Digital Economy Research Frameworks: Models, Trends, and Gaps

1. Introduction

Research frameworks in the digital economy are essential for structuring inquiry, clarifying concepts, and guiding both empirical and policy work in a rapidly evolving field. Over the past decade, scholars have developed a range of frameworks to address the complexity of digital transformation, the integration of digital technologies, and the socio-economic impacts of digitalization. Despite these advances, the field remains fragmented, with persistent gaps in theory, measurement, and practical application (Rong, 2022; Savastano et al., 2024; Xu et al., 2022; Zhang et al., 2023; Zheng et al., 2025; Bejjani et al., 2023; Liu et al., 2022; Medaglia et al., 2024; Guo et al., 2024; Hoxha & Thanasi-Boçe, 2024; Gu & Liu, 2024). This review synthesizes the most influential frameworks, highlights current trends, and identifies key gaps and future directions.

FIGURE 1　Consensus meter visualizing agreement on the effectiveness of digital economy research frameworks.

2. Methods

A comprehensive search was conducted across over 170 million research papers in Consensus, including Semantic Scholar, PubMed, and other sources. The search strategy included 20 unique queries targeting foundational, analytical, sectoral, and interdisciplinary frameworks, as well as critiques and emerging models in digital economy research. In total, 987 papers were identified, 561 were screened, 518 were deemed eligible, and the top 50 most relevant papers were included in this review.

Search Strategy

Identification		Screening		Eligibility		Included
N = 987	→	N = 561	→	N = 518	→	N = 50

Identified 971 papers that matched 20 Consensus searches	Removed papers with missing abstracts	Removed papers with low semantic relevance to each search	Selected the top 50 highest quality papers after final ranking
+ **971** identified		− **43** removed	− **468** removed

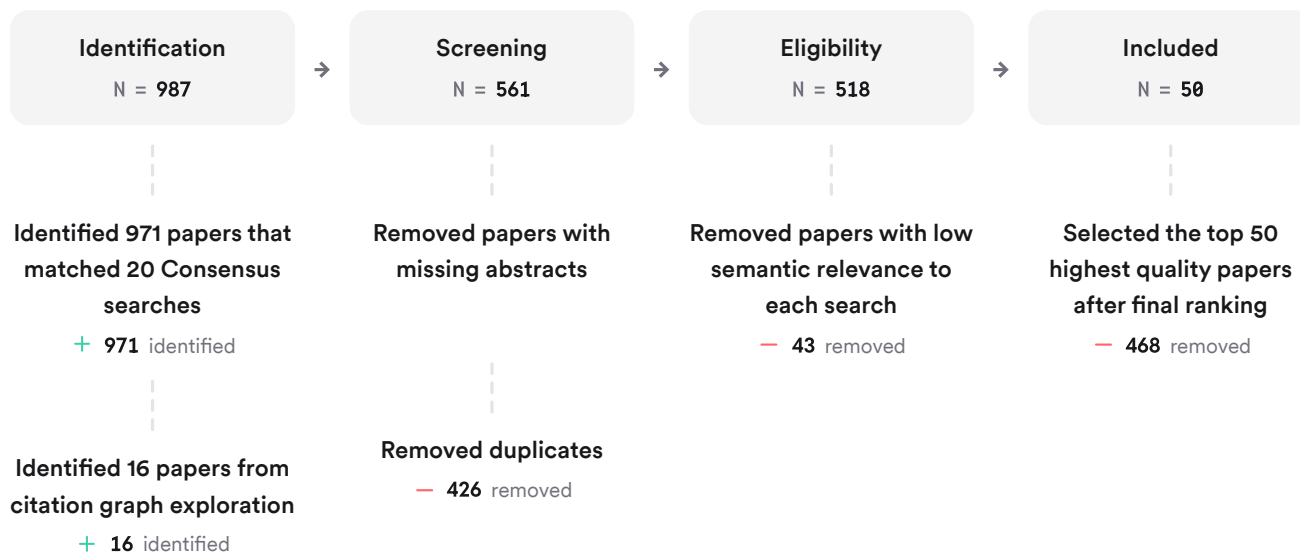| Identified 16 papers from citation graph exploration	Removed duplicates		
+ **16** identified	− **426** removed		

FIGURE 2　Flow diagram of the search and selection process for digital economy research frameworks.

