

OPTIMIZING THE EFFECTIVENESS OF DIGITAL MARKETING CAMPAIGNS WITH THE USE OF E-COMMERCE COMPANY DECISION SUPPORT SYSTEMS

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Abstract: Despite the rapid growth of the e-commerce sector in Indonesia reflected by a significant increase in the value of e-commerce transactions by 2022, the effectiveness of digital marketing campaign strategies is often faced with several challenges, including large and complex data volumes, lack of understanding of digital consumer behavior, and difficulty in measuring campaign effectiveness. This research aims to optimize the effectiveness of digital marketing campaigns by utilizing a Decision Support System (SDM), with the main focus of understanding the role of SDM in assisting decision-making in the context of digital marketing campaigns and developing a SDM model that can improve the effectiveness of these campaigns. This research uses the literature review research method which reviews or critically examines knowledge, ideas, or findings contained in academically oriented literature, formulating theoretical and methodological contributions to a particular topic. The integration of digital marketing campaigns and Decision Support Systems (SDM) increases marketing effectiveness by making the right decisions. Implementation using APIs and integration examples involves audience mapping, campaign effectiveness measurement, and campaign optimization. The application of SPK in e-commerce involves planning, development, implementation, and maintenance stages to improve marketing campaign effectiveness. Optimization of SPK integration with a focus on in-depth data analysis, customer segmentation, content personalization, and continuous monitoring can improve the effectiveness of e-commerce campaigns.

Keywords: e-commerce, Decision Support System, Marketing

1. Introduction

The rapid growth of the e-commerce sector in Indonesia is reflected in the significant increase in the value of e-commerce transactions in 2023, which reached 533 trillion, an increase of 3.5% from the previous year (Ministry of Trade, 2023). According to Rosario & Raimundo (2021), the booming e-commerce business is significantly influenced by the success of digital marketing campaign strategies. In an ever-evolving digital ecosystem, utilizing technology and online platforms is the key to effectively reaching the target market (Aksoy, 2023). Although digital marketing campaign strategies are crucial for e-commerce companies to increase sales and brand awareness, their effectiveness is often faced with several challenges, including large and complex data volumes, lack of understanding of digital consumer behavior, and difficulties in measuring campaign effectiveness (Mohan & Ali, 2019).

The importance of using Decision Support Systems (SDM) emerged as a potential solution to overcome these challenges (Walling & Vaneeckhaute, 2020). SPK is considered a system that can support decision-making by collecting, analyzing data, and providing appropriate recommendations (Kanas et al., 2020). Therefore, this research aims to optimize the effectiveness of digital marketing campaigns by utilizing SPK. The main focus of this research

is to understand the role of SPK in assisting decision-making in the context of digital marketing campaigns, and to develop a SPK model that can improve the effectiveness of these campaigns. This research has an expected positive impact on the development of e-commerce in Indonesia. The contributions include increased effectiveness of digital marketing campaigns, better understanding of digital consumer behavior, and encouragement of innovation in digital marketing strategies. The practical benefits of this research also include assisting e-commerce companies in increasing sales and profits, providing useful information for consumers, and assisting the government in regulating the rapidly growing e-commerce sector. Thus, this research is expected to make a meaningful contribution to the development of the e-commerce ecosystem in Indonesia.

2. Literature Review

Digital Marketing Campaign for e-commerce companies

A digital marketing campaign is a strategic approach to marketing that is conducted online to achieve specific goals (Bala & Verma, 2018). In the context of e-commerce companies, it involves a series of activities designed to increase brand awareness, generate potential new customers, or increase sales volume (Hategan et al., 2021). Digital channels that can be leveraged include social media, Search Engine Optimization (SEO), Search Engine Marketing (SEM), and email campaigns, among others. It is important for e-commerce companies to understand that digital marketing campaigns are not just about creating an online presence, but also building closer connections with customers through more personalized and relevant digital interactions.

