results (cont.)

- Instead of relocating / reshoring production, MNC owners tend to upgrade their existing production facilities
- Job losses BUT demand has grown for both skilled operators and highly skilled engineers → labour shortage!!
- **Policy implication**: immediate action is needed to reform factory economies' education system
- Delays may eventually hinder technology adoption, and will indeed lead to the relocation of activities !
- **Conclusion**: it is not technological progress per se that hits factory economies: it is the rigidity of their labour market and of their education system that makes them a loser of the digital transformation of manufacturing!

11

THANK YOU

12