

# Digital Business Adoption 2013-2018 A Bibliometric Study

Heru Kresnha Reza<sup>1\*</sup>, Melly Susanti<sup>2</sup>

<sup>1</sup>Department of Accounting, Faculty of Economics and Business, Esa Unggul University, Indonesia

<sup>2</sup>Department of Accounting, Faculty of Economic, Muhammadiyah Bengkulu University, Indonesia

\* Corresponding author:

Email : [kreshnareza60@gmail.com](mailto:kreshnareza60@gmail.com)

---

## **Abstract.**

*Evaluating changes in the field of research on business adoption of digitalization is very useful to know the direction and topics of research during a certain period. This information can quickly identify the most influential research variables and become research updates. So far, we have not come across any research on digital business adoption over the past decade. Therefore, bibliometric mapping will be of great benefit to readers and can help convert publication metadata into maps or visualizations. The data is obtained from the publish or perish 7 application and then exported to the Mendeley application. We select articles and reviews published in Scopus indexed journals to be processed through VOSviewer. To describe 4665 terms with a minimum number of 7 occurrences in one term and 184 terms. A relevance score will be calculated based on the 30 most relevant terms. The results were found that from 2015 to 2020, there were 65089 total publications involved in the annual list and 30 terms were taken which are variables of digital business adoption. The most frequently repeated terms from the 4 clusters are Customer and Government with the same relevance score of 8571, Bitcoin with a relevance score of 83333, Firm with a relevance score of 7273, efficiency with a relevance score of 3333, experience with a relevance score of 2222.*

**Keywords:** *Bibliometrics, Vosviewere, Visualization, Adoption, Business, Digitization*

---

## **I. INTRODUCTION**

Digital business adoption, digital business is a cost-effective innovation in organizations, further research is needed to empirically validate the relationship between digital business adoption, organizational innovation, type of efficient innovation, and company performance, Tjahjana et al., [1]. Not all researchers can develop software to search for publications from digital libraries. Some researchers have looked for digital libraries as bibliometric information. The steps taken are; Google Scholar searches, using publication metadata available from several sources such as CrossRef. Bibliometric studies can provide relevant judgments about a particular discipline or field of research [2,3]. Bibliometric studies on digital business adoption including China Xu et al., [3], India [5] and Sweden [6] are used by researchers, governments, and organizations to identify scientific publications as a basis for decision making.

Ezama-Nicolás, R., [7,8]. Yeung et al., [9] using the bibliometric method stated that brain imaging and the term brain connectivity have a relatively high citation score in neuroscience studies published from 2006 to 2015. Research using the bibliometric method conducted by Wagner et al., [10] tested the novelty and conventionality in international research collaborations, it turned out that international collaborations failed to produce more new articles. In fact, international collaboration appears to result in fewer combinations of new and more conventional knowledge. The costs and communication barriers for international collaboration suppress novelty. Citation for international works can be explained by the audience effect, where more authors from more countries result in greater access to a larger community. The purpose of this study was to identify publications from 2013 to 2018, determine the research terms with the highest citation influence, and compare the share of publications in the research area.

## **II. METHODS AND DATA**

Metode bibliometrik bekerja analisis statistik publikasi yang banyak digunakan oleh peneliti untuk mengidentifikasi pola publikasi sebagai dasar pengambilan keputusan. Ezama-Nicolás, R., [11], kebaruan penelitian Park, I. dan Yoon, [12], menilai kematangan teknologi penelitian [13]. Perangkat lunak VOSviewer dapat digunakan untuk melakukan analisis publikasi menggunakan metode bibliometrik [13]. Untuk memudahkan pembahasan, perlu dicari cara untuk berbagi data dan menghitung metrik [14]. Crossref

menyediakan mata rantai dan menghubungkan berbagai penerbit melalui sistem terbuka[15]. Crossref menyediakan alat dan sumber terbuka yang digunakan oleh komunitas riset secara global, Crossref menyediakan metadata untuk komunitas akademik[16]. Akses gratis dapat digunakan sebagai pilihan bagi akademisi[17]. Oleh karena itu, Crossref layak menjadi sumber utama dalam literatur ilmiah, namun hasil pencarian tidak dapat diekspor dan dianalisis lebih lanjut oleh alat bibliometrik.

