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Support managers of organisations in selection and adoption of automation technologies

Given that automation technology can make organisations considerably more competitive, technology adoption is an important strategic choice. However, one of the key challenges that employers/managers of the organisations face is a lack of knowledge on what technologies are best suited for a specific business purpose and how to adopt them in an effective way, minimizing disruptions for employees at a workplace.[1] The pace of technological progress makes it difficult even for technology experts to understand potential of emerging technologies and to support adopting organisations during the transformation period. Thus, mechanisms of support for these organisations are needed.

Inform managers about the benefits and challenges of technology adoption

The adoption of technology has multiple benefits, such as having better efficiency/productivity and competitive edge, improving monitoring and control of work processes, building more robust workflows, arranging work more flexibly.[2] Understanding these benefits can be a key driver behind managers' willingness to adopt a technology.[3] Beyond this, the managers should be aware of the challenges related to adoption of automation technologies that may affect relations with suppliers, customers and employees.[4] By being aware of potential challenges, the managers will be able to develop pre-emptive actions, strategies to address them. To raise awareness of both benefits and challenges of technology adoption, policymakers may foster knowledge-sharing practices among organisations that have undergone technological transformation, organize discussions between employers and employees' organisations, launch information campaigns or offer advisory support at technology centres.

Support the development of managerial skills

In view that the adoption of automation technologies might lead to significant organisational transformations, being able to plan and manage these processes requires heighted or even

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[1] European Commission, Executive Agency for Small and Medium-sized Enterprises. (2020). Supporting specialised skills development : big data, Internet of things and cybersecurity for SMEs. Publications Office of the European Union. Retrieved December 20, 2022, from https://op.europa.eu/en/publication-detail/-/publication/bb5c6c09-6285-11ea-b735-01aa75ed71a1/language-en

[2] Sarkar, A. (2022). Technology adoption - benefits, Challenges & How to create it - technology. Scribe. Retrieved December 20, 2022, from https://scribehow.com/library/technology-adoption

[3] Ibid

[4] Ibid

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specialised managerial skills.[5] The managers should be aware of the methods, skills/capabilities that will help them to smooth the transformation processes. Being able to network and be part of technology clusters is a good example of how SMEs can be supported while integrating automation technologies.[6] Networking, collaboration, communication, analytical and planning skills are essential for managers to access external support, to learn about employees' needs and to respond to them in a timely manner, to facilitate adjustments in work organization and in relations with partners.[7] Policymakers should raise awareness about the importance of managerial skills, ensure availability of suitable education/training courses to strengthen these skills, and suggest methods/networks that can support managers during organisational transformation.

Stimulate industrial relations between employers and employees

The adoption of automation technologies challenges industrial relations between employers and employees, as transformation of jobs and of work organization may negatively impact employees, at least in short-term.[8] However, good industrial relations ensure a smooth process of automation technology adoption, as they stimulate effective communication, collaboration between employees and their employer/managers. For example, effective communication ensures that employees understand importance of technology adoption for an organisation. As a result, employees are more likely to support the management team, raising concerns and needs of employees (e.g., provision of a training, better occupational safety) and suggesting possible solutions. Overall, perception of negative job quality goes hand-in-hand with low ability for collective bargaining.[9] In view of this, policymakers should

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[5] Accenture. (2014). From looking digital to being digital: The impact of technology on the Future of Work. Unistra. Retrieved December 20, 2022, from https://ccn.unistra.fr/websites/ccn/documentation/Travail-Transformationmetiers/accenture-impact-of-technology-april-2014.pdf

[6] European Commission, Executive Agency for Small and Medium-sized Enterprises. (2020). Supporting specialised skills development : big data, Internet of things and cybersecurity for SMEs. Publications Office of the European Union. Retrieved December 20, 2022, from https://op.europa.eu/en/publication-detail/-/publication/bb5c6c09-6285-11ea-b735-01aa75ed71a1/language-en

[7] Deltek. (2022). Five best practices to improve technology adoption. The American Institute of Architects. Retrieved December 20, 2022, from https://www.aia.org/articles/6479703-five-best-practices-to-improve-technology-

[8] Accenture. (2014). From looking digital to being digital: The impact of technology on the Future of Work. Unistra. Retrieved December 20, 2022, from https://ccn.unistra.fr/websites/ccn/documentation/Travail-Transformationmetiers/accenture-impact-of-technology-april-2014.pdf

[9] Berg, J., Green, F., Nurski, L., & Spencer, D. (2022, September 22). Risks to job quality from digital technologies: Are Industrial Relations in Europe ready for the Challenge? Bruegel. Retrieved December

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encourage effective industrial relations by, for instance, informing workers' and employers' representative organisations about their benefits, stimulating sharing of best practices among technology adopting organisations, and encouraging a collaborative culture at workplaces.

