How Scientific Fields Evolve: Evidence from Digital Economy Research*

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Abstract

How do scientific fields evolve, particularly when the phenomenon they study changes because of technological change? This paper examines this question through the case of digital economy research, an interdisciplinary and policy-relevant field. I construct a unique dataset of 8,426 papers presented at 195 conferences between 1989 and 2024, enrich it with bibliographic metadata and abstracts, and complement it with historical evidence. Based on a structured empirical analysis, I develop a retrospective conceptual framework in which pioneers, enablers, and audiences drive field evolution across three stages: emergence, consolidation, and diversification. The findings indicate that the field emerged as pioneering scholars created conferences to connect dispersed research on digital technologies and their economic implications; consolidated through enabling institutions, funding initiatives, and improved data access; and diversified as it became increasingly engaged with disciplinary, industry, and policy audiences. The paper contributes to research on science of science, knowledge evolution, and field formation by developing a conceptual framework for field evolution and highlighting the role of conferences as field-building infrastructures. It provides the first systematic empirical historiography of digital economy research.

Keywords: science of science, knowledge evolution, conferences, interdisciplinarity, digital economy

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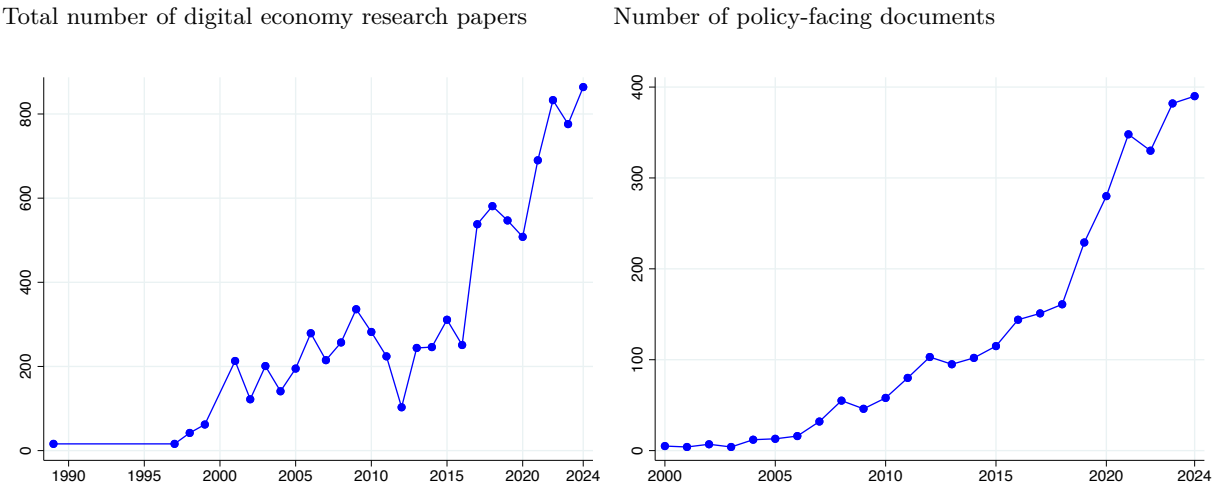
Access to the paper companion website: https://sites.google.com/view/digital-economy-research.

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1 Introduction

Digital economy research is a highly policy-engaged field. As digital technologies have transformed markets, firms, and consumer behavior, rigorous scientific evidence has become increasingly relevant to competition policy and intellectual property (IP) debates (Kesler et al., 2020; Aguiar and Waldfogel, 2018; Nicolle et al., 2018; Quinn and Gutt, 2025; Zhu et al., 2026). Figure 1 illustrates this dual development: the expansion of research output and its engagement with policy. The left panel shows the annual number of digital economy papers included in this study. The right panel shows the annual number of policy-facing documents citing these papers, as identified by Overton.io, a database of policy-facing documents that cite scientific research. Both measures increased substantially over the period studied, providing descriptive evidence of the growth of digital economy research and its increasing presence in policy-facing documents.

Figure 1: Growth in research output and policy-facing documents citing digital economy research



Note: The left panel shows the annual number of papers presented at the conferences included in this study and listed in Table 1. The right panel shows the annual number of policy-facing documents identified by Overton.io that cite 364 matched papers in the dataset. In total, these papers are cited by 3,517 policy-facing documents.

Examples of this policy engagement include research informing or evaluating regulatory initiatives by the European Commission, as well as antitrust and IP investigations in the U.S. and the U.K. (Seamans and Zhu, 2014; Goldfarb et al., 2015; Aguiar et al., 2018; Zhu and Liu, 2018; Brynjolfsson et al., 2019; Crémer et al., 2019; Gavazza et al., 2019; Cabral et al., 2021; Godinho de Matos and Adjerid, 2022; Peukert et al., 2022; Dubé et al., 2025; Lutes et al., 2025). Policy engagement is only one characteristic of digital economy research. Its engagement with disciplinary and industry audiences is examined later in the paper.

This study asks how scientific fields evolve. More specifically, it examines how fields evolve when

their phenomenon under study changes because of technological change. I study this question through the case of digital economy research, which is particularly informative because scientific research, technological change, and policy demand have developed in close interaction. As the technological frontier shifted from personal computing and internet infrastructure to platforms and artificial intelligence (AI), the case allows me to examine how changes in the phenomenon under study are reflected in research output, community, institutional participation, collaboration, disciplinary composition, topics, and methods. Digital economy research is a scientific field defined by a community of scholars interested in "exploring the enormous changes that digitization has brought to transaction costs, media functions, product personalization, and many other facets of modern life" (Greenstein, 2020). The field's boundaries and terminology have evolved over time. Earlier research appeared under labels such as *information and communications technology (ICT)*, *Internet economics*, *electronic commerce*, and *information economy*, while terms such as *digital economy*, *platform economics*, and *AI* have become increasingly prominent. I therefore treat digital economy research as an evolving scientific field organized around a shared phenomenon under study.

Empirically, I trace the field's evolution using a unique dataset of 8,426 research papers presented at 195 conferences selected for their relevance to digital economy research between 1989 and 2024 (Table 1).[1] This conference-based sample provides a systematic window into the organized research community and changes in its composition and research agenda over time. I enrich the data with abstracts, bibliographic metadata, author information, publication outlets, and citation information from Google Scholar, OpenAlex, and the SSRN Economics of Networks eJournal. Advanced natural language processing (NLP) techniques, including topic modeling with *BERTopic*, help identify thematic trends over time.

Building on empirical patterns in the data and historical evidence, I develop a conceptual framework for field evolution with three stages, each defined by a key driver: (i) pioneers driving field emergence, (ii) enablers providing the resources for consolidation, and (iii) engagement with disciplinary, industry, and policy audiences sustaining diversification. Applying this framework to digital economy research, the period before 2001 represents the emergence stage, when pioneering scholars created conferences to connect fragmented, largely theoretical research on digital

[1] Throughout this paper, the term "conferences" is used as shorthand for conferences, summer institutes, symposiums, and workshops.

technologies and their economic implications across computer science, management information systems, and the economics of ICT. It consolidated (2001–2015) alongside the development of enabling institutions, funding initiatives, and improved data access, while empirical work on innovation and digital platforms became increasingly prominent. Since 2016, the field has diversified rapidly, becoming more anchored in management while remaining interdisciplinary and shifting toward causal empirical work on platforms and AI. The analysis further documents increasing engagement with industry and policy audiences.

This study makes three contributions. First, it contributes to research on knowledge evolution, science of science, and field formation by developing a conceptual framework for field evolution. Prior work has examined knowledge diffusion through publications and citations (MacGarvie, 2005; Fortunato et al., 2018), collaboration networks (Singh, 2005; Leahey, 2016; Azoulay et al., 2019; Zacchia, 2020), geographic spillovers (Jaffe et al., 1993; Kahn and MacGarvie, 2016b; Lychagin et al., 2016; Atkin et al., 2022), institutions (Furman and Stern, 2011), and conferences (Spiegel and Toivanen, 2022; Baruffaldi and Poege, 2025); this study brings these mechanisms together in a framework for analyzing the evolution of a scientific field. Second, this study contributes a conference-based empirical strategy for measuring field evolution. Conferences can operate as field-building infrastructures that enable early-stage knowledge exchange and community formation. The conference-based approach therefore complements publication- and citation-based approaches by providing a window into emerging research agendas and scientific communities before they are fully reflected in journal publications. Third, the paper provides the first systematic empirical historiography of digital economy research. In doing so, the paper documents how scientific research evolved alongside successive waves of technological change.

2 Knowledge evolution and the formation of scientific fields

Fortunato et al. (2018) define the science of science as an interdisciplinary effort to identify regularities in scientific discovery, collaboration, impact, and field evolution. This literature conceptualizes knowledge production as cumulative, but also intellectually and socially structured. New research builds on existing concepts, theories, and methods, while reputational hierarchies, communication networks, and institutional infrastructures shape which ideas diffuse and which communities become central (Price, 1965; Jovanovic and Rob, 1989; Fortunato et al., 2018). Scientific fields therefore have both an intellectual dimension, reflected in topics,

concepts, theories, and methods, and a social dimension, reflected in authors, institutions, collaborations, journals, and conferences (Merton, 1968; Crane, 1972; Kuhn, 1962; Whitley, 2000; Carrell et al., 2024). This perspective is useful for studying field evolution because it connects changes in research content to the social and institutional structures through which scientific communities form. Prior studies have used publications, citations, collaborations, institutions, and careers to examine the evolution of fields such as science policy, innovation studies, and science and technology studies (Fagerberg and Verspagen, 2009; Choi et al., 2011; Fagerberg et al., 2012; Martin, 2012; Martin et al., 2012). These studies show how concepts, methods, leading authors, journals, and thematic clusters jointly define a scientific field.

This literature review focuses on three mechanisms relevant to field evolution. First, scientific fields evolve through interdisciplinarity and recombination, as concepts, methods, and empirical settings from different knowledge domains are combined in ways that can generate novelty and visibility, but may also increase complexity in evaluation and reduce productivity (Sorenson and Fleming, 2004; Wang et al., 2015; Leahey et al., 2017; Baaden et al., 2024). Interdisciplinarity is especially relevant for fields whose phenomenon under study cuts across disciplinary boundaries.

Second, scientific fields depend on institutional infrastructures that support cumulative knowledge production. Universities, funding agencies, journals, and data providers shape which questions can be studied and which communities can scale. Institutions can increase the cumulative value of scientific knowledge by certifying, preserving, and disseminating research outputs (Furman and Stern, 2011); funding policies can redirect scientific effort and shape the development of scientific frontiers (Furman et al., 2012); and broader incentive structures affect the allocation of talent, resources, and attention across scientific problems (Stephan, 2015).

Third, collaboration is central to collective knowledge production, and co-authorship has been widely used to study the structure of scientific communities (Katz and Martin, 1997; Newman, 2004). Its importance has increased as science has shifted from individual scholarship toward team-based, distributed, and specialized knowledge production (Wuchty et al., 2007; Leahey, 2016). At the same time, knowledge flows are not frictionless, but are structured by geographic proximity, labor mobility, and interpersonal networks (Jaffe et al., 1993; Almeida and Kogut, 1999; Sorenson and Fleming, 2004; Singh, 2005; Lychagin et al., 2016; Wagner and Goossen, 2018; Catalini et al., 2020; Zacchia, 2020; Arts et al., 2026; Poege et al., 2026). Evidence that

in-person interaction and physical proximity generate knowledge spillovers further underscores the importance of platforms for scientific exchange (Atkin et al., 2022; Roche et al., 2024).

These mechanisms suggest that conferences can function as field-building infrastructures because they are recurring events where researchers meet, exchange early-stage work, and organize around shared research questions. Related work on field-configuring events conceptualizes conferences as temporary social organizations that can shape field evolution (Lampel and Meyer, 2008). A small but growing empirical literature shows that conferences shape research trajectories through temporary co-location (Chai and Freeman, 2019), reduce search costs in collaboration formation (Boudreau et al., 2017), and are associated with subsequent publication outcomes, citation impact, and research visibility (Campos et al., 2018; de Leon and McQuillin, 2020; Gorodnichenko et al., 2021; Spiegel and Toivanen, 2022). Conferences also engage audiences beyond academia: Baruffaldi and Poege (2025) show that firms can learn from scientific conferences through active participation.

These insights motivate the use of conference programs as an empirical source for studying field evolution. Publication data capture published research and its journal outlets, citation data trace intellectual links among research outputs, and co-authorship data capture collaboration. Conference programs provide a complementary perspective by recording which research projects are presented at which conferences and when, including research published only later or for which no subsequent journal publication is identified (Spiegel and Toivanen, 2022). They link research output to the conferences in which it is exchanged, making it possible to trace changes in research agendas, methods, disciplinary composition, and the scientific community over time. Overall, the literature reviewed in this section informs the conceptual framework developed in Section 4.

3 Data sources

Digital economy research is an evolving scientific field centered on understanding how digital technologies reshaped markets, firms, and consumer behavior. Delineating the field empirically is challenging because it is not organized around a single journal or discipline and its terminology has changed over time. Following the conference-based approach motivated in Section 2, I construct a unique dataset from historical conference programs to trace the field's evolution empirically. I compiled an initial list of conferences relevant to digital economy research and refined and validated it through consultations with scholars familiar with the field's evolution,

including nine experts, several of whom founded or organized conferences in the sample.[2] The conference sample is intended to capture conferences particularly relevant to digital economy research, not all events at which such research has been presented. Early economics research on the internet was often presented at broader mainstream economics conferences, so some early contributions may be underrepresented.

I then collected historical conference programs from official websites, archived webpages, and conference organizers. I conducted an extensive internet search for historical programs and, when they were unavailable on official websites, searched for archived copies on the Wayback Machine. In cases where programs remained inaccessible, I contacted the organizers. In total, I gathered information on 8,426 papers presented across 195 conferences. From the collected programs, I extracted information on each paper's title, presenter and affiliation, as well as co-authors and their affiliations when available. I used generative AI tools, including ChatGPT and Microsoft Copilot, to accelerate the extraction process.[3] The final dataset provides a systematic record of research presented at conferences central to the evolution of digital economy research.