Ada There are several factors that can affect the success of digital marketing campaigns in e-commerce companies, including (Peter & Dalla, 2021):

- a. There are several factors that can affect the success of digital marketing campaigns in e-commerce companies, including (Peter & Dalla, 2021).
- b. Clear objectives: Setting specific and measurable goals is a critical step in planning a digital marketing campaign. Clear objectives help in formulating the right strategy and facilitate the evaluation of success.
- c. The right target audience: Understanding who your target audience is is a key step. With a good understanding of audience characteristics, companies can create messages that are more relevant and appealing to them.
- d. Quality content: Engaging and high-quality content is the backbone of any digital marketing campaign. Good content can grab the audience's attention, build interest, and motivate action.
- e. Clear call to action (CTA): Providing clear instructions to the audience on the desired steps helps steer them in the desired direction. A good CTA can include a purchase, subscription, or participation in a particular promo.
- f. Measurement and evaluation: Conducting regular monitoring and evaluation during and after the campaign is essential. This allows companies to identify successes and areas that require improvement.

On the other hand, the latest developments in digital marketing campaigns that can be implemented by e-commerce companies include:

- a. Omnichannel marketing: The integration of various digital channels in one strategy, such as social media, email, and website, provides a more holistic experience to customers (Gerea et al., 2021).

- b. Personalized marketing: Implementing strategies that tailor messages and offers to individual preferences and behaviors, creating a more personal and relevant experience (Chadra et al., 2022).
- c. Influencer marketing: Leveraging the presence of influential individuals on social media to promote products or services, reaching audiences that may be difficult to reach by conventional means (Guruge, 2018).
- d. Video marketing: Using the medium of video to deliver messages more dynamically, attract customer attention, and increase information retention (Kumar & Mittal, 2020).

By comprehensively understanding these definitions, concepts, success factors, and current trends, e-commerce companies can design and execute effective digital marketing campaigns, helping them better achieve their business goals.

Decision Support System

Decision Support System (DSS) in the context of e-commerce companies refers to a system designed to assist the decision-making process within the organization (Khatun & Miah, 2018). It integrates various data sources from different departments and provides relevant information and in-depth analysis to support effective decision-making (Tan et al., 2021). In e-commerce companies, GIS may include various elements such as analysis of customer data, sales, inventory, and market trends. These systems help e-commerce managers to understand customer behavior, identify sales trends, and respond quickly to changing market conditions. The main concept of a Decision Support System is to provide structured information and data analysis that can be used by managers in understanding the company's situation and making better decisions (Abayechaw, 2021). A CMS in an e-commerce company may include predictive analysis tools, interactive dashboards, and performance reports to provide a holistic view of business operations. With GIS, e-commerce companies can increase responsiveness to market changes, optimize marketing strategies, and improve customer experience, thereby supporting long-term growth and success.

3. Method

The methodological approach taken in this research is called descriptive qualitative. Research that examines or critically reviews knowledge, ideas, or findings contained in academically oriented literature, formulating theoretical and methodological contributions to a particular topic is known as literature research or literature review. Journal articles written in Indonesian and English that relate to the topic of digital marketing campaigns with the utilization of e-commerce company decision support systems. The thematic method was used to synthesize this literature review by grouping similar extracted data according to the outcomes measured to answer the objectives then developed by the researcher.

4. Result and Discussion

Integration of Digital Marketing Campaign and SPK

The integration of digital marketing campaigns and Decision Support Systems (SDM) creates synergy to increase the effectiveness and efficiency of digital marketing. According to Wahono & Ali (2021), SPK as a decision support system, utilizes data and models to help make decisions. In the context of digital marketing, SPK can combine, analyze, and visualize data from various sources, including social media, websites, and CRM (Pandey et al., 2020). The

result is the ability to make more informed digital marketing decisions. This integration provides a number of significant benefits. Sarjito (2023) revealed an increase in marketing accuracy and effectiveness because SPK helps in the collection and analysis of more accurate data. This allows marketers to make more informed decisions regarding the target audience, message, and media to be used. In addition, there is increased efficiency as GIS enables the automation of repetitive tasks, saving marketers time and energy to focus on more strategic tasks.