### **Sources Data**

Analyzed in this study were taken from reference manager files assisted by the publish or Perish 7 tool. Using the keyword “Digital Business Adoption” will make it easier for us to browse Journal Citation Reports (JCR). Here we filter the data used, namely journals published from 2010 to 2020. To describe 4319 terms with a minimum number of 5 occurrences in a term and 184 meet the threshold. for each 184 terms, a relevance score will be selected as many as 30 most relevant terms. WoS index Publication data is included if: (1) article or review; (2) published in journals under Quartile 1 and 2 categories, (3) published from 2013 to 2018. The notes and references cited can be downloaded manually.

### **VOSviewer**

Kata kunci dari setiap publikasi dianalisis melalui VOSviewer (van Eck & Waltman, 2010). VOSviewer menggambarkan jaringan kata kunci berulang, yang menunjukkan dampak kutipan yang relatif bersama. Metode dan algoritma telah ditetapkan telah dijelaskan dalam publikasi sebelumnya[18,19]. Untuk setiap peta istilah, hanya istilah yang muncul setidaknya 110 kali yang dipertimbangkan dalam perhitungan biner. Hitungan biner mengabaikan jumlah kemunculan istilah dalam satu publikasi. Frase kata benda dihilangkan dengan menggunakan algoritma[20]. Algoritme dirancang untuk memastikan bahwa istilah yang muncul bersama. Istilah yang muncul lebih sering memiliki gelembung yang lebih besar. Sebelum peta dibuat, kami memeriksa peta secara visual, menghilangkan istilah yang tidak relevan[21]. Tergantung pada jumlah kutipan dari setiap publikasi, setiap istilah menerima skor kutipan relatif (mulai dari nol) yang diwakili oleh warna. Biru (0) menunjukkan di bawah rata-rata, hijau (1) menunjukkan rata-rata dan merah ( $\geq 2$ ) menunjukkan di atas rata-rata[21,22].

### **Calculating Quote Score**

We rate those that appear 100 times, then calculate a term score using the VOSviewer app. The citation score was normalized based on the mean number of citations [23]. The citations for each year are scored and the citations normalized by the number of citations to the average number of citations. A score of 1 implies the number of citations from that publication is the average of all publications that appeared in digital business adoption that year. Furthermore, each citation score was normalized from all publications [20,24,22].

### **Publication Growth**

Publication growth is an indicator to analyze publications in a particular area. The aim is to evaluate whether publications have experienced exponential growth over a predetermined survey period López-Muñoz et al.,[2, 3]. After plotting the annual number of publications (y) against year (x), we apply linear and exponential trendlines and record the mathematical equations that make up the trendline.

### **Changes in Research Areas and Contributing Countries**

From 2013 to 2018, the first and last years of the study period, we identified research areas in publications. This information was gathered by examining the search results on WoS. To describe the relationship between digital adoption and other characteristics, as indicated in López-Muñoz et al.,[2,3], a prior literature review.

### **Core Journal under Bradford Law**

Annually identifies core journals in the digital business adoption category. The core journals identified for each year are those that account for one-third of the total publications for that year[25,26]. Slope, shows the magnitude of the change in the average over time, and R2 shows the effect of the regression model. Statistical analysis was performed with SPSS 23.0 (IBM, New York, USA). The results are significant if Sig < 0.05.

**III. RESULT AND DISCUSSION**

From 2013 to 2017, a total of 65,063 publications matched the selection criteria of this study (all articles in the Scopus Indexed International Journal category. Taken through publish or perish 7. An increase in the number of annual publications (y) against year (x) which is indicated in the number of adoption of digital business from 2013 to 2017 obtained a coefficient of determination R Square of 0.000. There is no effect between the number of annual publications on the year concerned.