Table 1 lists the conferences included in this study, covering the period from 1989 to 2024. The columns *First year* and *Last year* indicate when each conference was first and most recently held, respectively. The columns *Collected since* and *Collected until* indicate the earliest and latest years for which detailed program data was available. Historical conference programs are not available for all years, so the reported counts should be interpreted as lower bounds on the actual number of papers presented at the included conferences. The table additionally reports the total number of conference years (*No. years*) and papers (*No. papers*) observed in the data. Because DRUID and the Management, Analytics, and Data Conference (MAD) are broader

[2]These experts are: Irene Bertschek, Professor of Economics of Digitalisation at the University of Giessen, Director of the ZEW Research Unit Digital Economy, and co-founder of the ZEW *Economics of ICT Conference*; Erik Brynjolfsson, Professor at the Stanford Institute for Human-Centered AI, Director of the Stanford Digital Economy Lab, and co-founder of the NBER *Economics of Digitization* project; Jacques Crémer, Professor of Economics and Director of the Digital Center at the Toulouse School of Economics and co-founder of the TSE *Digital Economics Conference*; Avi Goldfarb, Professor of Marketing at the University of Toronto and co-founder of the NBER *Economics of Artificial Intelligence* project; Shane Greenstein, Professor of Business Administration, co-chair of the Harvard Business School Digital Initiative, and co-founder of the NBER *Economics of Digitization* project; Hanna Hottenrott, Professor for Economics of Innovation at the TUM School of Management and early organizer of the *Munich Summer Institute*; Ulrich Kaiser, Professor for Entrepreneurship at the University of Zurich and early organizer of the ZEW *Economics of ICT Conference*; Stephen P. Ryan, Professor of Economics at Washington University in St. Louis and early organizer of the *CESifo Area Conference on Economics of Digitization*; and Michael Ward, Professor of Economics at the University of Texas at Arlington and research associate at the Digital Economics Department of the ZEW.

[3]After feeding the program—only a few pages at a time—into the AI tool, I carefully verified each output manually against the original source to ensure accuracy and reliability (Horton et al., 2023).

Table 1: Scientific conferences and workshops on digital economy research

Conference	First year	Last year	Collected since	Collected until	No. years	No. papers
WISE - Workshop on Information Systems and Economics	1989	2025	1989	2023	14	861
DRUID Conference	1996	2025	1997	2024	25	2626
CIST - Conference on Information Systems and Technology	1996	2025	2018	2024	7	1109
Understanding the Digital Economy	1999	1999	1999	1999	1	14
TSE Digital Economics Conference	2001	2025	2001	2024	15	385
ZEW Conference on the Economics of ICT	2001	2025	2001	2024	22	659
SCECR - Symposium on Statistical Challenges in E-commerce Research	2005	2025	2005	2024	12	766
Paris Conference on Digital Economics	2006	2025	2008	2024	12	322
Searle Conference on Internet Search and Innovation	2010	2017	2010	2015	6	111
NBER Conference Economics of Digitization	2011	2025	2011	2024	13	96
NBER Summer Institute IT and Digitization/ Digital Economics and AI	2012	2025	2012	2024	13	369
BU Platform Strategy Research Symposium	2013	2025	2013	2024	11	268
MIT Conference on Digital Experimentation	2014	2025	2014	2024	9	723
Munich Summer Institute	2016	2025	2016	2024	8	216
CESifo Area Conference on Economics of Digitization	2017	2024	2017	2024	8	197
NBER Conference Economics of Artificial Intelligence	2017	2024	2017	2024	8	115
Digital Economy Network Workshop	2019	2025	2019	2024	6	134
Management, Analytics, and Data Conference	2022	2025	2022	2024	3	83
European Digital Platform Research Network Summit	2023	2025	2023	2024	2	39

Note: *First year* and *Last year* indicate the inaugural and most recent conference years, respectively. *Collected since* and *Collected until* indicate the earliest and latest years for which program data was obtained. *No. years* and *No. papers* report the number of conference years and papers retrieved.

than the other conferences in the sample, Appendix B assesses the robustness of the results to restricting these conferences to papers identified as related to digital economy research.

To enrich the dataset, I supplemented the conference program data with additional information from Google Scholar, OpenAlex, and the SSRN Economics of Networks eJournal. I used Google Scholar primarily to identify later versions and publication outcomes of conference papers and to obtain text and citation information for subsequent analyses. This approach allowed me to gather additional information for 5,368 papers, including abstracts, publication year, journal outlet, citation counts, paper links, and author profile links when available. The abstracts provide the information required to analyze research topics and methods, the publication information enables the analysis of publication outlets and disciplinary audiences, citation counts provide a measure of scholarly impact, and author profiles support the analysis of authors' disciplinary affiliations and research interests.[4] I used OpenAlex as a complementary source to expand the coverage of abstracts, author information, and citations and obtained such information for 2,805 papers (Priem et al., 2022). Finally, I scraped all publications from the SSRN Economics of Networks eJournal to identify conference papers that also circulated as working papers and would therefore not necessarily be captured through journal-publication information alone.[5]

[4]Google Scholar data was accessed through SerpAPI. Only the first result for each combination of paper title and author was accessible, creating a small risk of retrieval error when multiple plausible matches existed.

[5]The SSRN Economics of Networks eJournal contains more than 15,000 papers dating back to 1972, with most published since the early 2000s. Sponsored by the Networks, Electronic Commerce, and Telecommunications (NET) Institute, it covers research on network industries, digital platforms, electronic commerce, telecommunications, and the internet.

Together, these sources substantially increase the information available beyond the conference programs. The final dataset comprises 8,426 papers presented at 195 conferences between 1989 and 2024, of which 7,156 include abstracts that enable further NLP analyses.[6]

In addition to the quantitative data, I collected supplementary evidence on the evolution of digital economy research through interviews with the experts described above. These provided historical context on the emergence of the field, major research trends, and factors shaping its evolution, and were used to triangulate the findings.

4 A conceptual framework for field evolution

Building on the historical evidence discussed in Section 5 and the empirical analysis in Section 6, I develop a conceptual framework for field evolution. I present the framework here to organize the findings that follow. I characterize field evolution as a three-stage process – emergence, consolidation, and diversification – and identify three drivers that are central to the transition across stages. The three stages provide an ex post structure of the observed developments and are therefore subject to potential retrospective bias. Initially, pioneers, including conference organizers and visionary scholars, create platforms for exchange and help an initial scientific community emerge (Merton, 1968; Crane, 1972; Kuhn, 1962; Azoulay et al., 2010; Oettl, 2012; Azoulay et al., 2019). Enablers, including universities, research institutes, funding agencies, and data providers, consolidate the field by converting early momentum into scale and providing the financial, institutional, and data-related resources needed for expansion (Katz and Martin, 1997; Furman and Stern, 2011; Stephan, 2015; Kahn and MacGarvie, 2016b; Baruffaldi et al., 2024). Engagement with audiences across disciplines, industry, and policy then helps sustain attention, resources, and impact as the field diversifies (Martin, 2012; Martin et al., 2012; Fortunato et al., 2018; Baruffaldi and Poege, 2025; Arts et al., 2026). Table 2 summarizes the conceptual framework and applies it to digital economy research, specifying for each stage the time period, dominant disciplines, research foci, and field characteristics.

During the emergence stage (before 2001), digital economy research emerged from fragmented work in computing, management information systems, and economics of ICT. Pioneering scholars

[6]Some abstracts are incomplete, including longer abstracts retrieved through OpenAlex, which complicates the use of sophisticated text-based approaches that rely on a larger number of tokens. For 875 papers listed on the conference programs, no additional information could be found via Google Scholar, OpenAlex, or the SSRN Economics of Networks eJournal.

Table 2: A conceptual framework for field evolution

Stage	**Emergence**	**Consolidation**	**Diversification**
Key Driver	**Pioneers**	**Enablers**	**Audiences**

Applied to digital economy research:

Time Period	Before 2001	2001 – 2015	2016 – present
Disciplines	Econ, CS	Econ, Mgmt, IS	Mgmt, IS, Econ, CS
Research Focus	Internet, cost reduction, productivity	Innovation, IP rights, platforms	Platforms, causality, AI
Characteristics	Fragmented, scarce funding & data, theoretical exploration	Institutionalization, funding, data access, global dispersion	Rapid growth, empirical validation, policy engagement

Note: Econ = Economics, CS = Computer Science, Mgmt = Management, IS = Information Systems.

created early platforms for exchange and helped set initial research agendas. With limited funding and scarce data, theoretical exploration dominated over empirical validation. Core topics included the economic implications of the internet, cost reduction potentials, and productivity.

The field transitioned into the consolidation stage (2001 – 2015) as enablers supplied the resources needed to scale. Universities, research institutes, funding agencies, and data providers supported recurring conferences, facilitated collaboration, and improved access to data. These developments contributed to a sharp increase in research output, greater institutional participation, and stronger cross-institutional and intercontinental collaboration. Economics and information systems were especially prominent during this stage, while management became increasingly important. The research agenda focused on innovation, IP rights, and digital platforms.

In the diversification stage (2016–present), the field has experienced strong growth in conferences, papers, and the scientific community. Management has emerged as a dominant institutional home, while the field has remained strongly interdisciplinary. Empirical work, particularly experiments and causal identification, now leads the field, with core topics including platforms, AI, and industry-specific applications. While engagement with audiences across disciplines, industry, and policy has been relevant throughout the field's evolution, it has become increasingly central as digital technologies shape debates on platform regulation, data privacy, and competition policy.

5 A historical perspective on digital economy research

This section traces the historical evolution of digital economy research using historical literature and documentary sources, supplemented by contextual evidence from the expert interviews.

5.1 Emergence (before 2001)

Before 2001, during what I characterize as the emergence stage, digital economy research developed from antecedent streams in computer science, information systems, management, and economics. In computer science, scholars examined computing performance, electronic markets, and the organizational implications of computing technologies (Ein-Dor, 1985; Malone et al., 1987; Gurbaxani, 1990; Brynjolfsson, 1993). Information systems scholars studied the diffusion of personal computers, computing networks, and later web-based technologies (Brancheau and Wetherbe, 1990; Avgerou, 2000; Swanson et al., 2010). In management information systems, research covered computers and information systems in organizations, while business schools increasingly faced questions about how computing changed managerial practice and firm organization (Farhoomand, 1987; Zuboff, 1988; Friedman and Cornford, 1989; Scott Morton, 1991; Orlikowski, 1992; Choi et al., 2011). At the same time, the commercialization of the internet in the mid- to late 1990s, and its potential to reduce costs and reshape economic activity, captured economists' attention (Greenstein, 2015; Agrawal et al., 2016). Early work by Hal Varian and Jeffrey MacKie-Mason on network pricing was particularly influential (MacKie-Mason and Varian, 1994; Varian and MacKie-Mason, 1994). Other research addressed antitrust, electronic markets, market frictions, industrial organization, network infrastructure, technology policy, the economics of information technology, medical instruments, and productivity (Fisher et al., 1983a,b; Flamm, 1987, 1988; Trajtenberg, 1990; Berndt et al., 1995; Smith et al., 2000; Varian et al., 2004). However, measurement issues associated with the *productivity paradox* were prominent, as Robert Solow famously stated: "You can see the computer age everywhere but in the productivity statistics" (Brynjolfsson, 1993). Established publication channels posed an additional challenge, as they were not always well suited to this rapidly developing research area. Shane Greenstein recalled that early digital economy researchers often relied on edited volumes because "the delays in journals were a real problem" and "it was nearly impossible to

publish any work on Internet economics in high-prestige places."[7] Against this backdrop, pioneering scholars began to organize conferences that provided opportunities for exchange among researchers working on related questions across disciplinary boundaries.

One of the first conferences associated with the emerging field of digital economy research was the first *Workshop on Information Systems and Economics* (WISE), held in Cambridge, MA, on December 3, 1989 (Bakos and Kemerer, 1989; Greenstein, 2011; Gopal et al., 2024). The organizers Yannis Bakos and Chris F. Kemerer aimed to foster interdisciplinary dialogue and later introduced the "economics of information technology" in a seminal article (Bakos and Kemerer, 1992). Since then, conferences targeted at digital economy research have become recurring platforms for exchange in this technology-driven, policy-relevant, and interdisciplinary field (see Table 1). In the U.S., the *MIT eCommerce Research Forum* played an important role in disseminating research in the late 1990s and early 2000s, while the *Telecommunications Policy Research Conference* (TPRC) provided an interdisciplinary forum for infrastructure- and policy-oriented research (Tonegawa, 2002). Shane Greenstein described the TPRC as "explicitly interdisciplinary, mixing economists, management scholars, lawyers, engineers, and policy wonks," and noted that participants "talked about policy in real-time" with Federal Communications Commission staff. This early engagement with policy was also reflected in the 1999 *Understanding the Digital Economy* conference, which was organized by the U.S. Department of Commerce to fulfill President Clinton's directive to the National Economic Council. The directive reflected an early policy-driven interest in developing new methods of data collection and research to assess the impact of the digital economy and to identify effective ways to measure and evaluate it both domestically and internationally (Brynjolfsson and Kahin, 2000). Other notable examples of conferences include the *Conference on Information Systems and Technology* (CIST in Washington, D.C., 1996), *Current Issues in Managing Information Technology* (MIT, 1999), *Reinventing Commerce at Net Speed* (Stanford University, 1999), and *Measuring E-Commerce* (Brookings Institution, 1999) (Kovacic and Shapiro, 2000; Smith et al., 2000).

[7] *The Bell Journal of Economics and Management Science* (now *The RAND Journal of Economics*) was among the earliest journals to publish research at the intersection of economics, management, and public policy (see `https://www.jstor.org/journal/belljeconmanasci`). Similarly, IS scholars in the mid-1980s struggled to find publication outlets, which led to the creation of *Information Systems Research* in 1990 (Swanson et al., 2010).

5.2 Consolidation (2001 – 2015)

From 2001 to 2015, digital economy research entered what I characterize as the consolidation stage, as enabling institutions helped the field scale. In Europe, a key development during this stage was the establishment of influential conferences hosted and funded by publicly supported research institutions. Launched in 1995, the annual conference of the Danish Research Unit for Industrial Dynamics (DRUID) established an important platform for research on innovation, technology, economic development, and entrepreneurship. With an even stronger focus on the digital economy, the ZEW (Leibniz Centre for European Economic Research) Conference on the *Economics of Information and Communication Technologies (ICT)* was launched in Mannheim, Germany, in 2001. Reflecting ZEW's mission to provide high-quality research and evidence-based policy advice, the conference has consistently attracted leading researchers from North America and Europe and remains a cornerstone in the field. The same year, the Toulouse School of Economics (TSE) introduced its *Digital Economics Conference*, placing greater emphasis on theoretical contributions to the field. Together, these recurring conferences enabled scholarly interaction, fostered transatlantic exchange, and contributed to building an institutional infrastructure for digital economy research in Europe.