It also provides better visibility into digital marketing activities, gives marketers better control, and enables more accurate measurement of campaign effectiveness (Kalaigannam et al., 2021). There are several methods of integration, with the use of APIs being one common way. APIs facilitate communication between the two systems, allowing data from digital marketing campaigns to be integrated into the SDM for analysis and decision making (Al-Hawawreh et al., 2023). Some examples of integration applications include audience mapping based on demographic, behavioral, and interest data, campaign effectiveness measurement through click, conversion, and engagement data analysis, and campaign optimization by testing variables such as content, design, and airtime.

1. Conceptual Framework

The conceptual framework of digital marketing campaign integration and SPK can be described as follows:

- a. Input: The input of this integration is data from digital marketing campaigns. The data can come from various sources, such as social media, websites, and CRM. The data can be in the form of transactional data, behavioral data, and demographic data.
- b. Process: This integration process includes data collection, analysis, and visualization. Data from digital marketing campaigns will be collected from various sources and integrated into the SPK. Then, the data will be analyzed to obtain useful information. The information will then be visualized to facilitate decision making.
- c. Output: The output of this integration is useful information for digital marketing decision making. The information can be information about the target audience, campaign effectiveness, and areas that need improvement.

The integration of digital marketing campaigns with Decision Support Systems (SDM) provides a number of significant benefits (Lambin et al., 2017). One of the main advantages is increased accuracy and effectiveness in the execution of marketing strategies. SDM plays an important role in collecting and analyzing data more accurately, enabling marketers to make more informed decisions regarding the target audience, the message to be delivered, and the marketing medium to be used. Thus, this integration helps to increase precision in designing digital marketing campaigns.

In addition, the integration of digital marketing campaigns and SPK also brings increased efficiency in marketing operations. GIS enables the automation of repetitive tasks, reducing the manual workload of marketers. This not only saves time, but also allows marketers to focus on more strategic and creative tasks. With automation, the campaign planning and execution process can run more efficiently, supporting marketers' efforts to achieve marketing goals more effectively. Increased visibility and control is another benefit gained through this integration. SPK gives marketers better visibility into their overall digital marketing activities. With a deeper understanding of campaign performance, marketers can better control and measure its effectiveness. As a result, the integration of digital marketing campaigns and CMS provides the necessary tools to make quick changes and adapt to changing market dynamics, giving more effective control over digital marketing campaign results.

2. Implementation

There are several ways to implement the integration of digital marketing campaigns and CMS. One common way is to use APIs. An API is an application programming interface that allows two systems to communicate with each other. By using API, data from digital marketing campaigns can be integrated into SPK to be analyzed and used for decision making (Hasan, 2021). Here are some examples of the application of the integration of digital marketing campaigns and SPK:

- a. Audience mapping: SPK can be used to segment audiences based on demographic, behavioral, and interest data. The data can then be used to determine the most effective digital marketing strategies for each audience group.
- b. Campaign effectiveness measurement: SPK can be used to collect and analyze data from various sources, such as clicks, conversions, and engagement. The data can then be used to measure the effectiveness of digital marketing campaigns and identify areas for improvement.
- c. Campaign optimization: CMS can be used to test and optimize digital marketing campaigns. For example, CMS can be used to test various campaign variables, such as content, design, and airtime.

The integration of digital marketing campaigns and CMS is an increasingly popular trend among marketers. By integrating these two systems, marketers can increase the effectiveness and efficiency of digital marketing, thereby achieving better business goals.

Implementation of Decision Support System

The implementation of an e-commerce Decision Support System (SDM) requires a proper integration process in order to run effectively. The e-commerce SPK integration process can be divided into several stages, namely (Song, 2019):

1. Planning: In the planning stage, it is necessary to identify the needs and objectives of e-commerce SPK implementation. In addition, it is also necessary to determine the criteria and alternatives that will be used in decision making.
2. Development: The development stage is the stage of making an e-commerce SPK model. The e-commerce SPK model can be developed using various methods, such as hierarchical analysis method (AHP), simple multi-attribute rating technique (SMART) method, and weighted product method.
3. Implementation: The implementation stage is the stage of applying the e-commerce SPK model to the e-commerce system. At this stage, it is necessary to adjust the e-commerce SPK model to suit the needs and goals of the company.
4. Maintenance: The maintenance stage is the stage of keeping the e-commerce SPK running well. At this stage, it is necessary to monitor the e-commerce SPK system and make improvements if necessary.