Twenty unique searches were executed, focusing on theoretical, analytical, sectoral, and interdisciplinary frameworks in the digital economy.

3. Results

3.1 Major Frameworks and Models

- **IBCDE Framework:** Proposes five core perspectives—digital Infrastructure, to-B industry platforms, to-C two-sided platforms, Data ecosystem, and Economic contexts—to capture the complexity of the digital economy and guide future research (Rong, 2022).

- **Three-Level Framework:** Organizes research into digital technology (ICT, big data, platforms), integrating innovation (business models, Industry 4.0, circular economy), and digital governance (regulation, data management, regional digital economies) (Zhang et al., 2023; Zheng et al., 2025).

- **Analytical and Measurement Frameworks:** New models integrate blockchain, AI, and advanced analytics for digital economy measurement, especially in regional contexts like the GCC (Hoxha & Thanasi-Boçe, 2024), and propose hierarchical indices for development assessment (Guo et al., 2024).

- **Institutional and Policy Frameworks:** Emphasize the role of institutions, governance, and policy systems in shaping digital transformation, with specific models for the EU, China, and developing economies (Xu et al., 2022; Ivantsov, 2025; Radiev, 2024; Mashchenko & Radiev, 2023; Cai et al., 2025).

3.2 Sectoral and Thematic Frameworks

- **Circular Economy and Sustainability:** Frameworks link digital technologies to circular economy strategies, identifying digital functions and mechanisms for sustainability transitions (Liu et al., 2022; Medaglia et al., 2024; Chauhan et al., 2022; Trevisan et al., 2023).

- **Entrepreneurial and Ecosystem Models:** Conceptual frameworks for digital entrepreneurial ecosystems and business ecosystems blend knowledge-based and platform perspectives (Bejjani et al., 2023; Chen et al., 2023; Medfouni et al., 2024).

- **Smart Cities and Regional Resilience:** Models address the orchestration of digital economy strategies for smart cities and regional economic resilience, often using soft systems or coupling approaches (Subkhan et al., 2025; Gu & Liu, 2024; Yu et al., 2023).

3.3 Trends and Theoretical Foundations

- **Bibliometric and Content Analyses:** Recent studies combine bibliometric and in-depth content analysis to map the field, revealing that digital economy research is still in its infancy, with inconsistent definitions and theoretical underpinnings (Savastano et al., 2024; Xu et al., 2022; Detthamrong et al., 2024).

- **Integration of Data and Technology:** Frameworks increasingly incorporate AI, blockchain, and big data analytics to improve measurement, governance, and policy design (Hoxha & Thanasi-Boçe, 2024; Guo et al., 2024; Veldkamp & Chung, 2024).

3.4 Gaps and Limitations

- **Fragmentation and Lack of Standardization:** Persistent gaps exist in empirical studies, integration across sectors, and practical application—especially in areas like digital government, sustainability, and multiscale analysis (Savastano et al., 2024; Medaglia et al., 2024; Zhang et al., 2023; Zheng et al., 2025; Zhong et al., 2024).

- **Contextual and Regional Gaps:** Many frameworks are tailored to specific countries or regions, limiting their global applicability and comparability (Xu et al., 2022; Guo et al., 2024; Ivantsov, 2025; Kedia et al., 2023; Oloyede et al., 2023).

