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A Bibliometric and Visualized Analysis of Mobile Banking Research Using VOSviewer

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A B S T R A C T

Mobile banking as an innovative delivery channel for financial services, especially in developing countries. Mobile banking is the latest technological innovation, to streamline bank operations. Biometrics is an emerging technology in the era of the internet and mobile communications. The purpose of this study was to determine the development of research related to mobile banking. Bibliometrics is effective in providing datasets that can be used to improve the quality of research. By using Bibliometrics and publication trends in the Scopus database, the data is processed using VOSViewer software to view network visualizations, density visualizations and overlay visualizations.

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INTRODUCTION

Mobile Banking is a service provided by a bank or other financial institution that allows its customers to conduct financial transactions remotely. Ho et al., Usman et al., Liu et al., Boden et al., Li-Ya Yan., et al (2020), Jouda dan Verkijika (2018), Alalwan et al., Mun et al., (2017), Dennehy & Sammon, A.-C. Teo et al., Luarn & Lin, Dahlberg et al., (2015), Tan et al., Kang, Thakur & Srivastava, dan Miriti (2014) dalam penelitian mereka memperkenalkan teknologi seluler sebagai metode pembayaran serta niat konsumen didalam mengadopsi pembayaran menggunakan seluler. Data protection in mobile banking relies on passwords and biometric properties such as fingerprints (Santos et al., 2020). Thusi & Maduku, (2020) analyzed the relationship between acceptance and use of mobile banking applications from a sample of millennial retail banking customers in Africa. There are four main factors that influence the adoption of cellular payments, namely: Government support and sponsorship, easy-to-use technology infrastructure, QR Code instead of NFC technology, ease of use, convenience, and security of the Mpay application (Kennedyd et al., 2020). Mobile banking adoption is experiencing tremendous growth in developing countries. Intention to use banking is influenced by perceived benefits and perceived satisfaction (C.C & Prathap, 2020). There are differences between South Korea and Vietnam in terms of intention to use mobile banking services (Van Nguyen & Nguyen, 2020).

THEORETICAL REVIEW

Barry & Creti (2020) analyzed the use of PAYG (pay-as-you-go) on 10,120 consumers living in Benin (Sub-Saharan Africa), they found that consumers had a high probability of signing up for a PAYG contract. PAYG is a flexible loan that allows payment of fees via mobile banking. Mobile Banking users should find ways to protect their transaction data. Individual privacy with data security is critical in the information age, especially given the increased risk of data breaches and exploitation (Donohue et al., 2020). Biometrics is an emerging technology in the era of internet and mobile communication (Gayathri et al., 2020). Bibliometric studies can provide relevant evaluations and assessments of the social and scientific relevance of a particular discipline or field of research (López-Muñoz et al., 2014). There are many bibliometric studies on research output performance in Specific Countries such as in China (Xu & Ye, 2003), Nurgia (Xie et al., 2020) and Taiwan (López-Muñoz et al., 2014).. Bibliometrics is used to identify patterns of scientific publications (ezama-Nicolás, R., 2018), especially scientific publications controlled by Elsevier, Wiley, Taylor & Francis, Springer Nature, and Sage. Yeung et al., (2017) using the bibliometric method stated that brain imaging and the term brain connectivity have relatively high citation scores in neuroscience studies published from 2006 to 2015. While Wagner et al., (2019) tested both novelty and conventionality, international collaborations failed to produce more new articles. The purpose of this study was to determine the development of research related to consumer behavior using mobile banking. Using Bibliometrics and publication trends in the Scopus database, processed using VOSViewer software. Bibliometrics is effective in providing datasets that

can be used to improve the quality of research. Bibliometric analysis is used to look for trends and patterns (Heersmink et al., 2011).

METHODOLOGY

The method used in this research is to take data from Scopus through the publish or perish tool. Data is only 200 Scopus indexed documents that can be retrieved, this is due to storage limitations. All documents are taken from the most complete database on Scopus (Ondrej Klapka & Faculty, 2018). The research was conducted online, searching for data on October 5, 2022 using the keyword mobile banking. The data period used is 2012 to 2016. Then the articles are downloaded in *.ris format, then processed using Mendeley Desktop software to facilitate data analysis. Furthermore, VOSviewer was used for the bibiliometric map (van Eck et al., 2013). VOSviewer can create publication maps, or network-based journal/co-citation maps (Hudha et al., 2020). The frequency of less relevant keywords can be eliminated. VOSviewer software can also be used to perform data mining, mapping (Xie et al., 2020).

