

# Bibliometric Analysis to Encourage the Development of Digital Economy Scientific Studies

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## ABSTRACT

Digital economy is an effort to strengthen economic activity through the development of digital data by utilizing information and communication technology. Digital computing technology has been developed in various forms of digital platforms through internet-based business development to support the digital economy that is currently developing. This research was developed with qualitative method using bibliometric analysis to analyze various research topics that are currently growing rapidly. The development of various scientific literatures is analyzed which refers to scientific journals published in the last five years on the topic of digital economy. The results of analysis reveal that there are several topics with high novelty elements and have the feasibility to be developed in various sectors to support economic growth which include artificial intelligence, block chain technology, sharing economy, digital platforms, knowledge economy, cashless transactions, demonetization, financial technology. Various topics that have novelty, especially for the development of digital economy, need to be researched further so that they can be developed according to current needs with the support of knowledge and technology that is experiencing rapid improvement.

**Keywords:** *Digital economy, Artificial intelligence, Digital computing technology, Scientifics journal, Bibliometric analysis.*

## 1. INTRODUCTION

In research conducted in the last five years, the development of the digital economy concept around the world has become a part of public attention in all fields, including scientists in the economic field. The development of the digital economy is still being researched with various models found, for example the importance of using geo-information technology to generate a digital economy [1], need for exploration of business models in the implementation of economic digitization theoretically and practically [2], integrated development of manufacturing and service industries [3]. Various researches on the topic of the digital economy investigate the development of the economic sector on a broad scale through strengthening the

technology sector as the main supporter in its progress trend. However, although the researched digital economy is quite extensive, the issue of national economic development must continue to be promoted because it is an important indicator of a country's progress. The development of the digital economy certainly faces various serious problems including the difficulties faced by graduates of educational institutions while utilizing the modern education system [4], strategic needs in the integration of information technology developments involving the government, academia, and civil society [5], improving business processes through technological innovation is needed that seriously involves the digital economy [6].

Various solutions are sought to realize the expected goals of implementing the digital economy by various

countries, including the implementation of modern technology is an opportunity to solve problems and threats to the environment and sustainable development, especially in the application of the digital economy [7], digital platforms with implementation that refers to technology interoperability and adaptive control technology through autonomous control systems are an important part of business processes in digital economic activities [8], principle of automation in situational control using artificial intelligence is carried out in the application of the digital economy [9]. However, solutions in the development of the digital economy in various studies are still partially implemented, such as several events that have been studied in Russia, Slovakia, China, and South Africa. Treatments that have certain specificities in presenting the solutions that have been offered are sought to improve the digital economy. New steps and strategies are needed for the development of knowledge that has a serious relationship with the digital economy. Uniqueness is needed in applying new approaches in gaining knowledge development that has a wide diversity in describing the concept of the digital economy in a more orderly manner. Strengthening in research development has relevance in economic development on a national scale that needs to be followed up so that it has the potential to improve the quality of life.

The term digital economy has been widely developed in an effort to support the improvement of the national economy along with the development of knowledge and technology which is growing rapidly at this time. Therefore, there is a strong indication that digital economics research has increased, which refers to many studies discussing theoretical and practical issues, as well as the development of implementation strategies. The digital economy is one of the vital efforts to create opportunities for the development of a new economic system that utilizes several of the latest technologies including information technology, block chain, and big data analysis. However, the use of the latest technology in creating a new economic system with better effectiveness and efficiency in its implementation for the community can be do, one of them is by implementing a digital economic system. For this reason, the concept of digital economy needs to be developed in further research in order to develop knowledge that has relevance to the concepts studied in more detail in order to obtain theories and concepts that have novelty that can be improved at an advanced level. Knowledge development is carried out on the concept of digital economy which is implemented in this research with the aim of disseminating derivative topics on the concept of digital economy that supports various fields of research. For this reason, the scientific evolution of digital economy needs to be monitored to find out the current research trends that are used as the basis for determining the topics used in future research. The

resulting scientific evolution represents a variety of current issues that can be developed in order to grow the latest strategy in creating an effective digital economy system so that it plays a major role in supporting the improvement of the national economy so that it has an impact on strengthening people's welfare.

