

Conceptualization and Measuring the Digital Economy

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Mykola Melnyk, ORCID: <https://orcid.org/0000-0002-6244-5190>

Master in International Business, Kozminski University, Warsaw, Poland

Mykyta Kuchkin, ORCID: <https://orcid.org/0000-0001-6125-2701>

Master of Management, Kozminski University, Warsaw, Poland

Andriy Blyznyukov, ORCID: <https://orcid.org/0000-0002-2385-9841>

Master of Finance and Accounting, Warsaw School of Economics, Warsaw, Poland

Corresponding author: melnyk.polska@gmail.com

Abstract

With the rapid development of digital technology, a wide range of academic fields is devoting an increasing amount of attention to the study of “digital citizen building”, often known as “DC”. Despite the widespread use of the word, academics are free to define DC in any way they think proper. The primary emphasis of this extensive inquiry is an in-depth examination of every book that has ever been written about DC themes and values. Journal articles that other researchers have evaluated made up 114 of the total. The topic of education is mentioned in more than half of the entries on the list. Even while each major DC notion was welcomed by its specific disc method, they all had one thing in common: a storm. Concerns raised by participants and prior research on the DC study were considered in these outcomes. The difficulty is that there is a significant shortage of research information on young children, as well as a deficiency in the use of conventional methods of research that are relevant to developmental cohesion. According to the findings of the current integrated study, collaboration across different racial groups is necessary to solve both policy and operational challenges in the District of Columbia research community.

Keywords: Digital Citizenship, Conceptualization, Measurement, Digital Technology, Digital Economy.

JEL Classification: M10, M21.

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Introduction

As multiple economic sectors are progressively incorporated and new economic development opportunities are created, information and communication technology is now necessary for economic growth. The practices of our day include globalization, changing consumer behavior, mobility, and information availability. The global financial system is being drastically altered by digital technology. Establishing a strong digital economy would provide significant prospects for corporate growth and development, boosting investment flow, the use of human resources, and global finance. The phrase “digital economy” originally appeared in 1995, when 1994 was viewed as a revolution in the development of information technology equipment. Moreover, at that time, the internet became an important source of “free” content (Jorgenson, 2001). Throughout history, ever-changing technologies have transformed economies (telegraph, train, car). On the other hand, the Internet is a global phenomenon used by developed and poor nations (Rifkin, 2011).

Under the moniker's “third industrial revolution”, researchers Jeremy Rifkin and Raymond Kurzweil, Raymond Kurzweil's key theories, sought the gradual introduction of new technological solutions (such as clean and renewable energy sources, nanomaterial combinations, new biomedical materials, biomedical technologies). The scholars Jeremy Rifkin and Raymond Kurzweil are the leading proponents of the phrase “the third industrial revolution,” which calls for the gradual adoption of a vast array of new technology innovations solutions (such as clean and renewable energy sources, composite materials, and nanomaterials, biomedical advancements, 3D printing technology, widespread e-mobility, etc.) (Kurzweil, 2018). This

“digital economy” integrates the digital sector with new digital services and platforms and is defined as “part of a fully-fledged or primarily digital production economy through a business plan focused on digital assets or services”. “Digital economy” refers to the increasing use of ICT in all sectors of the economy (Ivanova, 2009). Citizenship education has long been a significant issue in the realm of education. Citizenship education traditionally has two goals:

- to instill in its people national, political, cultural, and religious ideals and behaviours (Abowitz & Harnish, 2006).
- to gain the information and abilities (skills) necessary to comprehend and exercise one's rights and obligations as a citizen, including the capability to engage in social and political activities and the practical and responsible use of society and media creation (Hobbs & Jensen, 2009).

Digital access and learning were heavily emphasized when the phrase “digital citizenship” first emerged in textbooks. DC is often seen by those who share this concern as a talent required for a man to execute his rights and duties in the digital age, (Ribble & Miller, 2013). Three significant consequences of internet usage and communication in mapping their research on internet use and public engagement in the US. Using the Internet improves economic prospects and income for citizens, particularly for members of ethnic minorities. More people participate in politics and the public sphere when social media and the Internet are used. There are disparities in Internet access about age, education, income, and ethnic diversity, and there is a connection between these changing circumstances.