**Table 3. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.000 <sup>a</sup>	.000	-.086	.70533

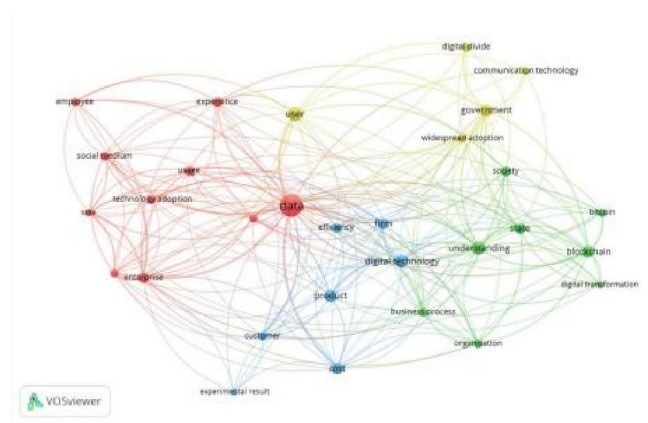
a. Predictors: (Constant), VAR.000002

**Table 4. Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.667E-6	.129		.000	1.000
	Total Publications	1.175E-5	.347	.000	.000	1.000

a. Dependent Variable: Number of Publications

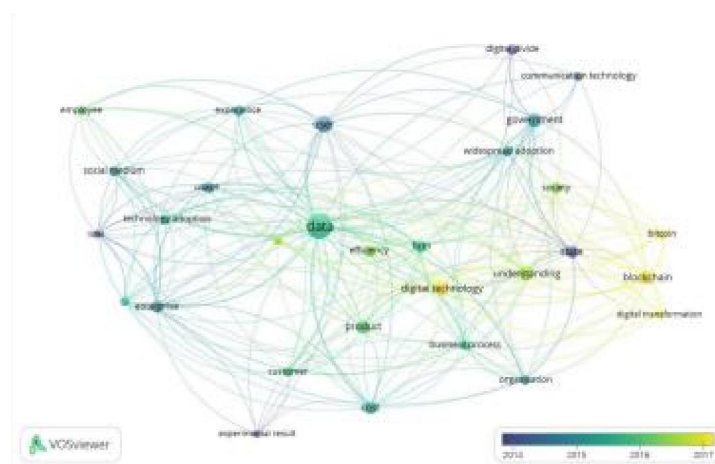
1. Peta visualization network 2020 for The 2010 can be seen in **Figure 1**.



**Fig 1. Network Visualization**

In **Figure 1**. There are 28 terms, namely Data, Usage, Technology Adoption, Enterprise, Sme, Social medium, Employee, Experience (red cluster), User, Digital divide, Communication technology, Government, Widespread adoption (blue cluster), Efficiency, Firm, Digital technology, Product, Customer, Experimental result, Cost (Yellow cluster), Society, State, Bitcoin, Blockchain, Digital, Transformation, Organization, Understanding, Business process (green cluster). All of them are divided into 4 clusters, 225 networks and a total network strength of 391.

