

DIGITALIZATION AND EMPLOYER ATTRACTIVENESS IN BIOECONOMY ORGANISATIONS

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Abstract

Employer attractiveness has increasingly become a strategic consideration for logistics organizations battling heightened intensifying talent shortages, sustainability pressures, and rapid digital transformations. For bio-economy organizations, digitalization plays a critical role in enhancing human resource outcomes and operational efficiency. This study examines the influence of digitalization on employer attractiveness in bio-economy organizations. Using a detailed literature review, the study integrates recent studies related to employee experience, sustainability-oriented employer branding, organizational culture, digital workplace practices, and digital human resource management. The results of this study indicate that digitalization improved employer attractiveness by improving perceptions of organizational innovativeness, reinforcing sustainability-oriented employer value propositions, supporting hybrid and flexible work-arrangements, enabling continuous development of skills, and enhancing recruitment efficiency. Even so, the relationship is moderated by employee perceptions to digital transformation, leadership practices, digital maturity, and organizational culture. Poor management of digital change can therefore weaken employer attractiveness by way of reduced perceptions on job quality, increased work intensification, and undermined trust. The study gives a positive contribution to emerging literature on sustainable digital transformation in bio-economy logistics. The practical implication of this study invites logistics organizations to digital strategies that align technological innovation with sustainable employment practices and digital employee expectations.

Keywords: employer attractiveness, digitalization, human-centered digital transformation, sustainable work, employer branding, digital HRM, bio-economy organizations

Introduction

Digitalization has become the backbone of dynamics in the labour market, work practices, and organizational strategies across various organizations. In logistics and management of supply chains, digitalization through technologies such as the Internet of Things (IoT), big data analytics, artificial intelligence (AI) and automation, have become the driving force towards responsiveness, transparency, and operational efficiency transformation (Chan et al., 2022; Verhoef et al., 2021). According to Ivanov and Dolgui (2021), these transformations are happening amidst other structural challenges in the labour market, including ageing labour force, high workers turnover, and dwindling employer attractiveness in occupations related to logistics. Logistics organizations therefore need to look beyond operational performance and strategically place themselves to attract employers.

The challenges mentioned above are especially prominent in bio-economy organizations, which deals with the management of biological resources such as organic waste, forestry products and agricultural wastes, managing their circular supply chains, while enhancing environmental performance, compliance and traceability, in a bid to improve sustainability of energy, materials and food. According to Baltic Rim Economies (2022) and Geissdoerfer et al. (2021), digitalization is a key play in bio-economy development, largely supporting the integration of multifaceted industrial and biological systems, their optimization and monitoring.

Although environmental and operational benefits of digitalization have earned scholarly documentation within the bio-economy logistics, there exists a gap in human resource, especially on employer attractiveness. Employer attractiveness has been defined as the extent to which an employer perceives an organization as desirable, because of its effective adoption of innovative practices and digital technologies that promote meaningful engagement, flexibility, learning and work efficiency for employees (Siem et al., 2025). Although other factors that promote an employer's perception of a desirable organization as a working place include organizational reputation, learning and development, work environment, organizational values and career opportunities, Backhaus and Tikoo (2023) opine that alignment with social and environmental values, and perceptions of digital maturity and innovation are pinnacles of employer attractiveness for sustainability-oriented sectors like bio-economy organizations.

This paper investigates how employer value propositions anchored on sustainability, employee perceptions and human resource practices influence employer attractiveness in the bio-economy organizations, thus identifying implications for theory and practice, moderators, and key mechanisms.

The primary databases used were ScienceDirect and Google Scholar, using the seven keywords listed above. Boolean operators (AND, NOT, and OR) were used to refine the search for relevance. 65 articles published between 2020 and 2026 were initially accessed based on titles and abstracts. Using thematic analysis and data extraction, 18 key articles

and institutional reports were used, based on their major themes. Editorials, conference abstracts, studies published before 2020, and non-peer-reviewed literature were all excluded.

Research aim to examine how employer attractiveness in bio-economy organizations is influenced by digitalization in EU, in order to develop a common conceptual perception of digital transformation mechanisms that drive a sustainable organizational attractiveness in the context of logistics.

The following **objectives** have been set to achieve the aim:

1. To examine the role of digitalization in determining employer attractiveness in bio-economy organizations in EU.
2. To assess how digital learning systems and digital work environments shape perceptions on employability among prospective and continuing employees in EU.
3. To explore factors that influence the relationship between employer attractiveness and digital transformation.
4. To identify potential risks of digitalization for employer attractiveness.

