

Research Article

The Role of the Decision Support System (DSS) as a Decision-making Tool in the Network Marketing Field: A Literature Review

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Abstract: *Background:* The development of information technology brings significant changes in the business world. There are various kinds of information systems using emerging information technology such as Decision Support Systems (DSS). Information technology appears as a result of increasingly widespread globalization in organizational life, increasingly fierce business competition, shorter life cycles of goods and services offered, as well as increasing demands for tastes. Implementation of management information systems is very much needed by organizations and companies in the current era. This study aims to review the role of the Decision Support System (DSS) as a decision-making tool in the field of network marketing. *Method:* This research is a literature review research on the role of the decision support system as a decision-making tool in the field of network marketing. This research was conducted by collecting articles through searching synta-accredited/indexed databases, such as Science direct, Google Scholar, Elsevier and others with a range of the last 10years published then conclusions are drawn and discussion is carried out. *Findings:* The decision support system can be used for adding alternative commodities and types of preference variations, priority intensity of outstanding business partners, planning and implementing marketing information systems, evaluating competitive projects, decision making effectiveness, sales predictions, global market competition, and others. *Conclusion:* The results of the journal review found that DSS has a positive role, namely helping decision making faced by several companies and the most widely used to make DSS is the hybrid method by as much as 50%. Some research results that have been reviewed that the implementation of DSS in network marketing provides benefits in planning and implementing management information systems, determining business partners and hiring criteria with AHP tools, setting priority criteria in identifying and dealing with problems, determining and selecting business ideas according to company criteria and various other benefits.

Keywords: Role, DSS, Decision, Network Marketing.

INTRODUCTION

DSS or decision support system is a knowledge management system that has a role in supporting the decision-making process for a company or organization. Basically, the decision support system is computer-based information. Decision support system is part of a knowledge management system that has an important role in supporting the decision-making process for an organization or company. With the DSS, companies can more easily solve problems or communicate on any structured or unstructured problems (Masaro, A. *et al.*, 2020).

Network marketing is a marketing strategy that allows a salesperson to recruit other salespersons, or so-called down lines, to distribute a company's products. This MLM system utilizes customers as its distribution network. Customers who then become distributors and recruit other customers will get a percentage of their sales as well as the people they recruit. These recruits are "down lines" of previous customers who have become product distributors. Thus it is important to know the role of the Decision support system in decision making in the field of network marketing to assist managers in making decisions to solve problems, support managers' assessments and increase the effectiveness of a manager's decision making rather than its efficiency (Marimin, A. *et al.*, 2016).

The methods that can be used in the decision support system include the Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE), the Analytical Hierarchy Process (AHP) method and the Qlikview method. The PROMETHEE method is a method of determining the best alternative in multi-criteria analysis where the result is a ranking of alternatives based on the selected criteria (Anjasmaya, R., & Andayani, S. 2018).

Furthermore, the AHP method is a quantitative technique developed for cases that have various levels of analysis. In addition, the AHP method is a practical way to handle various functions in a complex network. The AHP method uses pairwise comparisons, calculates weighting factors and analyzes them to generate relative priorities among existing relatives (Aprilda, Y., & Ipnuwati, S., 2017). The Qlikview method is an application created by QlikTech with the aim of solving critical problems for organizations of all sizes. The main drivers in the success of QlikTech are inspiration, imagination and innovation, besides its vision is to create a completely new work through software.

DSS development in the field of network marketing is felt to be very necessary lately as a leverage to increase the number of consumers and company profits. The development of DSS in the field of network marketing has begun with the marketing decision support system (MDSS) as a marketing decision-making tool, but until now, what DSS tools have been developed and used in the field of network marketing are therefore important (Kiet, H. A. T., & Kim, B. J. 2008; Malec, R., & Hayen, R. L. 2002).

BACKGROUND AND RELATED WORK:

Decision making plays an important role because the decisions a manager makes are the result of the final thoughts that need to be carried out by his subordinates or the organization he leads. A manager's decision is very important as it covers all aspects. A wrong decision can have a negative impact on your business, from image loss to money loss. Decision making is the thinking process in solving problems to implement outcomes (;Vafaei, F., & Harati, A. N. 2010)(Berisha - Shaqiri, 2014;. Information has become an essential resource for managing modern organizations. This is because today's business environment is volatile, dynamic and turbulent, increasing the demand for accurate, relevant, complete, timely and timely economic information needed to drive decision-making processes. Increasing highlighting organizational skills in dealing with opportunities and risks (Ghaffarzadeh, S. A. M. 2015).