RESULTS AND DISCUSSIONS

Visualizing Topic Areas Using VOSviewer

The magician shows the relationship between one topic and another, the relationship between topics can be seen in table 1.

Table 1. Relationship between Topics

Clusters	Collor	Keyword
1	Red	44
2	Green	39
3	Dark blue	36
4	Light green	35
5	Purple	30
6	Light blue	19
7	Orange	14
Total		217

Visualization of the network formed 7 clusters, as in table 1 and figure 1. The largest cluster is in red. Red shows the most used keywords in mobile banking research.

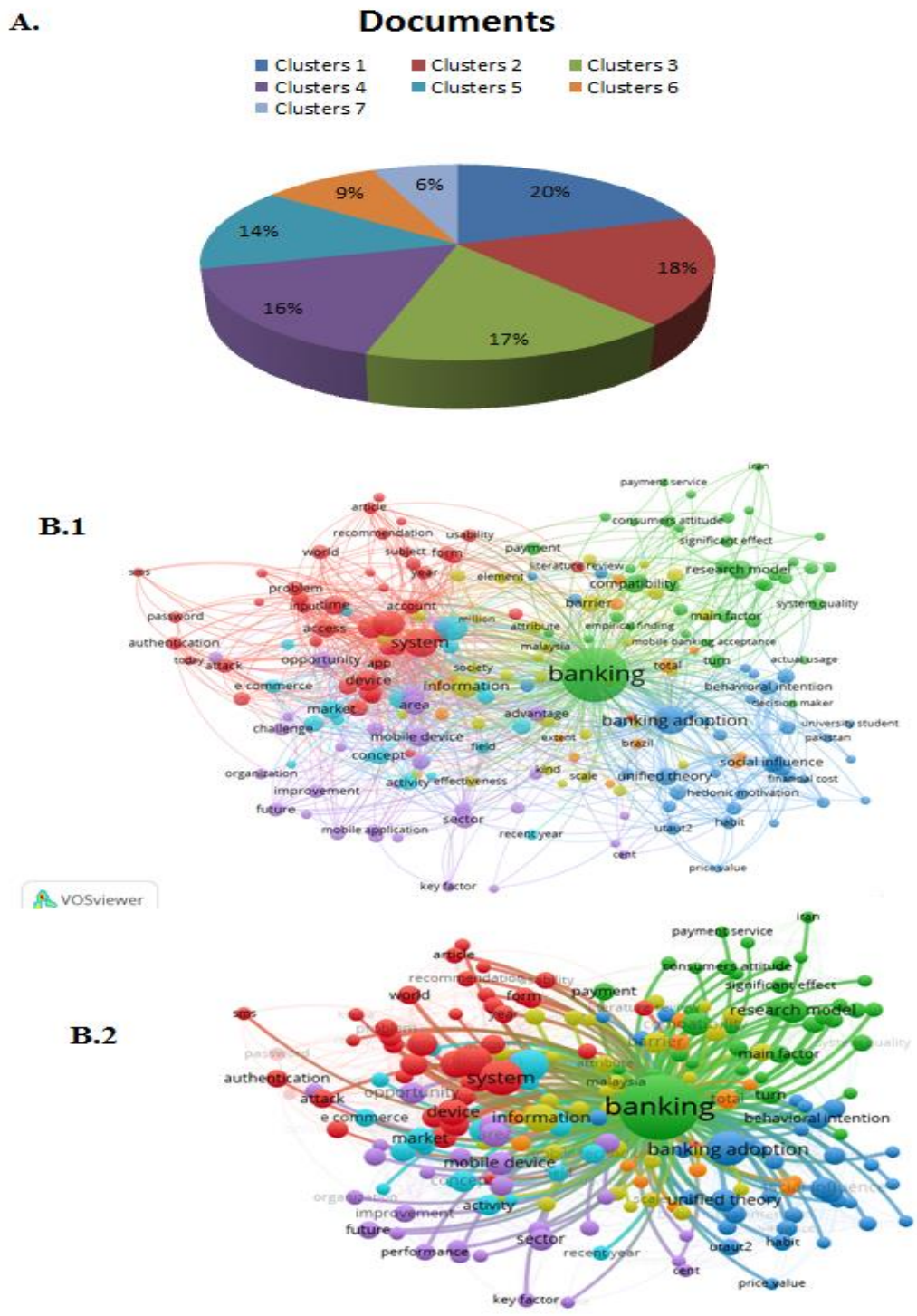

Figure 1. Items each Claster (A), Visualization Topic Area Using VOSviewer Using Network Visualization (B.1), Relationship between Clusters on the Keyword Banking (B.2)

Figure 1 shows the relationship between clusters in each of the researched topic areas. The keyword "Banking" (Green) corresponds to the keywords System (Red), Adoption (Dark Blue), Mobile Device (Purple) and so on. There is a close relationship between spherical circles. Figure 2 is Trends every year. lighter colors indicate that the topic was recently researched. On the map the yellow balls indicate the research topic that has just been studied (Figure 2.B).

