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A Computational Bibliometric Analysis of Game Advertising using VOSviewer

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A B S T R A C T S

The purpose of this study is to perform a computational bibliometric analysis of the Term "Game advertising" by combining mapping analysis using VOSviewer Publish or Perish software, and Google Schoolar. The method used is a bibliometric and descriptive quantitative approach. The data obtained is a search result based on the keyword "Game Advertising" on Google Scholar. The search results show 989 articles published from 2017 to 2022 decreasing every year except in 2021. This can be proven in 2017 with 232 articles, in 2018 it decreased to 210 articles, in 2019 it decreased again to 199 articles. In 2020 it decreased to 136 articles, except for in 2021 there was a less significant increase to 137 articles, and in 2022 research on Game Advertising decreased dramatically, the number of publications to 40. The conclusion of this study shows the importance of conducting bibliometric analysis, especially in advertising games field. This research is expected to be a reference for further research in determining and analyzing the research theme.

1. INTRODUCTION

A Computational Bibliometric Analysis of Game Advetising Using VOSviewer. Advetising games are attitudes related to a person's financial problems, where responses to a statement or opinion can be used as a useful measurement variable to define advetising games as a state of mind, opinions and judgments about finances. The game consists of a set of rules that build competing situations from two to several people or groups by choosing strategies built to maximize

their own winnings or to minimize your opponent's winnings. The rules specify the possibility of action for each player, a certain amount of information received by each player as the progress of play, and a certain number of wins or losses in various situations (Von eumann & Morgenstern, 2007). The West Kutai Regency Government aims to enhance the effectiveness and efficiency of public services by implementing E-Government internally within government organizations. One aspect of E-Government that must be prioritized is Government to Citizen or Government to Customer (G2C) services, where the government provides public service information through information technology. Online Services can significantly reduce administrative, relational, and interaction costs compared to manual services, benefiting both the government and its stakeholders. Additionally, there are technologies that can simplify administrative processes and reduce bureaucracy, thereby creating a positive business environment. However, based on direct observations including interviews and discussions with Kesbangpol of West Kutai Regency, it is evident that the implementation of E-Government is still in the preparation stage and has not yet reached the emerging level or the lowest level of adoption.

Promotion is anything that is done to help sell a product or service at each point of the sales network, from the presentation materials a salesperson uses when making offers to commercial broadcasts, television, or newspaper advertisements that try to lure customers into getting favorable impressions of what is advertised (Goutama, AE., 2018).

Advertising games (adv-games) are video games that include promotional content as a marketing technique, either overtly or implicitly. The brand is integrated into the story, mission, and other game activities in an adv-game. These adv-games can be observed in a variety of game components, including characters with specific brands, gameplay that demonstrates the characteristics of specific products, advertising banners in a game segment, and other elements (Aulia, et al, 2014). In general, advanced games have been around for a long time, yet they continue to evolve and adapt. Traditional games like monopoly, snakes and ladders, and chess may all be turned into adv-games by adding a hint of brand awareness. Following technical advancements, adv-games have evolved into digital media, and various adv-games applications are now available on smartphone media (Terlutter and Capella, 2013).

Advertising games (adv-games) can be an opportunity for business people to improve their marketing tools. To determine the great opportunity about improving marketing advertising through certain video games, research on each video game, including advertising games in improving marketing tools, research using bibliometrics should also be carried out. This is because bibliometrics can be used to categorize certain topics in bibliographical form as well as to generate representative summaries of selected topics. VOSviewer is a software tool that facilitates bibliometric analysis, Offering the capability to generate, visualize, and analyze bibliometric maps. With VOSviewer different types of bibliometric network data can be evaluated, such as connections between

journal publications or citations, associations between scientific terminology, and collaborative relationships among researchers.

Building upon previous research, this study aims to conduct bibliometric analysis on the topic of Game Advertising by utilizing VOSviewer software for mapping analysis. The research methodology involves quantitative bibliometric analysis and a descriptive approach. Data is collected from searches and processing using the keyword "Game Advertising" on platforms such as Google Scholar and Publish or Perish (Kania and Sabariah, 2013).