Organizations are looking for ways to harness the power of big data (BD) to improve decision making. Little attention has been paid in the literature to the significance of the impact of BD on the quality of decision making. This white paper uses case studies to identify the factors that influence BD-based decision-making. BD is collected from multiple sources with varying data qualities and processed by different organizational units, forming a large data chain. Accuracy (manipulation, noise), variability (data heterogeneity), and speed (constantly changing data sources) amplified by the size of big data can ensure BD quality and contextualize data Relational and contractual governance mechanisms are needed to ensure compliance. Case studies show that the use of

big data is an evolutionary process, and a step-by-step understanding of the potential of big data and the routines of the process play an important role (Janssen, M. *et al.*, 2017). Management Information System is needed by both public and private organizations. Management Information System is a support system in making decisions taken by managers in overcoming problems that are happening in an organization, both public organizations and private organizations. Through MIS managers can make decisions wisely in the sense of being able to overcome the problems that are happening and these decisions will not cause bigger problems that can interfere with the survival of an organization. the presence of computer technology has made a very positive contribution to management information systems and MIS is also very much needed by leaders in an organization or company for responsible decision making (Meiryani, P. S., & Puspokusumo, R. A. A. W. 2020).

Each type of managerial decision-making style has its own advantages and disadvantages. And it should be well thought out by the management of any company. For example, people who make decisions in the directive style are distinguished by speed, but may run the risk of making mistakes or missing out on the goodness of alternatives because the problem is not studied in detail. Decisions made in an analytical style are studied more deeply, and are therefore more reliable, but the problem here is - in today's world, when the pace of life is so accelerated -spending a lot of time on each decision can sometimes be detrimental to the company. As for the managers of the conceptual style, they are roughly similar to the managers of the analytical style but they have more social responsibilities, besides that they try to use their creative potential to the fullest. As for the instructive style, a big advantage for this type of manager is the provision of employee involvement in the decision-making process, which leads to having more alternatives and growing possibility to make better decisions. However, the disadvantage of the instructive style is that in large companies this process may take a lot of time (Khakheli, M., & Morchiladze, G. 2015).

Decision making plays an important role because the decisions taken by managers are the result of the final thought that must be carried out by his subordinates or the organization he leads. The manager's decision is very important because it involves all aspects. Mistakes in making decisions can be detrimental to the organization, ranging from image loss to money loss. Decision making is a thought process in solving problems to get the results to be carried out (Al-Tarawneh, H. A. 2012; Janssen, M. *et al.*, 2017; Khakheli, M., & Morchiladze, G. 2015; & Nooraie, M. 2012). Some decision-making models place more emphasis on feedback on decision outcomes. For example, Rubenstein and Haberstroh suggest the following steps: identification of the problem or

decision need, analysis and reporting of alternatives, selection among available alternatives, communication and implementation of decisions, follow-up procedures, and feedback decisions (Utami, S. S. 2011). The use of DSS in the field of network marketing is considered very important as a business strategy which will greatly affect company profits and increase the number of consumers (Kiet, H. A. T., & Kim, B. J. 2008). DSS development in the marketing field has started to move and is known by several terms such as marketing decision support system (MDSS) which represents an emerging trend in the field of marketing where increased adoption of decision support system (DSS) technology improves decision making. This study reviews recent advances in MDSS applications and technologies to identify the potential benefits and limitations of MDSS. This study supports the consideration of MDSS as a valuable decision-making tool (Malec, R., & Hayen, R. L. 2002). The related works above underlie the preparation of this paper in an important swamp to explore the extent to which DSS in the marketing field is needed and developed so far.

METHOD:

In this study, the data needed is data taken from previous research related to the implementation of DSS in the field of network marketing. What are the DSS tools that have been used in the field of network marketing and what are the benefits. Data obtained through article searches in the search period June-July 2022. The data obtained will be reviewed to conclude to what extent DSS has been developed in the field of network marketing. The research method used is a literature review that focuses on evaluating the results of previous research related to the role of the decision support system as a decision-making tool in the field of network marketing. Scientific articles are compiled with primary data in the form of national and/or international journals obtained through searching a syntax-accredited/indexed database, such as Science direct, Google Scholar, Elsevier and others with a range of years published in the last 10years. Search literature using the keywords “role, decision, marketing, decision support system and tools” in Indonesian and/or English. Journals or articles are filtered back by looking at the results, methods and the entire text. A total of 20 journals and/or articles were obtained using these keywords.