Some academics are highly concerned about their digital citizenship (DC) study and thinking, emphasizing the control of digital connections and participation by governments and technical authorities via technology codes and data collecting (Isin & Ruppert, 2020). To appreciate the current condition of the knowledge in the domain, the present study intends to deliver a full review of the DC literature, including definitions, approved research courses, methodologies used, whether there is evidence that DC research is conducive to multidisciplinary research, and, if so, what kinds of conceptual growth and performance have been made possible by such interdepartmental cooperation. The present comprehensive review seeks to respond to three important research issues to address this area of study: What is the circulation of the magazine in DC like, and how has it evolved? How is DC interpreted and envisioned by researchers? We did a thorough analysis of many parts of the DC literature study to shed light on these issues and learn more about the current state and potential growth directions in this expanding subject. Recent research has avoided emphasizing any concept of disciplinary action or performance direction in choosing and assessing the process, although DC papers include a variety of ideas and disciplines. It is done to make sure that the research can provide an unbiased assessment of how different educational and practical goals have influenced the growth of this field of study. It also enables us to better grasp the present status of DC research within the context of different structures and academic disciplines to spot significant obstacles and gaps in its advancement (McCosker et al., 2016).

Literature Review

Given the two-digit yearly growth rates seen by the global economy, particularly in the Southern Hemisphere, the digital economy is still a relatively young phenomenon (WEF, 2015). The political and economic dynamics causing this pandemic are already based on new technical innovations (themselves shaped by broad powers). The internet's arrival in the 1990s was strongly tied to the economic revolution, and this foundation is still in place now. New ICTs have also been instrumental in the economic transformation that took place during the years 2000 to 2010. Many examples include the Internet of Things and new consumer electronics (such as mobile phones and tablets), the increasing strength of data use due to the distribution, analysis and algorithmic decision-making that comes with big data, and the development of automated systems (OECD, 2015). This technology's emergence is a collection of digital costs or potential things a person or organization may accomplish with a digital system in the context of their operations (Heeks, 2017). These include datafication (extension of data storage events), digital processing (conversion of all analogue to digital conversions), virtualization (physical extraction operations), and production (randomization of data utilization and technological startups) (Heeks, 2016). Any technology's influence may be interpreted as a result of its depth and scale of spread (Handel, 2015). The influence of digital technology on the economy is expanding quickly due to its quick dissemination, notably in emerging nations, and increased depth of impact at ever-rising prices. Economic systems, processes and sectors are being restructured due to this effect. Consumer behaviour and firm interactions with business models are also changing (Dahlman et al., 2016). Also, new economic systems, processes, and industry sectors may be conceptualized this way. New business models will also take centre stage in the address, even if they are not yet commercially viable. Take the idea of “Industry 4.0” (see Figure 1), for instance.



Figure 1. Industrial Framework 4.0 and Its Digital Technology Impact

Source: Geissbauer et al., 2016

One paradigm emerging from a variety of expressions and realities is the concept of a digital economy. Some argue that this approach is at the forefront of economic growth and is responsible for “deep regional impacts on businesses, jobs, and people” and “life-changing economic crises” (Brynjolfsson & Kahin, 2000; Bahl, 2016). The digital economy provides a significant opportunity to stimulate economic growth in developing countries, and increase income and labor (WEF, 2015). Higher digital employment with a lower income in the Southern Hemisphere may lead to global revenue consolidation (Beerepoot & Lambregts, 2015). The domestic markets for digital innovation in developing countries are growing and evolving (Quinones et al., 2015). And among the digital benefits, we have already seen that can reduce economic inequality are crooked markets, labor institutions, and online forums in the South that provide unemployment (Lehdonvirta, 2016). In addition to these challenges, there are many challenges. There is a risk of publication, for instance, owing to low heights of numerical knowledge and too widespread use of technology (Dahlman et al., 2016).

There is a risk of negative investment in the digital economy and some instability in the digital world of developing countries due to limitations (lack of resources, skills, resources, and relationships) (Foster & Heeks, 2010). Additionally, any digital work collection created in the Northern Hemisphere could be detrimental to the workforce of developing nations (Martin, 2016). Particularly in developing countries (Manyika et al., 2013), as well as in the North and South of the world, there are risks associated with not using the digital economy (risks digital technology can contribute to “productive restructuring” and thus increase. However, most research and policy proposals focus on high-income countries, apart from the enormous benefits and risks of poor countries and the digital economy. Research into the effects of low- and middle-income countries on workers, organizations, and governments of the Southern Hemisphere is lacking.