Influence on Marketing Campaign

E-commerce SPK can have a significant influence on marketing campaigns. This influence can be seen from several aspects, namely:

1. Effectiveness: E-commerce GIS can help increase the effectiveness of marketing campaigns by providing accurate and timely information to business people. This information can be used to determine the right target market, marketing strategy, and marketing budget.

2. **Efficiency:** E-commerce SPK can also help improve the efficiency of marketing campaigns by reducing the cost and time required to analyze data. By using e-commerce SPK, businesses can make faster and easier decisions for marketing campaigns.
3. **Accuracy:** E-commerce SPK can help improve the accuracy of marketing campaigns by using various accurate data analysis methods. These methods can be used to predict consumer behavior and market trends that can be used to improve the effectiveness of marketing campaigns.

In the context of the influence of e-commerce GIS on marketing campaigns, there are several aspects that can be identified. First of all, e-commerce GIS has an important role in determining the right target market. Through consumer data analysis, businesses can use e-commerce GIS to identify consumer groups that have the highest potential to respond to marketing campaigns (Dubbelink et al., 2021). This allows for more efficient use of resources, focusing on market segments with more potential. Furthermore, e-commerce CMS also helps in the development of effective marketing strategies. By utilizing market data analysis capabilities, businesses can use e-commerce GIS to formulate marketing strategies that best suit the characteristics of the target market (Hussien et al., 2021). E-commerce GIS can provide deep insights into market trends, consumer preferences, and other factors that influence the success of marketing strategies.

In addition, e-commerce GIS has a significant role in measuring the effectiveness of marketing campaigns. Through data analysis of marketing campaign results, businesses can use e-commerce GIS to measure the extent to which marketing objectives have been achieved (Ogunmola & Kumar). This measurement includes aspects such as consumer response rate, sales generated, and ROI (Return on Investment). As such, e-commerce GIS enables real-time monitoring of marketing campaign performance, allowing for quick changes if needed to improve its effectiveness (Yu et al., 2017). Overall, the integration of e-commerce GIS has a positive impact in all stages of a marketing campaign, from target market identification, strategy development, to effectiveness measurement. This creates an environment that is more adaptive and responsive to changing market dynamics and consumer needs.

Optimization of Digital Marketing Campaign Integration and DSS

The optimization of digital marketing campaign effectiveness in the context of e-commerce companies can be achieved through the careful and measured utilization of decision support systems (DSS) (Chinedu et al., 2021). Several key factors that can enhance this effectiveness are as follows (Anshari et al., 2019):

1. **In-Depth Data Analysis:** Utilizing advanced data analysis systems helps e-commerce companies in collecting, storing, and analyzing consumer data. This data can be used to understand customer behavior, purchasing trends, and preferences, allowing marketing campaigns to be better tailored.
2. **Accurate Customer Segmentation:** Using decision support systems for customer segmentation ensures that digital marketing campaigns are targeted at groups most likely to respond. Accurate segmentation allows companies to deliver relevant and engaging messages to each customer group.
3. **Content Personalization:** Decision support systems can assist e-commerce companies in creating personalized campaigns. By better understanding customer preferences, marketing content can be customized to create a more personal and relevant experience.
4. **Effective Marketing Channel Selection:** Data analysis and data-driven decision-making help e-commerce companies determine the most effective marketing channels. Whether

through online ads, social media, or email marketing, selecting the right channels can increase campaign reach and response.

5. Continuous Monitoring and Evaluation: Decision support systems enable companies to continuously monitor and evaluate the performance of marketing campaigns. By tracking key metrics, such as conversion rates and customer retention, companies can identify successes and make necessary adjustments.
6. Real-time Interaction: Integrating decision support systems with e-commerce systems can enable real-time interactions with customers. By utilizing data directly, companies can quickly respond to changes in customer behavior and market conditions.
7. Deep Understanding of Competition: Decision support systems aid in collecting and analyzing information about competitors' marketing activities. With a deep understanding of competitors' strategies, companies can design more unique and attractive campaigns.

By integrating decision support systems into digital marketing strategies, e-commerce companies can enhance their campaign effectiveness, increase customer engagement, and optimize marketing investment returns.