RESULTS AND DISCUSSION:

The use of DSS in the field of network marketing is considered very important as a business strategy which will greatly affect company profits and increase the number of consumers (Kiet, H. A. T., & Kim, B. J. 2008). Shown in the results of a review of several related studies as follows:

(Anjasmaya, R., & Andayani, S. 2018) said that the decision support system in this study uses the PROMETHEE method, which is a method used to determine the best alternative. This method will rank alternatives based on the selected criteria. The positive impact of this system is the addition of alternative vegetable commodities and various types of preferences which are expected to be able to adjust to the characteristics of each criterion, as well as time efficiency in the calculations with the same results as manual calculations. (Carolinda 2021) in her paper said that the Decision Support System (DSS) used by PT. So Good Food is an application-based Qlikview management information system. This application was founded in Sweden in 1993 with the aim of solving critical problems for various organizations of all sizes, whether small, medium or large, which are already global companies. At PT. So Good Food, this system aims to make decisions in the planning and implementation of management information systems.

A decision support system using the Analytical Hierarchy Process (AHP) method is useful for helping PT Bandar Madani 165 in determining outstanding business partners. The process of collecting data by distributing questionnaires then carrying out the analysis process and inputting it into the search for the AHP method using a matrix so that the highest ranking value is obtained in the first position. The results of the calculation of the AHP that are applied will produce an output of the priority intensity value of the outstanding business partner so that the business partner with the highest score deserves a reward or award (Rosiska, E. 2018). In the decision support system for the selection of new employees of PT. Wahana Tata Sales Office Denpasar Insurance uses the PROMETHEE method. This method will take multi-criteria decisions to determine the order of priority in the analysis of the main problem. The selection of prospective employees can be used to increase the effectiveness and efficiency of employee performance in selecting prospective employees. With this system, a manager is very helpful in making decisions in selecting prospective employees (Setiawan, G. I. *et al.*, 2018). A decision support system using the Analytical Hierarchy Process (AHP) method and the results of AHP calculations that can provide opportunities for program managers to be able to build ideas or ideas and define existing problems by making assumptions in a hierarchy and then getting a suitable solution. Desired and intelligently apply a complex mathematical approach but based on a qualitative approach that is acceptable to all stakeholders and program managers. In this study, two factors were observed, namely constraint factors and supporting factors with criteria and sub-criteria considered by these two factors and alternatives which would later be chosen as the best marketing strategy to increase salted egg sales (Aprilda, Y., & Ipnuwati, S., 2017).

Business idea contests have gained increasing dominance and relevance especially among young, qualified graduates who intend to start their own business. The operating model of each competition is quite heterogeneous, but some common elements stand out, such as the need for a jury president to formulate the rules of each competition and manage the functions of each jury, the existence of multiple jury members usually with a multidisciplinary profile, and serialization of projects within a competition considering the evaluation of all jury members. This study simultaneously impacts on the theoretical and practical functions of the competition of ideas. In a theoretical and conceptual approach, this study proposes the use of the AHP method to facilitate and transform more robust the evaluation process of competing projects. From a practical point of view, this research has the potential to be used in several national and international competitions for ideas, regardless of the field of competition and the number of jury members (Martins, D. *et al.*, 2019). Information technology has developed very rapidly, both in terms of hardware and software. This has given birth to a decision support system or DSS, which is a specific information system aimed at assisting management in making decisions related to semi-structured problems by having facilities to generate various alternatives that can be used interactively by users. DSS plays an important role for managers in assisting the decision-making process. DSS is designed with an emphasis on aspects of flexibility and high adaptability, so that it is easily adapted to the needs of the user. DSS applications can increase the effectiveness of managers' decision-making (Whetyningtyas, A. 2011).

The work is focused on the design and deployment of an intelligent multi-store E-commerce platform capable of managing orders and warehouse stock through priority association rules and data mining algorithms. The proposed Decision Support System (DSS) is organized into two main levels: the first relates to the definition of priority rules because online product demand corresponds to the availability of check-ins in different store warehouses, and the second provides important information about sales predictions thereby facilitating stock management and logistics in an integrated manner. Sequentially In particular, the prototype platform is capable of managing product warehouses from different stores by means of simultaneous comparison of products available in different stores connected to the platform, and through a scalable end-to-end tree enhancement system XGBoost algorithm is able to predict online sales. This paper has been developed within the framework of an industrial project (Masaro, A. *et al.*, 2020). We discuss how marketing decisions are made, how they should be made, and the relative role of analytical versus intuitive cognitive processes in marketing decision making. We also discuss the fit between marketing problem solving modes and different types of marketing management

support systems. Finally, we discuss how the impact of the Marketing Management Support System can be increased. This is important, considering the current use of the Marketing Management Support System in practice. We discuss the conditions for successful implementation and use of an effective marketing management support system. The issue concludes with a discussion of the opportunities and challenges for systems marketing management support as we foresee (Van Bruggen, G. H., & Wierenga, B. 2010).