2. METHOD

The research methodology employed in this study involves bibliometric, descriptive, and quantitative approaches. Information was gathered from various published journals indexed by Google Scholar. Additionally, a literature review was conducted on the research topic "Gaming Advertising" using the Publish or Perish software, chosen specifically for identifying bibliometric data (Arwendria, A., 2021). Furthermore, data obtained from Publish or Perish was saved in *RIS format and imported into VOSviewer software for analysis. Publish or Perish 8 and VOSviewer 1.6.17 were utilized as the software tools for data collection in this study.

In this research, relevant materials related to game advertising were reviewed and selected. A total of 989 research articles on Game Advertising published between 2017 and 2022 were obtained. These articles were saved in *.ris format for further analysis. VOSviewer software was then used to generate visualizations and analyze

trends using bibliometric maps. The article data from the prepared database sources were mapped using three types of visualizations in VOSviewer software: network visualization, overlay visualization, and density visualization. Additionally, terms included in the VOSviewer mapping visualization were filtered to refine the analysis (Kurnia, S., 2021).

3. RESULTS AND DISCUSSION

3.1. Advancements in the Field of Game Advertising Research

Research on the development climate in the field of Game advertising, Illustrating the development of research in the field of Game advertising from 2017 to 2022 in Fig. 1.
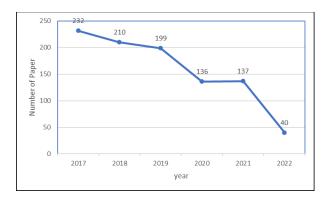

Fig. 1. Level of research development on Game Advertising

Figure 1 shows that research on Game advertising decreases every year, starting from 2017 to 2022 except for 2021. This can be proven in 2017 with 232 articles, in 2018 it decreased to 210 articles, in 2019 it decreased again to 199 articles, in 2020 it decreased to 136 articles, except in 2021 there was a less significant increase to 137 articles, and in 2022 research on Game Advertising decreased dramatically, the number of publications to 40. After conducting a search using the Publish or Perish software, we identified 989 articles

that are relevant to the research topic. From this dataset, we further filtered and selected the 20 articles with the highest number of citations, sourced from 20 distinct journals and books (see Table 1).

Table 1. Article Data in the Field of Game Advertising

No	Authors	Title	Year	Cites	Refs
1.	Herbert., et al.	Marketing: Grundlagen marktorientierter Unternehmensführung Konzepte – Instrumente – Praxisbeispiele	2018	7173	(Herbert, et al, 2018)
2.	Silver., et al.	Mastering the game of go without human knowledge	2017	7044	(Silver, et al, 2017)
3.	Leiss., et al.	Social communication in advertising	2018	2195	(Leiss, et al, 2018)
4.	Silver., et al.	A general reinforcement learning algorithm that master's chess, shogi, and go through self-play	2018	2194	(Silver, et al, 2018)
5.	J Koivisto., & J Hamari.	The rise of motivational information systems: A review of gamification research	2019	720	(J Koivisto & J Hamari, 2019)
6.	K Huotari., & J Hamari.	A definition for gamification: anchoring gamification in the service marketing literature	2017	685	(K Huotari & J Hamari, 2017)
7.	Evans., et al.	Disclosing Instagram influencer advertising: The effects of disclosure language on advertising recognition, attitudes, and behavioral intent	2017	611	(Evans, et al, 2017)
8.	Lee., et al.	Advertising content and consumer engagement on social media: Evidence from Facebook	2018	605	(Lee, et al, 2018)
9.	S Health.	method for social networking interactions using online consumer browsing behavior, buying patterns, advertisements and affiliate advertising, for promotions, online	2019	590	(S Health, 2019)
10.	DB Nieborg ., & T Poell.	The platformization of cultural production: Theorizing the contingent cultural commodities	2018	503	(DB Nieborg ., & T Poell, 2018)
11.	Wang., et al.	Irgan : A minimax game for unifying generative and discriminative information retrieval models	2017	460	(Wang, et al, 2017)
12.	Steenkamp., et al.	Competitive reactions to advertising and promotion attacks	2018	367	(Steenkamp, et al, 2018)
13.	M Meeker., & L Wu.	Internet trends 2018	2019	321	(M Meeker, & L Wu, 2019)
14.	J Roozenbeek ., & S Van der Linden.	Fake news game conferences psychological resistance against online misinformation	2019	244	(J Roozenbeek & S Van der Linden, 2019)
15.	S De Freitas.	Are games effective learning tools? A review of educational games	2018	243	(S De Freitas, 2018)

