

Sentiment Analysis on Digital Banking: Scopus Literature

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Abstract. This research was conducted to examine digital banking in the scope of economics and finance in terms of scientific research in published journals and indexed by Scopus. The method used is sentiment analysis from secondary data in the form of 350 journals published in the last three years then retrieved using Ms. software. Excel 2016 and SentiStrength The results show that research on digital banking in the scientific literature has increased. The results of the sentiment analysis show that there is a tendency for positive perceptions in the scientific literature on the existence of digital banking, with positive sentiments of 30%, neutral at 39%, then negative sentiments of 28% and the remaining high negative sentiments of 3%. The benefit of this research is for literature material to find out what needs to be improved from threats, negative perceptions, and shortcomings of digital banking. In addition, as a benchmark and consideration for Islamic digital banking in order to be able to innovate by paying attention to the perceptions that arise from the perception of digital banking.

Keywords: Sentiment analysis, Digital banking, Islamic digital banking.

1 Introduction

The development of digital technology in the financial market is one of the main factors of modern economic growth (Galazova & Magomaeva, 2019). Technology has changed the banking industry around the world (Kaur, Ali, Hassan, & Al-Emran, 2021). Where digitization results in savings in human resources and savings in all associated costs. With digital transformation, business models and concepts for the development of the banking sector continue to increase (Galazova & Magomaeva, 2019).

Digital banking is now widely seen as the industry's future (Nguyen & Dang, 2018). The wider reach of digital banking plays an important role in influencing the financial performance of banks by providing many advantages for customers who have limited access so that the adoption of digital banking technology is a strategic choice for competitive banks (Akhigbe & McNulty, 2003). Continuity and security of banking services characterize digital banking, where online transactions consumers are not limited to time and place. In addition, improving customer service and expanding customer base while maximizing revenue in certain segments (Melnychenko, Volosovych, & Baraniuk, 2020).

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In 2020 there was a surge in bank digital services to 660%. In addition, in the last three years, the volume of digital transactions per day has increased by 98%. And also the number of digital accounts increased to 170.7 thousand. Bank Indonesia noted that 15 banks were aggressively switching to digital banking during the COVID-19 pandemic. BI also estimates that bank digital service transactions will increase from Rp 27,036 trillion last year to Rp 32,206 trillion in 2021 (Setyowati, 2021)..

With the increasing development of digital banking. There are still pros and cons as well as pessimistic and optimistic perceptions regarding its development. The background behind the contra or pessimistic assumptions regarding digital banking includes the threats that will occur, the risks and weaknesses of digital banking. The reasons behind the optimistic perception regarding the development of digital banking are the advantages, convenience, and comfort, as well as innovations that provide benefits for customers or the banking sector itself.

Research on sentiment analysis of digital sharia banking was conducted by (Haidar et al., 2022). Where the results show that the differences in opinions of experts regarding digital sharia banking tend to vary, with positive sentiments of 36%, then negative sentiments of 18%, and negative sentiments of 46%. Therefore, it is necessary to conduct an analysis of sentiment analysis towards digital banking

Therefore, it is important to examine the value of perceived literature publications on digital banking to become additional literature and as an evaluation material and consideration for digital banking to improve quality. As well as efforts to find out what needs to be improved from threats, negative perceptions, and the shortcomings of digital banking itself. In addition, this research is also important because it can be a benchmark and consideration for Islamic digital banking. Where Islamic digital banking in the future can innovate by paying attention to the perceptions that arise from the perception of digital banking. In addition, in the future, Islamic digital banking is also expected to be able to improve the quality of the system so that it can respond to or minimize negative threats and perceptions of Islamic digital banking without leaving sharia principles.

2 Literature Review

Digital Banking

Digital banking is the computerization of traditional banking services. Where customers can access and utilize all banking services through online/electronic platforms. All banking operations are digitized to replace the physical presence of the bank and eliminate the need for customers to visit branches (Haralayya, 2021). Digital banking makes banks innovate in providing services for customers, as well as cutting costs that must be borne by customers related to transportation to branches, shipping costs, paper costs, and others (Mbama & Ezepue, 2018).