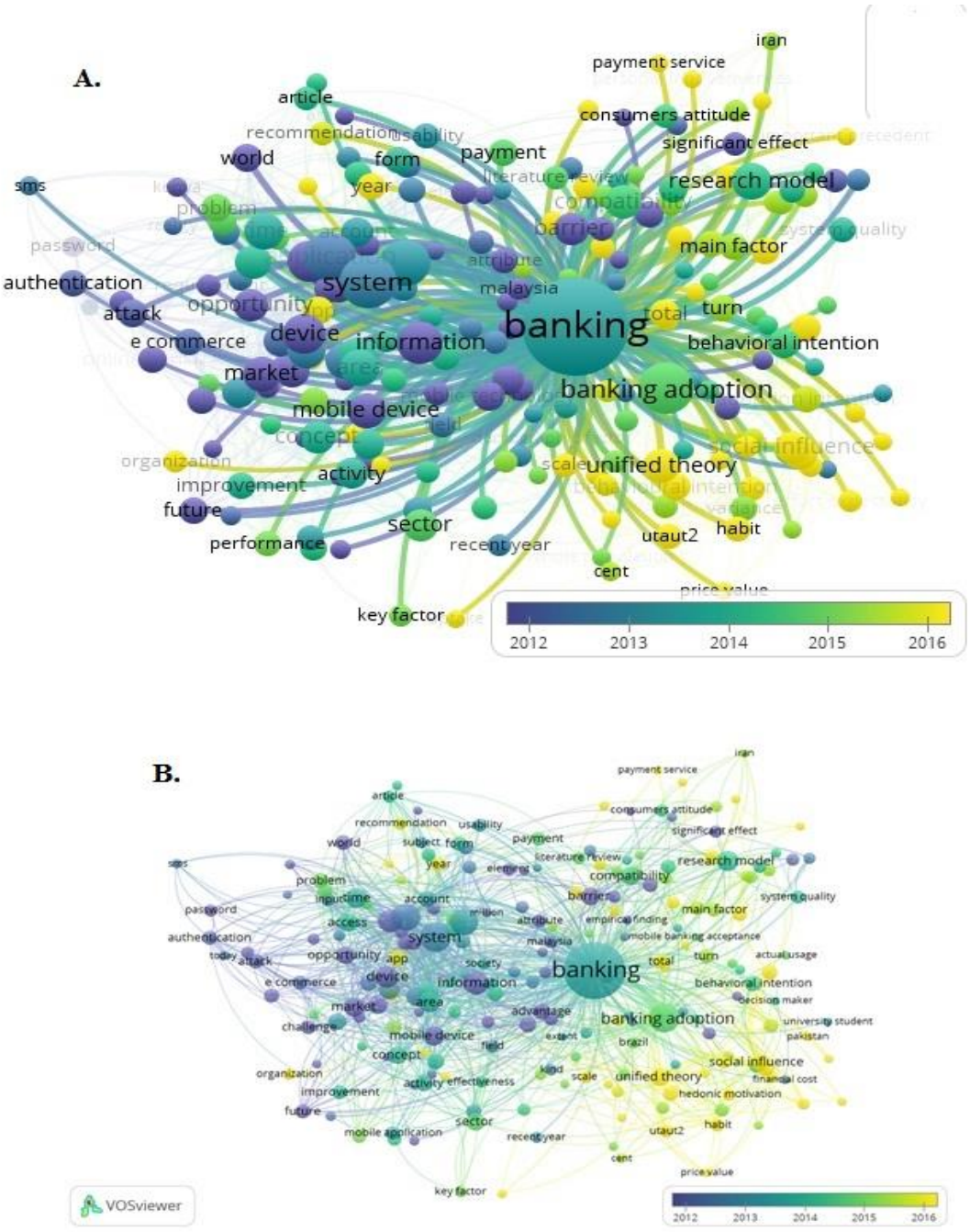

Figure 2. Keywords Related to Banking (A), Visualization Topic Area Using VOSviewer Using Overaly Visualization (B)

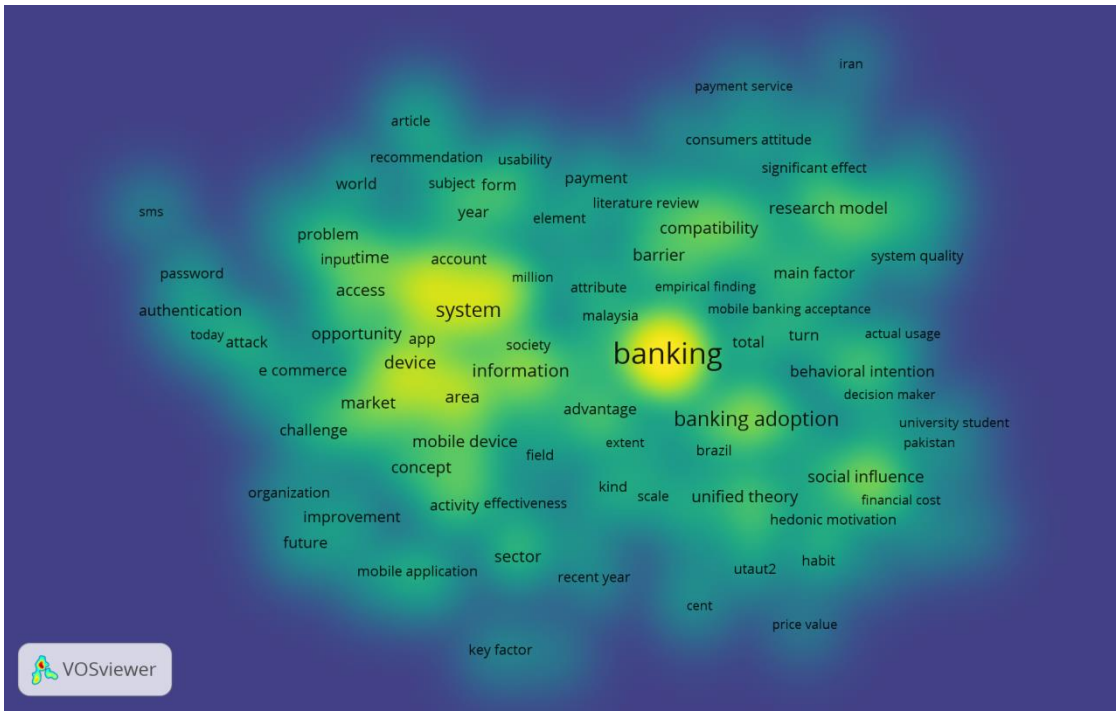

Figure 3. Visualization Topic Area Using VOCviewer Using Density Visualization

From Figure 1-3 it can be seen that the keywords that often appear are "Banking and Systems". This is seen in the 2 largest balls. because the bigger the ball size, the more these keywords are used for research. We can search for topics that are still little done (figure 3). This new topic search can be seen on topics that are in a concentrated area, the darker the color of the ball, the less researched the topic is. The theoretical contribution of this research is the mapping of research related to mobile payments. Furthermore, the availability of information in each topic area can be searched by entering more specific keywords. Other research such as Added Value and Ease of Using Quick Responses Qris Indonesian Standard (QRIS),(Susanti & Kresnha Reza, 2022). Business using the internet network is important and sustainable (Kresnha Reza & Susanti, 2022).