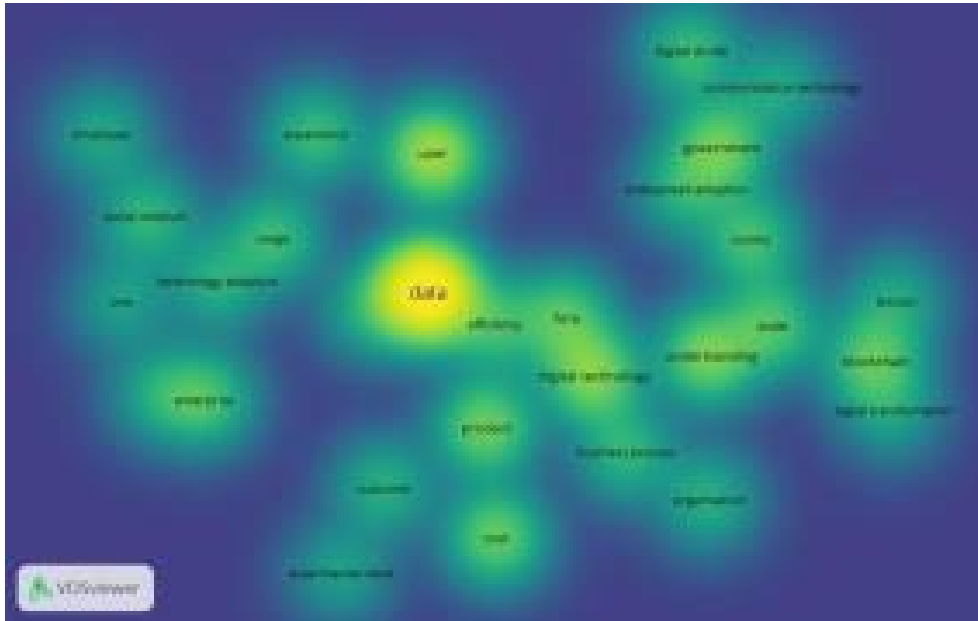
2. The Network Visualization map for 2014 to 2017 can be seen in **Figure 2**.



**Fig 2. Overlay Visualization**

In **Figure 2**. The overlay visualization consists of 4 clusters, namely the purple cluster (2014), the blue cluster (2015), the green cluster (2016) and the yellow cluster (2017). The total of each cluster can be seen in table 1.

3. The network visualization map for 2010 to 2020 can be seen in **Figure 3**.



**Fig 3.** Density Visualization

28 terms relevant to the highest impact were identified from 2013 to 2018. In Table 1. The most frequently repeated terms were Experiment Results, Digital Divide, functional connectivity, default mode and neuroimaging. Over the past 3 years (2013-2015).

**Table 3.** Keywords in Publications

No	Publikasi	Istilah
1	8571	Customer
2	8571	Government
3	8333	Bitcoin
4	7273	Firm
5	6383	Data
6	4667	Understanding
7	4286	Technology Adoption
8	3333	Smes
9	3333	Efficiency
10	2857	Widespread Adoption
11	2222	Experience
12	1875	Digital Technology

*Source: 2022 data processing*

Most publications and citations were carried out in 2017. In general, the 28 items were divided into 4 clusters of 225 links related to . The terms in the title and abstract in the accompanying publication will be clearly visible. The color associated with the quote is caused by the term, such as blue indicating below average, green indicating average, and red indicating above average. From 2013 to 2018, it is seen that the term on the left has a relative citation effect compared to the term on the right. Some keywords still have relatively low citation scores, such as Digital Divide, Employees, Experimental Results, Organizations, Products, Social Media, Usage.

Table 4. Relative citation scores of 30 high impact terms from 2013 to 2018

Istilah Keyword	2013	2014	2015	2016	2017	2018
Bitcoin	NA	NA	NA	NA	83333	NA
Blockchain	NA	NA	NA	NA	NA	5
Business Process	NA	NA	75	NA	NA	NA
Communication Technology	NA	5	NA	NA	NA	NA
Cost	NA	NA	2308	NA	NA	NA
Customer	NA	NA	8571	NA	NA	NA
Data	NA	NA	6383	NA	NA	NA
Digital Divide	NA	1	NA	NA	NA	NA
Digital Technology	NA	NA	NA	NA	1875	NA
Digital Transformation	NA	NA	NA	NA	NA	8
Efficiency	NA	NN	NA	3333	NA	NA
Employee	NA	NA	NA	1	NA	NA
Enterprise	NA	8	NA	NA	NA	NA
Entrepreneur	NA	NA	NA	5	NA	NA
Experience	NA	NA	2222	NA	NA	NA
Experimental Result	1	N	NA	NA	NA	NA
Firm	NA	NA	7273	NA	NA	NA
Government	NA	8571	NA	NA	NA	NA
Organisation	NA	NA	1	NA	NA	NA
Product	NA	NA	NA	1	NA	NA
Sme	NA	2	NA	NA	NA	NA
Smes	NA	NA	3333	NA	NA	NA
Social Medium	NA	NA	1	NA	NA	NA
Society	NA	NA	NA	4	NA	NA
State	NA	909	NA	NA	NA	NA
Technology Adoption	NA	NA	4286	NA	NA	NA
Understanding	NA	NA	NA	4667	NA	NA
Usage	NA	NA	1	NA	NA	NA
User	NA	55	NA	NA	NA	NA
Widespread Adoption	NA	NA	2857	NA	NA	NA
Total Publications Annual	1	9549	37311	8007	10208	13
Total Publications for 5 Years						65089