In digital banking, activities that can be accessed include the following:

1. Cash deposits, withdrawals, and transfers
2. Bill Payment
3. Account management and service
4. Apply for financial products
5. Loan Management
6. Portfolio management
7. Investment in financial services

Digital banking products and services can be accessed by all customers who have bank accounts, with access to a stable internet connection and smart devices such as laptops/PCs,

mobile phones, or tablets, can take advantage of digital banking products and services, without having to physically visit bank branches (Haralayya, 2021).

Research related to digital banking has been widely discussed by researchers. Among them (Galazova & Magomaeva, 2019) discusses the transformation of traditional banking towards digital banking activities. Budiman, Seminar, & Saptono (2020) discussed the formulation and strategy for developing digital banking, then (Haralayya, 2021) discussed how digital banking brings product and system innovation to India. And also (Kahveci & Wolfs, 2018) have discussed the influence of digital banking on the deposit performance of Turkish banks.

In addition, Mbama & Ezepe (2018) examine customer perceptions regarding digital banking, customer experience, and bank performance. Using the SEM method, the research results show that the main factors that determine customer experience in digital banking are service quality, functional quality, perceived value, employee-customer involvement, perceived usefulness, and perceived risk. In addition, there is a significant relationship between customer experience, satisfaction, and loyalty, which is associated with FP.

As for Nguyen (2020) in his research using the same method to analyze the factors that influence a person to use digital banking, it was found that attitudes towards services and perceived benefits have a positive and significant influence. Meanwhile, convenience does not affect the intention to use digital banking services. In addition, other factors such as awareness, web features have a significant positive influence on adopting digital banking (Ananda, Devesh, & Al Lawati, 2020).

2 Research Methodology

This study uses data in the form of research journals and other research publications during the period 2019 to 2021 which have been published related to the theme of digital banking perceptions in economic and financial research and is indexed by Scopus. The methodology used in this study is a qualitative method approach with descriptive statistics, a literature study of 350 publication papers related to digital banking.

The approach used in this research is sentiment analysis or opinion development. Sentiment analysis is research commonly used to measure public sentiment on a theme issue. Sentiment Analysis is a branch of research in the Text Mining domain which began to be widely used in early 2002. Sentiment analysis is research that is commonly used to measure public sentiment on a theme. The researcher uses SentiStrength software which is widely used in sentiment analysis research.

Simply put, text analysis is meant for word processing and does not process numbers. Sentiment analysis consists of three main subprocesses, namely: Subjectivity Classification, Detection Orientation, and Holder's Opinion & Target Detection (Medhat et al., 2014). To date, most of the research in the field of sentiment analysis has been devoted to English because there are so many tools/resources for English. Some of the frequently used sources for sentiment analysis are SentiWordNet and WordNet. SentiWordNet can be a helpful tool for opinion mining applications because of its broad coverage (all WordNet synsets are labeled according to each of the three labels Objective, Positive, and Negative) and because of its fine granularity, which was acquired by qualifying the labels using numerical scores (Baccianella et al., 2008). The basic task in sentiment analysis is to classify the polarity of the text in the level of documents, sentences, or features and aspects, whether the opinions expressed in documents, sentences, and feature entities have positive, negative or neutral aspects.

Data in the form of trends in the development of the number of digital banking theme paper publications and the top authors who became the location of the object of research related to published articles were analyzed using Microsoft Excel 2016. The data processed

was in the form of abstracts from each publication article with a digital banking theme. As for measuring sentiment maps on abstract papers published related to digital banking, As for measuring the sentiment map on the results of the Digital banking perception questionnaire, researchers used SentiStrength software which is widely used in sentiment analysis research.

3 Result and Discussion

3.1 Meta-Analysis

This section describes the number of paper publications on the perception of Digital Banking. In the last 55 years, there have been 863 publications on digital banking indexed by Scopus, namely from 1966 to 2021. Table 1 describes the distribution of papers per year that varies over the last 55 years with a range of 0 to 205 papers. The most widely published paper on the perception of Digital banking was in 2020 and 2019, with the number of publications each year being 205 papers and 141 papers. The least number of publications were in 1967-1971, 1973, 1980-1981, and 1993 where the total number of publications in that year was not indexed by Scopus.