Method. IR may be seen as a form of a systematic review. However, it does not limit the textbooks that can be used, and it is best suited for studies that aim to comprehend the current degree of advancement and the gaps in state of the art in the topic being researched. In addition, it enables the establishment of links between workplaces that are analogous to one another (Cooper, 1998). A growing number of other academic areas (Lehr et al., 2003) is adopting it. Depending on how well known the topic of the study is inferential, statistics may provide answers to a wide range of research questions (Torraco, 2005). Adults who already have a wealth of knowledge may benefit from the in-depth evaluations and analyses that IR provides of the basis for various sorts of information. Through the provision of a rigorous theoretical framework, IR has the potential to contribute to the provision of the basis for future study on novel or original geographical subjects. Due to the relative newness of DC, the focus of the research is on collecting a comprehensive understanding of how DC is considered and/or assessed in various fields. If the subject is directed at adults or teenagers, the results of integrated review studies may help the development of theory, the awareness of important challenges, the need for more research.

Collection of Data and Information. After determining the objectives of the research project, a systematic review was conducted using PRISMA1 (Optional Reporting Submit for Systematic Review and Analysis of Meta-Analyses) (Moher et al., 2009) to find relevant information and send it to DC. We need to ensure that neither the sources nor the search phrases we employ are biased in any way if we want the integrated review to accurately reflect DC research across a wide range of fields of study. It was done with the express intention of removing any possibility of prejudice against publications that were published in particular academic areas.

Investigation of the Data. After then, the data were coded and analyzed in two separate steps. We started by looking at the year that each item was published as well as the type of publication it was (such as peer-reviewed journals, other research publications, and professional literature) to get a sense of how things have changed over time and the purpose of the study for published DC. This study provides solutions to these problems. Since we only employed academic publications that had been peer-reviewed for the second phase of the data analysis, we did not need to use quality assurance for the data testing in this study because their quality was already ensured by the fact that they had been examined by other researchers (Whittemore & Knafl, 2005). Those with a basic understanding of what's being said (Sulossaari et al., 2011). This list does not include essays, commentary, editing, book reports, newsletters, conference proceedings, books, and book chapters. Figure 2 displays the publication's PRISMA flowchart for your convenience.

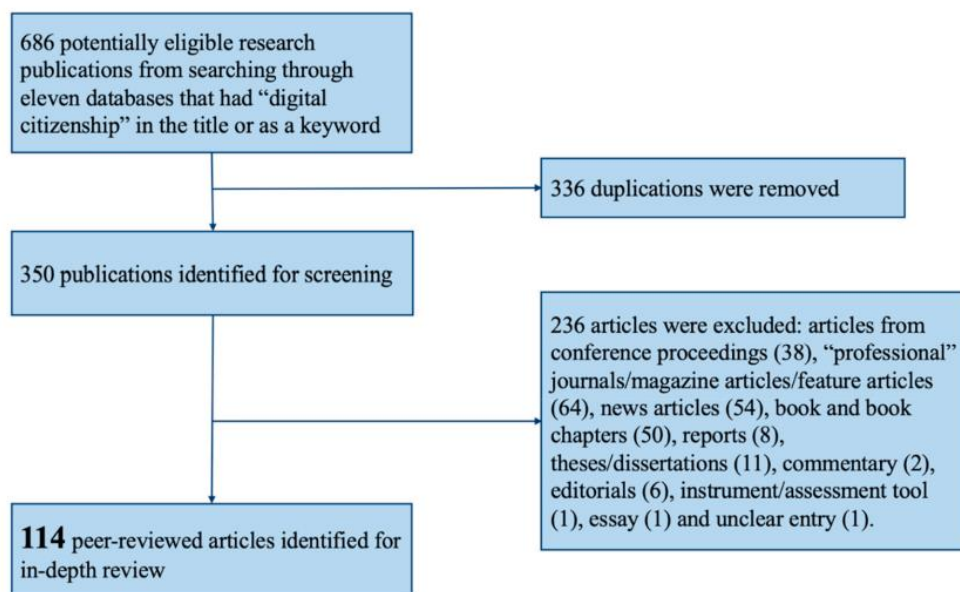


Figure 2. PRISMA Chart

Source: L.L. Chen et al., 2021

PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. It can be used to report evaluative reviews of randomized trials and systematic reviews of other types of research. Details can be found from <http://www.prisma-statement.org>.

