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THE EVOLUTION OF ON-DEMAND PLATFORMS: CONCEPTUAL FRAMEWORK, REGULATORY CHALLENGES, AND POLICY IMPLICATIONS IN THE DIGITAL ECONOMY

ALINA I. POPESCU

Abstract:

Digital platforms currently form the cornerstone of what is referred to as 'platform economics,' progressively assuming a central role in the city's economy, experiential landscape, and governance. On-demand platforms play a pivotal role in elevating the level of digital sophistication among citizens. This article extends the current research on on-demand service markets, aiming to cultivate an understanding of this nascent domain of digital platform business within the broader framework of the smart city. In the first section, we delve into various concepts related to on-demand service markets, outlining their distinctive features in comparison to traditional service markets, and elucidating the principal components of the on-demand digital platform economy. The second part of this paper employs bibliometric analysis to unveil, among other insights, emerging areas of interest, key works, and influential researchers in the field, as well as the countries and institutions where research on on-demand service markets is most advanced. This research endeavour may lay the foundation for the development of a theory pertaining to the provision of on-demand services within the context of the platform economy. Finally, the research extensively discusses regulatory challenges and public policy implications in the context of on-demand platforms, with a focus on worker protection, algorithmic transparency, and data security.

Keywords:

on-demand services, digital platforms, mobility on-demand (MoD), video on-demand (VoD), bibliometrics, on-demand markets, smart mobility, regulatory issues

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1. Introduction

The on-demand economy is rapidly expanding worldwide, leading to profound societal changes. This explosive growth is driven by technological advancements and increased internet accessibility, on one hand, and shifts in consumer behavior toward convenience and user experience, on the other. In the on-demand economy, there is immense disruptive potential in every market, where peer-to-peer or consumer-to-consumer transactions redefine the rules of the game and the nature of competition in traditional business markets.

The on-demand economy signifies a shift towards an economic system fundamentally based on crowdsourcing, sparking debates on a new paradigm where 'usership' takes precedence over 'ownership' as the fundamental mindset. In this new reality, the recognized disruptive impact of the on-demand economy on industries, consumers, and workers calls for a reevaluation of the frameworks for understanding market economic equilibrium determinants and changes in equilibrium. Research into on-demand service online platforms provides valuable insights for addressing a wide array of societal issues, including environmental concerns, social issues, labor regulation, economic development, and urban planning.

In the first part of this study, we employ conceptual analysis to examine a multidisciplinary literature on on-demand products and services. We identify independent economic and business concepts that have been explored in relation to a broader spectrum of on-demand services. In the second part, we utilize bibliometric analysis to elucidate the relationships between these concepts, identify the most influential scholars and journals in on-demand services research, and explore the countries where on-demand services research is most advanced, relative to the degree of market development for such services, among other factors.

Generally, bibliometric analyses shed light on the evolutionary nuances, such as timeliness and pervasiveness, of specific scientific interests when analyzing a particular problem or phenomenon. In particular, in economic and business fields, bibliometric data appear to inform and support management decision-making and public policy-making more effectively (Mourao & Popescu, 2022). Our analysis unveils emerging topics of interest, the most influential works and researchers in the field, and the countries and institutions where on-demand service market research is most advanced.

The remainder of this paper proceeds with Section 2, where we present the main concepts related to on-demand platforms. Section 3 outlines the research methods employed in this study. In Section 4, we present the results of the bibliometric analysis of the sample of research documents, discussing their evolution over the years and contributions in terms of authors, citations, keywords, and other dimensions. Finally, the last section concludes our work.

2. Conceptual Framework for On-Demand Services Research: Integrating the Components

The explosive growth of the on-demand economy, partly accelerated by the recent pandemic context (Atwater, 2020), has garnered increased interest from the business sector, academia, and policymakers. The on-demand economy represents a novel economic model that lacks a conceptual framework and conceptual clarity. One of the very few scholarly definitions of the on-demand economy refer to it as 'a business model utilizing Internet platforms to ensure that large pools of workers are readily available to meet customers' needs' (Todoli-Signes, 2017). However, this definition is subject to criticism, as services have always been 'on demand,' irrespective of the existence of a digital platform. In practitioners' terms, the on-demand

economy has been defined as 'the economic activity created by technology companies that fulfill consumer demand via the immediate provisioning of goods and services' (Jaconi, 2014).

Nonetheless, what remains unanimous is the remarkable growth of the on-demand economy. According to previous estimates, the on-demand economy attracts more than 22.4 million consumers each year (Colby & Bell, 2016), with an expected annual growth rate exceeding 25% in Europe (Mochimaru, 2022).

The success of the on-demand economy can be attributed to the illusion of control bestowed by the 'on-demand' nature of the service, allowing customers to achieve convenience and exert total control over the services they acquire. Demand, as an economic concept, expresses a consumer's desire to purchase goods or services, coupled with the willingness to pay for them. Digital on-demand platforms provide customers with the immediate ability to satisfy a need at the precise moment it arises, anywhere and at any time (van der Burg et al., 2019). What's more, such platforms grant consumers unprecedented rights and access to provide feedback on products and services (Jackson, 2019), thus enabling control over the reputation of the service provider.

The backbone of the on-demand economy is formed by on-demand service digital platforms that match consumer demands with service offerings provided by independent service providers (agents). The development of digital platforms has witnessed skyrocketing growth (Ardura Urquiaga et al., 2020). A new class of firms, termed 'on-demand companies' (Wladawsky-Berger, 2015), seeks to efficiently connect consumers and suppliers through innovative applications and highly scalable digital platforms.

On-demand service platforms are economic network-based systems that match and address customers' immediate needs through independent service providers (Delgosha & Hajiheydari, 2020). These platforms create economic value by utilizing online or mobile applications to collect and match customer requests with nearby available independent service providers, who can autonomously set their work schedules (Zhao & Chen, 2019; Zhong et al., 2019).

On-demand platforms exhibit several characteristics that have been identified and discussed in the scientific literature. Firstly, on-demand platforms operate in multisided markets, meaning that the company serves at least two distinct customer groups (constituting the different 'sides' of the market). This generates indirect network effects between these two or more customer groups (Wismer & Rasek, 2017). Secondly, the demand for services is characterized by significant temporal variability. Typically, these platforms operate in markets marked by substantial fluctuations in demand (Hu et al., 2020), where demand per unit period is higher during peak periods than during non-peak periods (Hall et al., 2015). Thirdly, service capacity fluctuates over time, as independent service providers (i.e., agents) possess self-scheduling authority (Zhong et al., 2019; Cachon et al., 2022). An agent's decision to participate through servicing (i.e., its self-scheduling capacity) hinges on the commission it receives for service, which, in turn, depends on the overall demand level, the number of agents servicing through the platform simultaneously, agent locations, and customers' sensitivity to delays (Cachon et al., 2022; Gurvich et al., 2019).

Digital platforms have profoundly transformed service delivery across nearly every industry (Delgosha & Hajiheydari, 2020). However, existing research highlights that several industries have undergone significant transformation due to the ascent of digital on-demand platforms, including transport, software and cloud computing, video on-demand, food and grocery delivery, home services, and health and beauty services (Lazarus et al., 2021). Furthermore, additional transformations are anticipated in these industries as the on-demand provision of services has

led to the emergence of 'real-time' service provision, owing to customers' increasingly reduced sensitivity to delays.

In the following, we provide a summary of the key developments identified in the examined scientific literature on the provision of 'on-demand services,' including both mainstream and alternative perspectives, as well as the latest trends.

The field of mobility (or transport) has undeniably been the most extensively studied industry concerning the 'on-demand' provision of services. On-demand mobility services are significantly reshaping the way individuals travel, offering dynamic, flexible, and convenient options that can complement personal vehicles and public transportation. Mobility-as-a-Service (MaaS) has emerged as a new mobility paradigm poised to revolutionize current travel practices (Goodall et al., 2017). MaaS represents a pooled on-demand transport system that offers flexibility and convenience while maintaining efficient mobility resource utilization and sustainability. In relation to MaaS, researchers have explored topics such as the drivers and barriers to MaaS adoption (Alonso-Gonzalez et al., 2020), customer activity patterns derived from mobile phone network data (Franco et al., 2020), system design (Bai et al., 2019; Wand & Qi, 2019; Sun et al., 2019), priority/membership pricing (He et al., 2021; Kung & Zhong, 2017), and horizontal substitution (He et al., 2021). The choice between a pooled ride and an individual on-demand ride depends on three primary attributes: fare discount, additional travel time, and the willingness (or unwillingness) to share the vehicle with unknown passengers (Alonso-Gonzalez, 2021).

The acceptability, preference for, and usage of mobility on-demand (MoD) and autonomous mobility on-demand (AMoD) services depend on both individual and service performance factors. Individual factors encompass user sociodemographics, travel behavior, personality traits, expectations related to performance and effort, prior experiences, and affective service assessments. Service performance factors fall into categories such as service characteristics (e.g., fare, schedule, location context, flexibility, travel information), safety concerns (e.g., driving behavior, absence of a driver, speed, privacy, protection of personal data), vehicle attributes, travel comfort, and automation (Pigeon et al., 2021). Notably, the cost of MoD service, travel time, and delay time have been identified as the most influential factors shaping perceptions of MoD value (Zhao et al., 2018; Amirkiee & Evangelopoulos, 2018; Yan et al., 2019). In contrast, previous experiences with autonomous vehicles (Asgari et al., 2018; Cai et al., 2019; Lavieri & Bhat, 2019) and privacy concerns (Amirkiee & Evangelopoulos, 2018; Lavieri & Bhat, 2019) have been recognized as determinants of the acceptance, preference for, and usage of AMoD.