Topic Analysis in each Cluster

In addition to bibliometric analysis we can analyze; author, journal, country of study, language used, and topics in each cluster. Specifically for Topics in Each Clusters are shown in Figures tables 1 and 2.

Table 1. Topics in Cluster 1, 2 and 3

Cluster 1	Cluster 2	Cluster 3
academic	actual usage	adoption intention
access	additional research	adoption rate
account	banking	awareness
africa	compatibility	banking adoption
app	consumers attitude	behavioral intention
application	continuance intention	behavioural intention
article	decision maker	consumer intention
attack	empirical data	effort expectancy
authentication	empirical finding	empirical evidence
basis	empirical investigation	financial cost
device	important precedent	financial inclusion
example	individual performance	habit
financial service	information quality	hedonic motivation
financial transaction	initial trust	important factor
form	investigation	light
inclusion	iran	m banking adoption intention
input	main factor	marketing strategy
kenya	managerial implication	mobile banking adoption intention
life	mobile banking acceptance	multi group analysis
literature review	moderating effect	online
mobile payment	new insight	pakistan
mobile payment service	payment	performance expectancy
mobile phone	payment service	previous study
money	perceived usefulness	price value
motivation	personal innovativeness	proposed model
online banking	research model	review
part	service quality	significant difference
password	significant effect	social influence
problem	significant impact	student
reality	square	taiwan
recommendation	structural assurance	unified theory
set	structural equation	university student
smartphone	system quality	utaut
sms	task	utaut model
subject	task technology	utaut2
system	task technology fit	variance
tablet	ttf	
time	turn	
today	ubiquity	
usability		
way		
work		
world		
year		

Table 2. Topics in Cluster 4, 5, 6, and 7

Cluster 4	Cluster 5	Cluster 6	Cluster 7
attribute	ability	activity	banking institution
barrier	advantage	business	combination
commitment	area	communication	commitment
consumer adoption	case study	communication technology	confirmatory factor analysis
consumers adoption	cent	comparison	customer satisfaction
consumers intention	challenge	concept	demographic factor
e banking	education	developed country	extent
earlier study	finance	development	income
effectiveness	future	e commerce	mobile banking app
electronic banking	germany	field	mobile service
element	implementation	internet	moderating role
future study	improvement	m commerce	mouth
image	infrastructure	market	survey data
important role	interest	mobile technology	total
information	key factor	new technology	
internet banking	mobile application	recent year	
kind	mobile device	requirement	
malaysia	mobile user	similarity	
million	number	transaction	
mobile banking technology	opportunity		
nature	organization		
non user	outcome		
practice	performance		
preference	platform		
present study	question		
resistance	saudi arabia		
respect	sector		
scale	technology acceptance		
significance	uptake		
society	whole population		
speed			
state			
success			
tradition			
users satisfaction			

Table 3. Number of Documents in each Cluster

Tahun	Clusters 1	Clusters 2	Clusters 3	Clusters 4	Clusters 5	Clusters 6	Clusters 7
2009	2	0	1	1	0	0	0
2010	1	1	0	3	3	0	2
2011	7	2	1	5	0	2	0
2012	13	3	2	9	12	6	0
2013	7	5	3	5	5	6	2
2014	7	8	6	2	7	2	3
2015	6	11	13	4	6	0	3
2016	0	5	0	1	2	0	2
2017	1	3	5	0	1	1	1
2018	0	1	5	0	0	0	1

Publications with the largest mobile banking topic in cluster 1 in 2012 and cluster 3 in 2015. The highest number of publications was in 2012 as many as 45 documents, 2015 as many as 43 documents.

CONCLUSIONS AND RECOMMENDATIONS

Mobile banking is recognized as an innovative delivery channel for financial services, especially in developing countries where access to banking services is still low. The mobile payent keyword was analyzed through VOSviewer, and found 7 clusters (Red, Green, Dark blue, Light green, Purple, Light blue, Orange). The results of mapping publications with the most mobile payment topics in 2012 and 2015. This can be used as information for further researchers, with the topic of mobile banking.

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