In North America, consolidation built on several earlier initiatives and conferences, including efforts by Brian Kahin at the Harvard Kennedy School and Tim Bresnahan at Stanford, which generated important research and policy engagement but, in Shane Greenstein's words, "did not turn into something regular." A major step in institutionalizing the North American scientific community came in 2010, when Josh Lerner, Scott Stern, and Shane Greenstein initiated the National Bureau of Economic Research (NBER) *Economics of Digitization* project with support from the program officer Daniel Goroff at the Alfred P. Sloan Foundation (Greenstein et al., 2010). The early organization of the NBER program was collaborative. Shane Greenstein and Scott Stern organized the first winter meetings at Stanford, while Susan Athey, Erik Brynjolfsson, Shane Greenstein, and Hal Varian helped organize the larger summer meetings associated with the NBER *Summer Institute*. Beyond recurring meetings, the program supported fellowships and research grants and produced agenda-setting publications (Goldfarb et al., 2015). The motivation was clear: creating a sustained scientific agenda around the economics of digitization, with community-building at its core (Greenstein, 2011, 2014). In 2015, the launch of the

NBER *Digitization Tutorial*, following efforts by Shane Greenstein and Avi Goldfarb and with initial funding from the National Science Foundation (NSF), can be interpreted as an important milestone in community building. Held alongside the *Economics of Digitization Conference*, the tutorial became an annual event bringing approximately 50 Ph.D. students together with leading researchers and helping integrate the next generation of scholars into the scientific community. Later, other conferences also included Ph.D. workshops in their programs.

At the same time, stronger links between academia and industry expanded opportunities for empirical research, as leading researchers moved into advisory and chief economist roles at large digital companies, including Google and Microsoft, and gained access to micro-level data on online behavior, advertising, search, and platform markets (Athey and Luca, 2019).

Taken together, these historical developments indicate how enabling institutions transformed dispersed research activity into a more coherent and institutionally embedded field during consolidation. By the mid-2010s, recurring conferences, expanded funding, improved data access, and a larger research community characterized the digital economy research.

5.3 Diversification (since 2016)

Since 2016, several new conferences have broadened the field's engagement with disciplinary audiences. I characterize this period as the diversification stage. The *Munich Summer Institute*, launched in 2016, connected digital economy research with innovation and law and economics. The *CESifo Area Conference on Economics of Digitization*, launched in 2017, provided a more focused economics-oriented conference while limiting overlap with existing conferences. The *Digital Economy Workshop* and the *Management, Analytics, and Data Conference* expanded participation from management and information systems scholars. Since 2023, the *European Digital Platform Research Network Summit* has invited "researchers from different disciplinary backgrounds (e.g., strategy, entrepreneurship, marketing, information systems, economics) to share their latest research and deepen their professional networks" (EU-DPRN, 2026). Reflecting the growing overlap between digital economy research and AI, the Alfred P. Sloan Foundation encouraged the integration of the NBER *Economics of Digitization* and *Economics of Artificial Intelligence* projects into the unified NBER *Digital Economics and Artificial Intelligence* project

in 2023 (Agrawal et al., 2019).[8]

The literature also documents a diversification of the field's research agenda as well as interest from industry and policy audiences during this period. In economics, digital technologies were increasingly studied as changes in the costs of search, replication, transportation, tracking, and verification, with applications to online welfare measurement, social media, privacy, and AI (Agrawal et al., 2016; Brynjolfsson et al., 2019; Chen and Yang, 2019; Goldfarb and Tucker, 2019; Allcott et al., 2020; Enikolopov et al., 2020; Aridor et al., 2024; Goldfarb and Tucker, 2024). In information systems, digital innovation research moved toward questions of platforms, ecosystems, data, and AI (Peukert et al., 2025; Yoo et al., 2024; Quinn and Gutt, 2025; Sanatizadeh et al., 2025; Shan and Qiu, 2025; Zhang et al., 2025). In management and strategy, platform-based competition, ecosystem governance, and digital transformation became central topics (Lee et al., 2018; Zhu and Liu, 2018; Rietveld and Schilling, 2021; Zhu et al., 2026). This diversification of research topics was accompanied by growing engagement with industry, as digital firms increasingly served as research settings and sources of data. At the same time, the field's engagement with policy audiences expanded as its research increasingly overlapped with debates concerning competition policy, copyright, privacy, platform governance, and AI regulation (Acquisti et al., 2016; Crémer et al., 2019; Gavazza et al., 2019; Cabral et al., 2021; Godinho de Matos and Adjerid, 2022; Peukert et al., 2022; Rong et al., 2023; Goldfarb and Tucker, 2024; Dubé et al., 2025; Lutes et al., 2025).

Overall, the historical evidence suggests that pioneering scholars were particularly important during the emergence stage, establishing early conferences and research agendas, while enabling institutions provided resources and infrastructure that supported the field's expansion during consolidation. In the diversification stage, the evidence points to an increasing role for engagement with disciplinary, industry, and policy audiences in the field's continued growth.

6 Measuring the evolution of digital economy research

The following section presents the empirical evidence from the conference-based dataset described in Section 3. The results are organized around the three stages and drivers of the conceptual framework introduced in Section 4.

[8] Since 2024, there has been a notable surge in AI conferences and workshops; however, their specialized nature places them outside the scope of this study.

6.1 Pioneers and the emergence of digital economy research

The first set of findings examines how digital economy research emerged as a scientific field in terms of output and community, driven by a number of pioneering researchers.

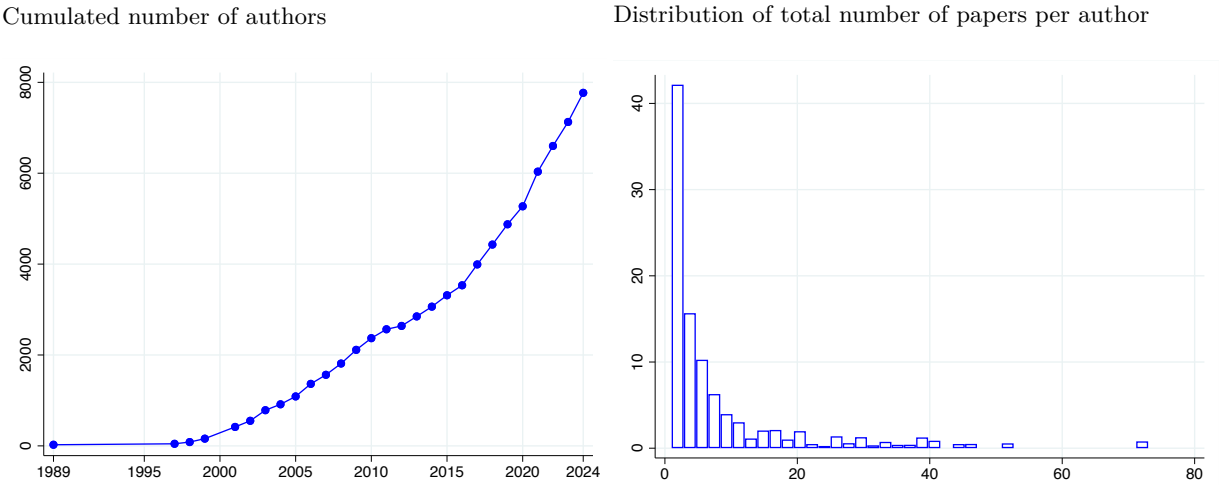
6.1.1 Research output

Digital economy research has expanded markedly over the past three decades. The left panel of Figure 1 illustrates the total number of papers presented annually from 1989 to 2024 across all conferences listed in Table 1. The number of papers is directly correlated with the number of conferences held, with most papers presented only once (maximum: seven). In the emergence stage (before 2001), annual output was low and stable. The consolidation stage (2001 onward) saw a marked increase, coinciding with the dot-com boom and rapid internet adoption, before dipping briefly during the 2011/2012 financial crisis amid uncertainty about the continuity of some conferences. The diversification stage (since 2016) has brought the steepest growth, coinciding with the rise of platforms for streaming and e-commerce, social media, and, more recently, the digital acceleration from the Covid-19 pandemic and a surge in AI-related research. The sustained growth in conferences and papers highlights the rise of the digital economy as a field of scientific significance and points to its increasing engagement with industry and policy audiences (Brynjolfsson et al., 2003; Crémer et al., 2019; Gavazza et al., 2019; Allcott et al., 2020; Enikolopov et al., 2020; Cabral et al., 2021; Peukert et al., 2022; Galasso, 2025; Dubé et al., 2025; Lutes et al., 2025).

6.1.2 Pioneers driving the expansion of the scientific community

This growth in output was accompanied by a steady expansion of the scientific community as evident in the left panel of Figure 2. During the consolidation stage, around 210 new authors joined the field annually; in the diversification stage, this number increased markedly, reaching approximately 640 new authors per year by 2024. In total, nearly 7,800 scholars have contributed at least partially to digital economy research. This expansion underscores the increasing interest in the field among researchers across disciplines. At the same time, author contributions are highly uneven. The right panel of Figure 2 shows that most authors contributed only a few papers: about 42% presented either one or two papers. In contrast, a small group of highly active scholars stands out, with some co-authoring more than 40 papers out of the 8,426 papers

Figure 2: Expansion of the digital economy research community



Note: In the left panel, the figure shows the cumulated number of authors in the field over time. Years for which data is available are marked with a dot. In the right panel, the figure shows the frequency distribution of the total number of papers authored by each individual across all conferences.

presented across 195 conferences since 1989. These pioneers are not only leading authors in terms of research output; they also serve as experts providing policy advice and play a central role in the research network through mentoring and supervising many Ph.D. students (Azoulay et al., 2010; Abbasi et al., 2011; Oettl, 2012; Zacchia, 2020; Carrell et al., 2024). Alongside journal editors, and reviewers, these scholars contributed to the formation and trajectory of digital economy research (Marquis and Tilcsik, 2013; Azoulay et al., 2019). However, transforming early initiatives into a recognizable scientific field also required institutional support.

6.2 Enablers and the consolidation of the field

The second set of findings examines how enabling institutions, such as universities, research institutes, and funding agencies, facilitated the consolidation of the field by sustaining recurring conferences, supporting research, and fostering collaboration. These enablers transformed early momentum into an internationally connected scientific field.

6.2.1 Conference locations and institutional expansion

Conference locations provide a first indication of where pioneering initiatives in digital economy research found institutional support. Over time, some conferences remained tied to their funding or hosting institutions, while others rotated internationally. Figure A.1 illustrates the cumulative global distribution of conference locations from 1989 to 2024. The United States hosted 109 conferences over three decades, with Cambridge, MA, Boston, and Stanford standing out as long-

term hubs. This was followed by Germany (42 conferences over 24 years, mostly in Mannheim and Munich), France (36 over 22 years, mostly in Paris and Toulouse), and Denmark (24 over 23 years, mostly in Copenhagen). Since the 2010s, rotating events such as SCECR and WISE have broadened the map, yet conferences outside North America and Europe remain rare.

The concentration of conference locations is mirrored in the institutional affiliations of contributing authors. Based on information from conference programs and additional co-author data collected from Google Scholar and OpenAlex, I identify 5,035 author-year observations with institutional affiliation information spanning 1989 and 2001 to 2024.[9] Because affiliation information is unavailable for 1990–2000, the analysis cannot trace institutional developments during most of the emergence stage and primarily captures changes from the consolidation stage onward. The data shows a steady increase in the number of institutions contributing to digital economy research. Between 1989 and 2007, about 34 distinct institutions contributed each year. From 2008 onward, this number fluctuated around 100 and peaked at 185 in 2024, reflecting the continued expansion of the field.[10] The rise in contributing institutions coincided with more conferences, more papers presented per conference, and a growing number of authors entering the field (see Figure 2).

Figure 3 maps the global dispersion of authors' institutions based on a geocoded sample of 2,464 author affiliations.[11] The figure highlights the continued dominance of institutions in North America and Europe. This pattern likely reflects both the ability of these institutions to attract leading researchers and the financial resources that allow them to host conferences, support research, and facilitate conference participation. Outside Europe and North America, Tel Aviv University and the National University of Singapore stand out. The limited representation of China is notable given the country's central role in digital markets (Nagaraj and Yao, 2026). The locations of conferences and author institutions therefore show both the international expansion of the field and its continued concentration in a small number of well-resourced regions.

[9] I use the first institution listed for each author-year as the author's primary affiliation and exclude secondary affiliations.

[10] The data shows a notable decline during the Covid-19 pandemic, reflecting disruptions caused by the shift to remote work and the absence of physical conferences in many cases. This does not necessarily indicate a decline in digital economy research itself, but rather a reduction in the exchange of research within conference settings.

[11] I used ChatGPT to geocode institutional affiliations and manually verified the resulting locations (Horton et al., 2023). Each institution's contribution is weighted by the inverse of the number of co-authors on the paper.

Figure 3: Relevance of institutions (1989, 2001 – 2024)



Note: The figure illustrates the cumulative weighted relevance of authors' primary institutional affiliations over time (1989, 2001 – 2024), based on 2,464 affiliation records that could be geocoded. Due to missing institution data for the years 1990 – 2000, these years are excluded from the graph. Interactive version: https://sites.google.com/view/digital-economy-research.

6.2.2 Collaborations

The expanding institutional base was accompanied by more collaboration. The left panel of Figure A.2 shows that the average number of authors per paper increased sharply after 1998, rising from fewer than 1.5 to nearly 3.5 by 2024.[12] The number of institutions contributing to a paper, shown in the right panel, followed a similar upward trend. After fluctuating around 1.7 institutions per paper during the consolidation stage, it rose to about 2 and continued to increase throughout the diversification stage. Together, these patterns indicate that collaboration both within and across institutions has become increasingly prevalent in digital economy research.

Figure A.3 further shows the evolution of intercontinental research collaborations. In the emergence stage, digital economy research was led primarily by U.S.-based scholars, with limited international collaboration. During the consolidation stage, the field became more international, although U.S.-based researchers remained central. Intercontinental collaborations increased markedly between 2008 and 2014 and then stabilized at a relatively high level. By 2024, they accounted for about 12% of all research contributions. The figure also shows a decline during the Covid-19 pandemic, consistent with the findings of Maher and Van Noorden (2021).

Overall, the evidence suggests that enabling institutions played an important role in consoli-

[12] This likely represents a lower bound of the true number of co-authors, as many conference programs list only the presenting author, and not all co-author information could be retrieved from Google Scholar or OpenAlex.

dating the field. The growing number of institutions contributing to digital economy research coincided with more conferences, more papers, a larger scientific community, and stronger cross-institutional and intercontinental collaboration (Katz and Martin, 1997; Singh, 2005; Leahey, 2016; Campos et al., 2018). At the same time, the continued dominance of a small group of well-resourced institutions in North America and Europe points to enduring path dependencies in scientific production (Jaffe et al., 1993; Marquis and Tilcsik, 2013; Kahn and MacGarvie, 2016b; Lychagin et al., 2016). Thus, the field became more institutionally embedded and internationally connected, but it remained geographically concentrated.