Encourage intra-organisational knowledge exchange

It is important to support knowledge exchange between technology adopting organisations on how to best adopt them, as well as, to learn about new, emerging technologies. The benefits of such exchange are numerous, such as sharing good practices on managerial processes that support technological uptake, on useful sources of information and trainings for employees, on cost reduction while abiding by labour-related regulations.[10] Thus, policymakers should support exchanges/groups/networks that share knowledge. This knowledge exchange can take place during trainings, for example. In general, trainings are a good place for onboarding and making sure enough understanding of the technology is divulged throughout the organisations to ensure optimal use of a technology.
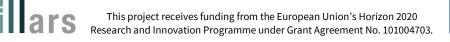
Ensure accessibility of advice from technology experts to technology adopting organisations

Technology experts should possess the most knowledge on available and emerging technologies, on their application and on factors for successful adoption. Besides helping with selecting a suitable technology, the technology experts should support managers in the development of a roadmap for technology adoption, as only about a third of organisations develop a clear roadmap.[11] The technology experts may be employed by private, technology companies that sell, support the process of technology adoption, provide advice, or by public/network organisations, such as technology centres, tech hubs, clusters etc. Policymakers should assess accessibility of advice from technology experts and develop solutions.

20, 2022, from https://www.bruegel.org/working-paper/risks-job-quality-digital-technologies-are-industrial-relations-europe-ready

[10] European Commission, Executive Agency for Small and Medium-sized Enterprises. (2020). Supporting specialised skills development : big data, Internet of things and cybersecurity for SMEs. Publications Office of the European Union. Retrieved December 20, 2022, from https://op.europa.eu/en/publication-detail/-/publication/bb5c6c09-6285-11ea-b735-01aa75ed71a1/language-en

[11] The state of AI adoption in 2021. Impact Networking. (2021, April 8). Retrieved December 20, 2022, from https://www.impactmybiz.com/blog/state-of-ai-adoption-2021/?utm_source=website&utm_medium=blog-internal-link&utm_campaign=biggest-barriers-to-technology-adoption-in-business

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Consider the following PILLARS and external resources to support managers of organisations in selection and adoption of automation technologies:

Title and weblink	Authors and year	Description
The Policymaker's Guide To Emerging Technologies	Niskanen Center, 2018	This guide serves as a comprehensive introduction for policymakers keen on understanding technology policy concerns and effective strategies to address them. It commences by examining the evolving landscape of "soft law" regulatory governance, now a primary system regulating innovative technologies that challenge conventional regulatory approaches. Part II delves into the multifaceted aspects involved in the maturation of the Internet and digital communication technologies, emphasizing issues surrounding antitrust, copyright, and privacy in the digital economy.
Automation, Global Value Chains and Functional Specialization	Lionel Fontagné, Ariell Reshef, Gianluca Santoni and Giulio Vannelli, 2023 (PILLARS REPORT)	The researchers examine how technology adoption and changes in global value chain (GVC) integration impact labour shares and business function specialization across 14 manufacturing industries in 14 European countries from 1999 to 2011. They emphasize the indirect effect of robotization on labour demand through GVC integration, revealing that increased participation in upstream and forward GVC activities directly reduces labour shares, particularly in fabrication roles. Surprisingly, they find no direct impact of robot adoption on labour, with robotization influencing labour demand indirectly by enhancing GVC integration, termed as "upstream-biased." Additionally, the study explores how China's rapid robotization has shaped trends in Europe, highlighting a novel way in which China's global integration has affected labour demand in its partner nations.
Digital Leaders Study 2022	BearingPoint, 2022	The 2022 digital leaders study assessed 679 companies from 21 sectors in 11 countries, against criteria related to digital product experience, e-commerce, e-CRM and digital marketing. To be able to download the report, you first have to put in your personal details.
The Route To Digital Business Leadership	KPMG, 2017	The 2017 Harvey Nash / KPMG CIO Survey stands as the largest global IT leadership study, with 4,498 CIOs and tech leaders participating from 86 countries and in five languages between December 2016 and April 2017. Its key findings highlight that 18% of surveyed organizations emerge as digital frontrunners, excelling notably in aligning business and IT strategies, integrating core systems with newer digital technologies, investing substantially in disruptive tech,