Table 1 (Continue). Article Data in the Field of Game Advertising

No	Authors	Title	Year	Cites	Refs
16.	S Dahl.	Social media marketing: Theories and applications	2021	213	(S Dahl, 2021)
17.	BT Shapiro.	Positive spillovers and free riding in advertising of prescription pharmaceuticals: The case of antidepressants	2018	188	(BT Shapiro, 2018)
18.	Wang., et al.	Display advertising with real-time bidding (RTB) and behavioral targeting	2017	157	(Wang, et al, 2017)
19.	Smith., et al.	Food marketing influences children's attitudes, preferences and consumption: A systematic critical review	2019	152	(Smith, et al, 2019)

In Table 1 there are 19 articles that match the criteria research. Of the 19 selected articles, showing that highest quote related to game advertising research is 7173, while with the lowest citation is 152. That in Table 1, it shows that in 2017 and 2022, each has articles with quotes highest. In 2017-2022, the most articles quoted is 7173 articles. Temporary that, in 2021, a lot of articles quoted are 213 articles. Year with quote the most is in 2018 as many as 7173 articles.

3.2. Visualization Game advertising topic area using VOSviewer

The visualization of the game advertising research area was carried out using VOSviewer software, with a minimum requirement of 3 relationships, with 2 terms set by Al Husaeni and Nandiyanto (Utami and Karlina, 2022). As a result, a total of 26 items were obtained and clustered into 4 groups based on the analysis of mapping visualization, according to the study on game advertising climate, namely:

(i) Cluster 1 has 9 items, those 9 items elements, engagement, game elements, gamers, gamified systems, market research, marketing communication, motivation, and tourism marketing (see figure 2).

(ii) Cluster 2 has 8 items, those 8 items are application, case study, computer game, development, digital marketing, education, marketing strategy, and target market (see Figure 3).

(iii) Cluster 3 has 5 items, those 5 items are gamification, gamified application, interactivity, and service marketing perspective (See Figure 4).

(iv) Cluster 4 has 4 items, those 4 items are analysis, game advertising, marketing management, and research directions (see Figure 5).

Cluster 1 is indicated by color red, Cluster 2 is shown in color green, Cluster 3 is shown in blue old, and Cluster 4 is shown in color yellow.
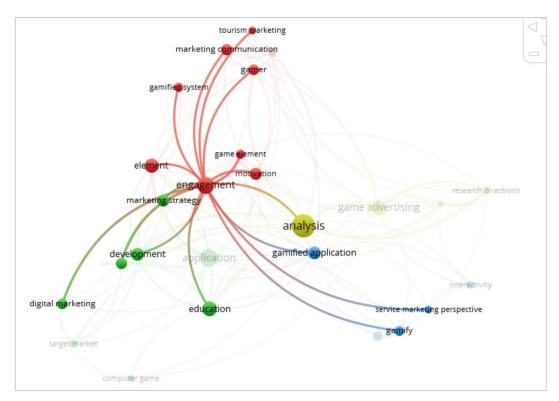
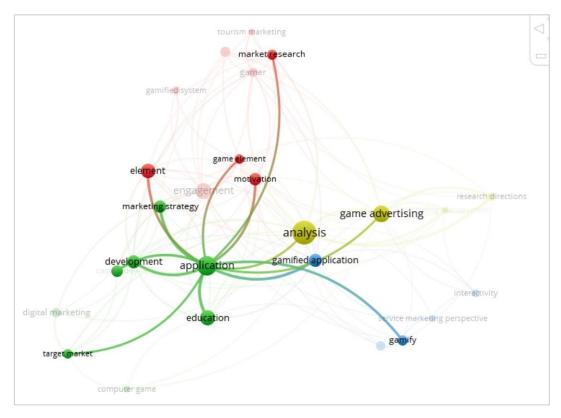**Fig. 2. Cluster 1 Visualization advertising game network**