## 2. METHODS

Mapping of digital economic topics is a goal to be fulfilled to obtain diversity from the evolution of knowledge in supporting the development of the national economy. Scientific journals with the main topic of digital economics as one of the scientific literature that is widely developed at this time can be researched using qualitative methods. Bibliometric analysis is a method for analyzing evolutionary scientific data [10], used to analyze knowledge mapping data [11]. Scientific evolution monitoring implemented through scientific journals to find out the latest research trends. Scientific journals are one of the sources of knowledge that are currently growing and developing rapidly and are expected to contribute to the improvement of the national economic system. Knowledge development is analyzed by utilizing the evolution of knowledge, especially focused on the topic of the digital economy.

Analysis of research data conducted through scientific journal searches is displayed in the form of visualization in an attractive format by applying the VOSviewer application. VOSviewer is displayed through a mapping that converts publication information with visual elements [12]. Researchers collect primary data systematically in the form of scientific journals with the topic of digital economy in September 2021. Publications of scientific journals for the 2016-2020 period or publications in the last five years are obtained through scientific searches. Primary data were obtained as many as 4954 scientific journals by inputting digital economic keywords using a search application for journals that have been published. Five time periods based on the year the journal was published in order to know in detail the specifications of the journal publication in the year concerned. The pattern of changes in the evolution of knowledge can be seen in its development referring to the publication of scientific journals. Changes in the evolution of knowledge that contain the latest issues in the digital economy can be seen in the development of new topics that arise. The emergence of several new topics related to the digital economy so that they can be used for the development of relevant knowledge and technology to strengthen the development of the national economic system.

### 3. RESULTS AND DISCUSSION

Visualization network and visualization density are presented to explain in detail the concept of digital economy. The keyword "digital economy" is entered in the search application to find relevant scientific journals to obtain some data. The scientific journals that have been collected are 4954 articles that have been published in scientific journals published in 2016-2020. Eight clusters are classified in order to simplify the

analysis that has new topics in scientific journals published in the last five years to be developed in further research. In addition, a total of 97979 citations have been obtained during journals published in the last five years. To obtain a database in the form of visualization, VOSviewer is used as a tool in analyzing big data in the form of scientific journals to facilitate analysis so as to get the novelty of a topic that can be utilized for the development of knowledge and technology.

**Table 1.** Classification of scientific journals on the topic of digital economics

Publication year	2016	2017	2018	2019	2020
Papers	985	992	997	992	988
Citations	32187	24527	19662	13939	7664
Cites/year	6437.4	6131.75	6554	6969.5	7664
Cites/paper	32.68	24.72	19.72	14.05	7.76
Authors/paper	2.03	2.09	2.07	2.26	2.34
h-index	76	75	61	54	39
g-index	161	130	114	88	58
hA-index	30	33	35	37	39

The search for scientific journals in the last five years is carried out on digital economic topics which are grouped each year of publication so that detailed developments can be detected. Although the number of papers that have been collected each year has a different number with a small difference, it can be seen that the number of citations in the older year of publication has a higher number of citations. This turns out to be different from the case of cites per year because for 2019 publications, the number of cites per year is 6969.5 which has the largest value compared to other years. The number of citations per year indicates that scientific journals are widely cited and used for

knowledge development, including through the development of research in various fields of expertise. The h-index, g-index, and hA-index values presented show the development of the quality of scientific journal publications as measured by the number of citations from journal articles. Scientific journals are declared of good quality and have a reliable reputation, one of which refers to the number of citations obtained so that the more citations, the more journal articles are used so that they are beneficial for researchers and academics.