Source: 2022 data processing

#### IV. CONCLUSION

According to Bradford's law, a journal is divided into three zones, and each zone must contain one-third of the total number of publications. Zone 1 journals are identified as core journals. The number of publications in this study refers to the total number of articles and reviews. publication distribution. The focus of this study is solely on bibliometric growth from 2013 to 2018. Improved consistency of linearity in close publications and psychopharmacology [2,3], bipolar disorder and attention disorder in melatonin publications (López-Muñoz et al., 2016), bipolar disorder and other disorders attention deficit hyperactivity. This study aims to provide an overview of the digital business adoption literature.

**Quotation Distribution Mapping,** Figure 1 illustrates the distribution of quotations from the term Digital Business Adoption to the terms mobile banking and m-payment. In recent years, the adoption of digital businesses under the terms mobile and m-payment has received attention, as has those related to digital data and technology. The research topics investigated in this model can lead to an increase in the relative citation impact of these terms. Certain clinical topics still have low citation impact, such as product, organization, experimental results, digital divide.

**Repeated Keyword,** The results in Table 3 show that the terms occupying three of the five high-impact terms are repetitive, namely Customer, government, bitcoin, enterprise, and data.

#### V. ACKNOWLEDGMENTS

The authors are grateful to all parties who have contributed to this research, so that this research can be carried out properly.