Research object and methods

Research object is digitalization and employer attractiveness in bio-economy organizations.

In order to assess and highlight the role of digitalization in determining employer attractiveness in bio-economy organizations in EU, the article employs analysis of relevant scholarly works, synthesis of existing data, and literature analysis. This approach allows gathering of relevant information from academic journals, reports and online databases, including Google Scholar and ScienceDirect. This review will be critically significant in providing a comprehensive examination of the influence of digitalization on employer attractiveness in bio-economy organizations in EU, including the factors affecting the relationship between employer attractiveness and digital transformation, as well as identifying potential risks of technological adoption for employer attractiveness, and gaps in literature. To this end, literature findings will be reviewed as obtained from recent publications, between 2020 and 2026.

Research results and discussion

Theoretical Background and Conceptual Foundations

The use of digital technologies to shape value creation mechanisms, organizational structures, business processes, competitive positioning, culture and organizational capabilities, is referred to as digitalization (Bresciani et al., 2024). Digital transformation in logistics revolves around AI-driven route optimization, predictive analytics, tracking shipment in real-time, and automation of warehouses, in order to enhance work patterns, skills requirements, alter job roles, promote sustainability, resilience, and improve efficiency (Hofmann & Rusch, 2021). To this end, digitalization goes beyond technical changes to reconfiguring how people work within organizational structures, and to what extent they would desire to continue working within the same organizations, or even desire to secure recruitment for new job seekers.

Bio-economy organizations mediate between sustainability-driven value chains and logistics management, encompassing circular flow of resources, processing, storage, and transportation of bio-based products. Kamble et al. (2024) notes that digitalization of bio-economy logistics is essential in supporting compliance reporting, carbon accounting, traceability and lifecycle assessment, all of which enhance employer attractiveness.

Employer value propositions in bio-economy organizations are increasingly being shaped by sustainability orientation and digital innovation (Aguinis & Glavas, 2021), in a bid to attract highly skilled employees who are purpose-driven towards values and meaningful work.

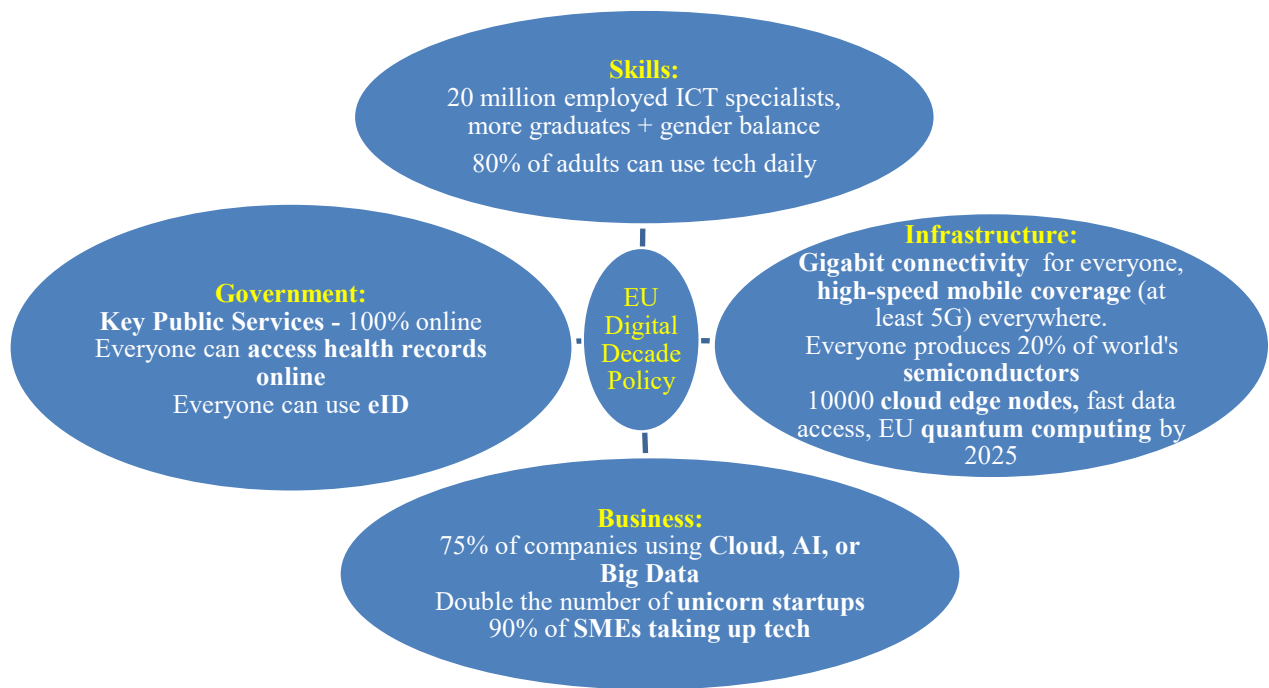
For digitalized bio-economy organizations, employer attractiveness usually depicts an institution, that is, offers clear professional career pathways, dynamic and forward-looking (Ng and Burke, 2021), especially if the organization blends digital innovation and environmental sustainability.