**Table 2.** Economic digital clustering

Cluster	2020	2019	2018
1	Block chain technology, cashless economy, digital currency, digital payment	Digital market, digital business model, financial inclusion	collaborative economy, intellectual property, moral economy, consumer protection
2	digital technologies, big data, cryptocurrency	Global digital economy, information security, information system	Global economy, digital literacy, human capital, platform economy
3	Digital marketing, value creation, supply chain management	Digital competence, knowledge economy, innovative development	Digital marketing, digital currency, creative economy, knowledge economy
4	Innovative technology, knowledge economy, cyberspace	Cashless economy, digital literacy, internet technology	Digital society, information system, economic system
5	Communication technology, financial technology, information security, political economy	Circular economy, collaborative consumption, sharing economy	Cashless economy, demonetization, digital payment, information security
6	Digital competence, digital literacy, economic security	Digital platform, platform economy, new economy	Block chain technology, cryptocurrency, technological change
7	Digital inclusion, national broadband	Collaborative economy, cryptocurrency, political economy	Digital entrepreneurship, new business model, sharing economy
8	Artificial intelligent, optoelectronic engineering	Digital marketing, big data, cloud computing	Soft innovation resources, open innovation, formalized ontology

The developed topics related to the digital economy published in scientific journals generate new issues that can be followed up by researchers who are aligned with the latest knowledge needs. The digital economy issues described in eight clusters over the last three years can reveal several new topics that can be used for further knowledge development. New

topics that can be leveraged for advanced research include digital platforms, artificial intelligence, communication technology, block chain technology, demonetization, cashless economy, and knowledge economy.

**Table 3.** Ranked in the top ten scientific journals

Rank	Authors	Title	Source Journal	Publisher	Year	TC	APY
1	M Dorofeyev, M Kosov, V Ponkratov, A Masterov	Trends and prospects for the development of blockchain and cryptocurrencies in the digital economy	European Research Studies Journal	International Strategic Management Association	2018	88	29.33
2	I Gontareva, M Chorna, D Pawliszczy, M Barna	Features of the entrepreneurship development in digital economy	TEM Journal	UIKTEN	2018	24	8.00
3	M Olbert, C Spengel	International taxation in the digital economy: challenge accepted	World tax journal	London Business School Research	2017	117	29.25
4	P Balcerzak, MP Bernard	Digital economy in Visegrad countries. Multiple-criteria decision analysis at regional level in the years 2012 and 2015	Journal of Competitiveness	Tomas Bata University in Zlín	2017	50	12.50
5	Y Chen, L Wang	Commentary: marketing and the sharing economy: digital economy and emerging market challenges	Journal of Marketing	Sage Publication	2019	23	11.50
6	T Koch, J Windsperger	Seeing through the network: Competitive advantage in the digital economy	Journal of Organization Design	Springer	2017	111	27.75
7	S Quinton, A Canhoto, S Molinillo, R Pera	Conceptualising a digital orientation: antecedents of supporting SME performance in the digital economy	Journal of Strategic Marketing	Taylor & Francis	2018	85	28.33
8	MA Ali, MR Hoque, K Alam	An empirical investigation of the relationship between e-government development and the digital economy: the case of Asian countries	Journal of Knowledge Management	Emerald	2018	40	13.33
9	MB Bulturbayevich, MB Jurayevich	The impact of the digital economy on economic growth	International Journal on Integrated Education	Research Parks Publishing	2020	52	52.00
10	EA Khitskov, SV Veretekhina	Digital transformation of society: problems entering in the digital economy	Eurasian Journal of Analytical Chemistry	Society for Innovative Research	2017	70	17.50

The topic of digital economics described in scientific journals 2016-2020 displays the ranking of the top ten journals that have been published. The digital economy topics described in scientific journals 2016-2020 display the rankings of the top ten journals that have been published. The ten journals that have a rating come from scientific journal publications with various sources and some come from reputable journal publishers. Some journals still have a limited number