6.3 Audiences and the diversification of digital economy research

The third set of findings examines the diversification of the field, as digital economy research became increasingly engaged with audiences across disciplines, industry, and policy. I analyze this process in two steps: first, by examining how the field diversified across disciplines, and second, by analyzing how its research focus and methodological orientation changed as digital technologies became increasingly central to policy debates.

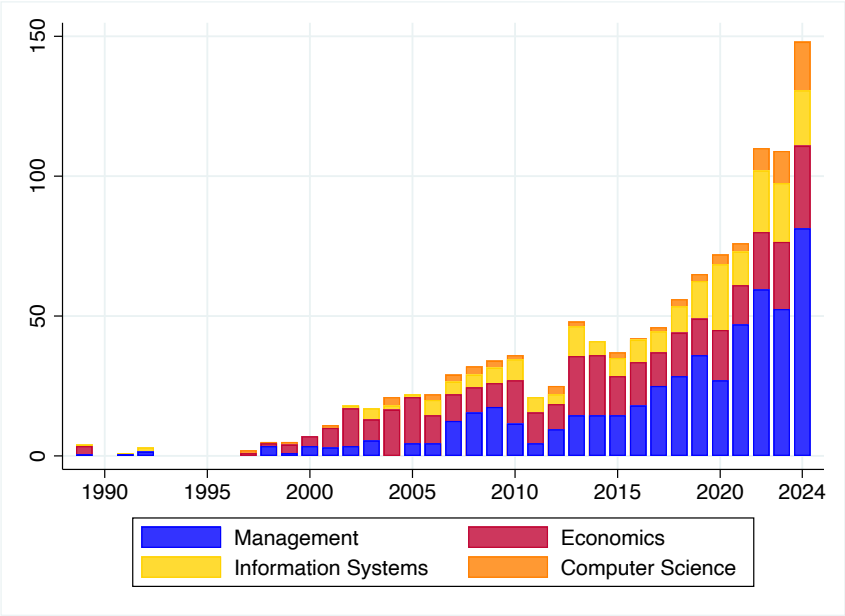
6.3.1 Interdisciplinarity

This subsection examines how the field engages with disciplinary audiences in two ways: first at the field level, through the journals in which digital economy research is published, and second at the individual level, through authors' departmental affiliations and research foci. The disciplinary categories used in this analysis should not be interpreted as sharply separated intellectual domains. Boundaries between economics, management, information systems, computer science, and related fields are fluid, and disciplinary orientations frequently overlap. The analysis therefore examines shifts in the relative prominence of these disciplines over time.

6.3.1.1 Disciplines based on journal publications

Digital economy research brings together scholars from economics, management, information systems, and computer science. To examine which disciplinary audiences the field reaches, I first analyze publication outlets. Following Rietveld and Schilling (2021), I classify each paper's main discipline using journal information from Google Scholar and the SSRN Economics of Networks eJournal. Journal information is available for 3,428 of the 8,426 papers, including 1,412 working

Figure 4: Disciplinary diversification of digital economy publications over time (1989 – 2024)



Note: For 1,165 published papers in the dataset, journal information from Google Scholar and the SSRN Economics of Networks eJournal enables classification into one of the four major disciplines. The y-axis shows the number of papers in each discipline, and the x-axis represents their publication year. Years without published papers have no bars in the figure.

papers and conference-proceeding records. Based on the first and most prominently displayed journal link on Google Scholar, I identify 1,527 papers published in academic journals, including 71 studies available via Google Books.[13] In total, 1,165 papers can be assigned to one or more of the four main disciplines based on the journal in which the final version was published.[14]

Figure 4 summarizes the results. The y-axis represents the yearly weighted number of papers published in each discipline. The figure shows that digital economy research has remained interdisciplinary throughout the entire observation period, while the relative prominence of disciplines has shifted over time. During the emergence and early consolidation stages, research on the digital economy was published predominantly in economics journals. Information systems and management journals gained prominence in the following years, and since the diversification stage, management journals have become the leading outlets for digital economy research (see also Valacich et al. (2006)). Economics and information systems continue to play substantial roles, although their relative contributions have been more stable over time, with information

[13] Another 187 records are associated with outlets that include both working papers and full articles and are therefore not classified as published.

[14] The classification is based on the journal's thematic scope as reflected in its title. Journals with a clear disciplinary focus are assigned fully to that discipline. Broader journals are assigned proportionally across all matching disciplines. Thus, a journal matching both information systems and management, such as the *Journal of Management Information Systems*, contributes 0.5 to each field.

systems increasing slightly in recent years. Computer science remains smaller overall, but has gained importance more recently, likely reflecting the rise of AI-related research and the faster publication cycles typical of computer science journals. Overall, the figure highlights both the growth of the field and its sustained engagement across disciplinary audiences.

Table A.1 complements this evidence by listing the ten most important journals, ranked by the total number of papers in the dataset published in them. *Management Science* and *Information Systems Research* rank first and second, respectively, followed by *Research Policy*, which also stands out for its high mean citation count, underscoring its relevance and broad scholarly impact (Martin et al., 2009; Tarafdar et al., 2022). To assess whether these patterns merely reflect broader growth in journal output, I collect annual publication counts from Scopus for four journals that are among the most important outlets in the dataset: *Management Science*, *Information Systems Research*, *Research Policy*, and *The RAND Journal of Economics*. I then compare these totals with the number of digital economy research papers in my dataset published in the respective journals. In recent years, digital economy research accounts for a meaningful share of all papers published in these outlets, including about 5% in *Management Science* in 2024, 10% in *Information Systems Research* in 2023, 4% in *Research Policy* in 2022, and 13% in *The RAND Journal of Economics* in 2023. Taken together, these patterns indicate that the rise of digital economy research publications reflects not only broader outlet expansion but also a growing presence of the field within major journals.

6.3.1.2 Disciplines based on authors' departments and research foci

While the journal analysis captures disciplinary diversification at the field level, authors' departmental affiliations and research foci provide a complementary measure at the individual level. I was able to extract additional information for 3,104 authors from their Google Scholar profiles. Of these, 1,216 provided sufficiently detailed information on their professorships or departmental affiliations as of 2026 to be assigned to one primary department category using explicit department labels where available and broader disciplinary keywords otherwise. One caveat of this analysis is that many authors do not report a specific professorship or department. However, many do list research interests or fields of specialization. I therefore complement the department classification with a broader research-focus classification based on keyword matches in authors' Google Scholar profile descriptions. I distinguish between eight research areas: eco-

Table 3: Departments and research foci of authors

Discipline	Department share	Research focus share
Business/Management	58.39	21.16
Marketing	3.37	6.75
Strategy	1.64	6.44
Economics	26.64	46.59
Information Systems	4.11	5.81
Computer Science	3.21	8.18
Statistics	1.56	3.69
Law	1.07	1.36
Total share	100	100
Observations	1216	1815

Note: *Department share* classifies each author into one primary discipline based on the professorship or departmental affiliation stated in their Google Scholar profile. The business/management category also includes generic business-school affiliations when no more specific field is stated. *Research focus share* is based on keyword matches in the author's research focus description and allows fractional assignment across disciplines when authors list multiple research areas. It measures the fractionally weighted share of authors whose stated research focus is related to a given discipline. Shares are reported in percent.

nomics, business/management, information systems, computer science, strategy, marketing, law, and statistics. This information is available for 1,815 authors. Unlike the department classification, the research-focus classification allows authors to be assigned to multiple research areas with fractional weights across disciplines.

Table 3 summarizes the results. Among authors for whom a department category can be assigned, about 58% are classified as business/management. This category includes both explicitly stated management affiliations and generic business-school affiliations for which no more specific field can be identified. More specific affiliations are reported separately, including marketing (3.37%), strategy (1.64%), and information systems (4.11%). About 27% are affiliated with economics, about 3% with computer science, and smaller shares with statistics and law. At the same time, the research-focus classification paints a more balanced picture: economics accounts for about 47% of weighted keyword matches and business/management for about 21%, followed by computer science (8.18%), information systems (5.81%), strategy (6.44%), marketing (6.75%), statistics (3.69%), and law (1.36%). Of the 1,815 authors for whom a research-focus classification can be constructed, 437 report research interests associated with more than one discipline. Among authors classified as business/management based on their affiliation, the average weighted research focus is about 34% business/management, 32% economics, 12% strategy, 11% marketing, and 6% information systems.

These findings suggest that interdisciplinarity is visible not only at the field level but also at the level of individual scholars. Business schools and management departments constitute an

important institutional home for digital economy research, even though many scholars based there engage with research areas beyond management. This may partly reflect differences in hiring incentives across disciplines, as business schools may have faced stronger demand for faculty with expertise on digitization because of its relevance to firms and managerial education.

This disciplinary pattern also aligns with the journal-based results in Section 6.3.1.1, where leading management journals are important publication outlets. At the same time, broader research interests and the presence of journals from several disciplines show continued engagement with multiple disciplinary audiences.

6.3.2 Changing research focus and methods

The field's diversification is also reflected in the topics and methods researchers engage with.

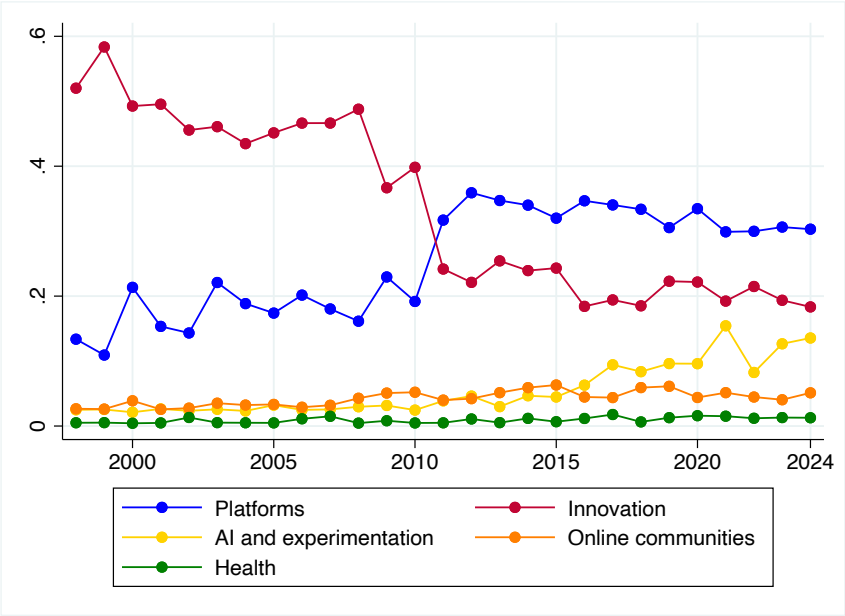
6.3.2.1 The evolution of research topics

To identify meaningful patterns and trends in digital economy research, I first apply topic modeling to paper abstracts. Specifically, I use *BERTopic*, a topic modeling technique based on the *BERT* NLP model (Egger and Yu, 2022). Because topic models perform better on richer text samples than on titles alone, I include only the 7,156 papers for which abstracts are available. *BERTopic* identifies clusters of semantically related papers and their representative keywords, which I use to characterize the underlying research topics. For a more detailed analysis, I focus on the five most frequent topics.[15] To facilitate interpretation, I manually assign titles to each topic based on the most frequent keywords associated with them, which are presented in Table A.2. Figure 5 shows the average annual topic probability among papers presented in each year.

During the consolidation stage in the early 2000s, innovation questions dominated research on the digital economy. This topic, represented by keywords such as *firms, innovation, knowledge, research, technology*, and *development*, captures the field's early emphasis on how digital technologies affected firms, knowledge production, and technological change (Gordon, 2000; Bresnahan et al., 2002; Brynjolfsson et al., 2021). IP rights also played a prominent role, reflecting

[15] *BERTopic* combines transformer-based embeddings, *UMAP* dimensionality reduction, *HDBSCAN* clustering, and *c-TF-IDF* topic representation. I configure the model to produce 10 topics, set a minimum topic size of 20, remove English stop words using a *CountVectorizer*, and calculate topic probabilities so that papers can be associated with multiple topics. Outlier papers are reassigned using a probability-based approach. Together, the five most frequent topics account for 69% of the average topic probability mass and are at least partially represented in 99% of papers with abstracts.

Figure 5: Evolution of top five topics in digital economy research (1998 – 2024)



Note: The figure shows the evolution of the five most frequent topics in digital economy research from 1998 to 2024. The y-axis reports the average topic probability across papers presented in each year. Papers may receive positive probability mass on multiple topics. Due to limited abstract coverage before 1998, the figure starts in 1998.

policy debates over piracy that intensified with the rise of illegal file-sharing platforms such as Napster (Waldfogel, 2012; Bacache-Beauvallet et al., 2015; Reimers, 2016; Peukert et al., 2017; Bradley and Kolev, 2023). As the field matured, the thematic focus shifted from foundational innovation questions toward applications and broader societal impacts.

Research on platforms has played a substantial role across all stages, but its prominence increased markedly around 2011 and remained high throughout the diversification stage. Characterized by keywords such as *data, online, consumers, platform, market, information, users*, and *content*, this topic reflects the growing economic significance of platform-based business models and their increasing prominence in competition policy, regulation, and broader societal debates (Parker et al., 2016; Rietveld and Schilling, 2021; Aguiar et al., 2023; Rong et al., 2023).

A third major development is the rise of AI and experimentation. This topic becomes more prominent in the diversification stage and is associated with keywords such as *AI, data, experiments, learning, treatment, models*, and *methods*. I interpret its growth as reflecting the greater availability of digital data, the rise of AI-related research, and the increasing prominence of experimentation, alongside the field's broader methodological shift toward empirical analysis (see Section 6.3.2.3). This pattern is also closely related to the field's growing engagement with

industry (Kaiser et al., 2018; Wagner and Goossen, 2018; Athey and Luca, 2019; Arora et al., 2021; Ahmed et al., 2023; Gofman and Jin, 2024; Arts et al., 2026), and to its increasing relevance for evidence-based policymaking (Crémer et al., 2019; Gavazza et al., 2019; Cabral et al., 2021; Peukert et al., 2022; Lutes et al., 2025).

