Digitalizing the last mile. Organisational and societal implication of Artificial Intelligence and Big Data in Industry 4.0

In recent years business were impacted by the last wave of digital transformation. The extensive adoption of Industry 4.0 technologies – especially artificial intelligence and big data – contributed to the digitalisation of the last mile of organisations. The digitalisation of the last mile increased the availability of data changing the way enterprises do business, and implying new strategies, business models, competences, capabilities for organisations. Nowadays Internet 4.0 technologies are a hot topic in research [1] and are used on assembly lines to interconnect programmable machinery with enterprise systems to both automate operations, keep a digital trace of the actions performed, and improve organisational integration [2, 3].

Such level of integration leads to a fully digital organisation in which cyber-physical systems produce big data. In such context a prominent highly disruptive technology – artificial intelligence – tries to mimic intelligent human behaviour conveying to machines and enterprise systems problem solving and decision-making capabilities [4]. Organisations are presented with unprecedent opportunities for business innovation and processes optimization. Digital manufacturing, smart factories, smart logistic, and flexible manufacturing are all current examples of business model innovation afforded by the extensive adoption of these technologies. However, organisations are called to profoundly rethink the way they work in the age of intelligent machines and artificial intelligence.

Since organisations have currently little awareness on the possibilities and challenges of the extensive adoption of these technologies in Industry 4.0, this track calls scholars and practitioners to investigate the organisational and societal implications of advanced technology adoption in Industry 4.0.

The digitalisation of the last mile opens the door to four implications. First, these technologies trigger new opportunities for business innovation that might lead to new ways of recombining value generation activities, value chains, or value networks [5, 6]. Digitally supported forms of production such as flexible or smart manufacturing are used by organisations to differentiate their products in quality and services to overcome the competition of low-cost competitors from developing countries.

Second, the digitalisation of the last mile radically changes the fabric of the organisation increasing the significance of the human and intelligent machines interaction on the workplace [7], exacerbating the relevance of the knowledge dimension, and stressing the need for developing organisational learning attitudes within organisations. Data is the new oil and developing organisational capabilities to value data and extract the value out of data – leveraging also on artificial intelligence and on the interaction with human intelligence – are implications of a fully digitalised firms.

Third, the adoption of Industry 4.0 technologies in general, and of artificial intelligence and big data in particular, act as a powerful transformation agent on firms, opening up issues of organisational and societal sustainability of Industry 4.0 technologies as a consequence of the co-existence within organisations of human resources and artificial intelligent machines [8]. Different implications emerge on a sustainability perspective, both in terms of redistribution of value among interested stakeholders, transformation of labour, or replacement of human labour with machine labour.

Fourth, as it's well known in the literature technology adoption processes must be enabled by adequate set of skills and capabilities. The potential gap in terms of set of skills and capabilities necessary for the adoption of industry 4.0 technologies and the adoption of technologies in general needs to be investigated

furthermore [9]. Moreover, it is also relevant discuss how organizations are preparing their members for getting ready for managing the digitalisation of the last mile.

This track calls for contributions that explore – through conceptual or empirical paper, with qualitative, quantitative, or design research approaches – the organisational and societal implications of the digitalisation of the last mile in organisations adopting artificial intelligence and big data among Industry 4.0 technology. The aim of this track is to enrich the academic debate on the different dimensions of Industry 4.0 adoption and innovation.

Track main topics

The main topics of interest include, but are not limited to:

- Industry 4.0, Artificial Intelligence, and Big Data in digital transformation;
- Social and societal sustainability of artificial intelligence;
- Interconnected human-artificial collaboration;
- Determinants of artificial intelligence and big data adoption in Industry 4.0;
- Determinants of diffusion of Industry 4.0 technologies;
- Digital transformation and smart manufacturing;
- Business innovation with Industry 4.0;
- Human – artificial interplay within organisations;
- Artificial intelligence, big data analytics, and intelligent systems for smart manufacturing and Industry 4.0;
- Competences and capabilities for Industry 4.0 adoption;
- Organisational benefits of artificial intelligence, big data, and Industry 4.0;
- Technology enabled business process innovation in organisations;
- Organisational learning and knowledge management with intelligent systems.

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Alessio Maria Braccini is Associate Professor at the University of Tuscia, Viterbo (Italy) and holds a PhD in Management of Information Systems from the LUISS Guido Carli University. He is the Director of a second level master in Artificial Intelligence for Business and Security at the University of Tuscia. His main research interst concerns the study of affordances and hindrances of digital technologies on coordination and operational processes in organisations. To this regard he investigates the innovation dynamics and sustainability aspects of Internet 4.0 technology adoption. He also investigates the impact of social media platform on the coordination mechanisms of online communities for collective action. His has published international scientific journals amongst which: Information Sytems Journal (ISJ), Information & Organisation (I&O), the International Journal of Accounting Information Systems (IJAIS), the Communications of AIS (CAIS). He presented his research results at national and international conferences amongst which: the International Conference on Information Systems (ICIS), the European Conference on Information Systems (ECIS), the annual Workshop of Italian Scholars of Organization Studies (WOA), and the annual conference of the Italian Chapter of AIS (itAIS).

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