Appendix

Appendix (1 of 6) - Summary of Descriptive analysis, Discussion and Integration Research questions and Future research.

1.Descriptive analysis

Table 1. The papers by percentage geographic regions

Geographic Area	Percentage (%)
Holland	2.5
India	5
Canada	7.5
Russia	20
Italy	7.5
Romania	7.5
Spain	2.5
Thiland	2.5
China	2.5
Portegual	2.5
Poland	2.5
Germany	12.5
Finland	2.5
United States	7.5
Austria	2.5
Uk	7.5
Norway	2.5
Danmark	2.5

Table 2. The list of studies organized by citation count across various journals.

Rank	Year	Title	Author(s)	Journal	TC[1]
1	2018	The impact of digitalization on business models.	(Bouwman et al.,)	*Digital Policy, Regulation and Governance, 20(2) , 105-124*	539
2	2018	Introduction to digitalization cases: how organizations rethink their business for the digital age. In digitalization cases: how	(Urbach et al.,)	*Journal of Springer International Publishing.*	226

[1] *TC* total citations.

		organizations rethink their business for the digital age			
3	2022	A framework to make charity collection transparent and auditable using blockchain technology.	(Farooq et al.,)	*Computers & Electrical Engineering, 83, 106588.*	107
4	2018	Challenges of digital transformation: The case of the non-profit sector	(Nahrkhalaji et al.,)	*International conference on industrial engineering and engineering management (IEEM) (pp. 1245-1249). IEEE.*	94
5	2020	Fields of action to advance the digital transformation of NPOs–development of a framework .	(Brink et al.,)	*In International Conference on Business InformaticsResearch (pp. 82-97). Cham: Springer International Publishing.*	17
6	2020	New technologies and digitisation: Opportunities and challenges for the social economy and social enterprises.	(Gagliardi et al.,)	*European Commission, Executive Agency for SMEs, DOI, 10, 667682.*	15
7	2021	Challenges of the digital transformationComparing nonprofit and industry organizations. In Innovation Through Information Systems: Volume I: A Collection of Latest Research on Domain Issues (pp. 297-312).	(Vogelsang et al.,)	*Journal of Springer International Publishing.*	18
8	2020	Digitalization peculiarities of organizations: A case study	(Vasilev et al.,)	*Entrepreneurship and Sustainability Issues, 7(4), 3173*	82
9	2018	Social and economic background of digital economy: conditions for transition.	(Afonasova et al.,)	*European Research Studies Journal, 21(Special issue 3), 292-302.*	27
10	2020	Digitalisation, social entrepreneurship and national well-being.	(Torres et al.,)	*Technological Forecasting and Social Change, 161, 120279.*	76

11	2021	Global trends in the social economy development.	(Stukalo et al.,)	*International economic policy, (34), 7-22.*	17

2. Discussion and Integration in Research Questions

RQ1: Do digital technologies like Big Data, Blockchain, and Artificial Intelligence relate to the Social Economy?

Blockchain facilitates secure and transparent contracts and transactions, which are essential for cooperatives and other social economy entities that operate on principles of fairness and equity. To achieve successful digital transformation, organizations must integrate modern technologies like IoT blockchain, Cloud Computing, and Data Analytics, and develop relevant digital skills and capabilities (Dicuonzo et al., 2021).

For instance, regarding the social economy and social economy enterprises in Italy, a recent survey on the digital transformation of the whole country's social economy highlights the fact that digital technologies are broadly diffused amongst Italian social economy enterprises and are often included in all their activities (23%), but still not deployed with a strategic purpose (34%). Nevertheless, a small portion of social economy enterprises still do not deploy any digital technologies (one in eight social enterprises). Social economy enterprises are shaping the digital sphere through the use of a growing number of digital applications. This has resulted in the emergence of new ecosystems of organizations that are building a digital social economy. Digital social economy enterprises prioritize users or use technology for social goals. These innovations help users manage and leverage digital impact for societal benefit and transformation (Brülisauer, 2020; Balcerzak & Pietrzak, 2017).

A 2020 study by Grow revealed that social economy organizations in Italy, including social enterprises, require practical and legal assistance to effectively implement digital technologies. This aid can assist them in overcoming challenges that may arise during the process of digitalization. Consequently, these enterprises are urging the government and central administrations to prioritize skills and technologies as part of the incentives they provide. To achieve a successful digital transformation, organizations must integrate modern technologies such as IoT, blockchain, cloud computing, and data analytics while also developing the necessary digital skills and capabilities (Tsolakis et al., 2022).

RQ2: What research has been conducted on the adoption of digitalization in social economy organizations?

The digitalization significantly impacts operational efficiency and social outcomes, which has been a focal point of research. Empirical studies demonstrate that digital technologies can greatly enhance the efficiency of social economy organizations by streamlining processes and reducing administrative burdens. For instance, digital platforms can help improve coordination and communication among staff and volunteers, resulting in more efficient service delivery (Chui et al., 2012).

Furthermore, the use of digital tools can enhance monitoring and evaluation processes, allowing organizations to measure the impact of their interventions more accurately and make data-driven decisions (Torres & Augusto 2020; Skivko, 2021). Digital tools significantly enhance the operational efficiency of social enterprises. Their findings highlight the capacity of digital technologies to streamline processes and reduce administrative burdens, enabling organizations to devote more resources to their core mission (Chui et al., 2012; Krueger & Haytko 2015).