## REFERENCES

- [1] Tjahjana, D., Abbas, B. S., Setiad, N. J., Bisnis, S., & Nusantara, U. B. (2018). *Pengaruh Adopsi Bisnis Digital dan Inovasi Organisasi terhadap Kinerja Usaha Kecil dan Menengah. 1.*
- [2] López-Abente, G., & Muñoz-Tinoco, C. (2006). Time trends in the impact factor of Public Health journals. *BMC Public Health*, 5, 1–7. <https://doi.org/10.1186/1471-2458-5-24>
- [3] López-Muñoz, F., Shen, W. W., Shinfuku, N., Pae, C. U., Castle, D. J., Chung, A. K., Sim, K., & Álamo, C. (2014). A Bibliometric Study on Second-generation Antipsychotic Drugs in the Asia-Pacific Region. *Journal of Experimental and Clinical Medicine (Taiwan)*, 6(4), 111–117. <https://doi.org/10.1016/j.jecm.2014.06.001>
- [4] Xu, W., Chen, Y.-Z., and Shen, Z.-C. (2003). Neuroscience output of China: a MEDLINE-based bibliometric study. *Scientometrics* 57, 399–409. doi: 10.1023/A:1025060819495
- [5] Shahabuddin, SM (2013). Mapping neuroscience research in India-a bibliometric approach. *Curr. Sci.* 104, 1619–1626.
- [6] Glänzel, W., Danell, R., and Persson, O. (2003). The decline of Swedish neuroscience: decomposing a bibliometric national science indicator. *Scientometrics* 57, 197–213. doi: 10.1023/A:1024185601555
- [7] ezama-Nicolás, R., et al. (2018). A Bibliometric Method for Assessing Technological Maturity: The Case of Additive Manufacturing. *Scientometrics*, 117(3), 1425–1452.
- [8] Leeder, S. (2019). The IJE and the Volatile World of Academic Publication. *International Journal of Epidemiology*, 48(2), 323–331.
- [9] Yeung, A. W. K., Goto, T. K., & Leung, W. K. (2017). The changing landscape of neuroscience research, 2006-2015: A bibliometric study. *Frontiers in Neuroscience*, 11(MAR), 2006–2015. <https://doi.org/10.3389/fnins.2017.00120>
- [10] Wagner, C. S., Whetsell, T. A., & Mukherjee, S. (2019). International research collaboration: Novelty, conventionality, and atypicality in knowledge recombination. *Research Policy*, 48(5), 1260–1270. <https://doi.org/10.1016/j.respol.2019.01.002>
- [11] ezama-Nicolás, R., et al. (2018). A Bibliometric Method for Assessing Technological Maturity: The Case of Additive Manufacturing. *Scientometrics*, 117(3), 1425–1452.
- [12] Park, I. and Yoon, B. (2018). Identifying Promising Research Frontiers of Pattern Recognition through Bibliometric Analysis. *Sustainability (Switzerland)*, 10(11).
- [13] Wong, D. (2018). VOSviewer. *Technical Services Quarterly*, 35(2), 219–220.
- [14] Lammey, R. (2019). How Publishers Can Work with Crossref on Data Citation. *Science Editing*, 6(2), 166–170.
- [15] Pentz, E. (2019). CrossRef: The Missing Link. *College & Research Libraries News*, 62(2), 206–228.
- [16] Fairhurst, V. (2018). The International Reach of Crossref. *Science Editing*, 5(1), 62–65.
- [17] Harzing, A. W. (2019). Two New Kids on the Block: How do Crossref and Dimensions Compare with Google Scholar, Microsoft Academic, Scopus and the Web of Science? *Scientometrics*, 120(1), 341–349.
- [18] van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538. <https://doi.org/10.1007/s11192-009-0146-3>
- [19] Waltman, L., van Eck, N. J., & Noyons, E. C. M. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics*, 4(4), 629–635. <https://doi.org/10.1016/j.joi.2010.07.002>
- [20] van Eck, N. J., Waltman, L., van Raan, A. F. J., Klautz, R. J. M., & Peul, W. C. (2013). Citation Analysis May Severely Underestimate the Impact of Clinical Research as Compared to Basic Research. *PLoS ONE*, 8(4). <https://doi.org/10.1371/journal.pone.0062395>
- [21] Heersmink, R., van den Hoven, J., van Eck, N. J., & van Berg, J. den. (2011). Bibliometric mapping of computer and information ethics. *Ethics and Information Technology*, 13(3), 241–249. <https://doi.org/10.1007/s10676-011-9273-7>
- [22] Waltman, L., Van Raan, A. F. J., & Smart, S. (2014). Exploring the relationship between the engineering and physical sciences and the health and life sciences by advanced bibliometric methods. *PLoS ONE*, 9(10). <https://doi.org/10.1371/journal.pone.0111530>
- [23] van Eck, N. J., & W. (2014). Visualizing bibliometric networks. In *Measuring scholarly impact*. Springer, 285–320.
- [24] López-Abente, G., & Muñoz-Tinoco, C. (2005). Time trends in the impact factor of Public Health journals. *BMC Public Health*, 5, 1–7. <https://doi.org/10.1186/1471-2458-5-24> 2003 to 2012: A bibliometric analysis. *PLoS ONE*, 10(3), 1–10. <https://doi.org/10.1371/journal.pone.0119503>
- [25] Jayaratne, Y. S. N., & Zwahlen, R. A. (2015). The evolution of dental journals from 2003 to 2012: A bibliometric analysis. *PLoS ONE*, 10(3), 1–10. <https://doi.org/10.1371/journal.pone.0119503>