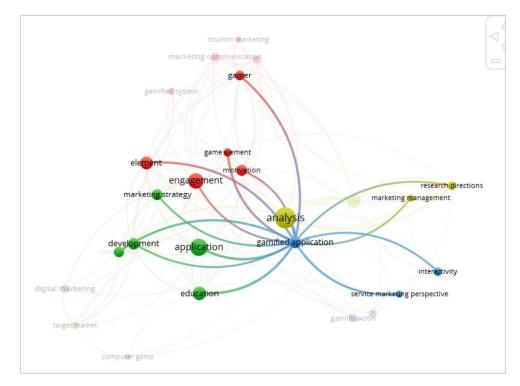**Fig. 3. Cluster 2 Visualization advertising game network**

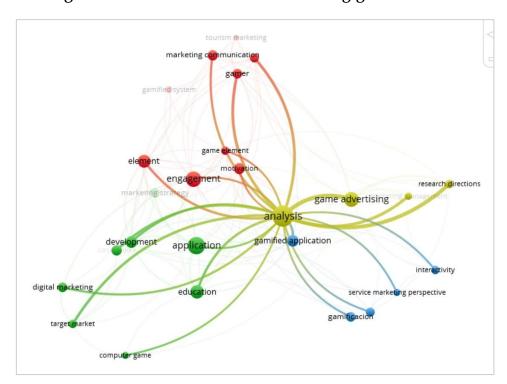**Fig. 4. Cluster 3 Visualization advertising game network**

Fig. 5. Cluster 4 Visualization advertising game network

3.3. Network visualization Game advertising topic area using VOSviewer

In VOSviewer software, mapping every term divided Becomes three type, the first is Visualization Network. Visualization Network that is connection Among thing on the map. Existing relationship in network visualization shown in network or the line that goes from one to one other things (see Figure 6).
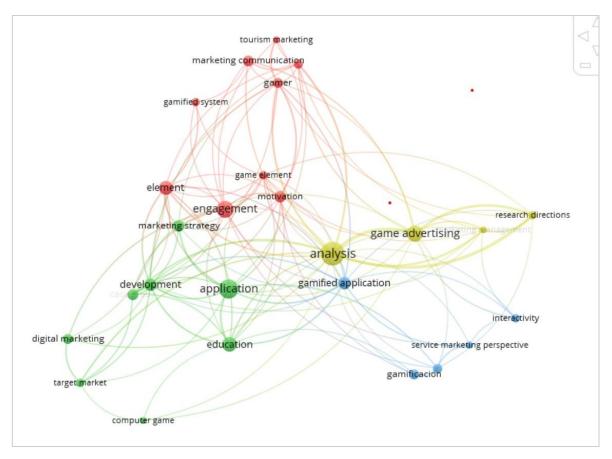
Fig. 6. Visualization advertising game network

Visualization Network from the "advertising game" gained using the VOSviewer software is displayed in Fig. 6. Each cluster where in each each each field or investigated issue is represented in Fig. 6. The game advertising climate alone is included in cluster 4 with a total strength of 40 and an occurrence of 43, as indicated in Figure 6 above. Advetising game climate connected to cluster 1, among them that is terms game element, marketing communication, and gamer, in k laster 2, among others that is term application, marketing strategy, computer games, and finally in cluster 3 of them namely with the term gamify, interactivity.