An Analysis and Review of the Information. Through an analysis of the data gathered during the second coding round, we found answers to the remaining two study questions. The selected journal articles were subjected to a comprehensive content analysis throughout the second and third rounds of the peer-review process. Specialists developed the coding system that will be used to evaluate proposals in child development and digital citizenship in the first step. DC, the research that was done, and the conventional method for reading published literature are all included in a code that we developed to capture the fact that DC is well-documented in many different academic domains (as represented by peer review journals). Every contribution was examined to see whether or not the standards of the journal had been met, as well as whether or not an appropriate definition of digital citizenship had been provided (if one existed) (real or false). Additionally, participant age, study style (quantitative, qualitative, or hybrid methods), and research background were broken down into categories. The coding technique is broken down into parts and fully detailed in the subsections of the Results section that are pertinent to those parts.

Results

Recurring ideas are seen in the literature on cyber citizenship. After going through 350 search results, we gained a significant amount of knowledge on the recent developments in the publishing industry in Washington, District of Columbia. It suggests that there is still some interest in this topic in the modern day. The first piece of evidence found goes back to 1999. These volumes may be broken down into three primary categories: articles from academic journals. Only 27 out of the total of 350 articles that were gathered had their first publication date before 2009. It represents 7.7 percent of the total. Figure 2 demonstrates how three distinct types of publication have been consistently popular throughout history. In comparing the three phases of book production, the category known as “expert books” had the most increase from 2015 to 2018, although all three steps have lately shown considerable expansion. The scientific community wasn't the only one intrigued in DC; schoolteachers and libraries were also curious about it.

A Format for the Publishing of Research on Responsible Use of Digital Technologies. We analyzed the conformity of 114 articles from scholarly journals to have a better understanding of the fundamental disciplinary viewpoints that have contributed to the formation of the current body of knowledge on DC. As seen in Table 1, academic journals are the most common venue for publishing works through the process of peer review.

Table 1. Distribution of Journal Disciplinary Background (n=114)

Disciplinary background of journals	Number
Education/Higher education/Educational technology	61
Political/Society/Community/Democratic participation/Law	27
Media/Communication Others:	11
Business/Business education/Business technology	3
Ethics/Philosophy	4
History and sociology	2
Sciences and arts	3
Social sciences	3

Source: Mossberger et al., 2007

Most publications in other fields are extremely rare; the only exceptions are special issues that attract a large number of papers in a single year, such as 2015's ethics and philosophy issue or 2017's increased interest in DC-related internet monitoring concerns. Both of these issues focused on topics related to the District of Columbia. The other fifty percent of the research projects that provided a comprehensive description of DC went with Mossberger et al. (2007) focus on digital participation). After that, the floor was opened up for anybody else who wanted to voice their thoughts and ideas. On the other hand, the vast majority of publications that are not intended for instructional purposes, such as those dealing with politics and social science as well as history, ethics, and the philosophy of social media, are likely to accept the definition that Mossberger and colleagues developed (2007). Although these two DC perspectives have been accepted to varying degrees by many sectors of society, such as educational institutions, political parties, the legal system, and ethical organizations, there is no difference in the conception of disciplinary action. It is the case despite the fact that there is no difference in disciplinary action in concept.