- **Measurement and Data Challenges:** Ongoing difficulties in defining, measuring, and comparing digital economy activities across contexts, especially in developing countries (Guo et al., 2024; Kedia et al., 2023; Oloyede et al., 2023).
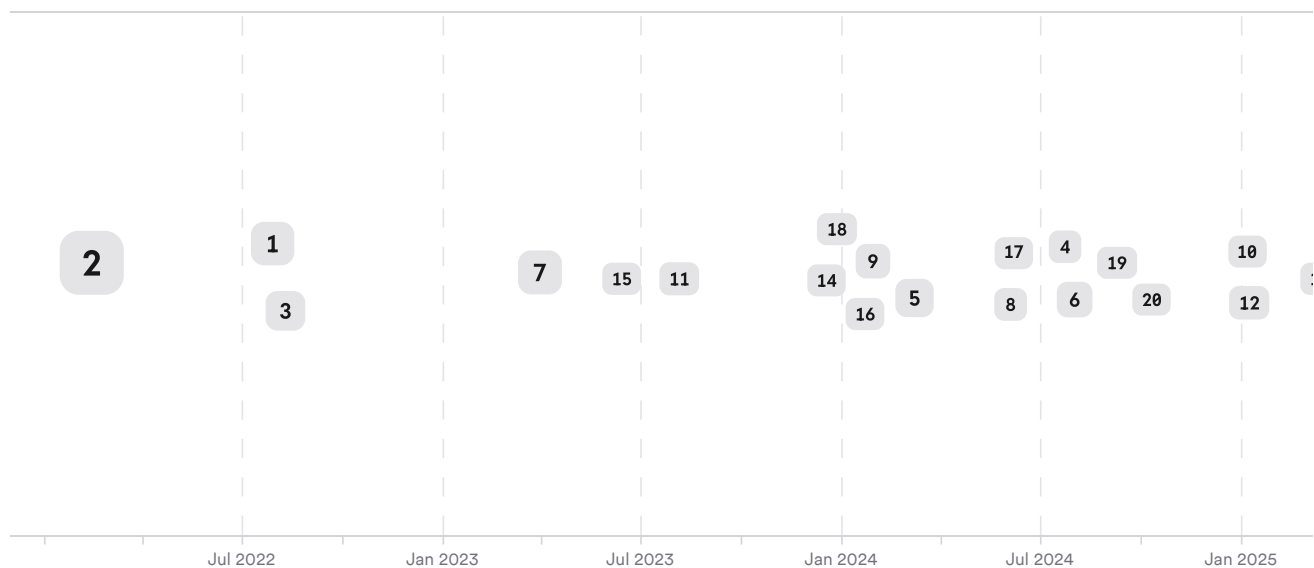
Results Timeline

FIGURE 3 Timeline of key publications on digital economy research frameworks. Larger markers indicate more citations.

Top Contributors

Type	Name	Papers
Author	J. Mascarenhas	(Liu et al., 2022; Trevisan et al., 2023)
Author	Dmytro Radiev	(Radiev, 2024; Mashchenko & Radiev, 2023)
Author	Jian Zhang	(Guo et al., 2024; Zhang et al., 2023)
Journal	*Sustainability*	(Zheng et al., 2025; Xu et al., 2023; Cai et al., 2025)
Journal	*PLOS ONE*	(Gu & Liu, 2024; Li, 2024; Yao & Yang, 2022)
Journal	*Journal of Business Research*	(Pan et al., 2022; Danni & Zhu, 2022)

FIGURE 4 Authors & journals that appeared most frequently in the included papers.

