DATA MINING AND KNOWLEDGE MANAGEMENT FOR MARKETING

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ABSTRACT

In order to support marketing decisions, this study aims to show how important knowledge management and data mining are. It demonstrates how data mining methods and technologies may be used to uncover hidden purchasing trends and aid marketers in making smarter decisions. Practically speaking, data mining and knowledge management methods particularly helpful for marketing, especially for businesses with large volumes of sales. Because of the wise choices made by marketers, knowledge management and data mining can also aid to boost profit. The article also demonstrates how data mining and knowledge management may be utilised to better understand the vast amounts of consumer and buy transaction data.

I.   INTRODUCTION

The enormous amount of data collected about clients and everyday purchase activities has caused business databases to grow rapidly. Because of this, the strategies and technologies used in knowledge management and data mining (DM) have become crucial for making marketing decisions. In order to support marketing decisions, DM can be utilised to gather relevant data on hidden buying trends. Additionally, DM can aid in market analysis as a whole.

For any business to increase profits, marketing decisions are crucial. It might change how people behave. Every day, marketing gets more challenging. The business environments of today are increasingly complicated. The environment and society have an impact on how marketers can make judgements. Because of this, marketing decisions ought to be standardised because doing so will assist marketers conduct their operations in a professional manner. There are various tools and approaches that should be employed to increase the accuracy of any marketing choice. An essential technique for assisting marketers is data mining. Studies showed that DM can improve marketing significantly.

Good marketing decisions are based on knowledge about customers. This kind of knowledge is very important and considered as a key for the marketing functions. This critical knowledge can be found in the organization's databases but most of it is hidden.

Data Mining tools are used by decision makers to help them to get the useful hidden knowledge in order to make better decisions. DM is just a combination of database and artificial intelligent. The process of data mining can be automated which makes it very common to be used in different areas including the marketing area. Data mining tools usually are used in areas that need to analyze huge amount of data.

Knowledge management is one of the most significant variables that could influence marketing choices. Treating knowledge as an important organisational resource has gained popularity during the past few years. Due to their realisation of its value, many organisations have become interested in knowledge management. Information Management Knowledge creation and use is known as KM. KM processes can be integrated with the corporation system which can helps the marketers to get the knowledge easily.

Customer relationship management (CRM) has a favourable impact on marketing choices as well. It refers to the idea of managing long-term relationships with customers. CRM tools can be used to examine client purchasing patterns. However, there are several solutions available on the market that can be utilised to support customer relationship management. Therefore, before using the best tool for the company, it should be analysed.

II.   RESEARCH METHOD

A literature review on marketing, data mining, knowledge management, and customer relationship management was chosen as the research approach for this paper. I was able to provide a theoretical underpinning for the topic thanks to this literature review. It enhanced my comprehension, which ultimately

enabled me to pinpoint the key determinants of marketing decisions. I discuss the key elements that aid marketers in achieving their objective of making better marketing decisions in this essay.

III. DATA MINING TOOLS AND TECHNIQUES

The value of data mining techniques comes from their capacity to uncover hidden information that is difficult for humans to assess and extract from huge databases or data warehousing. Any decision-making process can be enhanced by using these methods and tools. Marketing is one sector where data mining tools and processes are used. It provides insightful reports on the most effective times to run product advertisements and may extract important information from historical data. Additionally, data mining tools help marketers identify the ideal media to post product advertisements by providing statistics.

DM has several techniques that can provide different types of analysis. One of the DM technique is association analysis. This technique is used to check all the historical related data and compare the old transactions to provide informative reports to be used by the decision makers. Also DM techniques can be used to as market predict techniques to help to Predict the market future. These techniques can be used by marketers to help them to make better decisions then increase the future sales.

Data mining process is complicated. It is an iterative process with a lot of feedback loops. Sometimes the whole process should be repeated from the beginning. It involves six phases.

- Problem definition.
- Data Preparation.
- Data Exploration.
- Modeling.
- Evaluation.
- Deployment.

Data from data warehousing is typically the focus of data mining tools and procedures. According to the definition of a data warehouse, which supports management's decision-making process, it is a subject-oriented, integrated, time-variant, and non-volatile collection of data. When creating data warehousing, many modelling strategies are employed. These modelling methods differ from those used to model conventional databases. Techniques for dimensional modelling can be used to create DW. All the data is organised using dimensional modelling techniques into fact tables and dimension tables. In a dimensional model, there are three different architecture types: star schema, snowflake schema, and galaxy schema. The star schema is most frequently employed when creating data warehouses.