3.4. Overlay visualization of Game advetising topic area using VOSviewer

B Second Visualization Network, in VOSviewer software provide visualization mapping in overlay shape. Mapping in shape Overlay visualization focuses on novelty something term in research. Novelty term or Thing in research related to the climate of advertising games shown in Figure 7.
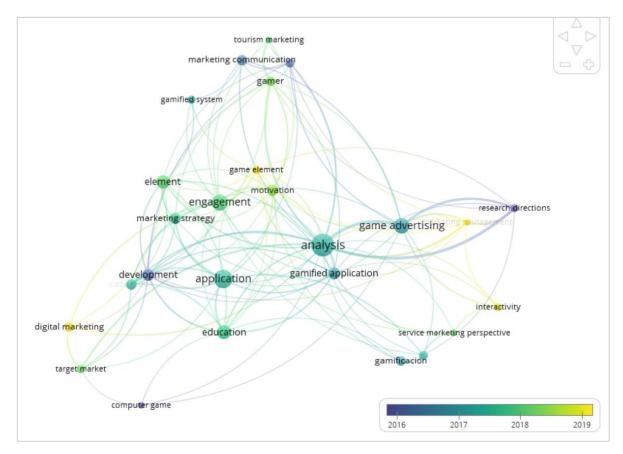
Fig. 7. Overlay game advertising visualization

In the depiction Thing or term type Overlay visualization, can see how much popular from every year. On Visualization Overlay, different colors showing extension term in something period certain. In research this, we use year 2017 to year 2022. More colors dark approach purple meaning that in something study about one Thing or term done more close to 2017. Meanwhile, the color is more light approach yellow is existing term in study latest.

3.5. Density visualization of Game advertising

Third that is the last mapping depiction in the VOSviewer software is Density Visualization. Visualization of Density on Financial Attitude is shown in Fig. 8. The mapping type used in this study involves the use of colors to indicate the popularity of a term. If the color of a term is lighter, it signifies that research on that term is becoming more popular. Conversely, if the color is darker or faded, it indicates that research on that term is decreasing in frequency. In Figure 8, it can be observed that there are some terms depicted in yellow color with relatively larger diameters. These terms called emission, game advertising, analysis, application, and engagement.
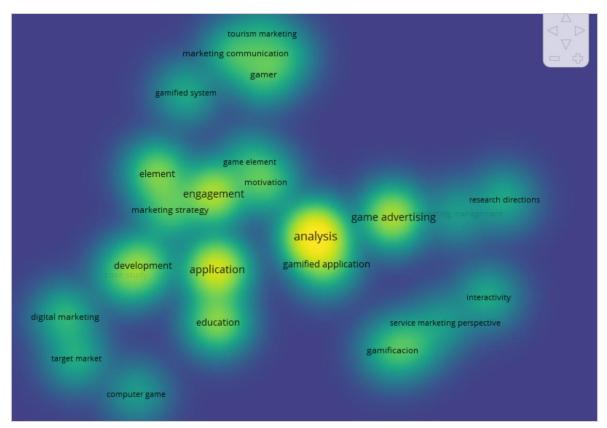
Fig. 8. Visualization Density advertising game network

Visualization density about climate advertising game research is in the picture above, which means that on the map density showing results analysis use all article regarding game advertising in 2017-2022. In the visualization in Figure 8 shows pattern colored yellow where is getting yellow color, more keyword thick and getting the diameter of the circle, which means that they appear more dominant and if color on map fade or blend with the background behind colored green, shows that keyword the appear more rarely

4. CONCLUSION

Study this aims to examine, analyze bibliometric literature on game advertising. The keyword "game advertising" is used to obtain data, which is based on a topic area that contains keywords, abstracts, and titles. After processing and filtering the data, obtained 989 relevant articles. Device soft VOSviewer is used to generate mapping data. Mapping data poured to in visualization grid, overlay, and density. Based on results in mapping and analysis use VOSviewer, obtained that study regarding financial management with the term game advertising in 2017-2022 decreased from every year to year. In research this, using method bibliometrics to identify theme main in every field studies before, because important to assess novelty in future research.

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