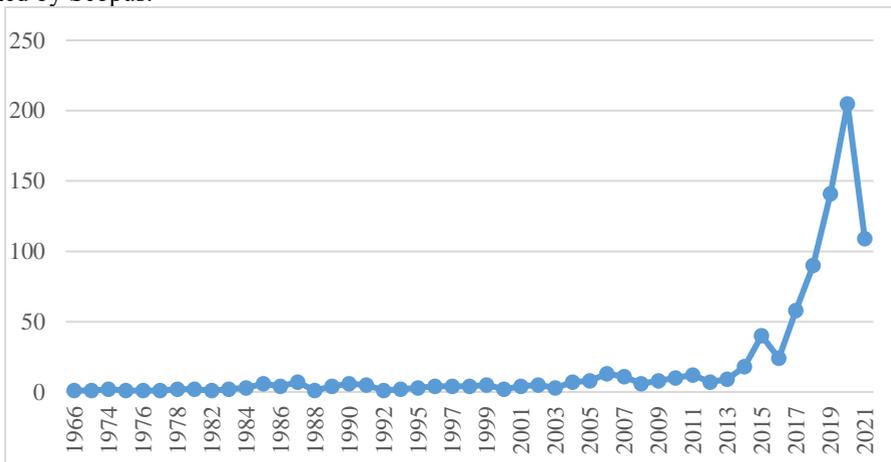


Figure 1. Number of Digital Banking Perception Theme Papers

Table 1. Number of Digital Banking Perception Theme Papers

Years	Number of Papers	Years	Number of Papers	Years	Number of Papers
1966	1	1990	6	2007	11
1972	1	1991	5	2008	6
1974	2	1992	1	2009	8
1975	1	1994	2	2010	10
1976	1	1995	3	2011	12
1977	1	1996	4	2012	7
1978	2	1997	4	2013	9
1979	2	1998	4	2014	18
1982	1	1999	5	2015	40
1983	2	2000	2	2016	24
1984	3	2001	4	2017	58
1985	6	2002	5	2018	90
1986	4	2003	3	2019	141
1987	7	2004	7	2020	205
1988	1	2005	8	2021	109
1989	4	2006	13		
Total					863

Based on the table and graph above, there is a tendency for papers published with the theme of digital banking to tend to increase. Where almost every year there are publications indexed by Scopus. There was a significant increase from 2019 to 2020. However, there was also a significant decrease from 2020 to 2021. However, because 2021 has not been completed until the end of December, this data is still provisional and it is still possible to add collections to this study. The Scopus indexed publication data related to digital banking used in this study amounted to 350 papers that were filtered and focused on the last three years, 2019-2021. Where in the last three years there has been a fairly large increase in digital banking (Setyowati, 2021)

3.2 Sentiment Analysis

The author tries to calculate the sentiment of published journals that discuss Digital Banking. As is well known, sentiment analysis is research commonly used to measure public sentiment on a theme. As a secondary data source, research was conducted on 350 pieces of literature. The tool used in this research is SentiStrength as a tool for processing data obtained from published journals indexed by Scopus. Then the results obtained are opinions classified into 5 types of ranking: namely opinions that are high positive (very good), positive (good), neutral (neutral), negative (bad), and high negative (very bad). The results of the sentiment analysis on Digital banking which are divided into 5 types of categories can be seen in the following figure:

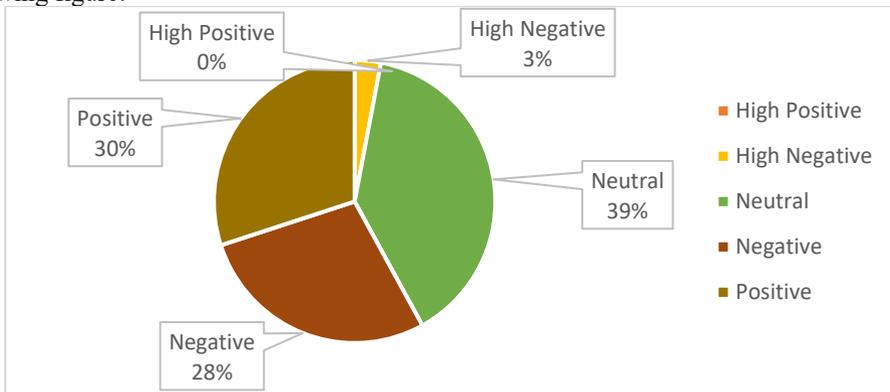


Figure 2. Sentiment Analysis

From the picture above, it can be seen that the existence of Digital Banking in the published and indexed economic and financial literature Scopus is quite a lot and has various sentiments according to the grouping of SentiStrength, namely the very good category (high positive) at 0%, then the sentiment is good (positive) that is as much as 30%, bad sentiment (negative) as much as 28%, very bad sentiment (high negative) 3% and the rest have neutral sentiment (neutral) 39%.

Sentiment results are obtained from abstracts of articles related to digital banking which are processed using the sentence tool, then the words in the form of written text are sorted from very negative intervals (-5) to very positive (5) with a value of 0 neutral. The opinion score of the sentences contained in articles related to digital banking is calculated by adding up the sentiment scores of each word listed in SentiStrength. Positive sentiment is the opinion of researchers who are positive and tend to be optimistic in responding to the existence of digital banking by looking positively at the existence of digital banking and supporting the development of digital banking. Meanwhile, negative sentiment is the opinion of the questionnaire that is negative and tends to express criticism in reviewing the development of digital banking, or in other words, its existence is still not optimal and requires improvement, and states that digital banking has not been applied professionally for various reasons.

This data shows that the majority of people have more neutral sentiments in responding to the existence of digital banking. The next sentiment that is quite a lot is positive. However, it was also found that there was a high negative response with a small proportion. In addition, negative sentiment has a proportion that is not much different from positive sentiment.

3.3 Discussion

Table 2 summarizes the research findings, which cover the main characteristics that influence positive and negative public sentiment, based on 350 data articles published on the topic of digital banking over the past three years.

Table 2. Keyword Factors

Positive	Negative
<ul style="list-style-type: none"> • Strategic needs • Trust • Convenience and Convenience • Accuracy • Speed • Security guarantee • Cost efficiency • Accelerate financial inclusion and literacy • Save money 	<ul style="list-style-type: none"> • High risk • Security system • There is no separate regulation from the regulator • Problems with the internet • Marketing competition • Wasteful • Reduce positive social values

The results of this study found the level of sentiment analysis of various published papers in assessing opinions about the existence of digital banking. Neutral sentiment dominates with a percentage yield of 39%. This shows that there is still a knowledge gap in digital banking. This is a challenge for every element involved in the field to increase the quantity and quality of digital banking. In addition, educational facilities that are suitable and easily accepted by all parties related to digital banking are also needed.

Many studies on digital banking have been carried out based on a literature review. Sentiment analysis provides an overview of responses and opinions about digital banking. However, digital banking is still a debate, where there are pros and cons related to the existence and development of digital banking. Sentiment analysis results show that high sentiment is negative by 7% and negative by 28%. This shows that the negative perception of digital banking is quite high. This means that there are still many pessimistic perceptions that do not agree with the development of digital banking. This negative perception is based on the risk of digital banking. digital banking carries a high risk (Galazova & Magomaeva, 2019). Even though the digital banking security system is safe, there are still irresponsible parties who try to do hacking such as stealing personal data or breaking into accounts. In addition, technological developments are inseparable from errors such as problems with the internet. This will annoy customers because when there is a problem with the internet, transactions cannot be carried out.

Digital banks do not yet have their own rules from the regulator. Where OJK is currently still preparing new regulations for commercial banks which include the establishment of digital banks (Prabowo, 2021). This is one of the supporters of negative sentiment. In addition, with the convenience offered by digital banks (Nguyen, 2020), customers will make transactions that are not controlled (wasteful). Digital banking also reduces the positive values of human interaction as social beings. The threat of digital banking is in the form of competition with fintech and startups where digital marketing models are more effective and efficient, fintech and startups are very active (Budiman, Seminar, & Saptono, 2020).