The remaining two smaller topics point to the broadening of the field into more industry-specific applications. The online communities topic, represented by keywords such as *crowdfunding, open, projects, software, source*, and *OSS*, captures research on open-source software, crowdfunding, and user-driven production (Lerner and Tirole, 2002; Von Hippel and Von Krogh, 2003; Lakhani and Von Hippel, 2003; Boudreau et al., 2021; Haese and Peukert, 2026). The health topic, represented by keywords such as *health, patients, healthcare, care, physicians*, and *hospitals*, remains small overall but illustrates the engagement of digital economy research with specific, data-intensive contexts (Athey and Stern, 2002; Miller and Tucker, 2009; Dranove et al., 2014).

6.3.2.2 Thematic shifts in digital economy research

As a second step, I use a structured text-mining approach to identify the most frequent terms in each year of the data and visualize them as word clouds. Figure A.4 complements the *BERTopic* results by highlighting high-frequency terms and thereby capturing nuances and shifts that are less visible in the topic model. For this analysis, I apply the *SpaCy* NLP model to the titles and abstracts of all papers in the dataset.[16]

In the emergence stage, digital economy research was dominated by economic questions related to *pricing, optimization*, and *information* transmission. These foundational themes align with early debates on market efficiency, competition, and the potential of digital technologies to reduce transaction and information costs (Bertschek and Kaiser, 2004). Over the 1990s, the field moved toward broader questions about the economic implications of digital technologies. By 2000, the most frequent terms – *economy, market, firm*, and *digital* – highlight a growing emphasis on the relationship between digital technologies, firms, markets, and economic growth.

By 2010, during the consolidation stage, the prominence of *innovation* mirrors the *BERTopic*

[16]SpaCy is a pre-trained NLP model that identifies linguistic tokens, including nouns, proper nouns, and adjectives, while excluding stop words and non-alphabetical characters. I lemmatize the extracted tokens, retain those that appear more than 20 times, and calculate yearly token frequencies to generate the word clouds.

results in Figure 5. Other frequent terms included *firm, research, model, knowledge*, and *effect*. This pattern points to a field increasingly focused on how digital technologies shape firm behavior, innovation, and knowledge production.

In the diversification stage, platform- and data-related terms become more prominent. In 2024, frequent terms included *platform, study*, and *consumer*. This pattern reinforces the *BERTopic* finding that platform-related research became increasingly prominent over time. The continued prominence of terms such as *effect*, *model*, and *impact* also points to the field's methodological maturation and closer engagement with evidence-based policymaking.

Taken together, the *BERTopic* and *SpaCy* analyses show a clear shift in research focus across the three stages of the field's evolution. The emergence stage centered on new digital technologies and their economic implications, the consolidation stage emphasized more applied and policy-relevant work on innovation and platforms, and the diversification stage has been marked by platforms, online communities, AI, and experimentation. This pattern is consistent with Greenstein's assessment that, since the early 2010s, "platforms have become more prominent [...] and innovation has become less prominent," while "AI has started to explode recently." Overall, both approaches point to a shift from foundational economic questions to a broader, policy-engaged research agenda.

6.3.2.3 Methodological evolution

Lastly, I examine whether diversification was accompanied by methodological change. Because authors often specialize in either theoretical or empirical research, the balance between these contributions provides insight into the field's methodological trajectory. To systematically classify papers, I use two approaches: an AI-based classification as the primary approach and a traditional keyword-based classification as a robustness check.

First, I use OpenAI's GPT-5.6 Luna model through the API to classify each paper based on the semantic context of its title and abstract. In a first stage, the model is instructed to classify a paper as *theoretical* when its substantive contribution is primarily theoretical or conceptual, as *empirical* when its substantive contribution is primarily based on empirical analysis, and as *mixed* when it contains substantial theoretical and empirical contributions. Papers for which the available information is insufficient are classified as *unclassified*. In a second stage, papers

that remain unclassified are reassessed using a separate prompt that again prioritizes the title and abstract but permits prior model knowledge when the specific paper is recognized with high confidence. In practice, prior model knowledge plays only a negligible role: among the 2,346 papers reassessed, 1,518 (64.7%) are evaluated based on their title and abstract, while prior model knowledge is used for only eight papers (0.34%). The complete prompts and implementation details for both classification stages are reported in Appendix C.

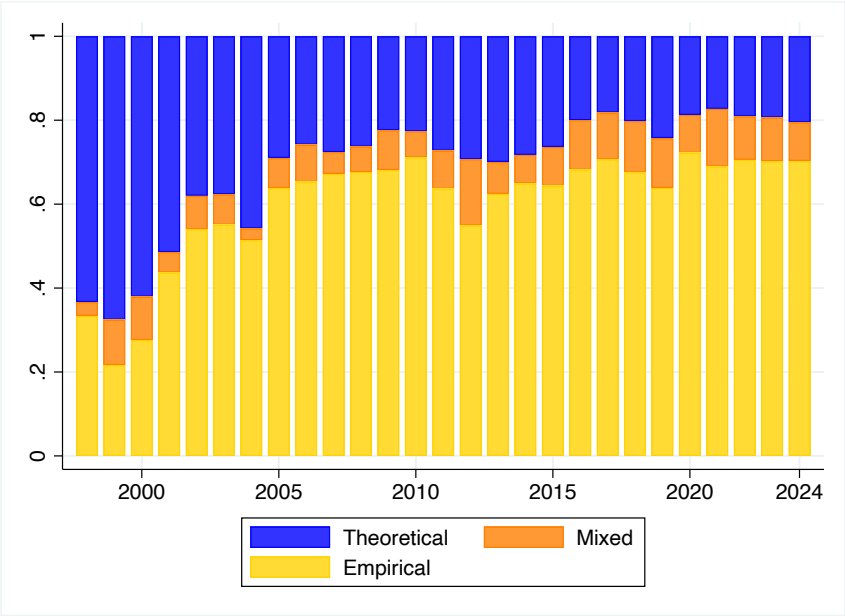
Out of 8,426 papers, 4,463 are classified as empirical, 1,607 as theoretical, and 651 as mixed. Another 1,671 cannot be classified due to missing or very short abstracts. Due to the small number of papers before 1998, the figure excludes 34 earlier papers, 43% of which are classified as *theoretical*. To validate the classification, I manually classify a random sample of 100 papers, of which 34% are empirical, 33% theoretical, and 33% mixed. Comparing these manual classifications with the AI-based classifications, excluding unclassified papers, yields an error rate of 14%. Most classification errors involve mixed papers, which can be difficult to distinguish consistently from purely theoretical or empirical work; excluding these cases reduces the error rate to 2%. For each year, I calculate the share of papers in each category relative to the total number of classified papers.

Figure 6 shows a pronounced change in the methodological composition of the field. Theoretical contributions account for 63% of classified papers in 1998, but their share declines substantially over time, while the share of empirical papers increases, a pattern that is also reflected in the findings from the word clouds. From around 2016 onward, the distribution becomes comparatively stable, with empirical papers accounting for about 70%, theoretical papers for about 20%, and mixed papers for about 10%.

Second, as a robustness check, I apply a more traditional keyword-based classification based on the relative occurrence of predefined theoretical and empirical keywords in paper titles and abstracts. Figure C.1 reports the results and describes the classification procedure and its validation in detail. Despite differences in the classification methods, the same broad temporal pattern emerges: the share of theoretical research declines while empirical research becomes increasingly prevalent. Additional analyses by publication field show that the shift toward empirical research cannot be explained solely by changes in disciplinary composition.

In sum, the analysis highlights the field's transition from theoretical exploration to empirical val-

Figure 6: Annual distribution of theoretical, empirical, and mixed papers (1998 – 2024)



Note: The figure shows the yearly share of 6,721 papers categorized as theoretical, empirical, or mixed. Unclassified papers are excluded from the analysis, and the figure starts in 1998 due to limited abstract coverage before that year.

idation. The declining share of theoretical contributions suggests that the emergence stage was more strongly characterized by conceptual and theoretical work. From the consolidation stage onward, digital economy research increasingly resembles broader methodological developments documented in economics and information systems, while data availability and policy relevance have also increased. Prior studies show a long-run rise in empirical research and the study of real-world phenomena, alongside a decline in purely theoretical work and a growing emphasis on causal identification (Farhoomand, 1987; Cheon et al., 1993; Figlio, 1994; Benbasat and Zmud, 1999; Lyytinen, 1999; Colander, 2005; Angrist and Pischke, 2010; Hamermesh, 2013; Einav and Levin, 2014; Angrist et al., 2017; Sarker et al., 2025). Related debates are also visible in management and marketing, where scholars have called for more phenomenon-driven and empirics-first research (Hambrick, 2007; Golder et al., 2023; Graebner et al., 2023). For the diversification stage, this methodological shift, together with the topic-modeling and text-mining results above, points to increasing engagement with societal and policy audiences and a stronger orientation toward evidence-based debates.

7 Discussion: Conferences as field-building infrastructures

This paper asks how scientific fields evolve, with particular attention to fields whose phenomenon under study changes because of technological change. Using a unique conference-based dataset, the empirical analysis documents substantial growth in digital economy research output and the scientific community, increasing institutional and intercontinental collaboration alongside persistent geographic concentration, and diversification in the field's disciplinary composition, research topics, and methods. Prior work has shown that conferences reduce search costs, create temporary co-location, foster collaboration, and shape later scientific impact (Boudreau et al., 2017; Chai and Freeman, 2019; Campos et al., 2018; de Leon and McQuillin, 2020; Gorodnichenko et al., 2021; Spiegel and Toivanen, 2022). Taken together with this literature and the historical evidence in Section 5, the findings in Section 6 suggest that conferences can function as field-building infrastructures by repeatedly bringing together researchers to exchange knowledge, develop shared research agendas, and engage with disciplinary, industry, and policy audiences. This perspective helps explain how digital economy research developed into an influential interdisciplinary field, or, as Michael Ward puts it, "amazingly successful" in terms of its "theoretical contributions, insights to policymakers, [and] pipeline of talent to industry." The NBER *Economics of Digitization* initiative is an illustrative example as it combines conferences, grants, working-paper series, and PhD tutorials, with high relevance to policymaking.

Selective access and concentration. Yet the empirical results also show that the expansion of digital economy research was accompanied by persistent concentration. Section 6.1 documents substantial growth in the scientific community alongside highly uneven contributions across authors, and Section 6.2 shows broader institutional participation and stronger intercontinental collaboration alongside continued concentration in North America and Europe. Combined with the historical evidence, these findings point to a dual role of conferences in field evolution: conferences create opportunities for exchange, feedback, collaboration, visibility, and audience engagement, while access to these opportunities depends on pioneering organizers and the enabling institutions that provide funding and infrastructure. At the individual level, the role of pioneers illustrates this tension: a small group of highly active scholars repeatedly contributes to the conference sample, as shown in Figure 2. Prior research suggests that such scholars can influence scientific communities through network formation and knowledge diffusion (Azoulay

et al., 2010; Oettl, 2012; Zacchia, 2020; Carrell et al., 2024). By identifying emerging research opportunities, organizing conferences, mentoring junior scholars, and connecting dispersed communities, pioneers may also shape which topics, methods, institutions, and audiences become central (Azoulay et al., 2010, 2019). Conferences can therefore support field evolution while also generating path dependence. A similar trade-off appears at the institutional level. Digital economy research has become increasingly international and collaborative, while remaining concentrated in well-resourced institutions in North America and Europe (Section 6.2), suggesting that conferences helped scale the field yet also reproduced geographic and institutional inequalities observed in global science (Merton, 1968; Jaffe et al., 1993; Singh, 2005; Kahn and MacGarvie, 2016a; Fortunato et al., 2018; Nagaraj and Yao, 2026). This also affects the historical interpretation: the conference-based data capture the institutionalized core of digital economy research, whereas earlier or adjacent work often circulated through other channels. Turning to disciplinary engagement, the observed diversification of research topics and disciplines in Section 6.3 relates to prior research on how scientific fields develop across disciplinary boundaries (Martin, 2012; Fortunato et al., 2018; Baruffaldi and Poege, 2025). This diversification also has implications for the field's future audiences. As the field increasingly addresses questions of AI, platform governance, privacy, copyright, and data access, its relevant audiences may continue to broaden. The challenge is therefore to design conferences that preserve quality and coherence while integrating different disciplines around shared research problems.

Conference funding and research evaluation. The historical evidence in Section 5 and the results on enabling institutions in Section 6.2 highlight the role of conferences and supporting institutions in the field's evolution. Prior research shows that institutional infrastructures and funding policies can shape cumulative knowledge production and influence how scientific fields evolve (Furman and Stern, 2011; Furman et al., 2012; Stephan, 2015). If conferences function as field-building infrastructures, their support becomes a research-policy issue. Figure A.5 shows that conference-related funding accounted for less than one percent of total NSF award obligations between 2011 and 2025. Given this relatively small funding share, understanding the scientific returns to conferences is particularly relevant, as they may generate field-level benefits that extend beyond conventional measures of research output. This points to three research-policy implications. First, future work should examine how the returns to conference funding can be measured relative to other forms of research infrastructure. Funding agencies could assess

field-building outcomes such as collaborations, follow-on publications, shared data resources, research agendas, junior-scholar entry, and engagement with diverse audiences. Second, agencies could provide flexible small-scale support for conferences in emerging and interdisciplinary fields, where modest resources may have substantial coordination value. For digital economy research, this means supporting conferences that bring together economists, management scholars, information systems researchers, computer scientists, legal scholars, regulators, firms, and technical experts. Third, research evaluation criteria may also shape the development of emerging fields. Criteria that rely narrowly on predetermined journal lists may discourage scholars from contributing to interdisciplinary research before it becomes established in recognized disciplinary outlets (Valacich et al., 2006; Stephan, 2015). These constraints may vary across disciplines because departments differ in the journals, conferences, and other scholarly contributions they recognize. Within economics, the NBER illustrates how an established disciplinary institution can provide visibility and legitimacy to an emerging research area. Research evaluation systems could therefore recognize a broader range of contributions, including policy reports, industry reports, data documentation, tutorials, and interdisciplinary conferences.

Implications for science-of-science methods. The empirical analysis illustrates the dimensions of field evolution that can be traced with conference-program data, including the expansion of research output and the scientific community, changes in contributing institutions and collaboration, and shifts in disciplinary composition, research topics, and methods. This perspective complements science-of-science research based on publications, citations, and co-authorship (Katz and Martin, 1997; Newman, 2004; Wuchty et al., 2007; Fortunato et al., 2018). These sources are well suited to tracing scientific activity once it becomes visible in formal scholarly records, but they may miss earlier stages of field formation, when research often circulates through conferences and working papers. This limitation is especially important for fields shaped by technological change, where the phenomenon under study can change rapidly relative to journal publication cycles. Conference data therefore provide a window into field evolution by capturing topics, methods, collaborations, and audiences at an early stage of the research process (Lampel and Meyer, 2008; Boudreau et al., 2017; Chai and Freeman, 2019; Gorodnichenko et al., 2021; Spiegel and Toivanen, 2022). Future science-of-science research can build on this approach by combining conference data with publications, working papers, funding records, scientific and policy citations, co-authorship, interviews, and archival material to better

understand how fields emerge, consolidate, and diversify.