IV. KNOWLEDGE, INFORMATION AND DATA

It is important to first comprehend the differences between data, information, and knowledge in order to better understand knowledge management. Facts are data. It could just be a description with numbers or plain text. Information is created when data are related to one another. Knowledge is a pattern created from previously acquired data. That information could be provided in a visual report.

Utilizing existing knowledge effectively through knowledge management can aid any firm in achieving its goals and objectives. Actually, it is a method for producing and disseminating knowledge. Knowledge is increasingly regarded as a valuable resource that can be managed similarly to physical assets in order to increase performance. Today, KM has advanced and a variety of techniques have been created to make managing information simple. KM enhances business performance in a variety of ways. It enhances all aspects of decision-making. Knowledge management has the benefit of being automated and integrated with any organization's system. If necessary, it can also function as a domain-independent system. Because of these factors, businesses recognised the value of KM. It should be used by marketing and marketers to help them make better marketing decisions. Marketing professionals could make better judgements more systematically with the support of useful patterns discovered through data mining and knowledge management.

V. DATA MINING AND KNOWLEDGE MANAGEMENT TECHNIQUES AND TOOLS

Data mining (DM) is a technique that combines databases and artificial intelligence (AI) to give consumers relevant information that will aid in better decision-making. It is typically employed as a decision-support tool that may be applied to a variety of fields, including marketing.

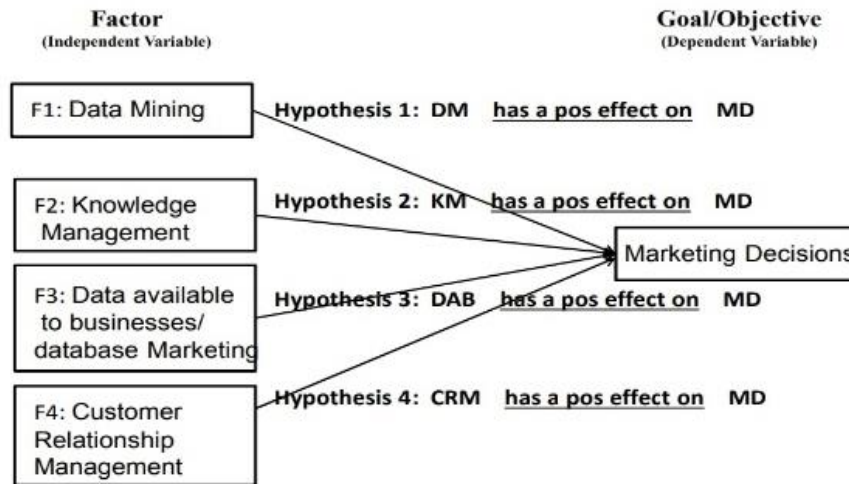## VI.   IMPORTANT FACTORS EFFECTING MARKETING DECISIONS

Fig.1. Important Factors effecting Marketing Decisions

VII.   EXPLANATION AND DISCUSSION

The model displays the aim, which is a marketing decision, as well as the primary deciding elements. Additionally, it demonstrates that every component influences marketing decisions in a favourable way.

7.1 GOAL (MARKETING DECISIONS)

According to Greene (1960), marketing choices are crucial for any firm looking to boost profits. Every day, marketing gets more challenging. Chakravarti et al. claim that the settings are more complicated. Additionally, as noted by Bell & Zabriskie, marketing decisions are based on demographic information. According to Gelb & Cheney (1986), social and environmental factors influence marketing decisions. According to Aylmer (1970), standardising marketing decisions will make it easier for marketers to conduct business. Other tools and strategies should be utilised to support judgements, according to Shaw et al. Data mining is a crucial tool for assisting marketers.

In my opinion, organizations may increase their profit when they have good marketing decisions. Due to the increase of the data of the daily transactions, the environments have became more complex . Also it depends on demographic data . For that reason some tools like data mining should be used to help marketers to make better marketing decisions. This kind of tool can be used to help in complex environment and surrounding restrictions . Also I agree that the marketing decision should be standardized to make it easier.

