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UTILIZATION OF ARTIFICIAL INTELLIGENCE IN MARKETING INFORMATION SYSTEMS AND STRATEGIES

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Abstract

This research study develops a model that integrates marketing information systems and strategic levels and examines the implementation of these systems at each strategic level. To achieve the first objective, the role played by the CEO or manager at each strategic level and the specific information systems required for each case are the starting points of the study. To achieve the second objective, a qualitative method is applied, and the technique used is in-depth interviews. The study shows that companies do use all four marketing information systems, although with different emphases, depending on the strategic level. Artificial Intelligence (AI) has developed rapidly and penetrated various aspects of life, from simple applications on mobile phones to complex systems in industry and scientific research. In general, AI is defined as the ability of a computer system to imitate human cognitive functions, such as learning, reasoning, and problem solving. The development of AI is driven by the availability of abundant data (big data), increasing computing power, and advances in algorithms.

Keywords: Strategy Level, Marketing Information System, Qualitative Research, Ai, Big Data.

Introduction

Marketing Information System (MIS) is an integrated and complex system, consisting of people, procedures, and hardware and software, designed to collect, analyze, and distribute relevant and timely information to marketing decision makers. MIS serves as a foundation for effective and efficient decision making in various aspects of marketing, from strategy planning, product development, pricing, promotion, to distribution. This system collects data from various sources, both internal to the company (such as sales data, customer data, financial data) and external (such as market data, competitor data, demographic data), then processes the data into meaningful and useful information. This information is then presented in various formats, such as reports, graphs, and dashboards, so that it is easily accessed and understood by marketing managers. With MIS, companies can better understand the market and customers, identify opportunities and threats, measure the effectiveness of marketing campaigns, and increase competitiveness in the market. In short, MIS is the backbone of modern marketing activities based on data and information.

Information system development is a structured process that aims to create, modify, or improve existing information systems to meet business or organizational needs. This process involves a series of interrelated

stages, from planning, analysis, design, implementation, testing, to maintenance. In the planning stage, user needs and business objectives are identified. The analysis stage focuses on understanding the details of the existing or future system, including data collection and identification of functional and non-functional requirements. The design stage designs the system architecture, user interface, database, and other components. Implementation involves writing program code, installing hardware and software, and configuring the system. Testing is carried out to ensure the system functions properly and meets the established requirements. Finally, the maintenance stage includes bug fixes, performance improvements, and system adjustments to changing needs. Information system development can use various methodologies, such as *waterfall*, *agile*, or *spiral*, depending on the complexity of the project and the preferences of the development team. The success of information system development is highly dependent on effective communication between the development team, users, and other stakeholders, as well as good project management.

Managers make decisions in a more complex and dynamic environment today than ever before; factors such as more global markets, competitive pressures, expanding markets, and more demanding consumers make highly specific information essential. In this context, marketing information systems (MKIS) must play a role beyond their traditional role; that is, they must play a role that supports decisions made at the corporate, functional, and operational levels. Previous research suggests that they have been applied primarily to the marketing function (Xianzhong, 1999). Often, organizations use these information systems to support competitive analysis to determine market conditions; however, research that can support strategy formulation has not been developed (Malo & Marone, 2002).

The use of Artificial Intelligence (AI) in marketing information systems and strategies has brought about significant changes in the way businesses operate and interact with customers. AI enables the rapid and accurate collection and analysis of large amounts of consumer data, providing deep insights into behavior, preferences, and market trends. This information is crucial for personalizing marketing campaigns, where AI can tailor content and offers to each individual, increasing effectiveness and engagement. In addition, AI automates various marketing processes, such as email delivery, ad management, and social media interactions through chatbots or virtual assistants, reducing the workload of marketing teams and enabling faster responses to customers. Sentiment analysis and customer reviews are also facilitated by AI, allowing companies to understand public perception of their brands and products. Thus, AI not only improves marketing efficiency and productivity but also enables smarter, data-driven decision-making, ultimately improving customer satisfaction and achieving better marketing goals.

Zabriskie and Huellmantel (1994) suggest that providing information to formulate marketing strategies is the responsibility of the marketing director. Research on marketing information systems has paid little attention to what types of information are considered useful to the marketing performance of decision makers (Ashill & Jobber, 2002). According to Proctor (1991), there is a lot of information, but there is a lot of error; that is, the information is more focused on operational functions than strategic functions.

Nevertheless, the utilization of MKIS is very important for the success of an organization and should be an integral part of the strategic planning process (Amaravadi, 1995) because marketing databases are an important element for strategic planning in many companies and often present challenges in management, marketing and sales (Stone & Shaw, 1987).