A global marketing decision support system can be understood as a coordinated collection of data, systems, tools, skills, and techniques with supporting software and hardware, which global companies use to gather and interpret relevant information about business operations and the environment, and use it further as the basis for the overall global marketing action. The global marketing decision support system also incorporates individual subsystems, whose coordinated actions result in the exchange of opinions between users and participants in the decision support system, as well as the global marketing environment (Grubor, A. 2009). DSS is an information system whose data is processed in the form of decision making for end users. DSS can also help change business processes, where managers generally make all decisions, but with information technology such as decision support tools, database access, and modeling software, decision making is everyone's part. EIS (Executive Information Systems) is an information system related to the needs of top management regarding strategic information in the strategic decision-making process. The presence of information technology provides many benefits for companies, such as being able to ease complex business activities and produce reliable, relevant, timely, complete, understandable, and tested in the context of planning, control and management decision making. In addition, the company's operating efficiency and company performance can also be improved. As a result, companies can survive in the information age and are able to face global market competition (Maharsi, S. 2000).

The development of information technology brings significant changes in the business world. There are various kinds of information systems using emerging information technology such as the Decision Support System (DSS). The development of information technology also affects the field of management accounting as a field that produces information in the context of planning, controlling and making management decisions. Information technology will be applied if the benefits obtained by using information technology are greater than the costs incurred to implement information technology. This is also known as the value of information technology. Therefore, management accountants need to consider it well before making a decision. Security must be continuously improved to avoid misuse of information technology.

For example, by storing the computer in a safe place, only allowed to be used by certain people with an interest, the use of passwords, and the creation of an access control matrix (Tarigan, D. *et al.*, 2019). Expert Choice is an application specifically used as an implementation tool in the Decision Support System (DSS) or better known as the Decision Support System (SPK) in a company or for academic purposes (PBM). Several conveniences are found in Expert compared to similar software. Such as the AHP (Analytical Hierarchy) method, this is the process of helping solve complex problems by structuring a hierarchy of criteria, interested parties, results and by drawing various considerations to develop weights or priorities. This method also combines the power of feeling and logic in dealing with various problems (Hutama, HJ, & Suliantoro, H. 2015).

This study found that DSS was used to evaluate the previous marketing performance to determine the continued performance in the future. The implementation of the sustainability strategy for evaluation was successful with the help of the DSS but there is still a need for a general performance picture that can be used by different types of industries to adopt, formulate and successfully implement the corporate sustainability strategy action plan. making DSS using many methods such as Fuzzy methods, Multi-Criteria Decision-making Methods (MCDM), Analytical Hierarchical Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), Decision-making Trial and Evaluation Laboratory (DEMATEL), Graph Theory and Matrix Approach (GTMA) and Analytical Network Process (Kitsios, F. *et al.*, 2020). This study aims to estimate the production and marketing strategy of an organization using DSS assistance in the form of decision trees and artificial neural networks as a hybrid approach. The proposed Hybrid model is applied in manufacturing companies to provide decisions on their marketing ideas by considering the problems that exist in the company and its marketing department. The selection of the company that is maintained leads to a bad image in the environment and stakeholders, so it is very important to get a decision support system for the development of production and marketing strategies, so that company profits can increase (Kumar, T. S. 2020).

This study uses a DSS in the form of an artificial neural network to predict the stock market index. For NASDAQ index predictions for two input datasets (four

days earlier and nine days earlier) were developed and validated. Then the network structure that is optimized for both types of datasets is selected according to its predictive ability. The results of the DSS research in the form of an artificial neural network found that there was no significant difference between the predictive ability of the previous four and nine working days as an input parameter (Moghaddam, A. H. *et al.*, 2016). *Decision support system* the method used in this research is to determine the marketing techniques that will be used for marketing new products. DSS makes it possible to determine which topics receive the most/least attention from the research community and to assess the completeness of the current set of marketing knowledge. The results of this study found that DSS can be accepted to determine marketing techniques in marketing new products (Figuroa-Perez, J. F. *et al.*, 2019). Researchers conducted research on the use of DSS in seeing the feasibility of marketing chicken using the weighted product method. DSS can provide alternative solutions when a group of people find it difficult to make the right decisions and according to the weighted product. The results of this study found that the DS used had produced and obtained good and relevant data rankings and the ranking results also showed 90% accurate (Defit, S. 2021).