4. Discussion

Digital economy research frameworks have evolved rapidly, reflecting the field's complexity and dynamism. The IBCDE and three-level frameworks offer comprehensive structures for organizing research, but the field remains fragmented, with persistent gaps in theory, measurement, and practical application (Rong, 2022; Savastano et al., 2024; Zhang et al., 2023; Zheng et al., 2025). Sectoral and thematic frameworks, such as those for the circular economy, smart cities, and entrepreneurial ecosystems, provide valuable insights but often lack integration and empirical validation (Liu et al., 2022; Medaglia et al., 2024; Bejjani et al., 2023; Subkhan et al., 2025; Chen et al., 2023). Measurement and data challenges, especially in developing countries, hinder cross-country comparisons and policy effectiveness (Guo et al., 2024; Kedia et al., 2023; Oloyede et al., 2023). There is a growing call for more integrative, empirically validated, and context-sensitive frameworks to address these challenges and bridge persistent knowledge gaps (Rong, 2022; Hoxha & Thanasi-Boçe, 2024; Zheng et al., 2025; Savastano et al., 2024).

Claims and Evidence Table

Claim	Evidence Strength	Reasoning	Papers
IBCDE and three-level frameworks provide comprehensive structure	Strong	Widely cited and adopted in recent research, covering key dimensions of the digital economy	(Rong, 2022; Zhang et al., 2023; Zheng et al., 2025)
Research remains fragmented and lacks standardization	Strong	Multiple reviews highlight persistent fragmentation and inconsistent definitions	(Savastano et al., 2024; Xu et al., 2022; Detthamrong et al., 2024; Oloyede et al., 2023)
Sectoral frameworks (e.g., circular economy, smart cities) are valuable but under-integrated	Moderate	Sectoral models offer depth but often lack cross-sectoral integration and empirical testing	(Liu et al., 2022; Medaglia et al., 2024; Subkhan et al., 2025; Chen et al., 2023; Trevisan et al., 2023)
Measurement and data challenges persist, especially in developing countries	Moderate	Ongoing difficulties in defining, measuring, and comparing digital economy activities	(Guo et al., 2024; Kedia et al., 2023; Oloyede et al., 2023)
Need for more integrative, empirical, and context-sensitive frameworks	Moderate	Calls for new models that bridge theory and practice, and adapt to diverse contexts	(Rong, 2022; Hoxha & Thanasi-Boçe, 2024; Zheng et al., 2025; Savastano et al., 2024)

FIGURE 5 Key claims and support evidence identified in these papers.

5. Conclusion

Digital economy research frameworks have advanced the field by providing structure and direction, but significant gaps remain in theory, measurement, and practical application. Future progress depends on developing more integrated, adaptive, and empirically grounded frameworks to keep pace with the digital economy's complexity and rapid change.

5.1 Research Gaps

Framework/Topic Area	Measurement & Metrics	Sectoral Integration	Empirical Validation	Global Applicability	Policy Relevance
IBCDE/Three-Level	5	2	2	1	2
Circular Economy/Sustainability	2	4	1	1	1
Smart Cities/Regional Models	1	2	2	2	1
Entrepreneurial Ecosystems	1	1	2	1	1
Measurement/Indices	4	1	1	3	2

FIGURE 6   Matrix showing the distribution of research gaps by framework/topic area and study attribute.

5.2 Open Research Questions

Future research should focus on developing standardized, context-sensitive frameworks, improving empirical validation, and enhancing integration across sectors and regions.

Question	Why
How can digital economy research frameworks be standardized for global comparability while remaining context-sensitive?	Standardization is essential for cross-country benchmarking, but frameworks must adapt to local realities.
What empirical methods best validate digital economy frameworks across diverse sectors and regions?	Empirical validation ensures frameworks are robust, actionable, and relevant in varied contexts.
How can sectoral and thematic frameworks (e.g., circular economy, smart cities) be better integrated into holistic digital economy models?	Integration will bridge fragmentation and enhance the practical utility of research frameworks.

FIGURE 7   Open research questions highlighting future directions for digital economy research frameworks.

In summary, while digital economy research frameworks have made significant strides, advancing the field will require more integrative, empirically validated, and globally relevant models to address persistent gaps and support effective policy and practice.

These papers were sourced and synthesized using Consensus, an AI-powered search engine for research. Try it at *https://consensus.app*

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