Information system development, although crucial for modern organizations, is often marred by various problems that can hinder the success of the project. These problems can be grouped into several categories. First, problems related to *requirements* often arise due to lack of communication and understanding between

developers and users. Unclear, changing, or incomplete requirements can result in a system that does not meet user needs. Second, *technical* problems include obstacles in selecting the right technology, complex system integration, data security issues, and infrastructure limitations. Third, *project management* problems such as poor planning, inefficient resource allocation, unrealistic schedules, and lack of project control can cause projects to be late, over budget, or even fail completely. Fourth, *human resource* problems such as lack of development team skills, user resistance to change, and lack of management support can also be obstacles. Finally, inadequate *budget* problems can force compromises on system quality or even stop the project midway. Overcoming these problems requires careful planning, effective communication, good project management, a competent team, and strong commitment from all parties involved.

Definition of Marketing Information Systems and Ai

Marketing Information System, or *Marketing Information System*, is an integrated system designed to provide information needed in the marketing decision-making process. This system involves people, procedures, and equipment that work together to collect, sort, analyze, evaluate, and distribute relevant, accurate, and timely information to marketing decision makers. This information comes from various sources, both internal to the company (e.g. sales data, customer data) and external (e.g. market research, competitor data, industry trends). With a marketing information system, marketing managers can better understand the market, identify opportunities and threats, formulate effective marketing strategies, and evaluate overall marketing performance.

Marketing information systems proposed by Cox and Good (1967) refer to it as procedures and methods for analyzing and presenting information to be used in marketing decision making. Thus, Proctor (1991) defines MKIS as a system that examines and collects data from the environment; that uses data for operations and transactions within the company; and that filters, organizes, and selects data to present it for business purposes. Kotler (2003) and Burns and Bush (1995) define MKIS as a consistent system of people, equipment, and procedures to collect, classify, analyze, evaluate, and distribute necessary, timely, and accurate information needed for decision making. For Talvinen (1995), marketing information systems are a fundamental part of a company's information systems portfolio.

Artificial Intelligence (AI) in information systems refers to the use of AI technologies to improve the efficiency, effectiveness, and capability of information systems in managing, processing, and utilizing data. AI is integrated into information systems to perform tasks that would normally require human intelligence, such as pattern recognition, learning from data, decision-making, and problem-solving. For example, AI can be used to automate data entry, analyze large amounts of data to identify trends and anomalies, provide recommendations based on historical data, and improve system security by detecting suspicious activity. By utilizing AI, information systems become more intelligent, adaptive, and able to provide more valuable insights to their users, thereby supporting better decision-making and achieving organizational goals. The integration of AI into information systems also enables the development of new applications and services that are more innovative and personalized for users.

Classification of Marketing Information Systems

Marketing information systems can be classified from several perspectives, including the type of information managed and its functional components. Based on the type of information, there are three main classifications, namely: (1) **Marketing Intelligence**, which collects information from the company's external environment, such as market trends, competitor activities, and consumer behavior. This information is

obtained through market research, observation, and other external sources. (2) **Internal Marketing Information**, which comes from the company's internal data, such as sales data, customer data, production data, and financial data. This information is used to monitor marketing performance, identify opportunities, and make decisions. (3) **Marketing Communication**, which relates to information sent by the company to the market, such as advertising, promotions, and public relations. This information aims to promote products or services, build brand image, and establish relationships with customers.

In addition to classification based on the type of information, marketing information systems can also be classified based on their functional components, which include: (1) **Input Subsystem**, which collects data from various sources, both internal and external. (2) **Database**, which stores and manages the data that has been collected. (3) **Output Subsystem**, which produces information needed by marketing managers for decision making. This output subsystem can be in the form of reports, graphs, or other visual displays. This classification emphasizes the flow of data and information in the marketing information system, from data collection, storage, to presenting information to users.

Some sources also classify marketing information systems based on more specific subsystems, such as product subsystems, price subsystems, promotion subsystems, and place (distribution) subsystems. This classification focuses on the functional areas in marketing that are supported by information systems. With these various classifications, understanding of marketing information systems becomes more comprehensive and facilitates the design, implementation, and use of these systems.

