

11



IN4ACT Research and Stakeholder Engagement Strategy

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Industry 4.0 impact on management practices and economics (IN4ACT)



Introduction: Industry 4.0 in historical perspective: Charting the 'field' Method: a 'novel optic'

Part I: Thematic structure and research priorities

Module I: Micro-level – Industry 4.0 at the level of the firm, functions and phases of production *Module II*: Meso-level – Industry 4.0 at the level of regional economic and innovation ecosystems *Module III*: Macro-level – Industry 4.0 at the level of governance systems and innovation strategy

Part II: National/EU/International operational and engagement plan

- Universities / research centers: interdisciplinary
- Business community / civil society
- Policy /regulatory organs: National, EU...
- Conference plan
- Publications plan
- Industry 4.0 Observatory



Source: Deutsches Forschungszentrum für Künstliche Intelligenz, (DFKI), 2011.

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Why a "Fourth Industrial Revolution"?: Impacts and implications

The origins of the 4IR can be traced to the beginning of this century and builds on and amplifies the impact of the digital revolution. So why not call it a more intense phase, a phase of maturation, of the computer or digital revolution? There are mainly three reasons why not:

- Velocity and scale: In contrast to the previous industrial revolutions, the Fourth Industrial Revolution has the potential to evolve at an exponential rather than linear pace;
- Breadth and depth: the Fourth Industrial Revolution builds on the digital revolution and combines multiple technologies from across various fields that have the potential to lead to unprecedented paradigm shifts in established practices in the domains of business, the economy, and society;
- Systemic Impact: the Fourth Industrial Revolution presents the real possibility of transforming entire systems, across and within countries, companies, industries and civil society as a whole and the structures of the state.

Velocity: Shortening Time Lapse before Mass Adoption of New Technologies



Source: World Economic Forum, Mitigating Risks in the Innovation Economy, 2017.

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Breadth and depth: systemic impact



The technological ecosystem of Industry 4.0

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Part I: Thematic structure and research streams: Module I



Module I: Micro-level: Industry 4.0 in the level of the firm, functions and phases of production:

I. 1: The decomposition/re-composition of production and the changing value composition of Global Value Chains:

 Focus area: the changing calculus of opportunities and threats of specific business profiles and value propositions

I. 2: Al: the cloud, big data, algorithmic models, and the Internet of Everything:

 Focus areas: the functions and uses of predictive analytics, 'smart factories', implications for different business activities such as knowledge management, marketing and human resources

I. 3: The platform economy, its typology and emerging business models:

Focus areas: types of platforms, direct and indirect network effects, two-sided networks and the economics of multisided platforms; transitions from product-centricity to platforms, from value chains to ecosystems, from physical assets to digital and intangible assets and innovation capital

I. 4 Industry 4.0. as a matrix of risk and opportunity (with added emphasis on SMEs):

 Focus areas: technological, organizational, and strategic management challenges, business model (re)design, skills development, challenges concerning security and protection of know-how, risks of loss of control, reduced independence, flexibility and adaptability, performance measurement methodologies Part I: Thematic structure and research streams: Module II

Module II: Meso-level: Industry 4.0 on the level of regions and regional innovation ecosystems:

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II. 1. Centralization vs. decentralization in Industry 4.0:

Focus areas: the dynamics of centralization vs. decentralization of economic capacities; management challenges in the context of existing as well as emerging industries and the regional business ecosystems in which they operate

II. 2. The changing economic geography and its implications for regional economic ecosystems:

 Focus areas: the dynamics of concentration of economic capacities few economic centers and the implications for management in regional business ecosystems (e.g., clusters etc.)