Empirical studies on MoD or AMoD have primarily been conducted in Anglo-Saxon and Germanic regions, including the United States (Dubey et al., 2018; Nazari et al., 2018; Asgari & Jin, 2020; Patel et al., 2022; Rafiq & McNally, 2021; Weinreich et al., 2020), the Netherlands (Narayan et al., 2020; Narayan et al., 2022; Alonso-Gonzalez et al., 2020; Alonso-Gonzalez, 2021; Geržinič et al., 2022; Idiz et al., 2021), Germany (Dandl et al., 2021; Hartleb et al., 2022), Australia (Ho et al., 2018), Canada (Alsaleh & Farooq, 2021), Finland (Haglund et al., 2019), Sweden (Leffler et al., 2021), Switzerland (Sieber et al., 2020), the United Kingdom (Franco et al., 2020), Norway (Aslaksen et al., 2021), and Asian countries such as China and Pakistan (Wang & He, 2021; Wang et al., 2022), Japan (Abe, 2021), Korea (Jang et al., 2021; Kim et al., 2022), Malaysia (Susilawati & Lim, 2021), Singapore (Nahmias-Biran et al., 2021), as well as Italy (Consilvio et al., 2021; Giuffrida et al., 2021), Brazil (Frederico et al., 2021), and Greece (Fafoutellis et al., 2021). A wide spectrum of on-demand transport modes and systems has been investigated, encompassing human-operated and autonomous vehicles such as electric scooters (Hartleb et al., 2022), cars used for ridesharing and ride-hailing (Asgari & Jin, 2020),

rail cars (Abe, 2021), minibuses (Archetti et al., 2018), ferries (Aslaksen et al., 2021), or combinations of these in various intermodal transport and transit systems (Franco et al., 2020; Geržinič et al., 2022).

Researchers have distinguished between single-occupancy or ride-alone mobility on-demand (MoD) and shared MoD services, where transportation resources and services are shared among users either simultaneously or sequentially (Dubey et al., 2018). In the latter case, shared ride services encompass various mobility services employed by riders to reach a common destination (Shaheen et al., 2015). These studies have shed light on the most successful on-demand mobility applications and digital platforms, including ride-hailing on-demand services (where customers request a driver for transportation), such as Uber, Didi, ViaVan, Chariot, and Slide; car-sharing on-demand services, such as Snappcar, Greenwheels, car2go, and Uberpool; bike/scooter-sharing on-demand services, such as Mobike, OV fets, and Felyx; and flexible public transport services like Twentsfex, Bravofex, U-fex, and Delfthopper.

System optimization models have primarily been developed for transit and mobility networks, addressing issues such as route directness, optimal transfer strategies, service coverage, and ridership (Zhao & Ubaka, 2004; Guihaire & Hao, 2008). Hyland & Mahmassani (2020) employed an agent-based stochastic dynamic simulation framework to model operational challenges in on-demand services for automated mobility, where the agents are automated vehicles (AVs), and shared rides are not considered. For shared autonomous electric vehicle systems, some studies have proposed deep learning-based algorithms that incorporate deep learning-based passenger demand prediction models to address challenges related to idle vehicle relocation, optimal strategy estimation to significantly reduce delay and waiting times, and operational costs (Kim et al., 2022).

On-demand IT services, including cloud computing, utility computing, and software provision, constitute another rapidly growing category of services. This surge in demand can be attributed to their affordability and ease of implementation, which promote the development of start-ups and reduce the efforts required for firms to build and maintain their IT infrastructure. The key feature of on-demand IT services is flexibility, enabled by external ownership and pricing structures based on usage or fixed fees, encompassing a wide range of services such as website hosting, data storage, software solutions, and even more complex services like technical support, billing, sales, human resources management, and supply chain management (Chen & Wu, 2013; Sundararajan, 2004; Wu & Banker 2010).

Cloud computing is a disruptive technology that has instigated fundamental changes in the software industry. As KC et al. (2020) suggest, cloud computing supports high computational demands with nearly unlimited scalable computational resources, data storage capacity, and network capabilities. In contrast to the traditional on-premises software delivery model, where software runs on users' computers, cloud computing allows software applications to operate on a cloud infrastructure, commonly referred to as 'software as a service' (SaaS) (Benlian et al., 2010). Researchers have delved into various aspects of cloud computing, including current cloud security challenges and issues (Kumari & Singh, 2021), the impact of input parameters on model outcomes and associated uncertainties through sensitivity analysis (Saltelli et al., 2008; Qin et al., 2013), mechanisms for parallel computation in scheduling cloud workflows (Kataraki & Maradithaya, 2021), and cloud computing applications, such as big data management (Qi et al., 2022). Faiz & Daniel (2022) have identified key attributes used to define the performance of cloud services, including availability, reliability, stability, response time, flexibility, scalability, transparency, and novelty. Additionally, subscription plan parameters for cloud services encompass cost, performance, capacity, security, and maintenance.

In cloud environments, system optimization involves devising optimal resource allocation mechanisms and task scheduling algorithms, all while considering constraints such as energy and time (Kataraki & Maradithaya, 2021). Research on Video on Demand (VoD) systems has primarily focused on optimizing system performance to enhance user experiences (Cheng et al., 2008), the development of routing protocols to optimize service quality on mobile ad hoc networks (Ghalib et al., 2018), optimizing video data storage (Dyaberi et al., 2010), and bandwidth resource optimization (Petit et al., 1994).

Video on Demand (VoD) represents another industry experiencing significant growth, driven by the emergence of online platforms. Online content streaming has disrupted traditional media and entertainment industries, with most users adopting video, music, and gaming streaming platforms. Research in this domain has concentrated on various aspects, including online television streaming (Lüders, 2022; Mateos-Pérez & Sirera-Blanco, 2021), interactive television (Enns, 2021), VoD platforms in general (Jang et al., 2021; Pereira & Tam, 2021; Romero et al., 2014; Szabó & Pham, 2022), and specific platforms like Netflix (Giannakodimos et al., 2022; Idiz et al., 2021; Lordache et al., 2022; Martín-García et al., 2022; Pedro, 2022). VoD services provide users with an online video content library where discrete pieces can be selected, paid for, and watched at their convenience. Cennamo & Santalo (2013) note that VoD services act as on-demand platform-mediated services, facilitating value-creation exchanges between two distinct user groups, namely creators and content viewers.

Schauerte et al. (2021) differentiate between advertising-based video-on-demand (AVoD) services and subscription-based video-on-demand (SVoD) services based on their content monetization models. AVoD offers content supported by various forms of advertisements, such as on YouTube, at no charge to consumers. In contrast, SVoD content is available for a fee, either for a specific duration (e.g., daily, weekly, monthly, or annually) or on a per-content-item basis. Several researchers have explored pricing schemes based on time and volume measurements for non-elastic traffic (Kelly, 1994), per-packet charges during network congestion (MacKie-Mason & Varian, 1994), or charges per unit of time for elastic traffic, where the rate is determined by the network according to a proportional fairness criterion applied to the rate per unit charge (Kelly, 1997). VoD platforms offer users greater control over content and scheduling, low costs, ease of access, extensive content libraries, freedom from ad interruptions, and compatibility with various devices (Nagaraj et al., 2021).

This study explored various aspects of on-demand platforms, including on-demand retail and food delivery platforms (e.g., Wang & He, 2021; Xu et al., 2021; Xu, 2021; Yan et al., 2021), on-demand housekeeping services (e.g., Yu et al., 2022), on-demand insurance (e.g., Zeier Röschmann et al., 2022), and on-demand education (e.g., Taminiau et al., 2013; Taminiau et al., 2015; Kicken et al., 2015; Bargerion et al., 2014).

Participation in the on-demand platform market demands efforts and knowledge for platform development. Continuous usage of these platforms has become a crucial concern for providers due to increasing global competition. Ensuring continuous use entails enhancing the user experience and accessibility on the demand side, improving agents' benefits on the supply side, and continuously developing and optimizing the platform system. While some authors, like Veljanovski (2022), have observed that on-demand online platforms emerged seemingly out of nowhere, others have developed systematic models to simulate demand-supply interactions (KC et al., 2020; Leffler et al., 2021; Narayan et al., 2020; Pierotti & van Essen, 2021; Sieber et al., 2020). Benjafaar & Hu (2020) distinguish between three types of on-demand platforms: peer-to-peer resource sharing, on-demand service platforms, and on-demand rental networks. However, the central challenge in any two-sided market platform remains effectively assigning available agents to on-demand customer requests, whether in real-time, forecasted, or pre-

booked, while balancing service levels with operational costs and agent benefit expectations. Archetti et al. (2018) analyse and discuss the properties of on-demand transportation services, including scalability and responsiveness.