Several authors such as Cox and Good (1967), Kotler (1991, 2003), Proctor (1991), and Talvinen (1995), have presented models for marketing information systems. Burns and Bush (1995) present a classification of marketing information systems similar to Kotler (2003) in which there is a reciprocal relationship between the environment and the MKIS and the managing director (see Figure 1). As follows:

1. Support systems in marketing decision making related to data collection, coordination, hardware and software, which collect relevant information for business to become the basis for marketing decision making (Little, 1979).
2. Intelligence systems in marketing These are the sources used to obtain information about relevant developments in the environment (Burns & Bush, 1995; Kotler, 2003). It includes procedures for collecting information from informal media (books, journals, printed materials, conversations with clients, suppliers and distributors, and meetings with marketing executives of other companies) as well as from formal media (carried out by staff members specifically tasked with finding data traces relevant to the company or industry); that is, it deals with the collection of information about the surrounding environment that can directly or indirectly affect the company. Today, technology makes this task easier, since this procedure can be carried out electronically, allowing the coverage of thousands of documents at the same time.
3. A marketing research system that collects information not produced by the marketing information system. This system consists of studies designed to meet the needs of the organization (Burns & Bush, 1995; Kotler, 2003).
4. An internal record-keeping system that collects internal information regarding purchases, prices, costs, inventory levels, etc. (Burns & Bush, 1995; Kotler, 2003).

Marketing Information Systems and Strategies

A marketing strategy is a measurable action plan designed to achieve a company's marketing objectives. These objectives can be increasing sales, expanding market share, building a strong brand, or increasing customer loyalty. Marketing strategies cover a variety of aspects, from market research to understand consumer needs

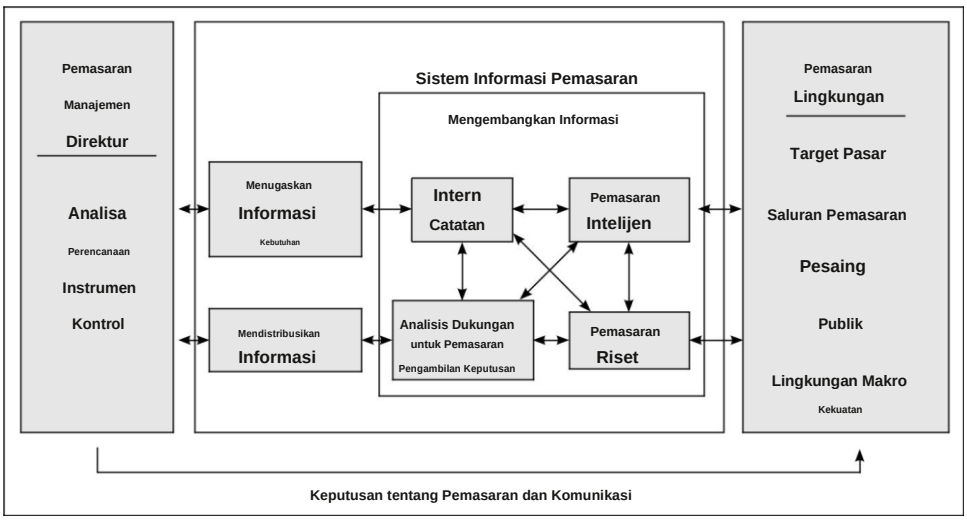
and preferences, market segmentation to group consumers into more specific segments, determining the most potential target market, to developing a marketing mix consisting of product, price, place, and promotion.

Furthermore, marketing strategy is not just a promotional or sales activity, but also involves competitive analysis to understand the strengths and weaknesses of competitors, identify opportunities and threats in the market, and determine a unique and relevant brand positioning in the minds of consumers. An effective marketing strategy must be adaptive and responsive to changes in the market and consumer behavior. Therefore, periodic evaluation and adjustment of the strategy is essential to ensure long-term success. In other words, marketing strategy is the foundation for a business's success in achieving its commercial goals.

So, according to Ansoff, Declerck, and Hayes (1990), the strategic level of a company is always related to the environment. Mintzberg and Quinn (1993), strategy is defined in the form of four p: planning, pattern, position, and perspective. Finally, according to Thompson, Strickland, and Gamble (2005), the strategy approach used to attract consumers, be able to compete, successfully develop a business, run and achieve the goals set.

Researchers have paid more attention to the marketing information systems needed to support decision making (Amaravadi, 1995; Ashill & Jobber, 2002; Talvinen, 1995). However, little has been studied about marketing information systems and strategy formulation. Research studies have focused on general aspects of the strategy formulation and implementation process (Ashill, Frederikson, & Davies, 2003; McCarthy & Leavy, 2000; Varadarajan & Jayachandran, 1999; White, Conant, & Echambadi, 2003) rather than on specific aspects such as the information systems needed by organizations to formulate strategies (Proctor, 1991). MKIS require different types of information about marketing at each level. These level differences have prompted several authors to study MKIS and strategy levels (Hair, Bush, & Ortinau, 2003; Talvinen, 1995), as well as the MKIS required at each strategy level (Talvinen, 1995).

Sistem Informasi Pemasaran



Gambar 1. Sistem informasi pemasaran.