5. Conclusions

The integration of digital marketing campaigns and Decision Support Systems (DSS) within the context of e-commerce companies has a significantly positive impact. DSS helps enhance the accuracy and effectiveness of marketing by collecting, analyzing, and visualizing data from various sources. The use of APIs facilitates the integration between the two systems, enabling more precise decision-making regarding target audience, messaging, and marketing media. The main benefits include improved accuracy, operational efficiency, better visibility, and more effective control over campaign results. The conceptual framework presents inputs from digital marketing campaigns, the integration process involving data collection and analysis, and outputs in the form of information for digital marketing decision-making. Implementing the integration of digital marketing campaigns and DSS requires stages of planning, development, implementation, and maintenance. E-commerce DSS also positively impacts marketing campaigns, enhancing effectiveness, efficiency, and accuracy.

Through in-depth data analysis, accurate customer segmentation, content personalization, and effective marketing channel selection, companies can better achieve their marketing objectives. Continuous monitoring and evaluation, real-time interaction, and a deep understanding of competition are also crucial aspects in achieving digital marketing success. To optimize the integration of digital marketing campaigns and DSS, e-commerce companies can take certain steps. It is necessary to enhance data analysis capabilities by using advanced technologies, such as machine learning and artificial intelligence. Customer segmentation should be continuously updated based on the latest data, and marketing content should be personalized accordingly. Additionally, companies must continuously monitor and evaluate campaign performance, and be prepared to adapt to market changes and consumer behavior. Implementing real-time interactions and gaining a deep understanding of competitors' strategies can also enhance a company's competitive advantage in the dynamic e-commerce market.

References

- Abayechaw, D. (2021). Review on decision support system for agrotechnology transfer (DSSAT) model. *International Journal of Intelligent Information Systems*, 10(6), 117-124.
- Aksoy, C. (2023). Digital Business Ecosystems: An Environment Of Collaboration, Innovation, And Value Creation In The Digital Age. *Journal of Business and Trade*, 4(2), 156-180.
- Al-Hawawreh, M., Alazab, M., Ferrag, M. A., & Hossain, M. S. (2023). Securing the Industrial Internet of Things against ransomware attacks: A comprehensive analysis of the emerging threat landscape and detection mechanisms. *Journal of Network and Computer Applications*, 103809.
- Anshari, M., Almunawar, M. N., Lim, S. A., & Al-Mudimigh, A. (2019). Customer relationship management and big data enabled: Personalization & customization of services. *Applied Computing and Informatics*, 15(2), 94-101.
- Bala, D. Verma (2018). A Critical Review of Digital Marketing. *International Journal of Management, IT & Engineering*, 8(10), 321-339.
- Chandra, S., Verma, S., Lim, W. M., Kumar, S., & Donthu, N. (2022). Personalization in personalized marketing: Trends and ways forward. *Psychology & Marketing*, 39(8), 1529-1562.
- Chinedu, P. U., Nwankwo, W., Masajuwa, F. U., & Imoisi, S. (2021). Cybercrime Detection and Prevention Efforts in the Last Decade: An Overview of the Possibilities of Machine Learning Models. *Review of International Geographical Education Online*, 11(7).
- Dubbelink, S. I., Herrando, C., & Constantinides, E. (2021). Social media marketing as a branding strategy in extraordinary times: Lessons from the COVID-19 pandemic. *Sustainability*, 13(18), 10310.
- Gerea, C., Gonzalez-Lopez, F., & Herskovic, V. (2021). Omnichannel customer experience and management: An integrative review and research agenda. *Sustainability*, 13(5), 2824.
- Guruge, M. C. (2018). Comparison between attributes related to celebrity endorsement and social media influencer marketing: A conceptual review. *Sri Lanka Journal of Marketing*, 4(1), 17-37.
- Hassan, A. (2021). The usage of artificial intelligence in digital marketing: A review. *Applications of Artificial Intelligence in Business, Education and Healthcare*, 357-383.
- Hategan, C. D., Pitorac, R. I., Hategan, V. P., & Imbrescu, C. M. (2021). Opportunities and challenges of companies from the Romanian e-commerce market for sustainable competitiveness. *Sustainability*, 13(23), 13358.
- Hussien, F. T. A., Rahma, A. M. S., & Wahab, H. B. A. (2021, May). Recommendation systems for e-commerce systems an overview. *Journal of Physics: Conference Series* (Vol. 1897, No. 1, p. 012024). IOP Publishing.
- Kalaignanam, K., Tuli, K. R., Kushwaha, T., Lee, L., & Gal, D. (2021). Marketing agility: The concept, antecedents, and a research agenda. *Journal of Marketing*, 85(1), 35-58.
- Kanatas, P., Travlos, I. S., Gazoulis, I., Tataridas, A., Tsekoura, A., & Antonopoulos, N. (2020). Benefits and limitations of decision support systems (DSS) with a special emphasis on weeds. *Agronomy*, 10(4), 548.
- Kemendag. (2024). Kemendag Ramal Transaksi E-Commerce di RI Tembus Rp533 Triliun. Diakses tanggal 19 Januari 2024 pada <https://www.kemendag.go.id/berita/pojok-media/kemendag-ramal-transaksi-e-commerce-di-ri-tembus-rp533-triliun>.