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		and adeptly selecting fitting technologies and architectures.
Heterogeneous Adjustments of Employment to Automation Technologies: Evidence from Manufacturing Industries in European Regions	Tommaso Ciarli, Florencia Jaccoud and Fabien Petit, 2022 (PILLARS REPORT)	Employment changes due to automation vary by industries, regions, technologies, and timeframes. Robots initially boost industry employment in low-tech regions but negatively impact employment in knowledge-intensive areas. Regional differences in robot-induced employment changes aren't solely due to industry makeup. High-tech industries adapt to ICT faster than low-tech ones.
OECD Guidelines Chapter 5: Employment And Industrial Relations	OECD, 2011	Seven pages of guidelines from the OECD aimed at multinational enterprises, giving them directions pertaining to which rights should be respected and which contributions should be made to ensure good relations with employees.
Taking Stock of the Effects of Technological Change on Labour Markets	Maria Savona, Tommaso Ciarli, Tommaso Portaluri, Ed Steinmueller and Simone Vannuccin, 2022 (PILLARS REPORT)	Advancements in technology and lowered trade barriers have led to a decline in manual-routine jobs, as automation takes over tasks easily handled by machines. Similarly, certain occupations are now at a higher risk of being moved offshore. Workers in these fields are facing a shrinking job market due to evolving global value chains and technological advancements. This report's objective is to investigate how workers transition in the job market after displacement caused by these changes. It delves into the impact of technological shifts, increased capital investment, and evolving global value chains on different worker groups, aiming to understand the diverse challenges and adjustment costs they face during these transformations.
Industrial Relations And Social Dialogue	Eurofound, 2023	A tab in the Eurofound website that explains why good industrial relations are vital. It also explains everything Eurofound has done thus far to help develop good industrial relations in Europe. Stakeholder priorities, key policy messages, and current and ongoing research including all publications available on the topic by Eurofound are also found under this tab.
Science-Industry Knowledge Exchange: A Mapping of Policy Instruments And Their Interactions	OECD, 2019	Nations utilize diverse financial, regulatory, and soft policy tools to foster science-industry knowledge exchange, often viewed separately despite their interdependent nature. This paper introduces a conceptual framework to analyse these instruments collectively, exploring their interactions and acknowledging their potential to reinforce, complement, weaken, or overly complicate each other. Drawing from the EC-OECD STIP Compass database

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		and case studies, it showcases how various countries prioritize these policy tools differently based on budget allocation, target groups, eligibility criteria, timeframes, and implementation methods, influenced by both national contexts and global trends.
What Is the Future Of Automation? Using Semantic Analysis to Identify Emerging Technologies	Sugat Chaturvedi, Ekaterina Prytkova, Tommaso Ciarli and Önder Nomaler, 2023 (PILLARS REPORT)	This study delves into the impact of emerging digital automation technologies on work, labour demand, and business organisation by analysing extensive databases like Derwent, PATSTAT, and OpenAlex. Utilising a blend of machine learning and computational linguistics, it identifies these technologies by pinpointing groundbreaking patents and publications, clustering them based on similarity, and assessing their impact over the past decade. The resulting dataset provides key insights for professionals and policymakers, outlining forthcoming technologies and their implications for labour markets and society.
Knowledge Exchange Policy Simulation Manual	Carl Abbott, 2013	Strengthening collaboration and knowledge sharing between businesses and higher education institutions drives innovation by leveraging the expertise of the region's academic institutions. This guide aims to aid policymakers in studying successful strategies and policies regarding knowledge exchange, facilitating their adaptation and implementation within their respective regional settings.
Strategic Public/Private Partnerships in Science, Technology And Innovation	OECD	Governments utilize public-private partnerships (PPPs) in science, technology, and innovation (STI) to adapt research and innovation policies to evolving innovation trends and societal challenges. Businesses benefit from collaborating with public research, leveraging cooperation to tackle issues, explore new markets, and create value. PPPs serve governments by addressing market and coordination gaps in research and innovation, attracting private investment, and becoming pivotal in confronting future societal challenges like climate change and energy efficiency.
The Design of Digital Automation Technologies: Implications for the Future of Work	Maria Savona, Tommaso Ciarli, Ed Steinmueller and Simone Vannuccini, 2022 (PILLARS REPORT)	Automation technologies differ significantly in design and task capabilities, despite belonging to the same category. While the exposure of sectors to digital automation is expanding, data-intensive technologies are more prevalent in services than in manufacturing. This shift prompts policymakers to broaden their focus from just robots to encompass other pervasive automation forms. Unlike robots, data-intensive technologies consistently complement human efforts rather than substitute them. This distinction

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		emphasizes the need for a nuanced policy approach that recognizes the diverse impacts of automation on the workforce.
Knowledge Transfer Within Clusters: The Catalyst Role of Private Collective Support Structures	Karine Goglio-Primard & Florence Crespin-Mazet, 2011	Amid market globalization, as prominent companies prioritize core competencies, collaboration becomes vital for innovation and resource revitalization. This research investigates how leading firms within the same competitive sphere collaborate to foster innovation through shared knowledge and expertise. It specifically examines the influence of local governance on this collaboration and knowledge exchange, concluding with the significance of private associations, forming epistemic communities, in driving territorial engagement.