The interaction between supply and demand in these markets is influenced by several distinctive characteristics of digital platforms compared to traditional service systems. These characteristics include temporal and spatial variability in capacity and demand, bidirectional influence between capacity and demand, indirect control of capacity through pricing and wages, the ability to return resources rented from one location to another, spatial distribution of resources, and the absence of advance booking requirements (Benjafaar & Hu, 2020). Additionally, self-scheduling capacity is a significant benefit for agents, enabling them to adjust supply as needed (offering immediate flexibility) and safeguard against unexpected labour market shocks (offering long-term flexibility) (Koustas, 2018).

Hence, the primary research questions in the study of on-demand platforms revolve around price optimization and agent compensation. The optimal pricing and wage structures are considered to be dynamically adjusted by platform policies, taking into account factors such as the inconvenience of congestion-driven delay disutility, suppliers' independence, and the uncertainty in evaluating customers or supplier services (Taylor, 2018). Chen et al. (2022) provide a synthesis of the pricing schemes used by on-demand platforms, including uniform pricing, peak-load pricing, surge multipliers, commission contracts, and compensation models. Chen et al. (2021) demonstrate that reference-dependent preferences impact the platform's capacity pool and agent revenue, with commission and subsidy ratios playing crucial roles. Software and cloud-based services have also adopted dynamic pricing models, linking client payments to actual usage or charging flat rates. Price optimization in such environments should consider revenue management, quality differentiation, capacity, and peak-load pricing (Huang et al., 2015). New pricing methods include reserved service contracts, complementing existing spot prices. However, it is worth noting that spot prices are often set lower than reserved service instance prices by providers to encourage on-demand service usage (Huang et al., 2015).

In general, on-demand platforms have been observed to increasingly employ surge pricing. This strategy employs two pricing schemes: uniform pricing, where prices remain fixed for both peak and non-peak periods, and multiplier-based pricing, where prices are higher during peak periods compared to non-peak hours. Surge pricing impacts both supply and demand dynamics, as it encourages inactive agents to join the platform or prompts active agents to increase their working hours, while also reducing demand to avoid capacity constraints. However, opinions on the suitability of surge pricing by on-demand digital platforms remain divided. Some researchers believe surge pricing is advantageous due to its impact on capacity utilization (Cachon et al., 2017; Guda & Subramanian, 2019; Chen et al., 2022), while others argue that price stability should be maintained unless significant changes occur in the underlying market conditions and suggest that surge pricing "may antagonize riders and induce riders and drivers to behave strategically" (Chen & Hu, 2020).

Most empirical research studies have employed methodologies based on the maximum likelihood approach for user utility maximization and choice modeling, often employing latent class analysis for demand and supply modeling. Utility functions have been widely used in sharing economy models (e.g., Tian & Jiang, 2017; Bai et al., 2019). Research questions have explored user adoption of on-demand services (e.g., willingness to share rides by Alonso-González et al., 2021; adoption of automated vehicles based on peer input and advertisement by Sharma & Mishra, 2022; attitude toward shared mobility by Wang et al., 2022), user behavior (e.g., MoD user profiling by Geržinič et al., 2022; Rafiq & McNally, 2021), VoD usage continuance intention (Pereira & Tam, 2021), modal preferences of MoD users (Shamshirpour

et al., 2020), user experience (UX) and enhancers of UX (e.g., greater control over the on-demand service by Frederico et al., 2021), inertia and subjective evaluation of the service (Mo et al., 2021), the impact of brand image on user satisfaction and loyalty (Shamsudin et al., 2022), the relationship between the cost of service, user propensity to provide online reviews for the service, and customer satisfaction (Xu, 2021), and the spillover effect of customer complaints (Yan et al., 2021). Additionally, some research studies have employed artificial intelligence methodologies, such as neural network algorithms (Alsaleh & Farooq, 2021) and fuzzy logic (Faiz & Daniel, 2022), to investigate similar issues by simulating human reasoning and decision-making regarding the provision of on-demand services.

Furthermore, the need for better regulation of on-demand online services has been recognized by various authors. Two main issues dominate the current debate. First, concerns have arisen regarding the nature of platform work, specifically whether the work performed by agents constitutes employment. Scholars have repeatedly highlighted a "regulatory gap," emphasizing the precarious nature of platform work from its inception (e.g., Boyce et al., 2007) to recent times (e.g., Drahokoupil & Fabo, 2016; Schor et al., 2020; Wood et al., 2019; Cano et al., 2021; Parwez, 2022). Second, concerns related to privacy and security regarding on-demand platforms and service usage have been raised. These issues need to be addressed in light of the ongoing paradigm shift in the platform economy. Given that disclosing private information is critical to providing and implementing on-demand services, customer privacy concerns remain significant. Customers' privacy concerns depend on their attitudes, beliefs, and perceptions (Pavlou, 2003; Metzger, 2004), socio-demographic characteristics (Dinev & Hart, 2006), situational risk factors (e.g., type of information collected, the purpose for which it is collected, how the information is treated after service fulfillment, and the requesting stakeholder (Anderson et al., 2011; Bansal et al., 2015)), and platform policies and procedures (Li et al., 2011). In particular, platform policies and procedures play a crucial role in building trust when relationships involve a large social distance (Culnan & Armstrong, 1999).

3. Methodology

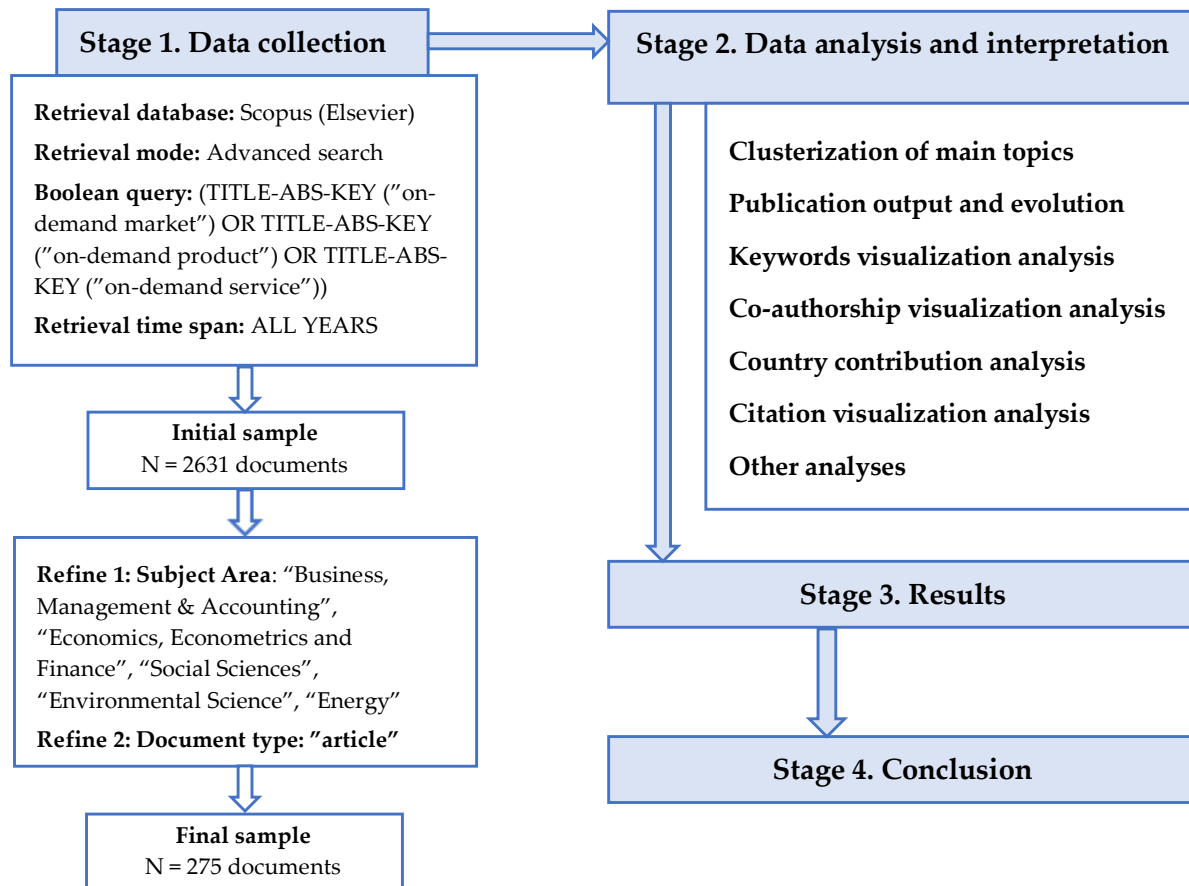
This study presents the results of a systematic literature review and bibliometric analysis of existing academic research related to on-demand product and service provision through digital platforms. The systematic literature review established the context and background for this research study. It provided an overview of existing knowledge and research related to on-demand services, digital platforms, and their impact on various industries and urban environments. This helps the authors and readers understand the current state of the field and identify gaps or areas that need further exploration. By reviewing a wide range of literature, the study can provide readers with a comprehensive understanding of the topic. This is particularly important in a multidisciplinary field like urbanism and digital platforms, where insights from various domains come into play.