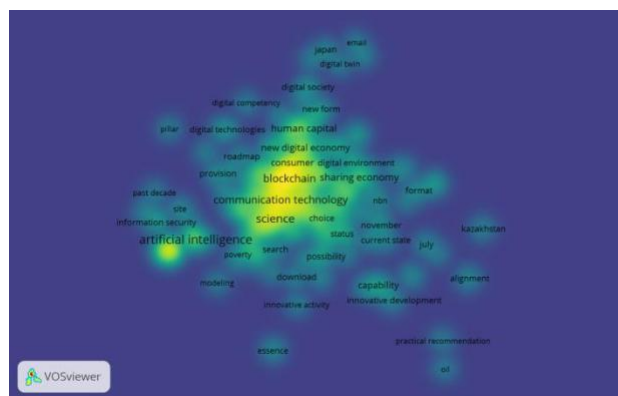
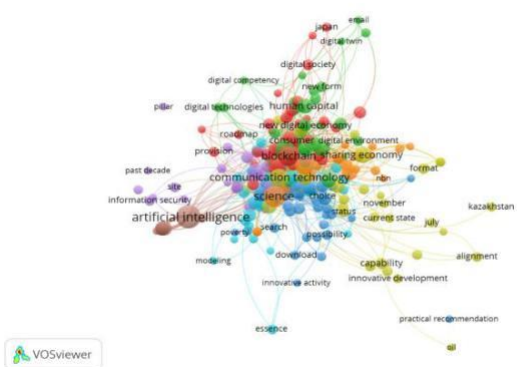
of citations due to the short time frame for publication, so additional time is needed to add citations. The benefits of scientific journals can be marked through the large number of citations so that one way to increase the number of citations is how scientific journals are more easily recognized by researchers and academics in order to develop further knowledge that can be utilized by the public.

**Table 4.** Scientific journals with the highest number of citations

TC	APY	Title	Source Journal	Authors	Year
3478	695.60	The sharing economy: Why people participate in collaborative consumption	Journal of The Associations For Information Science and Technology	J Hamari, M Sjöklint, A Ukkonen	2016
1450	290.00	Debating the sharing economy	Great Transition Initiative	J Schor	2016
879	293.00	The digital platform: a research agenda	Journal of Information Technology	M De Reuver, C Sørensen	2018
812	203.00	Racial discrimination in the sharing economy: Evidence from a field experiment	American Economic Journal: Applied Economic	B Edelman, M Luca, D Svirsky	2017
768	153.60	Algorithmic labor and information asymmetries: A case study of Uber's drivers	International journal of communication	A Rosenblat, L Stark	2016
768	153.60	A thematic exploration of digital, social media, and mobile marketing: Research evolution from 2000 to 2015 and an agenda for future inquiry	Journal of Marketing	C Lambertson, AT Stephen	2016
498	166.00	Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems	Strategic Entrepreneurship Journal	E Autio, S Nambisan, LDW Thomas	2018
442	110.50	Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas	Journal of Rural Studies	K Salemin, D Strijker, G Bosworth	2017
439	146.33	The fourth industrial revolution: Opportunities and challenges	International Journal of Financial Research	M Xu, JM David, SH Kim	2018
437	109.25	Challenges to mismeasurement explanations for the US productivity slowdown	Journal of Economic Perspectives	C Syverson	2017

Scientific journals that were published five years ago with a total of 3478 citations obtained and an average per year of 695.60 are the journals with the highest number of citations based on the topics studied. The large number of citations obtained in scientific journal publications indicates that the articles written are of very good quality and have

unprecedented novelty that can be utilized for the development of knowledge and technology. Articles that are novel with scientific quality as needed in the development of current knowledge are an indication that the benefits of articles are a priority and an important part in improving the quality of human life.



**Figure 1** Network and density visualization in 2020

The topic of digital economics published in scientific journals 2020 can be analyzed analytically which is described in the form of network visualization and density visualization. Nodes with lines that have certain colors with several types of visualizations displayed and linking the themes

studied show the relationship between the existing nodes. The color of the nodes with rounded shapes shows the cluster groups that exist in the displayed visualization. The dominance of the topic can be seen in the size of the nodes presented with the added level of color brightness. The large dimensions of the nodes

with bright colors indicate that a topic like this is a trend and is being researched a lot, and is needed in the development of knowledge at that time. Artificial intelligence, blockchain and communication technology shown in Figure 1 are depicted by node dimensions with larger sizes and brighter colors. These three topics found are an important part of the