Catatan. **Burns, A. & Bush, R. (1995) Sistem Informasi Pemasaran (hal. 14). New Jersey: Prentice Hall.**

Integrative Conceptual Model

The Marketing Information System conceptual model is essentially a framework that describes how information is collected, processed, and used to support marketing decision making. There are several models that explain this concept, but the essence is that the system consists of several interacting subsystems. These subsystems include **marketing input** (internal company data such as sales data, customer data, production data, etc. and external data such as market data, competitor data, economic data, etc.), **information processing** (data analysis, data categorization, report generation, etc.), and **marketing output** (relevant and timely information to support marketing decisions such as market segmentation, pricing, promotion, distribution, etc.). Some models also emphasize additional subsystems such as **marketing research** (specific data collection to solve a particular marketing problem), **marketing intelligence** (monitoring the marketing environment to identify opportunities and threats), and **product, price, place, and promotion subsystems** that focus on specific information related to each element of the marketing mix. In essence, the MIS concept model aims to provide accurate, relevant, and timely information for marketing decision makers so they can plan, implement, and control marketing activities effectively and efficiently.

To integrate marketing information systems with strategy, the starting point is the role played by the CEO or manager at the strategic level. Thus, at the corporate level, the mission and objectives are established, the business to be engaged in is determined, and resources are allocated. At the business unit level, business strategies are formulated to meet the objectives established at the corporate level and to improve the competitive position of the product in a particular industry or market segment. (Hill & Jones, 2005; Johnson & Scholes, 1993; Kotler, 2003; Thompson et al., 2005; Webster, 1992).

However, marketing-related activities are conventionally concentrated on the sales function (Xianzhong, 1999), a limitation when a business operates in a dynamic and complex environment where it must anticipate changing market needs, and, therefore, rely on relevant information at the strategic level. Marketing activities go beyond sales, with a more strategic external orientation, and are more oriented to the competitive market (Lynch, 1994; Talvinen, 1995; Webster, 1992; Xianzhong, 1999).

Like marketing, the implementation of MKIS is also more focused on productivity and sales than on strategy (Hewson & Hewson, 1994; Wilson & McDonald, 1994). Although some businesses have used this system at a strategic level, its use is still focused on marketing functions related to consumers, such as, for example, sales (Xianzhong, 1999). Facing the existing gap, because there is no classification of MKIS according to strategy level (Burns & Bush, 1995; Kotler, 2003; Talvinen, 1995).

Method

This study uses qualitative methods and interview techniques. This method provides a deeper understanding of the research (Hanson & Grimmer, 2007), and qualitative techniques as a tool for researchers (Cassell & Symon, 2006). Interviews as a meeting for the exchange of information between the interviewer and the interviewee (Hernández, Fernández, & Baptista, 2006).

The instrument for obtaining data was designed conceptually consisting of an interview guide in an unstructured format applied to those participating in strategy formulation at various levels.

Discussion Results

This study revealed that managing directors are aware of the importance of the strategic function, but because they are more involved in day-to-day operations, due to the high level of competition that exists, their main

interests end up centering on designing at the marketing functional level, in addition, in many cases, they are more concerned with the marketing mix.

Based on the data obtained, the company's managing director showed a lack of knowledge about MKIS as seen in the MKIS theory. The application of MKIS is greater in areas related to the environment, or strategic areas. At the company level, the most widely used MKIS are marketing decision support systems and marketing intelligence systems; at the business unit level, there are marketing research systems and marketing intelligence systems.

In addition, the study found that managers utilize MKIS at all levels, but not all types of marketing information included in the system. These areas are: at the corporate level, business analysis that allows for, market trends, market structure analysis, typical clients, and company positioning; at the business unit level, sales forecasting, industry competitive structure, and product differentiation and segmentation; at the functional (marketing) level, demand analysis, client preference studies, sales follow-up, and with strong potential for use in behavioral studies.

It is important to note that this study revealed the importance of all MKIS at the strategic level, although some managers placed more emphasis on the sales area.

This study shows that a fairly broad scope of MKIS is recommended for managers to articulate the strategic function of marketing with business units and corporate levels, so that decision support systems, can support the marketing process. and market intelligence, can offer better support with specifically sought and relevant information.

Conclusion

Directors recognize the strategic role of marketing activities at all levels and emphasize the importance of using MKIS. However, some managers still work with only operational-tactical information, such as the marketing mix, or to streamline sales.

Opportunities are found with strong potential for the use of MKIS at various strategic levels, such as market trends, market structure analysis, company positioning, sales forecasts, industry competitive structure, demand analysis, client preference studies, and other research.

It is important to utilize MKIS because at each level of strategy, CEOs or managers require different types of information, with their own characteristics. Therefore, it is important to promote research on MKIS to support implementation in formulating their strategies based on information specific to the needs of each level of strategy.

It is recommended that future research studies focus on different industry sectors to identify opportunities for MKIS to support firms in strategy formulation.

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