Digitalization and Employer Attractiveness in EU

a) The European Commission (2024) leveraged the Digital Decade Policy Framework to accelerate digital transformation for digital skill labour, with the view to increase competition, efficiency, employer visibility, and innovation in human resource management (Nikolaou, 2021). Figure 1 below shows the EU Digital Decade Policy Program, covering digital preparedness and engagement in terms of skills, government, infrastructure, and business.

b) Eurostat (2025) reported that about 5% (more than 10 million people) of total employment in EU characterized ICT specialists, an upward trajectory compared to the previous decade, with only 56% of adults having basic skills in digitalization.

c) The EU Digital Decade Policy Framework targets 80% of digitalization by 2030, revolving around four cardinal points as shown in the figure above: *a skilled population with highly skilled digital professionals, sustainable digital infrastructure, digital transformation, and digitalization of public services*. The digital transformation program of the EU is anchored on various objectives that not only promote EU values but is beneficial to the entire citizenry.



Source: <https://digital-strategy.ec.europa.eu/en/policies/digital-decade-policy-programme>

Fig. 1. EU Digital Decade Policy Program

The objectives of the EU Digital Decade Policy are illustrated in Figure 2 below.

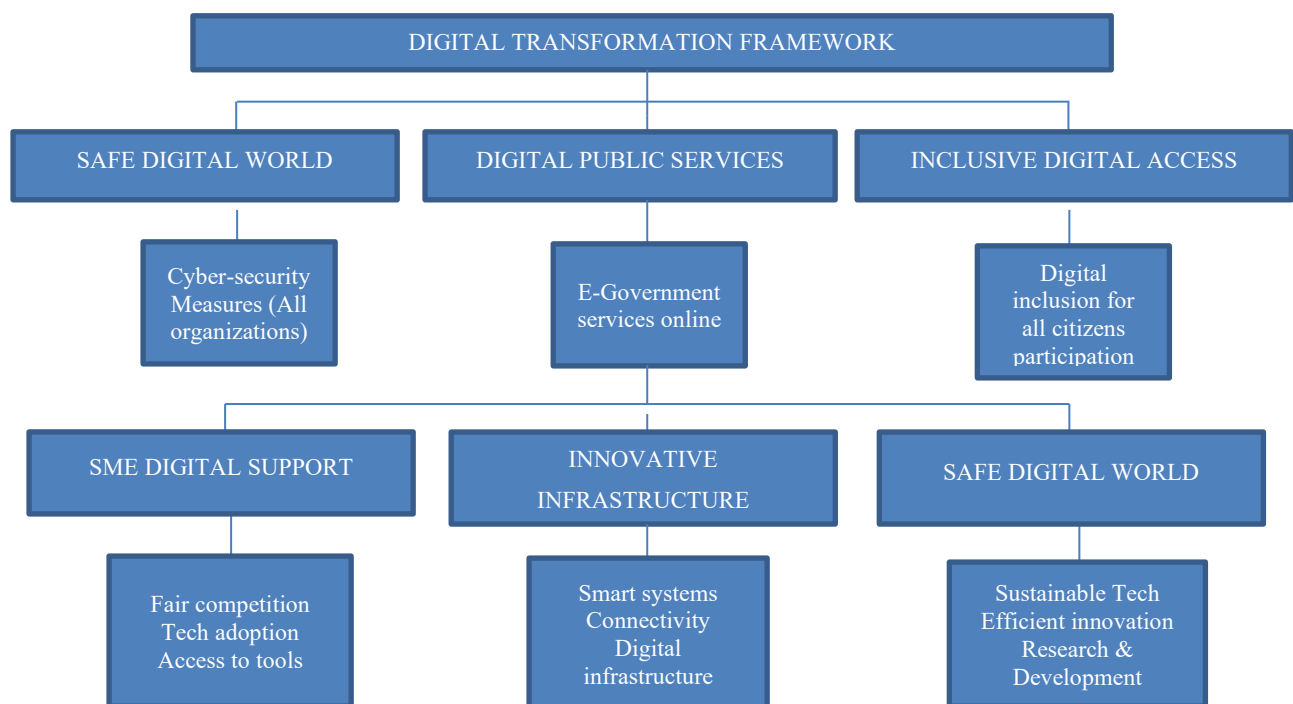


Fig. 2. Digital Transformation Framework

d) About 30% of workers in EU have embraced use of AI tools in their day-to-day work experiences, according to the Joint Research Centre (2025), with more than 70% of the firms in EU having challenges recruiting a working force that is adequately equipped with digital skills. The OECD (2023) notes that there is a higher bargaining power for candidates and workers who are digitally skilled, as digitalization brings about flexible work schedules and endless learning opportunities on various digital tools.

It is encouraging to note that the EU has invested considerable time and resources in embracing digitalization, and that both organizations and employees have embraced the national direction. Although the numbers remain significantly below half, all indicators point to a positive trajectory. Table 1 (below) presents a summary of theoretical background and conceptual foundations, demonstrating the significance of various focus areas to employer attractiveness.