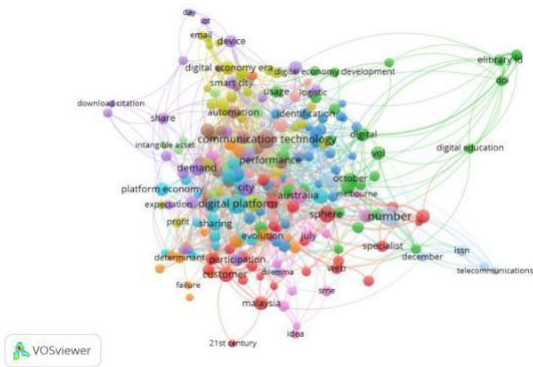
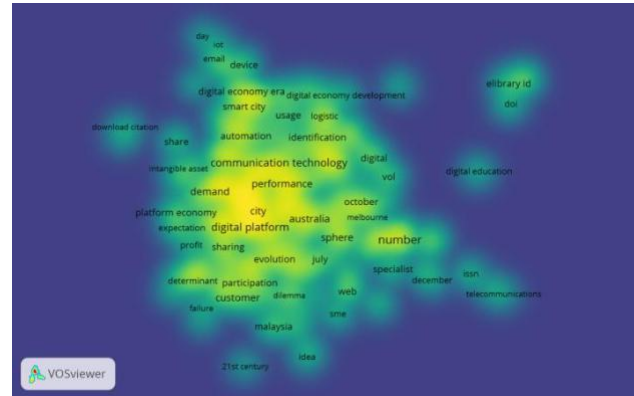


Figure 2 Network and density visualization in 2019

Digital platforms and communication technology are new themes that have developed in scientific journals published in 2019. The two themes found in this study, which are presented in Figure 2, need to be

research results because they are the most widely discussed and researched so that they need to be followed up and developed in the development of the national economic system which is correlated with the development of a digital system that is in line with current technological developments.



further developed in various fields of research and academia, especially related to the development of digital economy in supporting the strengthening of the national economic system.

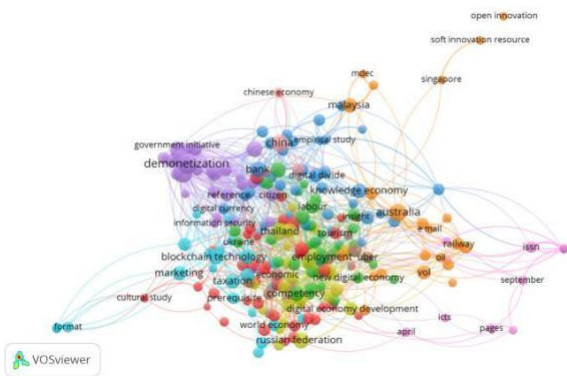
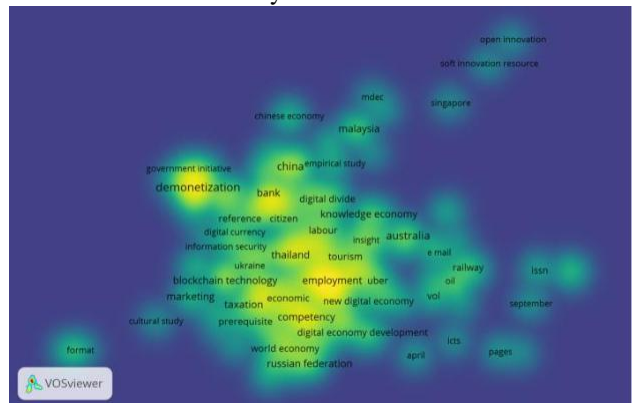


Figure 3 Network and density visualization in 2018

Demonetization, knowledge economy, and blockchain technology are topics that have novelty found in this research which was published in scientific journals in 2018. The development of digital economy requires several new concepts that need to be followed



up further including referring to the three topics found in this research. The topics found can be followed up as new concepts that can be used for knowledge development, especially for the development of the digital economy concept.

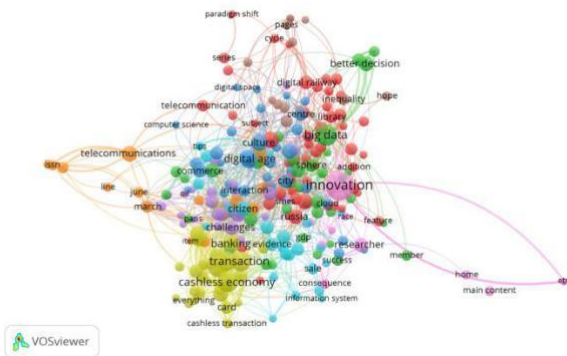


Figure 4 Network and density visualization in 2017



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