II. 3. Commoditization and "smart specialization":

Focus areas: Industry 4.0 and the reinforcement of dynamics of commoditization of business value propositions and business attractiveness of regional economic ecosystems, critical review of "smart specialization" theory and strategies especially concerning the ability of such strategies to provide a sustainable counterweight to the spatial centralization and commoditization that leading research identifies as key characteristics of Industry 4.0

II. 4. Symbiotic vs. parasitic ecosystems:

 Focus areas: critical perspectives on 'smart specialization' and 'open innovation' [production vs. extraction of value], different systems of financing innovation and sustainable development) Part I: Thematic structure and research streams: Module III



Module III: "Macro-level: Industry 4.0 on the level of governance, policy, regulation and sustainability:

III. 1. Comparative readiness for Industry 4.0: assessment and measurement methodologies:

Focus areas: how countries across the EU and internationally respond to the management and policy challenges of Industry 4.0 and their strategies to leverage production as a national capability (e.g., WEF Readiness Diagnostic Model Framework)

III. 2. The future of work: Industry 4.0 skillsets:

Focus areas: skillset requirements of Industry 4.0, comparative vulnerability of skills and occupational profiles to obsolescence due to Industry 4.0 and automation, design of work processes and workplaces, skills and training needs at firm level, human resources management

III. 3. Industry 4.0 and social sustainability:

 Focus areas: increasing levels of inequality within firms and society and its management challenges for Industry 4.0. initiatives, social exclusion and segregation

III. 4. Governance: regulation, innovation and sustainability:

Focus areas: strandardization, skills development, competition and anti-trust regulation, challenges of monopoly and monopsony, labor and consumer protection, global governance of big data, social accountability and legal compliance, inter-state tensions regarding the collection and uses of data

Part II: National/EU/international operational and engagement plan



Universities/research: Interdisciplinary	Business community/civil society	Policy, regulatory organs: Nat'l, EU
 Mapping the' terrain' within Lithuania ECIU A: U of Vienna B: KU Leuven CDN: Toronto, York, UBC CZ: Charles DE: Fraunhoffer, Max Planck DK: CBS EE: Tartu FI: Aalto, Tampere FR: INSEAD, HEC GR: AUEB, NTUA HU: Corvinus IT: Milano, Florence NL: Erasmus, VU Amsterdam Amsterdam NO: SINTEFF, Research Council of Norway PL: Warsaw, Jagiellonian ES: IESE, IPTS SE: Stockholm, Jönköping, Upsala CH: ETHZ, St. Gallen UK: Sussex, Oxford, Cambridge, LSE, UCL, LBS, Southampton US: NBER, MIT, Michigan, Columbia, Northwestern, Berkeley, Davis, USC 	 Mapping the' terrain' within Lithuania EU Industry 4.0 initiatives and strategies across the EU and internationally, e.g., Industrie 4.0 platform, Industrial Internet, China 2025 etc. BusinessEurope National/regional/EU/ industrial unions/associations ETUC National, regional and cross-border clusters European Cluster Observatory Smart Specialization authorities and key actors: Lithuania and across the EU World Economic Forum 	 Mapping the' terrain' within Lithuania A comparative international perspective European Commission European Parliament European Committee of the Regions National state agencies attached to Industry 4.0 initiatives Centre for European Policy Studies (CEPS) Center for Economic Policy Research (CEPR) Bruegel ETSI OECD World Bank CEDEFOP



Conference strategy	Publications strategy	Industry 4.0 Observatory
 IEEE CeBIT 	 Leading Economics and Management Journals (e.g., European Management Journal) 	Live 'observatory' on leading trends in Industry 4.0 across the world
•	 Leading policy and regulation journals (e.g., <i>Journal of Public Policy</i>). Development of policy-oriented position papers 	The main objective of the 'observatory' is to organize the observatory or 'radar' as a cutting- edge data collection mechanism but the same time to help IN4ACT maximize its publicity footprint and impact.
		Institutionalization of internal quarterly 'review/screening' of current research to determine publication of 'working' and 'position' papers under 'current research' section of the IN4ACT website.
		Publication and promotion of papers and presentations delivered at reputable conferences and seminars by RG members to the IN4ACT website.



Part II: National/EU/international operational and engagement plan

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Lithuania Industry 4.0 Achieving together

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 810318. The opinions expressed in the document are of the authors only and no way reflect the European Commission's opinions. The European Union is not liable for any use that may be made of the information.