Table 1. Summary of Theoretical background and Conceptual Foundations in on digitalization and Employer Attractiveness in EU/

Author/Source	Focus Area	Major Argument	Significance to Employer Attractiveness
Joint Research Center (2025)	Digitalization of work	30% of employees in EU rely on AI tools at work.	Skilled talent is more attracted to work environments supported by AI.
Eurostat (2025)	Statistics on labour market	5% of employees in EU are ICT specialists. Digital intensity is slower for SMEs.	Firms with advanced digitization appeal more strongly to employees.
European Commission (2024)	Policy on digital skills	Basic digital skills are prevalent among 56% of adults; the EU Digital Decade Policy Program is targeting 80% by 2030.	Digital up-scaling and up-skilling employers will attract more employees.
OECD (2023)	Resilience in labour markets	Workers with digital skills are more adaptable and on higher demand.	Organizations embracing digitization have greater competitive advantage.
Acikgoz et al. (2020)	Perceptions of AI fairness	Organizations conducting recruitment aided by AI are more appealing to candidates who perceive it as fair and just.	Employer attractiveness is sustained by fair and transparent use of digitization.
Nikolaou (2021)	Digital employment technologies	Decision-making, experience of candidates, and efficiency of recruitment are shaped by digitization.	Organizational attractiveness to employees is enhanced by positive digital experience of employees.

Benefits of Digitalization and Employer Attractiveness in EU

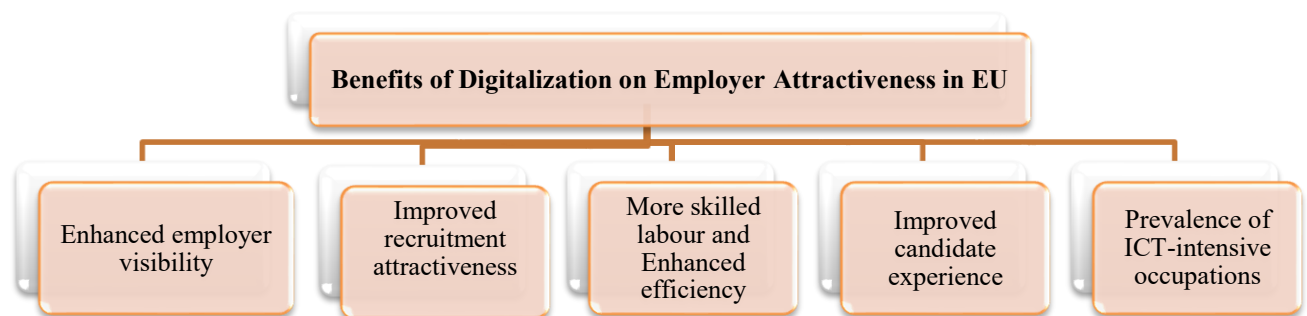
a) *Digitalization promotes organizational competitiveness and efficiency:* digitalization trends in bio-economy leverage technology to enhance cost structures and process quality, improve sustainability, transparency, and operational efficiency. Consequently, such organizations attract potential candidates because they emerge as progressive, career development orientation, forward-looking and more innovative (Verhoef et al., 2021).