8 Conclusion

This study examines how scientific fields evolve, with particular attention to fields whose phenomenon under study changes because of technological change. Using digital economy research as an empirical case, I develop a conceptual framework in which pioneers, enablers, and audiences drive field evolution across three stages: emergence, consolidation, and diversification. During emergence, pioneering scholars created conferences that connected fragmented research on digital technologies and their economic implications. During consolidation, enabling institutions, funding initiatives, and improved data access expanded collaboration and helped the field scale. During diversification, the field broadened in audience engagement and thematic scope, while causal empirical research became increasingly prominent.

The paper contributes to science-of-science research in three ways. First, it develops a conceptual framework for field evolution. Second, it shows that conferences can operate as field-building infrastructures and provide a window into emerging research agendas and scientific communities before they are fully reflected in journal publications. Third, it provides the first systematic empirical historiography of digital economy research as a field shaped by repeated technological change.

The case of digital economy research also highlights several scope conditions that open avenues for future research. First, the conceptual framework is developed retrospectively from an interdisciplinary field whose phenomenon under study changes substantially with technological change, and its applicability to other scientific fields remains to be established. Comparative studies could assess whether the framework extends to fields with different disciplinary structures, including more siloed fields, and to fields characterized by more stable research phenomena. Second, the conference-based evidence primarily captures the institutionalized core of digital economy research and may underrepresent earlier or adjacent research that circulated through other channels. Future research could combine conference data with publication, citation, and co-authorship data from bibliographic databases, as well as qualitative and historical evidence, to examine how different research communities contribute to field evolution. Because conferences themselves can influence which researchers and research agendas become part of this institutionalized core, future research could also study how their funding and governance shape

participation, field boundaries, and persistent geographic and institutional inequalities, as well as how the returns to conference funding compare with other forms of research infrastructure. Third, this study shows that the evolution of digital economy research has been accompanied by changes in data availability and engagement with policy and industry audiences. Future research could study how changes in data access and audience engagement shape field evolution. Regulatory initiatives such as the EU DSA may expand scientific access to digital data, but they also raise questions about proprietary data, scientific freedom, and open science. Understanding how such data access arrangements and governance models shape the independence, quality, and direction of scientific fields is therefore an important next step.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the author used ChatGPT and Microsoft Copilot for assistance with coding, data collection, data extraction from PDF documents, and writing. After using the tools, the author reviewed and edited the output as needed and takes full responsibility for the content of the publication.

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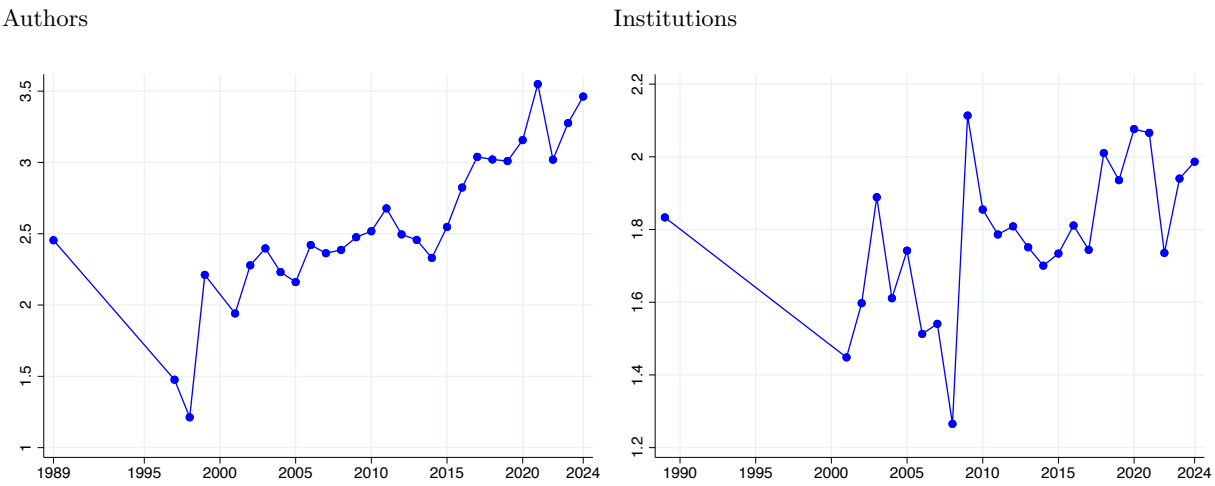
Appendix A

Figure A.1: Cumulative conference locations worldwide (1989 – 2024)



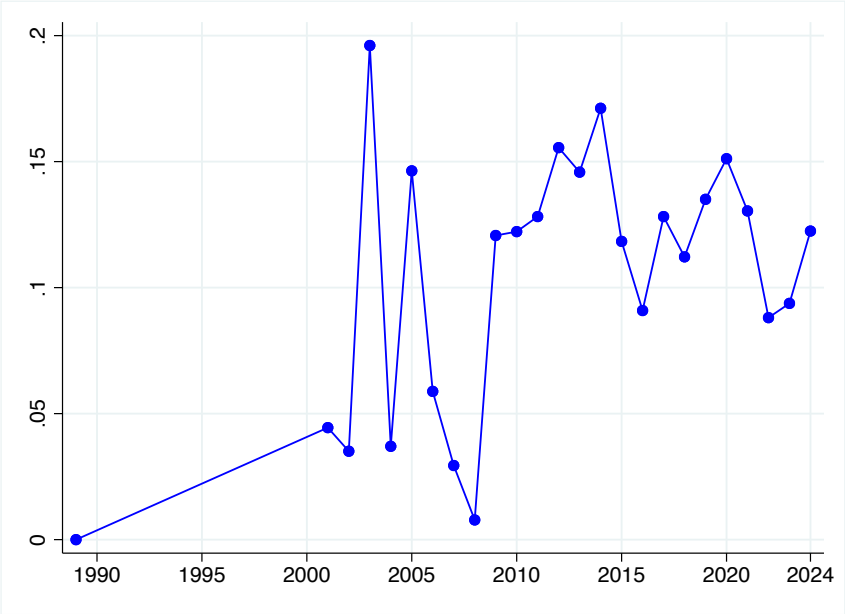
Note: The figure illustrates the cumulative number of conferences hosted in each country between 1989 and 2024, based on data from the conferences listed in Table 1. It also includes conferences for which the program could not be obtained. Interactive version: https://sites.google.com/view/digital-economy-research.

Figure A.2: Average number of authors and institutions per paper



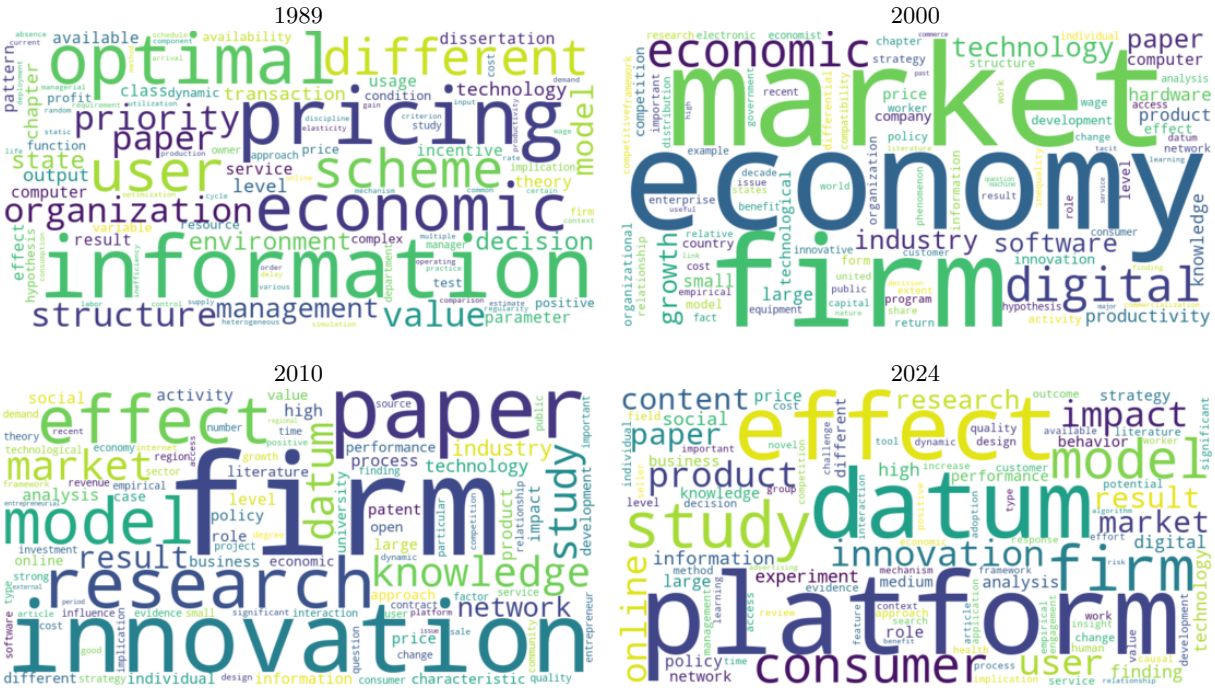
Note: The left panel shows the average number of authors contributing to a paper each year. The right panel shows the average number of institutions contributing to a paper each year. Years for which data is available are marked with a dot.

Figure A.3: Yearly share of intercontinental collaborations



Note: The figure shows the average annual share of intercontinental collaborations from 1989 to 2024. Years for which data is available are marked with a dot.

Figure A.4: Word clouds for the years 1989, 2000, 2010, and 2024



Note: Remaining years and interactive version: https://sites.google.com/view/digital-economy-research.

Table A.1: Most frequent journals

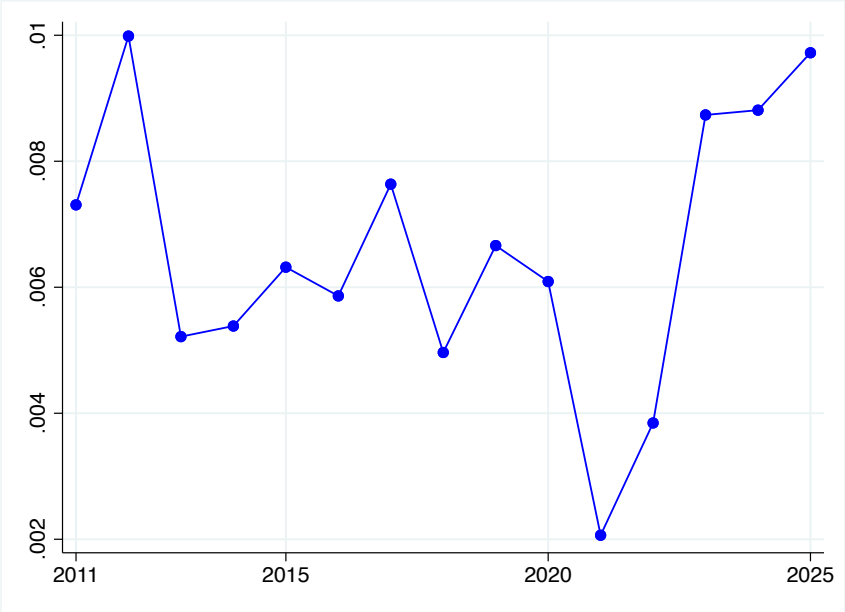
Rank	Journal	Number of papers	Mean citations
1	Management Science	98	141
2	Information Systems Research	93	121
3	Research Policy	50	457
4	MIS Quarterly	47	190
5	Marketing Science	36	167
6	Industry and Innovation	16	253
7	Journal of Management Information Systems	16	123
8	International Journal of Industrial Organization	15	204
9	The RAND Journal of Economics	14	80
10	Nature	11	500
Total publications		1527	175

Note: The table lists the most frequent journals in which digital economy research is published. It shows how many papers are published in each of the journals and their mean number of citations on Google Scholar. Citation information is available for 1,488 out of the 1,527 published papers. *Nature* includes publications in *Nature*, *Nature Communications*, and *Nature Human Behaviour*.

Table A.2: Top 5 topics and their corresponding keywords

#	Topic	Keywords
1	Platforms	data, online, consumers, platform, platforms, market, information, users, social, content
2	Innovation	firms, innovation, knowledge, paper, research, firm, new, technology, development, industry
3	AI and experimentation	ai, data, experiments, learning, treatment, models, methods, model, design, using
4	Online communities	platform, crowdfunding, open, projects, platforms, software, source, oss, backers, market
5	Health	health, patients, healthcare, care, patient, information, physicians, hospitals, medical, data

Figure A.5: Yearly share of NSF award obligations allocated to conference-related funding (2011–2025)



Note: Conference-related funding includes awards related to conferences, workshops, tutorials, summer schools, travel grants, doctoral consortia, and collaborative scientific exchange. A visible break occurs during the Covid-19 period, when conference-related obligations declined markedly, consistent with disruptions to in-person scientific exchange. The NSF data can be accessed at https://www.nsf.gov/about/about-nsf-by-the-numbers.

Appendix B: Robustness to the inclusion of broader conferences

One may be concerned that broader conferences such as DRUID and MAD shape the results disproportionately, given that they are not exclusively focused on digital economy research. To address this concern, this Appendix reassesses the results after restricting DRUID and MAD to papers identified as related to digital economy research based on keyword matches in the title or abstract, including terms associated with digitization, the internet, online platforms, artificial intelligence, machine learning, software, and related technologies. This approach retains digitally relevant papers from these conferences while excluding papers outside the scope of the study. The resulting sample contains 7,647 conference-paper observations, corresponding to 6,986 unique papers. In Table B.1, the number of papers for DRUID decreases from 2,626 to 1,195, and for MAD from 83 to 68. The tables and figures reported below show that the main findings remain substantively unchanged. I therefore focus only on the small changes that emerge from this robustness check.

As expected, restricting DRUID and MAD to papers related to the digital economy leads to a slight decline in the total number of papers and in the cumulative number of authors, as shown in Figures B.1 and B.2. Looking at Table B.3, the ranking of journal outlets changes only modestly. The leading outlets remain the same, with *Management Science* and *Information Systems Research* continuing to rank first and second. The main differences are that *Research Policy* moves down from third to fifth place, and *Industry and Innovation* is replaced in the top ten by *Production and Operations Management*. Overall, the pattern of publication outlets remains largely stable.