Bibliometric research offers valuable insights into the evolving nuances of on-demand service provision within the platform economy. It sheds light on various aspects, including the clustering of main topics, publication output and its evolution, keyword co-occurrence, co-authorship, and citation networks. According to several scholars, bibliometric analysis is an essential step in assessing the status of a particular subject within a specific scientific field (Mourao & Martinho, 2020; Mourao & Popescu, 2022). It allows researchers to explore the performance of different types of scientific contributors and the impact of their activities, enabling a comprehensive mapping analysis that reveals intellectual, social, and conceptual structures (Mourao & Popescu, 2022). Numerous scholars have emphasized that bibliometric analyses significantly

contribute to advancing knowledge and the progress of science, particularly in fields such as economics, business, computer science, medicine, psychology, sociology, mathematics, and physics (Martínez et al., 2015; Gutiérrez-Salcedo et al., 2018).

Bibliometric data were analyzed using VOS Viewer (version 1.6.11), Stata (version SE17), and Tableau (version 2020.3). Figure 1 illustrates the research process flow.

Figure 1. The Flow of the Research Process



Data were collected from a pool of 275 documents sourced from Elsevier's Scopus research database. An advanced search was executed using a query designed to retrieve documents containing either 'on-demand market,' 'on-demand service,' or 'on-demand product' in their title, abstract, or keywords. No temporal restrictions were imposed on the sample. However, due to the substantial number of documents originating from subject areas beyond the scope of this study (e.g., Medicine, Mathematics, Engineering, Computer Science, Material Science, Chemical Engineering, etc.), further constraints were introduced. The initial sample, comprising 2631 documents, was subsequently refined to include only documents falling under the following subject areas: 'Business, Management & Accounting,' 'Economics, Econometrics, and Finance,' 'Social Sciences,' 'Environmental Science,' and 'Energy' (Refinement 1). The second refinement involved the exclusion of document types other than 'articles.'

4. Results and Discussion

Over the years, considerable debate and discussion have unfolded concerning the remarkable proliferation of on-demand services and digital platforms. The findings presented and discussed below pertain to a sample of 275 articles, predominantly in the form of research papers, disseminating research outcomes in the realm of on-demand service provision through online

platforms. These publications were collectively authored by 159 researchers affiliated with a total of 157 institutions spanning 46 countries, as detailed in Table 1. It's worth noting that an author may hold multiple affiliations. The number of articles per author on the subject of interest varies from 1 to 10, with an average of 1.5283 articles per author, and a distribution of articles per author that skews to the right. Regarding the institutions to which authors are affiliated, it's observed that the number of published articles per institution ranges from 1 to 26, with an average of 1.8343 articles per institution. In terms of contributions by country to the body of scientific articles on the topic of on-demand markets, the data shows a significant skew. The 275 articles under investigation were published across 160 journals, with the number of articles per journal spanning from 1 to 16. These preliminary findings suggest a heightened level of interest among a relatively small cohort of researchers, largely concentrated in a handful of countries. We will delve further into these observations in subsequent discussions.

Table 1. Summary Statistics

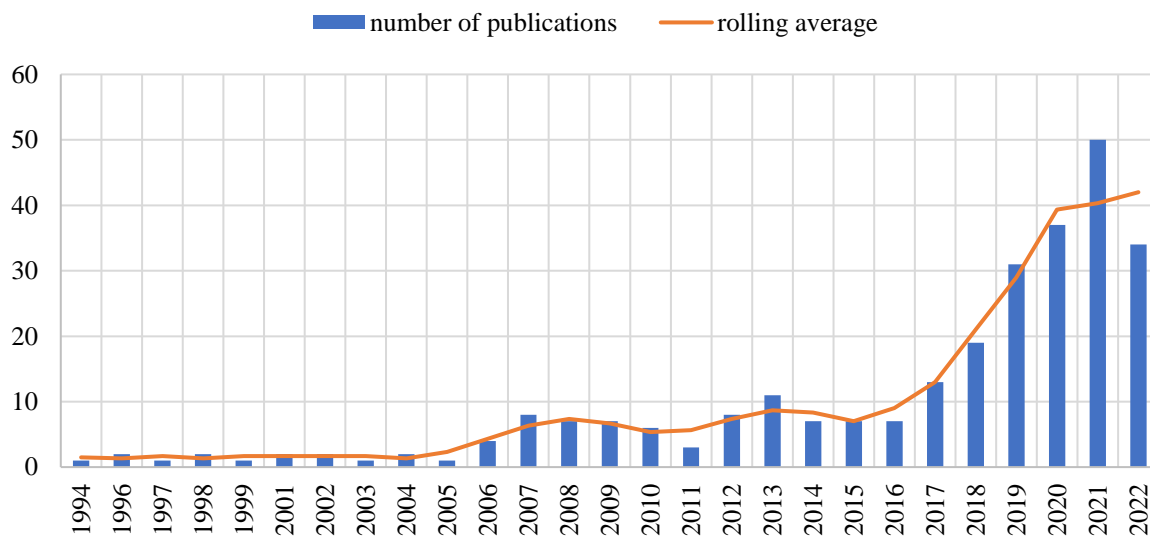
# Papers per:	<i>Author</i>	<i>Institution</i>	<i>Country</i>	<i>Journal</i>
Count	159	157	46	160
Mean	1.5283	1.8343	7.6304	1.6437
Standard Error	0.0850	0.1772	1.7970	0.1442
Median	1	1	3	1
Mode	1	1	1	1
Standard Deviation	1.0721	2.2212	12.1880	1.8235
Sample Variance	1.1495	4.9339	148.5493	3.3251
Kurtosis	29.4175	91.1199	16.0320	32.0806
Skewness	4.6219	8.6504	3.5610	5.1924
Range	9	25	70	15
Minimum	1	1	1	1
Maximum	10	26	71	16

The results of the conducted research on on-demand services, products, or markets were predominantly published in English, accounting for the vast majority of cases (259 articles). Additionally, 7 articles were written in Spanish, 5 articles in German, 2 articles in Chinese, and one article each in French, Dutch, and Croatian. Among them, one article was bilingual, presented in both English and Dutch.

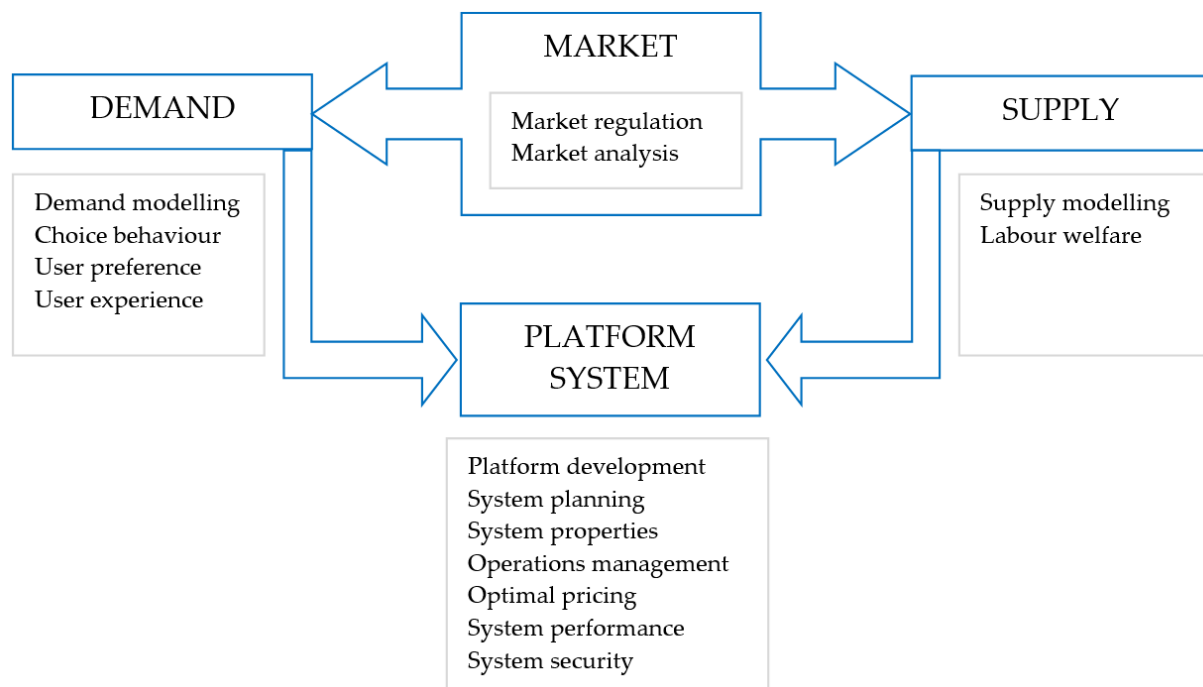
Moving forward, we examine the evolution of interest in this subject over time (Figure 2). Research interest in on-demand services, products, and markets is currently experiencing growth, although it has moderated. Early works, dating before 2000, focused on various aspects, including on-demand educational services (e.g., the publication of higher education learning resources by Pickering and McMenemy, 1999, and VoD of interactive higher education programs by Mustillo et al., 1997), on-demand driverless freight (Anon, 1996), document delivery (Bland et al., 1996), and on-demand IT services' infrastructure (Huang et al., 1998; Lam, 1998).