Furthermore, positive sentiment occupies the second position with a sentiment value of 30% from journal publications. This is due to the very rapid development of technology, digital banking offers convenience and convenience of service (Ananda, Devesh, & Al Lawati, 2020). Where customers do not need to visit bank branch offices to open accounts, transfer funds, or other banking services (Haralayya, 2021). All banking activities can be done online, customers do not have to go to the bank office if they want to do trivial activities such as checking balances, which can be accessed anytime and anywhere for 24 hours, as long as they are connected to the internet. In addition, digital banks offer various conveniences in terms of transactions and authorizations. Digital banks can also accelerate financial inclusion and literacy in Indonesia with the ability to reach a wider reach supported by technology, digital banks can embrace more of the younger generation. In addition, trust is an indicator of positive sentiment and acceptance of digital banks (Alkhowaiter, 2020).

Another advantage of digital banks is the efficiency of banking costs due to technological assistance. For example, customers can directly apply for an account opening through a digital bank application, so that banks can minimize the assistance of administrative staff. Likewise, with customers, digital banking has the plus value of being more cost-effective, because it is paperless and does not need to waste fuel and energy to come to the bank. Speed is also a positive value of digital banking. Wherewith the help of technology customers will get fast service and no need to queue for hours (Haralayya, 2021). Digital banking services provide better security guarantees, where there is layered firewall protection to prevent hacking (Budiman, Seminar, & Saptono, 2020) Accuracy is also an important point in banking transactions, digital banks with the help of sophisticated technology have good accuracy values (Haralayya, 2021). Banks invest in digital banking to gain a strategic advantage and can help maintain the banking strategic position, and also to maintain competition in the all-digital era (Kahveci & Wolfs, 2018).

With the value of positive sentiment and negative sentiment that is not too much different. This proves that the perception related to digital banking is increasingly optimistic in an all-digital era. This is a challenge for policymakers and those who play a role in digital banking to continue to improve the quality of digital banking itself. With the various factors behind the pros and cons related to digital banking above, this can be a benchmark and consideration for Islamic digital banking. Where Islamic digital banking in the future can innovate by paying attention to the perceptions that arise from the perception of digital banking. In addition, in the future, Islamic digital banking is also expected to be able to improve the quality of the system so that it can answer or minimize threats and negative perceptions of Islamic digital banking.

4 Conclusion

This study presents a meta-analysis in the form of tables and graphs of the main trends in digital banking perceptions in the last 55 years, from 1966 to 2021. Content analysis is carried out by the number of publications per year. The results show that the quantity of research publications on digital banking has increased in the last 55 years so it has the potential to continue to be studied and developed.

Regarding sentiment analysis, digital banking assessments from various kinds of literature indexed by Scopus showed neutral sentiment of 39%, while 30% showed positive sentiment and 28% showed negative sentiment. The remaining 7% shows a positive high sentiment. This shows that the scientific literature shows variations in sentiment, dominated by neutral sentiment, followed by positive sentiment, and then negative sentiment and negative high.

It should be noted that the purpose of this research is to present an overview of the perception of digital banking from the Scopus indexed scientific literature, but the limitation

is only in publications from 2019 to December 2021 where in the last three years there has been a surge in digital banking (Setyowati, 2021). In addition, the benefits of this research are for literature material and considerations for digital banking to improve the quality of digital banking as well as efforts to find out what needs to be improved from the threats, negative perceptions, and shortcomings of digital banking itself.

Another benefit of this research is as a benchmark and consideration for Islamic digital banking. Where Islamic digital banking in the future can innovate by paying attention to the perceptions that arise from the perception of digital banking. In addition, Islamic digital banking is also expected to be able to improve the quality of the system in the future so that it can answer or minimize threats and negative perceptions of Islamic digital banking. This research has been carried out using specific meta-analytical indicators and sentiment analysis so that readers can get a general representation of the most significant data. However, the results presented are still dynamic and may change over time, with new trends emerging or variables increasing and decreasing in the future.

The limitation of this research is that the data used is not comprehensive, so it only looks at perceptions from the last three years from filtered data. Suggestions for further research, if possible, process all data so that the research results will be richer and more diverse. In addition, I suggest in the future to analyze the sentiments of literature publications on Islamic digital banking. So that the perception of the development of digital Islamic banking can be known and for future improvements, it will not only reflect on digital banking in general.

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