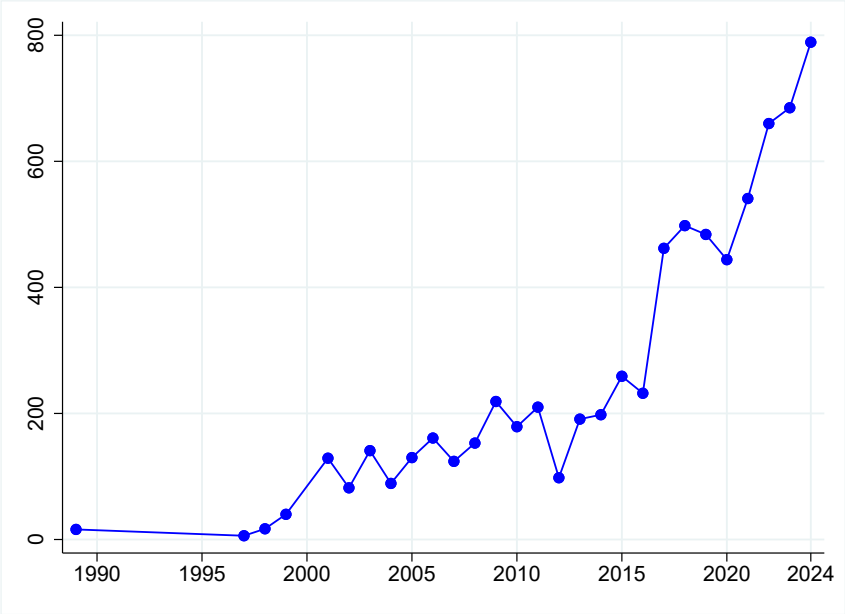
The BERTopic results are also broadly similar (see Table B.4 and Figure B.5). The two largest topics remain unchanged; *Innovation* is somewhat less prominent in the earlier years, *Platforms* is more prominent from the early 2010s onward, and both *AI and experimentation* and *Online communities* account for slightly larger shares throughout the period. The keywords associated with *Online communities* shift from crowdfunding and open-source software toward news and social media. The overall topic structure and time trends remain qualitatively stable. The SpaCy-based NLP results are even less affected, as shown by the comparison between Figure A.4 and Figure B.8. Taken together, these robustness checks suggest that the main empirical patterns and interpretations are robust to a narrower conference sample definition.

Table B.1: Scientific conferences and workshops on digital economy research (digital-only)

Conference	First year	Last year	Collected since	Collected until	No. years	No. papers
WISE - Workshop on Information Systems and Economics	1989	2025	1989	2023	14	861
DRUID Conference	1996	2025	1997	2024	25	1195
CIST - Conference on Information Systems and Technology	1996	2025	2018	2024	7	1109
Understanding the Digital Economy	1999	1999	1999	1999	1	14
TSE Digital Economics Conference	2001	2025	2001	2024	15	385
ZEW Conference on the Economics of ICT	2001	2025	2001	2024	22	659
SCECR - Symposium on Statistical Challenges in E-commerce Research	2005	2025	2005	2024	12	766
Paris Conference on Digital Economics	2006	2025	2008	2024	12	322
Searle Conference on Internet Search and Innovation	2010	2017	2010	2015	6	111
NBER Conference Economics of Digitization	2011	2025	2011	2024	13	96
NBER Summer Institute IT and Digitization/ Digital Economics and AI	2012	2025	2012	2024	13	369
BU Platform Strategy Research Symposium	2013	2025	2013	2024	11	268
MIT Conference on Digital Experimentation	2014	2025	2014	2024	9	723
Munich Summer Institute	2016	2025	2016	2024	8	216
CESifo Area Conference on Economics of Digitization	2017	2024	2017	2024	8	197
NBER Conference Economics of Artificial Intelligence	2017	2024	2017	2024	8	115
Digital Economy Network Workshop	2019	2025	2019	2024	6	134
Management, Analytics, and Data Conference	2022	2025	2022	2024	3	68
European Digital Platform Research Network Summit	2023	2025	2023	2024	2	39

Note: *First year* and *Last year* indicate the inaugural and most recent conference years, respectively. *Collected since* and *Collected until* indicate the earliest and latest years for which program data was obtained. *No. years* and *No. papers* report the number of conference years and papers retrieved.

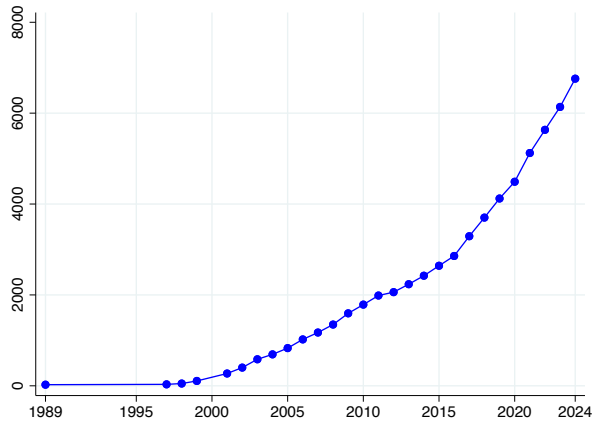
Figure B.1: Growing output of digital economy research (digital-only)



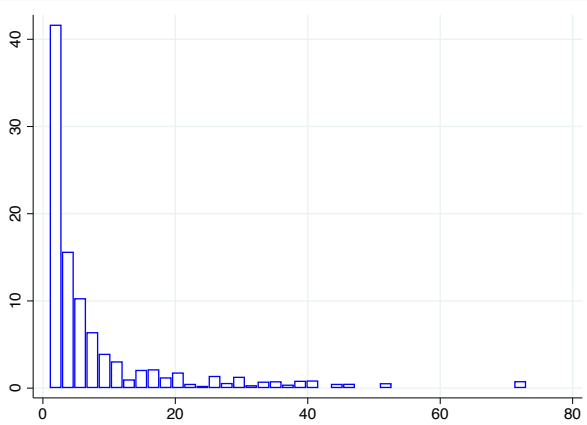
Note: The figure shows the annual number of papers presented across all conferences included in this study and listed in Table B.1, after restricting DRUID and MAD to papers identified as related to digital economy research. Years for which data is available are marked with a dot.

Figure B.2: Expansion of the digital economy research community (digital-only)

Cumulated number of authors



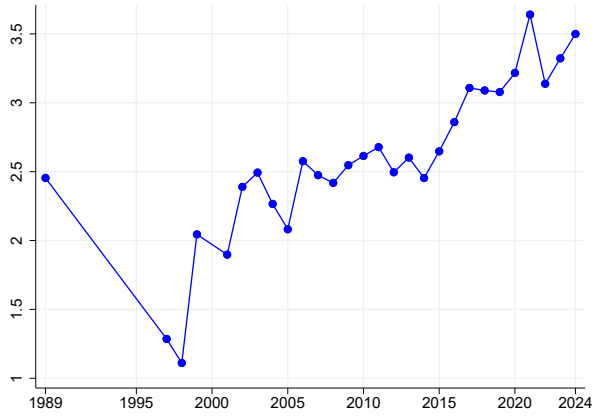
Distribution of total number of papers per author



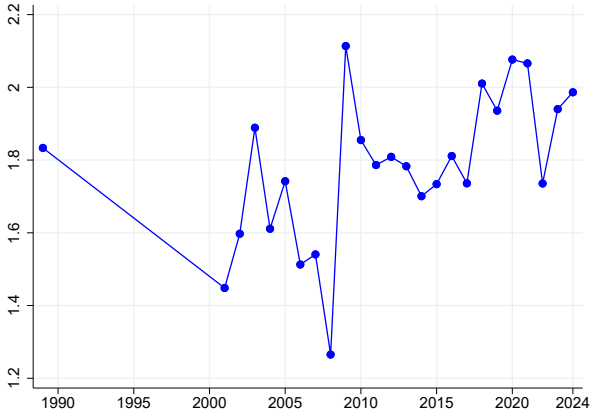
Note: In the left panel, the figure shows the cumulated number of authors in the field over time. Years for which data is available are marked with a dot. In the right panel, the figure shows the frequency distribution of the total number of papers authored by each individual across all conferences.

Figure B.3: Average number of authors and institutions per paper (digital-only)

Authors



Institutions



Note: The left panel shows the average number of authors contributing to a paper each year. The right panel shows the average number of institutions contributing to a paper each year. Years for which data is available are marked with a dot.

Figure B.4: Relevance of institutions (1989, 2001 – 2024, digital-only)



Note: The figure illustrates the cumulative weighted relevance of authors' primary institutional affiliations over time (1989, 2001 – 2024), based on 2,463 affiliation records that could be geocoded. Due to missing institution data for the years 1990 – 2000, these years are excluded from the graph.

Table B.2: Departments and research foci of authors (digital-only)

Discipline	Department share	Research focus share
Business/Management	57.51	18.44
Marketing	3.80	7.49
Strategy	1.30	5.59
Economics	26.35	47.59
Information Systems	4.64	6.49
Computer Science	3.43	8.89
Statistics	1.76	3.99
Law	1.21	1.51
Total share	100	100
Observations	1078	1609

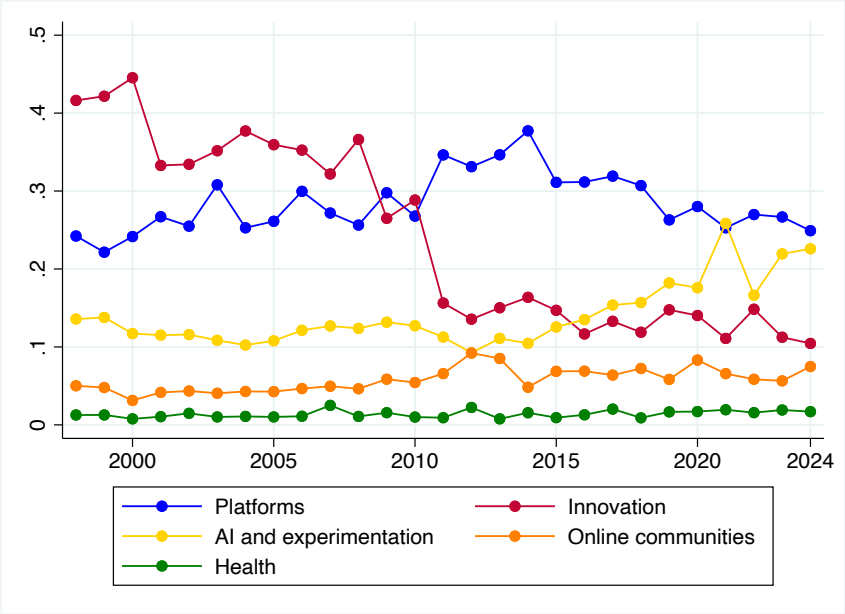
Note: *Department share* classifies each author into one primary discipline based on the professorship or departmental affiliation stated in their Google Scholar profile. The business/management category also includes generic business-school affiliations when no more specific field is stated. *Research focus share* is based on keyword matches in the author's research focus description and allows fractional assignment across disciplines when authors list multiple research areas. It measures the fractionally weighted share of authors whose stated research focus is related to a given discipline. Shares are reported in percent.

Table B.3: Most frequent journals (digital-only)

Rank	Journal	Number of papers	Mean citations
1	Management Science	93	145
2	Information Systems Research	93	121
3	MIS Quarterly	47	190
4	Marketing Science	36	167
5	Research Policy	28	293
6	Journal of Management Information Systems	16	123
7	International Journal of Industrial Organization	15	204
8	The RAND Journal of Economics	13	86
9	Nature	11	500
10	Production and Operations Management	10	12
Total publications		1279	169

Note: The table lists the most frequent journals in which digital economy research is published. It shows how many papers are published in each of the journals and their mean number of citations on Google Scholar. Citation information is available for 1,244 out of the 1,279 published papers. *Nature* includes publications in *Nature*, *Nature Communications*, and *Nature Human Behaviour*.

Figure B.5: Evolution of top five topics in digital economy research (1998 – 2024, digital-only)

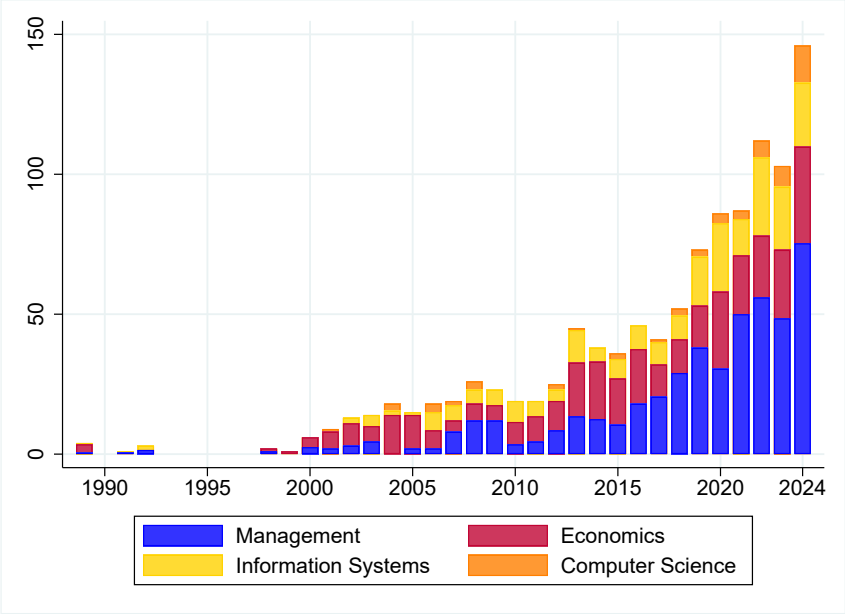


Note: The figure shows the evolution of the five most frequent topics in digital economy research from 1998 to 2024. The y-axis reports the average topic probability across papers presented in each year. Papers may receive positive probability mass on multiple topics. Due to limited abstract coverage before 1998, the figure starts in 1998.