- Khatun, M., & Miah, S. J. (2018). Design Methods for Decision Support Systems: A Perspective of Small Business B2C. *Design Methods*, 9(1).
- Kumar, V., & Mittal, S. (2020). Mobile marketing campaigns: practices, challenges and opportunities. *International Journal of Business Innovation and Research*, 21(4), 523-539.
- Lambin, P., Zindler, J., Vanneste, B. G., Van De Voorde, L., Eekers, D., Compter, I., & Walsh, S. (2017). Decision support systems for personalized and participative radiation oncology. *Advanced drug delivery reviews*, 109, 131-153.
- Mohan, V., & Ali, S. (2019). Challenges faced by Indian MSMEs in adoption of internet marketing and e-commerce. *Academy of Marketing Studies Journal*, 23(1), 1-9.
- Ogunmola, G. A., & Kumar, V. (2023). E-commerce research models: a systematic review and identification of the determinants to success. *International Journal of Business Information Systems*, 43(1), 87-106.
- Pandey, N., Nayal, P., & Rathore, A. S. (2020). Digital marketing for B2B organizations: structured literature review and future research directions. *Journal of Business & Industrial Marketing*, 35(7), 1191-1204.
- Peter, M. K., & Dalla Vecchia, M. (2021). The digital marketing toolkit: a literature review for the identification of digital marketing channels and platforms. *New trends in business information systems and technology: Digital innovation and digital business transformation*, 251-265.
- Rosário, A., & Raimundo, R. (2021). Consumer marketing strategy and E-commerce in the last decade: a literature review. *Journal of theoretical and applied electronic commerce research*, 16(7), 3003-3024.
- Sarjito, A. (2023, November). Human Resource Management in the AI Era: Challenges and Opportunities. In *Prosiding Seminar Nasional Ilmu Manajemen, Ekonomi, Keuangan dan Bisnis* (Vol. 2, No. 2, pp. 211-240).
- Song, Z., Sun, Y., Wan, J., Huang, L., & Zhu, J. (2019). Smart e-commerce systems: current status and research challenges. *Electronic Markets*, 29, 221-238.
- Tan, T., Mills, G., Papadonikolaki, E., & Liu, Z. (2021). Combining multi-criteria decision making (MCDM) methods with building information modelling (BIM): A review. *Automation in Construction*, 121, 103451.
- Wahono, S., & Ali, H. (2021). Peranan Data Warehouse, Software Dan Brainware Terhadap Pengambilan Keputusan (Literature Review Executive Support Sistem for Business). *Jurnal Ekonomi Manajemen Sistem Informasi*, 3(2), 225-239.
- Walling, E., & Vaneeckhaute, C. (2020). Developing successful environmental decision support systems: Challenges and best practices. *Journal of Environmental Management*, 264, 110513.
- Yu, Y., Wang, X., Zhong, R. Y., & Huang, G. Q. (2017). E-commerce logistics in supply chain management: Implementations and future perspective in furniture industry. *Industrial Management & Data Systems*, 117(10), 2263-2286.