The interpretation of this data must be considered in relation to the emergence of various on-demand markets. Milestones such as the establishment of OnDemand VoD company in 1995, Google's entry into cloud computing services in 2006, AirBnB in 2008, and Uber in 2009 are regarded as pivotal moments in the development of specific on-demand markets. The number of articles per year transitioned from an average of 1.5 articles per year during the period 1994 - 2005 to an average of 7 articles per year for the period 2006-2016. The growing interest among researchers in on-demand services, products, and markets evolved in tandem with the surge in the adoption of these services post-2016. More than half of the documents, specifically 152 articles, that we investigated were published in the last 4 years, with a declining trend observed in the current year.

Figure 2. Evolution of the Number of Publications (Scopus data)



Following the study of the existing literature in the field of on-demand products, services and markets, the present study developed the following conceptual framework that integrates the research on various aspects of on-demand products and services in a variety of industries. The challenge here was to develop a conceptual framework that integrates research across a variety of on-demand markets, drawing elements from discrete and distinct disciplines. The overview of this framework is shown in Figure 3.

Figure 3. The Integrative Framework of On-Demand Platform Research

Source: own research

The economic literature on the topic of on-demand online platform research falls into two major research orientations: mainstream economic modelling and behavioural economics of consumer choice. Mainstream economists have contributed to the examination of certain aspects of on-demand markets. They have been particularly interested in the determination of the market equilibrium through the interplay of demand and supply and the optimization of the on-demand system. On the other hand, behavioural economists attempted to find significant predictors of the actual behaviour of users. Continuous use of the platform has become an important concern for on-demand platforms providers, as competition has rapidly increased worldwide. Continuous use is achieved by improving user experience and accessibility on the demand side, improvements in agents' benefits on the supply side, continuous platform system development and optimization.

Participation in the market for on-demand platforms requires efforts and knowledge for platform development. Although some authors (e.g., (Veljanovski, 2022) noted that on-demand online platforms rose out of nothing, others developed systematic models to simulate the demand-supply interaction (KC et al., 2020; Leffler et al., 2021; Narayan et al., 2020; Pierotti and van Essen, 2021; Sieber et al., 2020). Benjafaar and Hu (2020) distinguish between 3 types of on-demand platforms: peer-to-peer resource sharing, on-demand service platforms, and on-demand rental networks. However, the core problem of any two-sided market platform is the problem of effectively assigning the available agents to on-demand requests from customers, either received in real time, forecasted or prebooked, while balancing the objectives of level of service with the operational costs and benefit expectations of the service providing agents. Archetti et al. (2018) analyze and discuss the properties of on-demand transportation services (scalability and the responsiveness).

System optimization models were mainly devised for transit and mobility networks, including route directness, optimal transfer, service coverage, and ridership (Zhao and Ubaka, 2004; Guihaire and Hao, 2008). Hyland and Mahmassani (2020) used an agent-based stochastic

dynamic simulation framework to model the operational problems of on-demand services of automated mobility where the agents are automated vehicles (AVs), without shared rides. For shared autonomous electric vehicle systems, some proposed deep learning-based algorithm considered a deep learning-based passenger demand prediction model to solve the problems of idle vehicle relocation and estimate the optimal strategy to significantly reduce delay and waiting times and operation costs (Kim et al., 2022). In cloud environments, system optimization is devised with an optimal resource allocation mechanism, task scheduling algorithms, while considering energy and time as constraints to system optimization (Kataraki and Maradithaya, 2021). Research on VoD systems focused on optimizing system performance while improving user experience (Cheng et al., 2008), development of routing protocol for service optimization of the quality on mobile ad hoc networks (Ghalib et al., 2018), optimization of video data storage (Dyaberi et al., 2010), or bandwidth resource optimization (Petit et al., 1994).

The interaction between supply and demand in these markets is determined by several distinctive characteristics that digital platforms have in contrast to traditional service systems. These can be summarized as follows: capacity and demand vary temporarily and spatially; capacity affects demand, and demand is stimulated by capacity; capacity can be controlled indirectly by prices and wages; resources rented from one location can be returned at another location; resources are spatially distributed, and no advance booking is required (Benjafaar and Hu, 2020) and participant independence (Taylor, 2018). Additionally, self-scheduling capacity is a major benefit of agents, which allows them to change the supply when needed (immediate flexibility) and, more importantly, avoid the unexpected shocks of the labour market (Koustas, 2018) (long-term flexibility).

Consequently, the main research questions in the research of on-demand platforms include price optimization and agent compensation. The optimal price and wage have been considered to be established by a platform policy that dynamically adjusts prices and wages (Cachon et al., 2017), and to influence the inconvenience of congestion-driven delay disutility, suppliers' independence, and the uncertainty in the evaluation of customers or supplier service (Taylor, 2018). Chen et al. (2022) make a synthesis of the pricing schemes used by the on-demand platforms (uniform pricing; peak-load pricing; surge multiplier, commission contract, and compensation). Chen et al. (2021) show that reference-dependent preferences affect the capacity pool of the platform and the agents' revenue, where the commission and subsidy ratios play important role. Software and cloud-based services have also been priced dynamically, where client payments are tied to actual usage, or by charging a flat rate. Price optimization in such environments should consider the revenue management, quality differentiation, capacity, and peak-load pricing (Huang et al., 2015). New identified pricing methods include the use of a reserved services contract by paying an upfront fee, complementing the existing spot prices. However, it was noted that spot prices were often set lower than reserved services instance prices by providers to encourage use of on-demand services (Huang et al., 2015).

Generally, on-demand platforms have been shown to be more likely to use surge pricing. Basically, it means using two pricing schemes: uniform pricing, where the price is fixed for both peak and non-peak periods; and multiplier-based pricing, where the price is higher for peak periods than for lower peak periods. This pricing method impacts both supply and demand in the sense that it increases capacity by encouraging inactive agents to join the platform or active agents to increase working time, while reducing the demand to avoid out-of-capacity situations. Opinions on the suitability of the use of surge pricing by on-demand digital platforms are still divided. Some researchers believe that surge pricing schemes are better than fixed fee contracts given their impact on capacity utilization (Cachon et al., 2017; Guda and Subramanian, 2019; Chen et al., 2022). Others believe that price optimality can be achieved by

maintaining stable prices unless the underlying market conditions have changed significantly, and even argued that surge pricing 'may antagonize riders and induce riders and drivers to behave strategically' (Chen and Hu, 2020).

Most empirical research studies had used methodologies of maximum likelihood approach to user utility maximization and choice modelling with latent class analysis for demand and supply modelling. The utility function has been used in sharing economy models (e.g. Tian and Jiang (2017), Bai et al. (2019)). The main questions that were studied related to the adoption of users of on-demand services (e.g., willingness to share rides, by Alonso-González et al., 2021; Ma and Koutsopoulos, 2022; adoption of automated vehicles based on peer input and advertisement by Sharma and Mishra, 2022; attitude toward shared mobility by Wang et al., 2022), user behaviour (e.g. MoD user profiling by Geržinič et. al, 2022; Rafiq and McNally, 2021); VoD usage continuance intention (Pereira and Tam, 2021); modal preferences of MoD users (Shamshiripour et al., 2020), user experience (UX) and enhancers of UX (e.g. greater control over the on-demand service by Frederico et al., 2021); inertia and subjective evaluation of the service (Mo et al., 2021); impact of brand image on user satisfaction and loyalty (Shamsudin et al., 2022); the relationship between the cost of service, user propensity to provide online reviews for the service, and customer satisfaction (Xu, 2021); the spillover effect of customers complaints (Yan et al, 2021). Additionally, other research studies used artificial intelligence methodologies, such as neural networks algorithms (Alsaleh and Farooq, 2021) and fuzzy logic (Faiz and Daniel, 2022) methodologies to investigate similar issues by simulating human reasoning and decision-making regarding the provision of on-demand services.

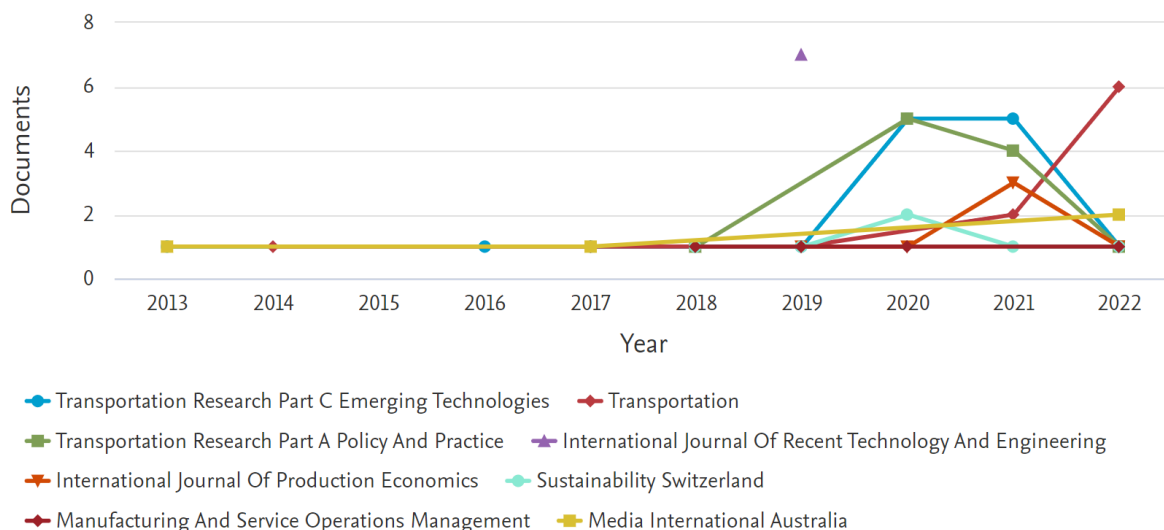
Furthermore, the need for better regulation of the on-demand online services was recognized by different authors. Two main issues dominate the current debate. First, we found the concerns regarding the nature of platform work, and specifically whether the work provided by agents constitutes employment or not. Scholars have repeatedly drawn attention to a 'regulatory gap' signalling the precarity of platform agents since the inception of platform work (e.g., Boyce et al., 2007) to recent times (e.g., Drahokoupil and Fabo, 2016; Schor et al., 2020; Wood et al., 2019; Cano et al., 2021; Parwez, 2022). Second, privacy and security concerns of the on-demand platform and service usage discuss issues and problems that need to be addressed given the current paradigm shift of the platform economy. Given that the disclosure of private information is critical to the provision and implementation of on-demand services, customer privacy concerns remain an important issue. Customers' privacy concerns depend on their own attitudes, beliefs and perception (Pavlou, 2003; Metzger, 2004, socio-demographic characteristics (Dinev and Hart, 2006), situational risk factors (e.g., type of information collected, the purpose for which it is collected, how the information is treated after service fulfilment and the requesting stakeholder (Anderson et al., 2011; Bansal et al., 2015), and platform policies and procedures (Li et al., 2011). In particular, platform policies and procedures act as an intermediary in building trust when relationships are characterized by a large social distance (Culnan and Armstrong, 1999).