Table B.4: Top 5 topics and their corresponding keywords (digital-only)

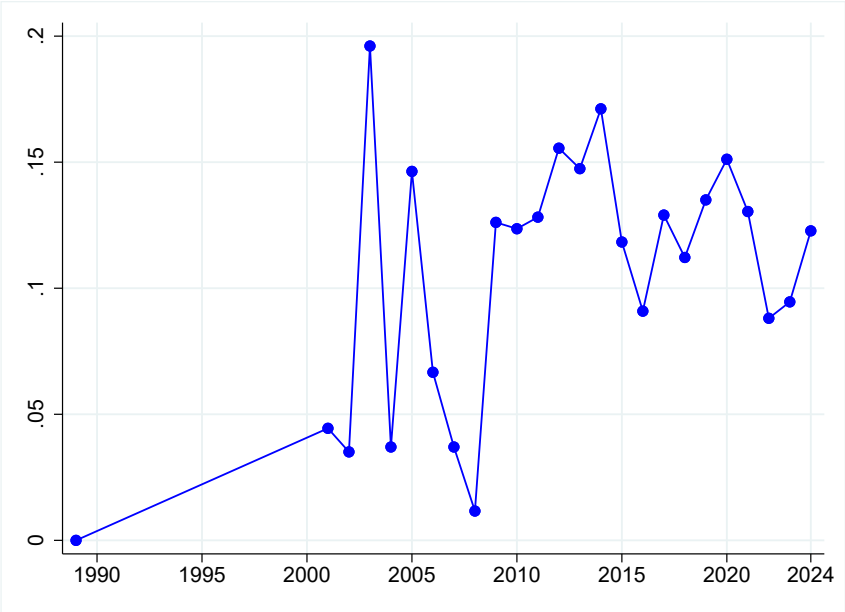
#	Topic	Keywords
1	Platforms	data, consumers, online, platform, platforms, market, users, information, model, price
2	Innovation	firms, innovation, technology, knowledge, paper, research, firm, new, development, industry
3	AI and experimentation	ai, data, learning, experiments, model, using, study, information, models, design
4	Online communities	news, social, content, media, online, influence, network, networks, information, users
5	Health	health, patients, healthcare, care, patient, information, physicians, medical, hospitals

Figure B.6: Disciplinary diversification of digital economy publications over time (1989 – 2024, digital-only)



Note: For 1,100 published papers in the dataset, journal information from Google Scholar and the SSRN Economics of Networks eJournal enables classification into one of the four major disciplines. The y-axis shows the number of papers in each discipline, and the x-axis represents their publication year. Years without published papers have no bars in the figure.

Figure B.7: Yearly share of intercontinental collaborations (digital-only)



Note: The figure shows the average annual share of intercontinental collaborations from 1989 to 2024. Years for which data is available are marked with a dot.

Figure B.8: Word clouds for the years 1989, 2000, 2010, and 2024 (digital-only)

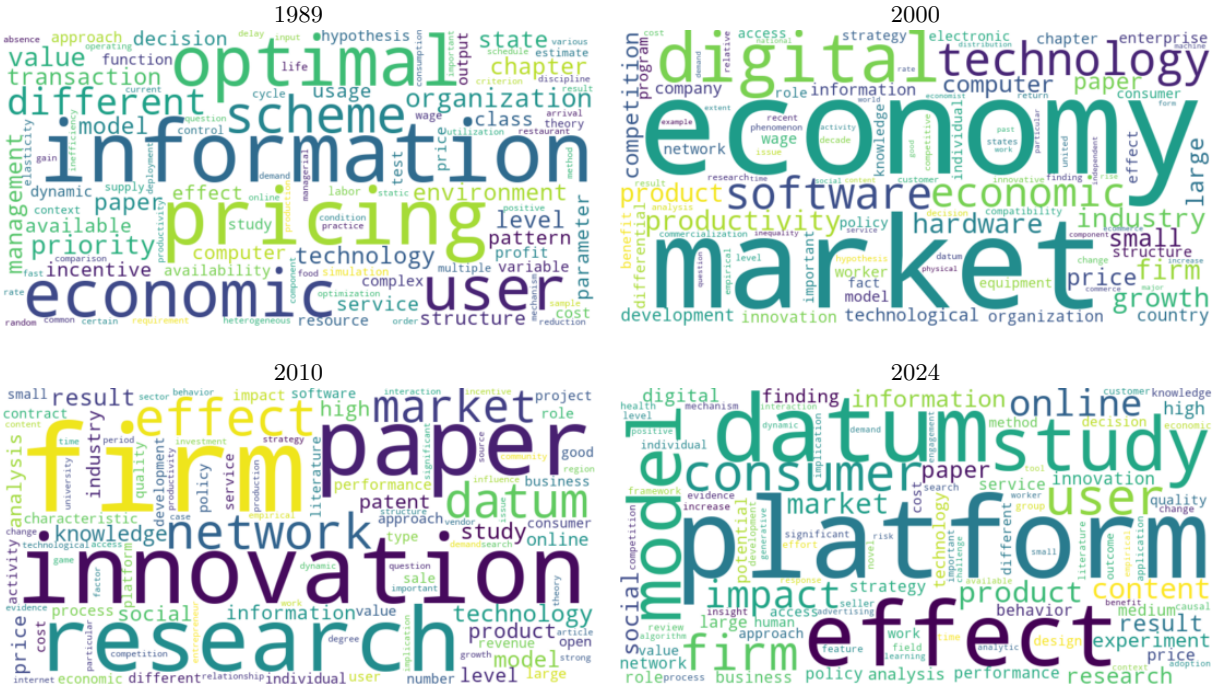
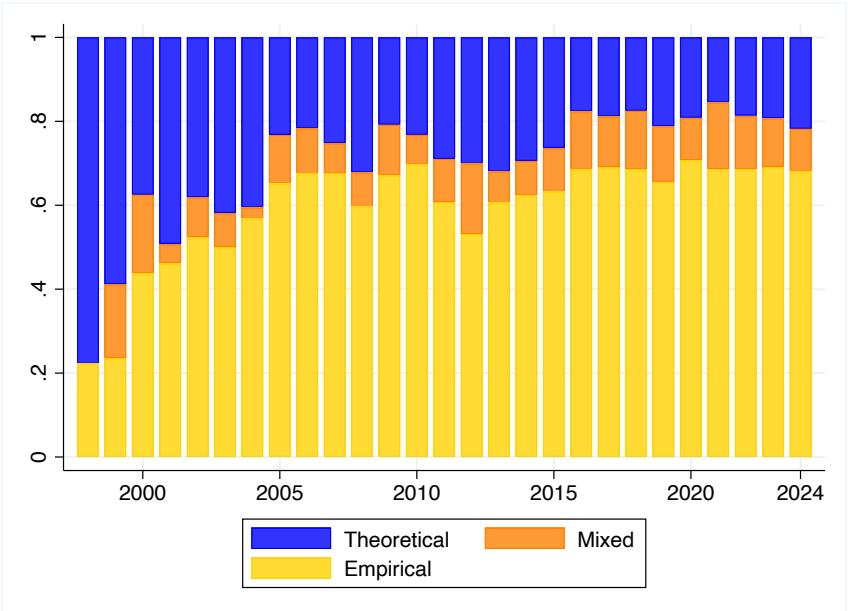


Figure B.9: Annual distribution of theoretical, empirical, and mixed papers (1998 – 2024, digital-only)



Note: The figure shows the yearly share of 5,144 papers classified as theoretical (1,170), empirical (3,386), or mixed (588) using OpenAI's GPT-5.6 Luna model. Unclassified papers are excluded from the analysis, and the figure starts in 1998 due to limited abstract coverage before that year.

Appendix C: Methodological classification used in Section 6.3.2.3

This Appendix provides additional details on the classification of papers as theoretical, empirical, or mixed. The main analysis uses an AI-based classification with OpenAI's GPT-5.6 Luna model. As a robustness check, I additionally perform a keyword-based classification. Despite the substantial methodological differences between the two approaches, they yield broadly similar conclusions regarding the shift from theoretical toward empirical research over time.

AI-based classification. The AI-based classification proceeds in two stages using OpenAI's GPT-5.6 Luna model through the API.

First-stage classification. In the first stage, all papers are classified exclusively on the basis of their title and abstract. The model returns one of four categories—*theoretical*, *empirical*, *mixed*, or *unclassified*—together with a confidence level, indicators for theoretical and empirical contributions, and a short rationale. The complete prompt is:

> *Classify an academic paper's research design from only its title and abstract.*
>
> *Use exactly one category:*
>
> ***Theoretical**: the main contribution develops or derives a new formal, analytical, mathematical, or substantive conceptual theory/model/method. A literature framing, citations to theory, hypotheses, or the word "model" alone do not make a paper theoretical.*
>
> ***Empirical**: the main contribution analyzes observed or collected evidence, including administrative or observational data, surveys, interviews, case studies, lab/field/online experiments, or causal/econometric estimation. Simulations or numerical illustrations alone do not make a paper empirical.*
>
> ***Mixed**: the same paper makes both a substantive new theoretical/model contribution and a substantive empirical analysis. Do not choose Mixed merely because an empirical paper motivates hypotheses with existing theory or because a theoretical paper contains a small numerical illustration.*
>
> ***Unclassified**: the title/abstract does not provide enough reliable evidence to determine the paper's main research design, or the abstract appears corrupted, fragmentary, unrelated, metadata-like, or unusable.*

Judge the main contribution, not isolated keywords. If evidence is insufficient or the text is corrupted, choose Unclassified. Keep rationale under 25 words and refer only to evidence visible in the title/abstract.

Second-stage reassessment. Papers classified as *Unclassified* in the first stage are reassessed using a second prompt. The title and abstract remain the primary source of evidence. Only when these are missing, corrupted, fragmentary, or insufficient may the model use prior knowledge of the specific paper, and only when it recognizes the paper with high confidence. The reassessment additionally records whether the decision is based on the title and abstract, prior model knowledge, or insufficient evidence. Among the 2,346 papers reassessed, the decision basis is the title and abstract for 1,518 papers (64.7%), while prior model knowledge is used for only eight papers (0.34%). Thus, prior model knowledge plays only a negligible role in the final classification. The complete reassessment prompt is:

Reassess the research design of an academic paper that was previously left unclassified.

Use exactly one category:

***Theoretical**: the main contribution develops or derives a new formal, analytical, mathematical, or substantive conceptual theory/model/method.*

***Empirical**: the main contribution analyzes observed or collected evidence, including administrative or observational data, surveys, interviews, case studies, experiments, or causal/econometric estimation.*

***Mixed**: the same paper makes both a substantive new theoretical/model contribution and a substantive empirical analysis.*

***Unclassified**: there is still not enough reliable evidence to determine the paper's main research design.*

Use the supplied title and abstract first.

If the title/abstract are missing, corrupted, fragmentary, or insufficient, you may use reliable prior knowledge of the specific paper if you recognize that paper with high confidence.

Do not infer the classification merely from the author, journal, field, topic, or what papers with similar titles usually do.

Keep the rationale under 25 words.

For papers receiving a valid second-stage classification, the reassessed category replaces the first-stage *Unclassified* category; otherwise, the paper remains unclassified. Because prior model knowledge cannot generally be traced to a particular external source, the basis of each reassessment is recorded and its use is permitted only under the restrictive conditions specified above.

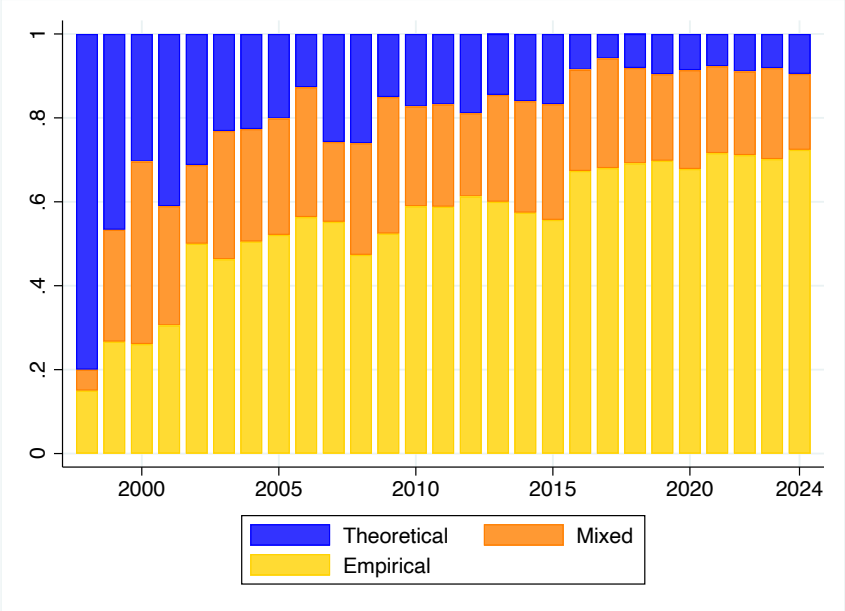
Validation. I validate the final classification using a manually classified random sample of 100 papers, consisting of 34 empirical, 33 theoretical, and 33 mixed papers. Excluding unclassified papers, the error rate between the manual and AI-based classifications is 14%. Most remaining errors concern mixed papers, for which distinguishing a substantive combination of theoretical and empirical contributions from predominantly theoretical or empirical work is difficult. Excluding mixed cases reduces the error rate to 2%.

Keyword-based robustness classification. As an additional robustness check, I retain the earlier keyword-based classification. Titles and abstracts are lemmatized using SpaCy, and theoretical and empirical scores are calculated from keyword matches. The theoretical dictionary consists of *theory, theoretical, theorize, framework, proposition, hypothesis, hypothesize, proof, conceptual, concept, conceptualize, assumption, assume, paradigm, equilibrium, model.* The empirical dictionary consists of *empirical, evidence, experiment, experimental, measure, measurement, treatment, randomized, controlled, trial, survey, regression, panel, quantitative, qualitative, test, data, dataset, model.* The term *model* appears in both dictionaries because it can refer to either theoretical or empirical work. I include *data* in the empirical dictionary to reduce the number of unclassified papers; this does not affect the broad temporal pattern.

The classification distinguishes theoretical research, which primarily develops conceptual or theoretical models, from empirical research, which primarily emphasizes data-based analysis and estimation; mixed research combines both elements. Papers are classified as theoretical when the theoretical score exceeds the empirical score, empirical when the empirical score exceeds the theoretical score, and mixed when the two scores are equal and positive. Papers with no matches in either dictionary remain unclassified. The keyword-based approach classifies 5,917 papers: 782 as theoretical, 3,769 as empirical, and 1,366 as mixed. Comparing the keyword-based classifications with the manual classifications, excluding unclassified papers, yields an error rate of 43%. Most discrepancies involve papers classified as mixed; excluding these cases reduces the error rate to 3%. Figure C.1 shows the resulting annual distribution. Despite the substantial

methodological differences between the AI-based and keyword-based procedures, both show the same broad temporal pattern of a declining theoretical share and an increasing prevalence of empirical research.

Figure C.1: Annual distribution of theoretical, empirical, and mixed papers (1998–2024, keyword-based classification)



Note: The figure shows annual shares among the 5,917 papers classified using the keyword-based procedure described above. Unclassified papers are excluded from the analysis, and the figure starts in 1998 due to limited abstract coverage before that year.