Decision support system is a tool that can be used in various fields, one of which is in the field of marketing. In the marketing field, DSS can be used to determine marketing priorities to be carried out. There are 20 journals that are relevant to the topic and obtained from the database using the keywords that have been created. The results of the journal review found that DSS has a positive role in decision making faced by several companies. The decision support system is used to add alternative vegetable commodities and type preference variations, priority intensity of outstanding business partners, selecting prospective employees, planning and implementing marketing information systems, evaluating competitive projects, decision making effectiveness, sales predictions, global market competition, increasing business demand, evaluation of previous marketing performance to determine continued performance in the future, estimate the production and marketing strategy of an organization, predict the stock market index, determine marketing techniques that will be used for marketing new products and marketing feasibility. DSS methods used are very diverse. The results of the identification of the methods used in the selected journals can be seen in Diagram 1.

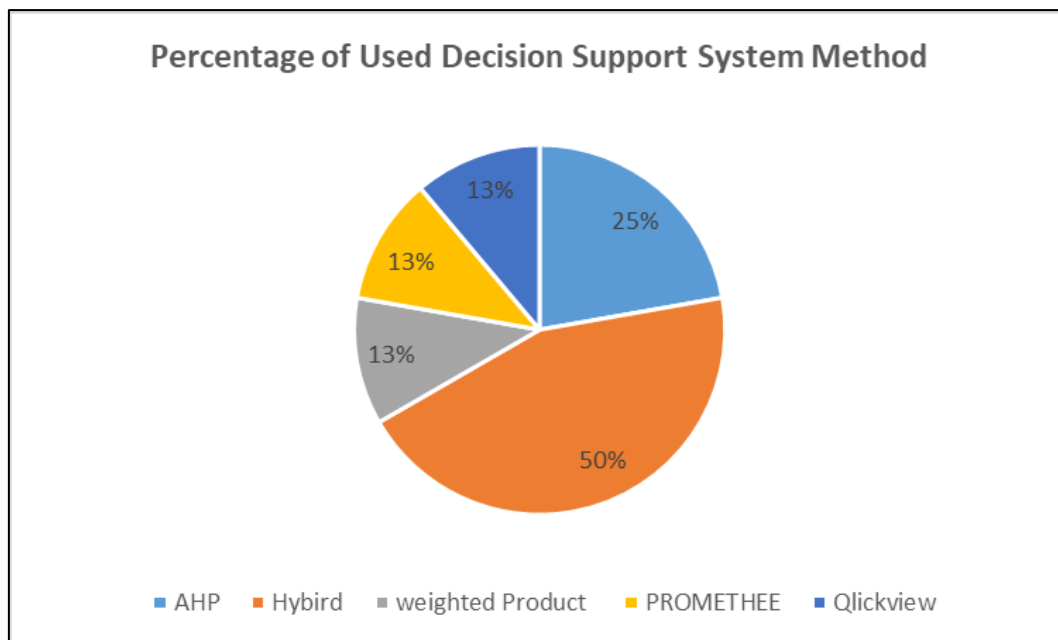


Figure 1: Percentage of DSS method used

A total of 20 articles were obtained, 50% of them used the Hybrid method, Analytical Hierarchical Process (AHP) method are 25%, the weighted product method is 13%, the Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE) method is used as much as 13% and the Qlickview method is 13%. The hybrid method is widely used because it uses 2 different methods combined with a certain approach so that the results obtained are more accurate because they come from two different methods.

CONCLUSION:

Some research results that have been reviewed that the implementation of DSS in network marketing provides benefits in planning and implementing management information systems, determining business partners and hiring criteria with AHP tools, setting priority criteria in identifying and dealing with problems, determining and selecting business ideas according to company criteria and various other benefits that have been described in the discussion of this article. Decision support systems help various companies in determining the decisions that must be taken, especially in the field of marketing or marketing. The results of the review show a positive impact, namely that DSS is very helpful for the company. The most widely used method for making DSS is the hybrid method by as much as 50%.

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