b) *A stronger employer brand:* candidate experience is always better where organizations have adopted digital recruiting platforms to streamline hiring, and applicant tracking systems to minimize time-to-hire. Skilled workers find such bio-economy organizations more appealing (Strohmeier & Parry, 2021), presenting the workplace culture as more modern.

c) *Learning culture and digital skills:* digitally advanced companies invest more fund in up-skilling and training on areas like automation tools and data analytics. For candidates who are just getting started in their careers, this provides early professional growth as they develop digital skills for better differentiation in the otherwise competitive markets (Van Laar et al., 2020).

d) *Flexible work organization:* work organization has been reshaped tremendously by digitalization, which provides for collaborative digital platforms, flexible schedules, and the choice to work remotely. While this may come with over-monitoring perceived as intrusion and handling of huge data sets, many workers value the flexibility that comes with digitalization, consequently allowing them to enjoy job satisfaction from the work-life balance (Chaudhuri, Arora, & Roy, 2022).

It would be critically important for organizations to pay keen attention of the benefits of digitalization, if they are to remain relevant in the job market today, and attract highly skilled employees. Five benefits of digitalization on employer attractiveness in the European Union are show in figure 2 (below), including how visible job seekers are to employers, enhanced attractiveness to the recruitment process, improved efficiency, improved level of skills and candidate experience.

**Fig. 3.** Benefits of digitalization on employer attractiveness

Challenges and Ethical Considerations for Digitalization and Employer Attractiveness in EU

While digitalization offers great attraction to potential employees, it is only prudent to point out that it comes with a host of other challenges, which must not be ignored, as some may pause legal challenges, or present social biases which may negatively impact bio-economy organizations.

a) *Data privacy* – digital recruitment strategies need to be both ethical and inclusive in order for organizations to sufficiently address themselves to safeguarding privacy and data security (Kuner et al., 2022). Lack of adequate skilled personnel and inadequate resources to invest towards data protection is still an uphill task for most SMEs.

- b) Algorithmic bias – where potential candidates consider algorithmic screening processes efficient but bias or opaque, this may significantly lower the attractiveness of an organization (Raghavan et al., 2020).
- c) Dehumanisation of Human Resource processes – the huge digital investments and strategic plans notwithstanding, a significant number of workers still want to connect with the human element at various structural levels of an organization, and as such do not wish to commit fully to digitalization (Strohmeier, 2020).
- d) Digital exclusion – according to Eurostat (2025), the number of women in ICT and digital related professions is about 20%, an imbalance that may undermine the attractiveness of an organization to candidates who are sensitive to social tendencies.
- e) Digital skills gaps and automations may result in job insecurity, thus weakening employer attractiveness and job quality. Here, social considerations and human interactions need to be approached as the balancing factor for technological efficiency (World Economic Forum, 2023).

Conclusions

1. In examining the role of digitalization in determining employer attractiveness in bio-economy organizations in EU, it was noted that digitalization plays a critical role in determining employer attractiveness in bio-economy organizations in EU. Organizations can easily attract talent owing to enhanced investments in development of digital skills, increased branding of digital employer, and adoption of advanced practices in digital recruitment.
2. In assessing how digital learning systems and digital work environments shape perceptions on employability among prospective and continuing employees in EU, it was noted that majority of SMEs in EU have very low digital intensity, a disparity that makes them uneven in employer attractiveness in all sectors. Continuous advancements and integration of digital driven technologies not only addresses challenges in bio-economy organizations in EU, but also brings about a host of possibilities for logistics companies and all stakeholders.
3. In exploring factors that influence the relationship between employer attractiveness and digital transformation, it was noted that the 2023 digital transformation program of the EU anchored on vision 2030 aims at 80% digitalization, a move that will significantly promote the bio-economy organizations. This will go a long way in containing the aforementioned ethical challenges, unequal digital maturity, and continuous gaps in digital skills.
4. In identifying potential risks of digitalization for employer attractiveness, it was noted that lack of skilled personnel and lack of adequate resources in a great risk to data privacy, as data protection can be costly. The other risks include algorithmic bias, dehumanization of human resource processes, digital exclusion, and digital skills gaps and automations, which may lead to job insecurity.

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