According to Bellakhal and Mouelhi (2020), integrating digital tools into operations can have several advantages. It can improve human resource management, reduce expenses, and contribute to substantial economic growth. Digitizing processes enables social enterprises to access financing opportunities and cut costs associated with communication, administration, and commerce. These benefits can significantly enhance performance within the social economy organizations.

A recent study by Alshawaaf and Lee, 2021, research and innovation (R&I) are crucial for digital transformation in the social economy. However, R&I is not fully utilized due to a lack of structure and systemization. Social economy organizations must implement digitalization strategies and integrate digital technologies to address challenges. This requires proper support and guidance.

Organizations can expand both physically and virtually by creating digital intellectual resources. The European Social Economy Summit held in May 2021 recognized the social economy as the new way of doing business and the future business model for Europe. Social economy organizations in European countries consist of around 2.8 million entities, such as cooperatives, mutual benefit societies, associations, foundations, and social enterprises. These organizations have created over 13 million jobs. The Commission will conduct a thorough study to gain a comprehensive understanding of the social economy in the EU. This study will involve both qualitative and quantitative data collection. (Social Economy Europe Report, 2022).

Digital technologies are vital for nonprofit organizations to grow; as per a 2019 study by Chunakov et al., these technologies offer effortless access to information and feedback mechanisms, which in turn reduces the need for expensive marketing tools.

Thus, nonprofits can fully leverage the power of digital technologies to achieve their goals. It is evident that data must undergo transformation to become suitable for analysis. Analysts often encounter challenges or barriers in integrating various datasets commonly utilized by third sector and social economy organizations. Therefore, implementing new digital solutions is imperative to determine how data can be captured, stored, and managed to augment nonprofit entities' accountability and data analysis (Farooq & Abid, 2020; Calderon & Ribeiro 2024). Digitalization poses theoretical challenges regarding how technology affects organizations and individuals and how it is adopted by organizations, as noted by Leviäkangas & Kauppila (2020) In brief, this content explores the potential of digitalization within the social economy, particularly for developing economies and international companies, including those in the food industry. While implementing digital tools poses challenges, the benefits are substantial, including improved efficiency, transparency, and customer engagement. For food industry companies, digitalization can help meet consumer demands, streamline supply chains, and strengthen global competitiveness.

The summary emphasizes that future research should focus on social issues and consider the complex impacts of digital technology to support an inclusive, equitable digital transformation. This approach will help ensure that digital advancements align with broader social goals and meet the specific needs of social economy organizations.

RQ3: How can digitalization's factors and capabilities contribute to enhancing the social economy?

Blockchain technology introduces a new framework for trust and transparency in the social economy. Its decentralized ledger system ensures transparent, immutable, and verifiable transactions, which is essential for maintaining stakeholder trust. This transparency can enhance governance models in social economy organizations, ensuring ethical management and fair resource distribution (Zheng et al., 2017). Theoretically, AI capabilities support adaptive and personalized service delivery within the social economy. AI's machine learning and predictive analytics can customize services to individual needs, promoting inclusivity and equity. This aligns with theoretical concepts of personalized social support, enabling more effective and responsive interventions (Vinuesa et al., 2020). Digital technologies enable social economy organizations to expand their operations and foster innovation. AI and Big Data can assist in identifying emerging social issues and swiftly developing innovative solutions. Blockchain can aid in establishing decentralized networks and partnerships, allowing for collaborative approaches to social challenges on a broader scale (Gupta et al., 2020). AI provides powerful tools to address complex social problems and boost operational efficiency effectively. From personalized education programs to predictive maintenance in social housing, AI-driven solutions substantially elevate the effectiveness of social economy initiatives (Vinuesa et al., 2020). As per Kaplan and Haenlein's (2019) definition, Artificial intelligence (AI) refers to a system's ability to interpret external data accurately, learn from it, and use that knowledge to achieve specific goals and tasks through adaptable adaptation. Nonprofit organizations, specifically museums, are embracing digitization, such as AI, to leverage the potential of digital technology. This approach aims to enhance social value for their audiences and promote cross-cultural understanding. Some of them have already succeeded in finding new ways of interaction and

information sharing through this modern approach. These theoretical frameworks create valuable insights into the dynamics of digital technology within the social economy. They highlight the transformative potential and the challenges that must be addressed for inclusive and sustainable development.

3. Future research

For this analysis, we suggest the research method DEMATEL because it evaluates the relationship among barriers. This method utilized a Comparison Pairwise Form to explore the relationships and cause-and-effect among the identified barriers. Third, what are the long-term effects of digitalization on the sustainability and growth of social economy organizations? Research could focus on understanding the broader implications of digital adoption, including financial stability, social impact, and scalability of operations over time. A mixed-methods approach combines both quantitative and qualitative methods to provide a holistic perspective on the long-term effects of digitalization.

For example, quantitative data (such as financial performance metrics, growth rates, and digital adoption levels) can be supplemented with qualitative data (such as interviews, focus groups, and surveys with organizational leaders, employees, and stakeholders). The final suggestion is, How do digitalization trends vary across different types of social economy organizations (e.g., cooperatives, nonprofits, social enterprises)? A comparative case study involves analyzing multiple cases (in this context, different types of social economy organizations) to explore the similarities and differences in digitalization trends. This method allows for a detailed examination of how various organizational types adopt and implement digital tools and strategies, as well as the unique challenges and opportunities they face.

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