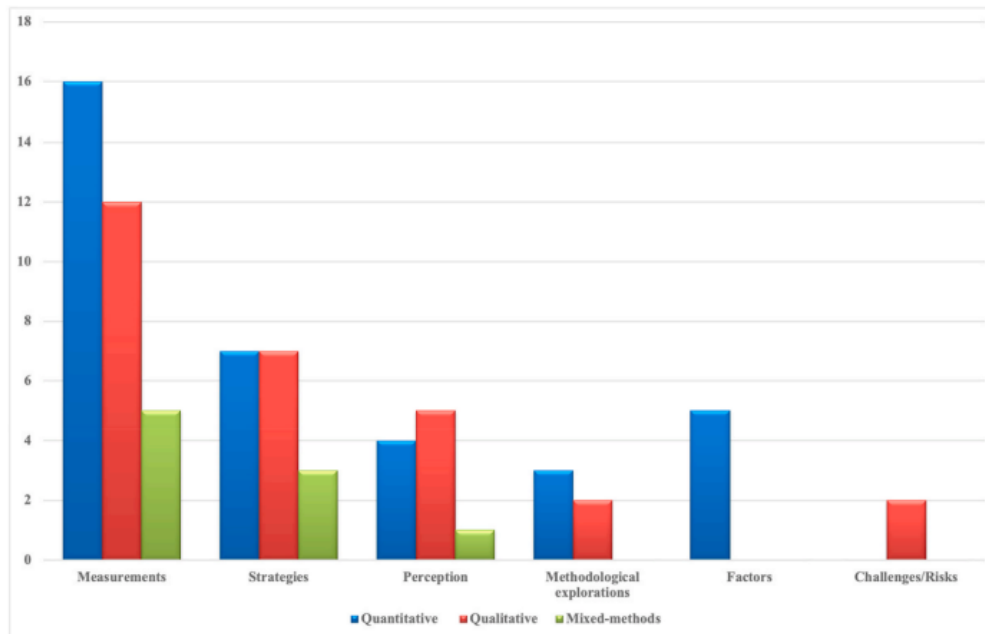


Figure 3. Methodological Approaches

Source: Ribble, 2011

Figure 3 shows the research focuses and the methodologies that were used in the 66 empirical publications that were reviewed.

With a substantial emphasis placed on studies into DC to define the specific study themes and research material that are covered in the case studies, in-depth assessments of 66 academic papers were performed. The coding system for Table 2 was produced using a straightforward method that was based on the many aspects of the research.

Table 2. The Distribution of Disciplinary Backgrounds for the 47 Articles that Have Adopted Either/Both of the Two Most Popular Definitions of Digital Citizenship

	Mossberger, Tolbert, and McNeal's online participation theory	Ribble's nine dimensions of digital citizenship
Business/Business education/Business technology	1	0
Education/Higher education/Educational technology	11	26
Ethics/Philosophy	2	1
History and sociology	1	0
Media/Communication Others:	2	0
Political/Society/Community/Democratic participation/Law	5	2
Sciences and arts	0	2
Social sciences	0	1

Source: Ribble, 2012

As seen in Figure 5, researchers in each of these fields use a wide array of research approaches. According to the results, the major purpose of the study was to evaluate significant aspects of DC, such as DC's engagement in the digital community and its level of digital competence. The research utilized a wide range of methods and standards that are of very high quality and widely recognized worldwide. In contrast, analysis on the factors that had a role in the development of DC revealed only moderation approaches as contributing factors. The methodology utilized in these two studies on the challenges and threats individuals face was very high. The bulk of the experimental research that was conducted made use of measurement methodologies, as shown in Figure 3. We consolidated the distribution of research concentration across the various disciplinary organizations of the journals that publish these dynamic studies, and we monitored the results using the network evaluation tool Gephi. It was done because many people are interested in DC research Fig. 3.