The described research framework operates as a comprehensive system that incorporates the research efforts of the on-demand service provision across the different markets. The proposed framework reflects current knowledge on the topic of on-demand services provided through digital platforms, underlying the complexity of a multidisciplinary subject. The framework unifies the research efforts regarding the on-demand services provision by the identification of the salient variables descriptive of the phenomenon that may be used for developing a theory of on-demand platform services provision given the current developments towards the ubiquitousness of this type of services.

Domain analysis reveals that Mobility on demand (MoD) research comprises the majority of the analyzed documents, followed by studies on cloud computing and software on-demand, video on-demand, general research pertaining to digital platforms, educational on-demand services, and on-demand services in food and other retail sectors. This market structure is reflected in the subject areas of the journals in which these documents were published. Prominent journals that have published research on various aspects of on-demand services, products, or markets include Transportation Research Part C: Emerging Technologies, Transportation, Transportation Research Part A: Policy and Practice, International Journal of Recent Technology and Engineering, International Journal of Production Economics, Sustainability Switzerland, Manufacturing and Service Operations Management, Media International Australia, and Profesional de la Informacion.

The progression of articles published in these top journals is depicted in Figure 4. The International Journal of Recent Technology and Engineering published the highest number of articles in a single year related to on-demand service, product, and market research in 2019. A noticeable trend of increasing interest in publishing papers on these investigated topics can be observed for the journal Transportation, which has steadily increased the number of published articles. Additionally, with the exception of Media International Australia, all other journals have shown a declining trend in the number of published articles on this subject.

Figure 4. Evolution of articles published by top journals (Source: Scopus)



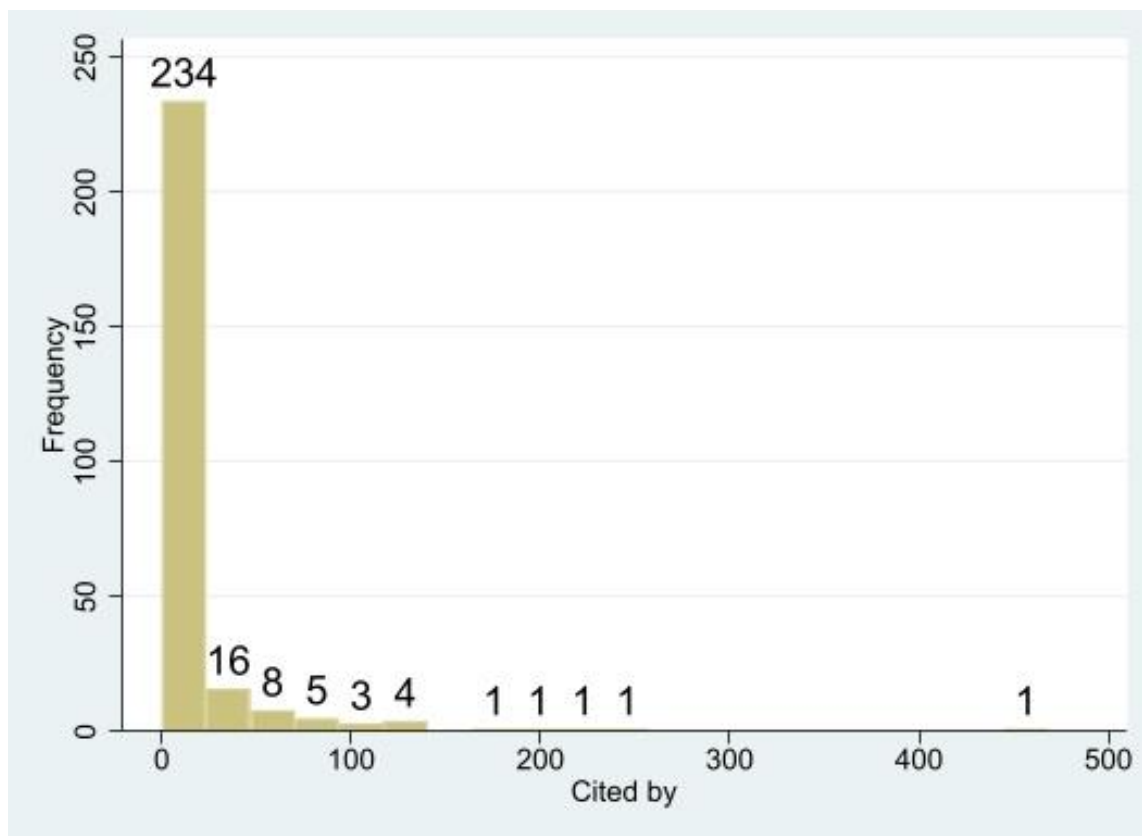
The most influential articles, each receiving more than 100 citations, are as follows:

- 1) "Preferences for shared autonomous vehicles" (Krueger et al., 2016, cited 468 times).
- 2) "A behavioral choice model of the use of car-sharing and ride-sourcing services" (Dias et al., 2017, cited 235 times).
- 3) "What influences travelers to use Uber? Exploring the factors affecting the adoption of on-demand ride services in California" (Alemi et al., 2018, cited 230 times).
- 4) "On-demand service platforms" (Taylor, 2018, cited 205 times).
- 5) "Coordinating supply and demand on an on-demand service platform with impatient customers" (Bai et al., 2019, cited 178 times).

- 6) "How sustainable is the sharing economy? On the sustainability connotations of sharing economy platforms" (Geissinger et al., 2019, cited 123 times).
- 7) "Utilizing Cloud Computing to address big geospatial data challenges" (Yang et al., 2017, cited 123 times).
- 8) "Not just a taxi"? For-profit ridesharing, driver strategies, and VMT" (Anderson, 2014, cited 123 times).
- 9) "Potential uptake and willingness-to-pay for Mobility as a Service (MaaS): A stated choice study" (Ho et al., 2018, cited 117 times).
- 10) "Shared versus private mobility: Modeling public interest in autonomous vehicles accounting for latent attitudes" (Nazari et al., 2018, cited 105 times).

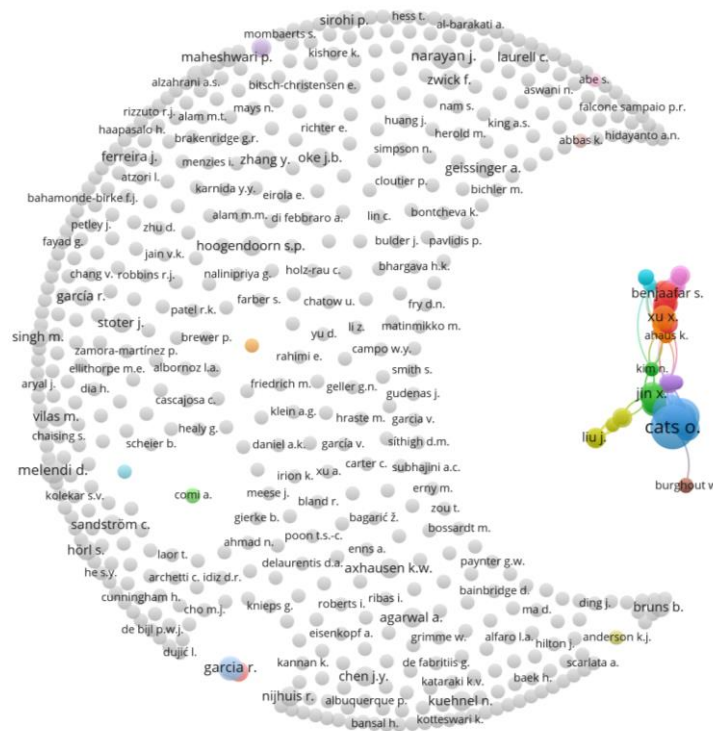
These ten articles collectively received more than 100 citations each, constituting 40% of the total number of citations received by the documents under investigation. Figure 5 illustrates a frequency plot of the number of citations per article.

Figure 5. Frequency plot of the number of citations per article



Moving on to the most-cited author, let's explore the citation network in relation to the 275 researched documents, as depicted in Figure 6. Similar to the data from the document citation network, a small proportion of authors received a substantial number of citations. The five most influential researchers, whose articles have been cited more than 100 times in Scopus-indexed documents, are as follows: Cats, O.; van Oort, N.; Hoogendoorn, S.; Hoogendoorn-Lanser, S.; and Alonso-Gonzalez, M.J. Additionally, the following five researchers received between 20 and 60 citations for their work: Garcia, R.; Ben-Akiva, M.; Zhong, Y.; Xu, X.; and Jin, X.

Figure 6. Authors' Citation Network



A total of 984 author keywords were associated with the 275 articles listed in Scopus based on our data retrieval strategy. Out of these, 109 keywords met the threshold requirement of at least 2 occurrences per keyword. To ensure accuracy, we processed the raw data extracted from Scopus to standardize the way keywords were written (e.g., 'mobility on-demand' was preferred over various other variants such as 'mobility on demand,' 'on-demand mobility,' 'MOD,' or 'on demand mobility'). Table 2 displays only the seventeen keywords with a minimum total link strength of 10 within the 275 observed publications; the complete list is available upon request.

Table 2. The Most Frequent Keywords

Keywords	Occurrences	Total Link Strength
mobility on-demand	18	38
ridesharing	12	27
shared mobility	10	25
cloud computing	20	20
autonomous vehicles	8	18
on-demand services	32	18
stated preferences	5	18
video on-demand	15	18
television	8	17
Netflix	10	16
demand-responsive transport	4	15
ride-hailing	4	13
mobility-as-a-service	7	12
choice modelling	3	11
ridesourcing	5	11
agent-based simulation	5	10
MATsim	3	10

The keyword network is illustrated in Figure 7. Central to this network is the keyword 'on-demand services.' The analysis of bibliographic data reveals five main clusters of documents.

Cluster 1 (green) encompasses documents centered around the keyword 'on-demand services.' These articles investigate general aspects and topics related to digital platforms, the on-demand economy, on-demand services, the gig economy, the sharing economy, millennials, sustainability, spillover effects, information asymmetry, incentives, social media analytics, and mobile apps.

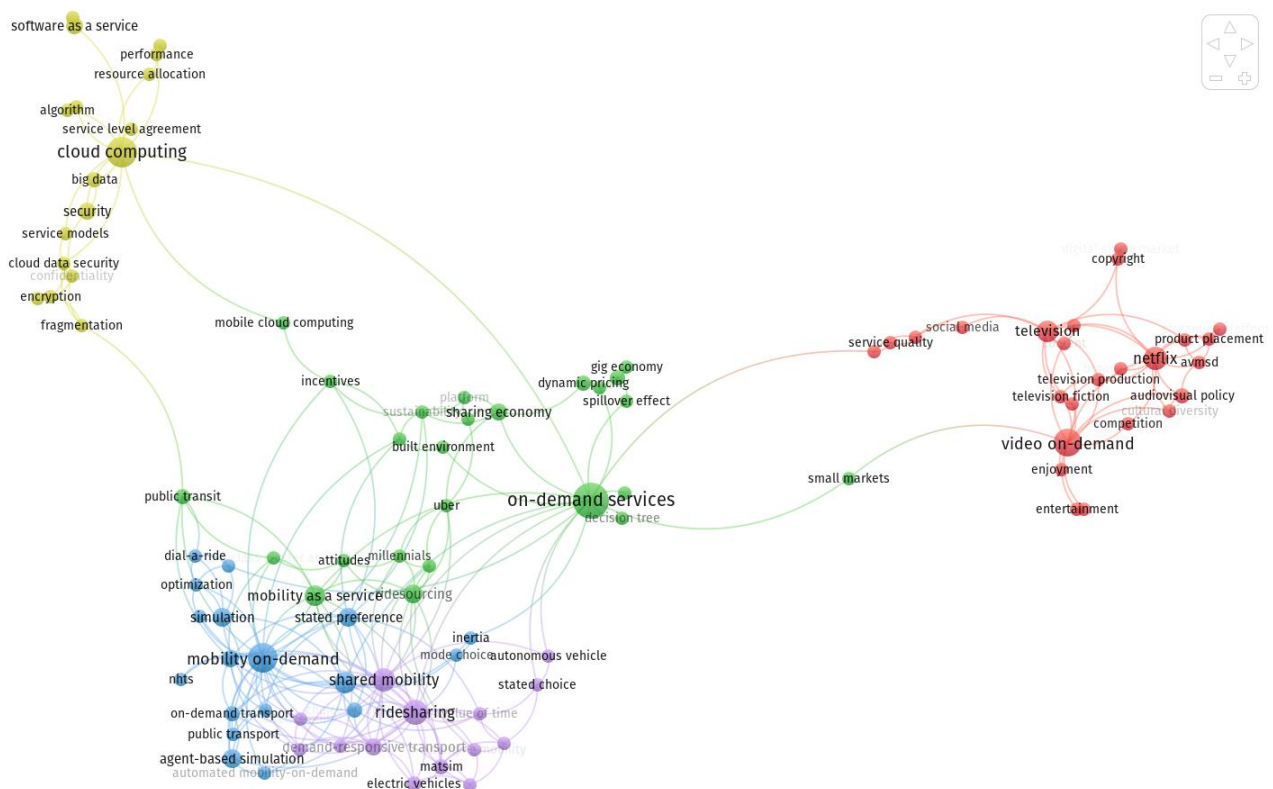
Cluster 2 (blue) comprises documents that focus on the keyword 'mobility on-demand' (MoD). These articles delve into topics related to mobility on-demand, urban mobility, automated mobility, dial-a-ride, public transport, and ride-hailing. Documents in this cluster are more likely to present simulation results.

Cluster 3 (violet) includes documents that explore shared mobility. These articles are associated with keywords such as shared mobility, ride sharing, demand-responsive transport (DRT), flexible transport, emerging mobility, mobility-as-a-service (MaaS), shared automated vehicles, value of time, or user choice.

Cluster 4 (yellow) contains documents that disseminate research on cloud computing and on-demand software markets. Topics covered include big data, service models, software-as-a-service (SaaS), resource allocation, cloud data security, data encryption, confidentiality, privacy, security, performance, fragmentation, and service level agreements (SLA).

Cluster 5 (red) encompasses documents discussing television online streaming and video on-demand-related issues. These research avenues pertain to audiovisual policy, copyright, competition, video content production, streaming platforms, cultural diversity, service quality, and user experience.

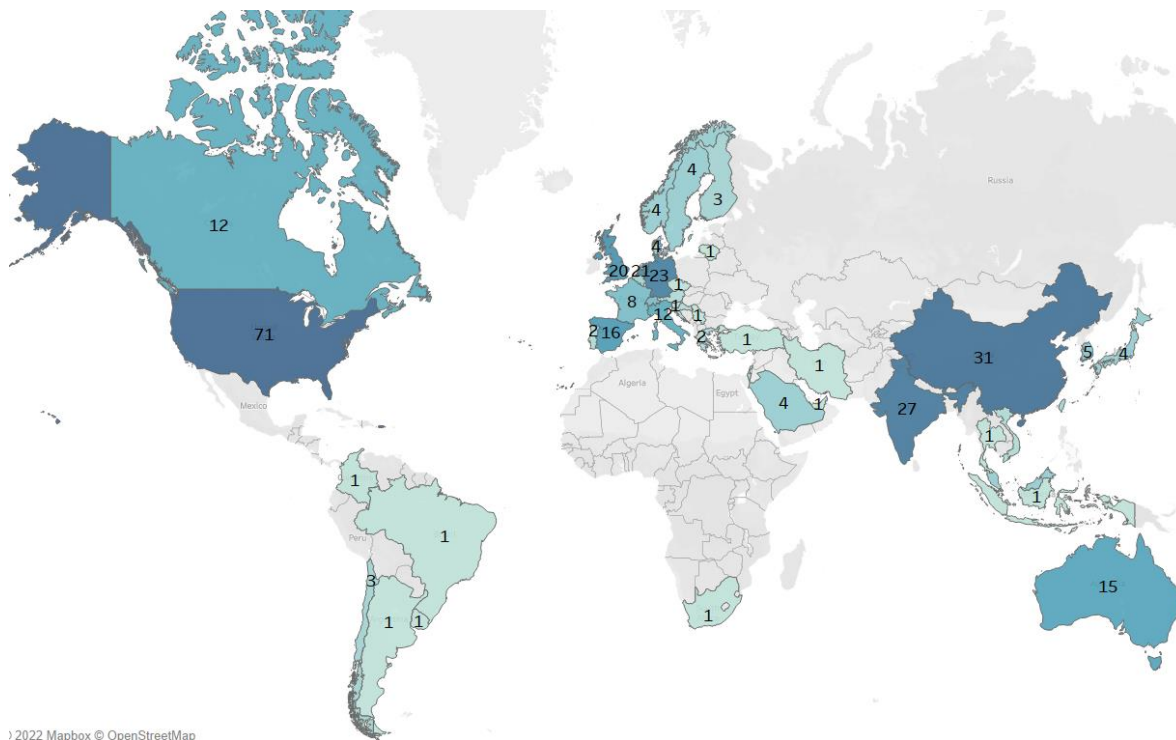
Figure 7. Keyword Network



Affiliation data provides insight into the countries and institutions that are most actively engaged in research on on-demand services, products, and markets. Delft University of Technology in the Netherlands stands out as the leading institution in terms of publishing research results on these topics, with 26 articles authored by researchers affiliated with this university.