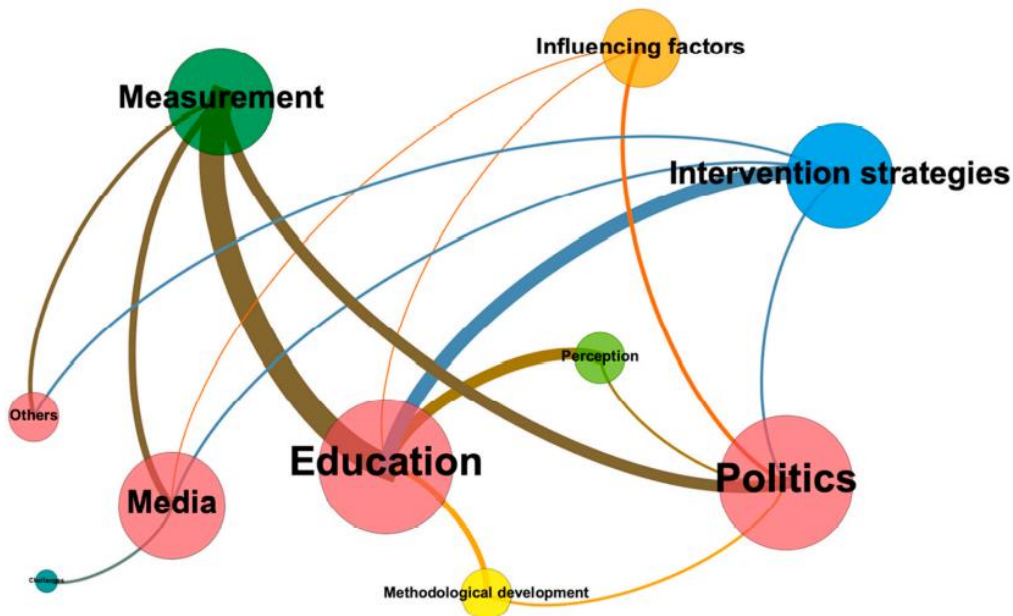


Figure 4. Methodological Development

Source: L.L. Chen et al., 2021

Figure 4 is a network graph that provides a visual representation of the distribution of 66 journals published throughout the focused study and disciplinary foundations for publishing sites.

There are two distinct categories of network nodes. There are a variety of colored nodes that each publication's scientific content is represented by, while the pink nodes reflect the focus of each magazine. The horizontal linkages between the nodes show the number of papers that address the study subject and are published in each journal category. The size of each node changes proportionately, which is determined by the weight of the nodes attached to it. Large nodes in other areas, such as those with thick edges, imply a more significant frequency of topics on or within such themes. The network graph shown in Figure 4 displays dynamic research on DC qualifications, intervention techniques, DC vision, and performance assessment as having very narrow margins. It gives educational research a key role in the field. There were many papers published on the same issues. Still, since the scope of political research was narrower than educational publications, fewer articles were written on these subjects. Academic and political research were conducted to investigate the factors that impact Washington, DC. The political study (n=3) was more educational than the academic study (n=1), although both studies were conducted. On the other hand, articles on “assessment and intervention strategies”.

Findings

In 1999, the phrase “digital citizenship” (DC) was used for the very first time in any publication's title or keywords that were searchable via prominent databases. This was the year the term “DC” was coined. After the year 2010, there was clear evidence of an exponential increase in the number of scientific articles that made use of the word. Research has trailed behind the growth in interest from stakeholders in policy and practise, despite the fact that the number of publications that have been peer-reviewed has increased by double digits. Two definitions, both of which were published in 2007, or their offshoots mostly influenced the conceptualizations that were used in the publications that were analysed. The nine-dimensional framework developed by Ribble and colleagues (Ribble, 2011; Ribble & Bailey, 2007) focuses on digital competence and norms of conduct towards the use of digital technology. The concept developed by Mossberger et al. (2007), which places primary emphasis on the social involvement of citizens via the use of digital tools. ISTE, which is a professional group established in the United States that has been publishing relevant technology standards for students, teachers, and school administrators since 1998, is the organisation that released Ribble and colleagues' DC framework. The first iteration of the National Educational Technology Standards for Students (NETS.S) placed a primary emphasis on the process of training students to become capable technology users. The concept of "digital citizenship," which was expanded to take into consideration the social dimensions of an individual's engagement in cyberspace, is still a very significant benchmark.

Conclusion

Economic and political agendas are linked to technological success to promote digital economic development and high growth rates, especially in developing countries. To ensure this growth is well planned, the corporate industry, government, civil society, and academia must work together. Despite this, many of these actions are based on pre-digital ideas and practices. This study provides a three-dimensional model for the digital economy by explaining many of its meanings and emergence over time. Digital technology is widely used in today's business, and we see that this is part of the "digital economy", even though many of its definitions are included. Unpredictable limitations, low data quality, price problems, and unpredictability of many digital services make efforts to scale the digital economy difficult. The digital economy has the highest share in the Northern Hemisphere, but growth rates are very slow in the Southern Hemisphere. If obstacles are overcome, growth rates in the southern hemisphere may be much higher. A comprehensive assessment of the opportunities, barriers, and behavioral interventions needed to identify these digital economic opportunities will significantly impact development.

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