Other prominent higher education institutions and research centers involved in research related to on-demand services, products, and markets include: Technical University of Munich (Germany); University of California, Irvine (United States); Georgia Institute of Technology (United States); Massachusetts Institute of Technology (MIT) (United States); Universidad Carlos III de Madrid (Spain); Hong Kong Polytechnic University; University of Toronto (Canada); South China University of Technology; Tsinghua University (China); ETH Zürich (Switzerland). These institutions demonstrate significant contributions to research in this field.

Figure 8. Geographical distribution of documents by country



Referring back to the summary statistics provided in Table 1, our sample of documents was authored by researchers from 46 different countries. Figure 8 illustrates the geographical distribution of these articles by country. The majority of these studies, totalling 71, were conducted by researchers from the United States, where theoretical models and frameworks were empirically tested. The second-largest number of studies related to on-demand services, products, and markets originates from China (31), followed by India (27), Germany (23), the Netherlands (21), the United Kingdom (20), Spain (16), and Australia (15).

It's worth noting that access to financing has played a significant role in stimulating research in specific countries. For instance, the China Natural Science Foundation funded the research results presented in 14 papers, followed by the United States Department of Transportation, which funded the research results in 9 papers. Other funding bodies supporting research in this field include the European Research Council, the Netherlands Organization for Scientific Research, and the Australian Research Council.

5. Conclusions

Over the years, significant debate and discussion have revolved around the unprecedented growth of on-demand services and digital platforms. On-demand digital platforms have experienced rapid development, significantly influencing various industries, from mobility to software, food delivery and video entertainment. These platforms deliver services immediately, on demand, which radically changes the way consumers and businesses interact. Prior research has delved into the opportunities created by this evolution, as well as the barriers that might hinder further global development and adoption. Several researchers have advocated for the need for regulation and the formulation of public policies to oversee the on-demand economy. Empirical research in this field has validated and simulated models from a wide range of perspectives, utilizing various methodologies.

However, despite the increasing interest among practitioners and scholars, a theoretical framework is essential for gaining a better understanding of the fragmented research addressing specific topics related to the provision of on-demand services. The literature review highlights the absence of a comprehensive conceptual framework for grasping the complexities of on-demand service markets. The 'on-demand' concepts still lack clear definitions, often appearing vague and understood in inconsistent ways. Few unified definitions were identified throughout the analysis, and those were limited to specific terms.

The conceptual framework proposed in this study for the integration of research on on-demand platforms aims to unify the various perspectives and fields related to the demand-based economy. It aims to provide a deeper understanding of on-demand markets and services, addressing the complexity of the phenomenon from a multidisciplinary perspective. The conceptual framework brings together research related to on-demand mobility, cloud computing, software-as-a-service (SaaS), video on demand (VoD), retail, education and delivery services, among others. It highlights the commonalities between these domains and defines the key variables influencing the provision of on-demand services. A central aspect of on-demand platforms is the interaction between two distinct groups of users (consumers and suppliers). Platforms create economic value by facilitating interactions between these groups. The framework emphasizes that the success of a platform depends on its ability to balance supply and demand in an efficient manner. On-demand platforms differ from traditional service systems in their flexibility and ability to respond to demand in real time. The framework emphasizes the role of dynamic pricing, mobile technology and agent independence in dealing with fluctuations in supply and demand.

The conceptual framework integrates elements from two major orientations of economic research: mainstream economic modelling, which focuses on market equilibrium and the optimization of demand and supply within on-demand platforms, and behavioural economics, which analyses the factors that influence consumer behaviour and the adoption of on-demand services, such as preferences for shared mobility and continued use of platforms.

The bibliometric analysis revealed a heightened interest in several countries, such as the United States, China, Germany, the Netherlands, Italy, and Korea, along with specific on-demand markets like mobility on-demand, cloud and software on-demand, and video on-demand. The landscape of scientific production is dominated by a few authors who have produced a significant number of highly cited papers, primarily affiliated with select higher education institutions and research centres. Research production has been encouraged by the availability of research funding. While much research has focused on mobility, there is an increasing interest in exploring other types of on-demand services.

Nonetheless, there is a consensus in the literature that there is an urgent need for regulation and the formulation of public policies to oversee on-demand service markets. Another important conclusion refers to the urgent need for regulation and formulation of public policies to manage and govern the on-demand economy. Regulatory issues are a key issue within on-demand platforms, addressing two main areas: the nature of work and data privacy and security. Regarding the nature of the work, there is a significant regulatory gap, as the status of agents working on on-demand platforms (such as drivers, deliverymen or service providers) is not clearly defined. These agents are often treated as independent workers or freelancers, meaning they do not enjoy the same rights and protections as traditional employees, including social security, protection against unfair dismissal or access to a guaranteed minimum wage. This precariousness of work has been signalled since the beginning of the platform economy, and the lack of clear regulations favours the exploitation of agents and keeps them in a vulnerable position. At the same time, data privacy and security are another major challenge, as on-demand platforms collect and manage significant amounts of users' personal information. The risks of uncontrolled exposure of this data require strict data protection policies and transparency in their use.

For on-demand platforms to continue to develop in a sustainable and equitable manner, it is essential that governments implement a clear and adaptable regulatory framework. It must provide adequate protections for workers, ensure transparency and privacy of user data and support economic development through responsible innovation.

First, a major challenge of the on-demand platform economy is the ambiguous legal status of workers. Many workers are considered freelancers or self-employed, which means they do not benefit from essential social rights and protections, such as health insurance, paid holidays or pension contributions. To correct this situation, governments could: Create a hybrid worker status that combines the flexibility of self-employment with essential protective rights. This status should include access to social security, health insurance, pension contributions and protection against unfair dismissals; Introduce a system of standardized contracts for platform workers, which clearly define their rights and responsibilities. These contracts should be flexible to allow for autonomous scheduling of work, but provide minimal protection in the event of accidents, illness and other critical situations; Develop a 'gig economy' legislation to regulate working hours and impose a guaranteed minimum wage for platform workers, even in the case of part-time or temporary work. This could prevent exploitation through extended working hours without adequate compensation.

Second, the supervision can target platform algorithms and compensation policies. Digital on-demand platforms often use algorithms to manage supply and demand, thereby influencing the level of workers' compensation. Dynamic pricing policies (such as surge pricing) can create uncertainty for workers, and algorithms can favour certain unstable work practices. In this sense, it is recommended: Increased transparency in algorithms, meaning that platforms should be required to publish clear and accessible information about how their pricing and task allocation algorithms work, to allow workers to understand how they are affected; Establishing regulations on dynamic pricing policies considering that it is important for governments to regulate the use of 'surge pricing' to prevent abuses and maintain market stability. One approach could be to impose limits on rate increases during periods of peak demand, protecting both workers and consumers from extreme price fluctuations; Establish fair compensation policies so that platforms provide a guaranteed minimum level of compensation that workers receive regardless of demand variability. This would reduce the risk of poverty and encourage constant participation on the platform.

Third, increased attention must be paid to the protection of personal data and the security of users. In the context of on-demand platforms, which collect and use a significant amount of personal data (from usage preferences to location), there is an increased risk to the privacy and security of this data. Public policies should address these risks by: Introducing strict privacy and transparency standards in the management of personal data. Platforms should be required to disclose how they collect, store and use user data and obtain their explicit consent for each type of data collected; Regulators should implement clear penalties for privacy breaches and oversee compliance with data security regulations; On-demand platforms may undergo external data security auditors at regular intervals to ensure protection against security breaches.

Fourth, it is recommended to create a social dialogue framework between platforms and workers. As the on-demand platform economy is booming, dialogue between all parties involved should be encouraged to find solutions that protect the interests of both workers and platforms. Public policies must facilitate: The creation of tripartite dialogue commissions (platforms, workers and government) to discuss platform work regulations. These commissions could help develop solutions that balance the flexibility needed by platforms with worker protections. Even more, the introduction of worker representation mechanisms, in the sense that workers are allowed to form trade unions or worker representation groups, which would actively participate in the formulation of the internal policies of the platforms, including regarding compensation and working conditions.

Last, continuous monitoring and evaluation of the impact of on-demand platforms can be implemented. It is essential that governments monitor the evolution of on-demand markets and adjust regulations as new challenges and opportunities arise. This could include creating a framework for continuous monitoring of the impact of platforms on the labour market, economy and society in general. This framework should involve collaboration with academia, experts and state agencies to periodically assess the economic and social effects of on-demand platforms. Also, public policies must support development and innovation in the field of on-demand platforms, but in a responsible way that ensures that workers and users are protected, and platforms contribute to the sustainable development of the digital economy.

Data Availability: All the data processed in this research are available in the Scopus database (Elsevier).

Conflict of interest: Author declares no conflict of interest.

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