7.2 FACTOR 1 (DATA MINING)

Shaw et al. (2011), stated that data mining can play an important role in different areas to help to predict and support the decision makers . According to Bora (2011), data mining tools for decision support . Guozheng et al., (2008) said, DMcan be applied in different areas including Marketing . Also, as Ding (2010) said, data mining (DM) can play an important role in improving marketing. According to Guozheng et al., (2008) data mining become more popular because of the contributions that can be made in converting information to knowledge. Also, as Hargreaves & Yi (2012) stated that data mining can be used to predict which can help in marketing area.

I think, the huge amount of data of customers, lead to the necessity of using technology like data mining techniques which will help to extract hidden information from that huge datadata. This will help organizations to take correct decisions then maximize the profit. DM shows that using its tools can improve the decision in different areas which lead marketers to think of using it in marketing. It will enhance marketing decisions made

my marketers. DM is unique technique used to convert information to knowledge. Also will help marketers to predict in case they need to do that in norder to make better decisions .

7.3 FACTOR 2 (KNOWLEDGE MANAGEMENT)

Knowledge management is one of the key elements that may have an impact on marketing decisions, according to Shaw et al. In recent years, there has been an increase in interest in addressing knowledge as a key organisational resource, according to Alavi & Leidner (2001). According to Garca-Murillo et al. (2002), numerous firms have been interested in KM as a result of realising its significance. Additionally, it may strengthen an organization's competitive advantage. According to Palacios et al. (2009), KM is a process of generating and applying knowledge. KM can be used to design and develop domain-independent systems, according to Applegate et al. (1987). Additionally, according to Singh et al. (2003), KM procedures can be connected with the corporate system.

I agree that nowadays , the knowledge management is making any marketing decisions . The knowledge is very important so we should find a method to deal with it. Everybody realizes the importance of KM. It contribute the advantages of any corporation. KM together with data mining will help marketers to get more information and take marketing decisions in a systematic way . KM can used for implementing domain-independent systems.

7.4 FACTOR 3 (DATA AVAILABLE TO BUSINESSES/DATABASE MARKETING)

Marketers create customer profiles using the data they have access to in order to identify targets. The marketing process will be made better with the aid of this data. For mass-market operations, database marketing is used. Database marketing, according to Gogan (1996), helps advertisers to spot trends in consumer behaviour and preferences across finer groups. It improves the marketing campaign's accuracy. Additionally, according to Davis (1997), data helps to strengthen consumer relationships, which in turn strengthens marketing choices.

Data available to business and database marketing is one of the most important factors that can affect the marketing decisions in a positive way. I think the data is the base of the marketing decisions. Marketers use data to targets and then make customers profiles. Also this kind of data can be used to identify patterns in customer behavior and preferences within finer segments. Old data and statistics can be used to make appropriate decision. Customer relationship can be maintained by using available data of customers

7.5 FACTOR 4 (CUSTOMER RELATIONSHIP MANAGEMENT)

The idea of customer relationship management is to systematise the long-term management of connections with customers. CRM may aid businesses in improving their performance across the board. It facilitates their marketing activities.

The best customer profiles for a given product are provided, assisting marketers in choosing the appropriate target market. Additionally, it maximises the way that various departments within the company may share client information. In order to supply the most valued clients with additional services and to boost their pleasure so that we can maintain our good relationship with them, CRM may also help to increase profit. Due to this, it is crucial that marketers pay close attention to the CRM in order for it to be of assistance to them.

CRM has became an important success factor for most of enterprises. For that reason , most of the organizations have given a special attention to the CRM and turn to CRM software to help them to manage their customer relationship in a systematic way. CRM tools can be used to analyze purchase behavior of customers. There are many CRM software in the market that can help organizations in that matter. For that reason tools should be evaluated before using the right one for the organization.

Customer relationship management (CRM) is, in my opinion, among the most important elements that influence marketing choices favourably. Long-term customer relationship management can assist marketers in choosing the correct target and making more accurate selections. Additionally, it aids in keeping track of the most valuable clients' most recent interests and contacts. I concur that CRM needs to be integrated into IT for greater accuracy. Having more tools available to aid in customer relationship management is beneficial [10]. By measuring and analysing client satisfaction, these tools help enhance the process.

VIII.   IMPORTANCE OF MODEL/RESEARCH OUTCOME

In particular, data mining and knowledge management characteristics are highlighted as significant factors that positively influence marketing decisions. This comprehension prompts me to consider a real-world instance where data mining tools and procedures were used to boost profit. I chose a product for which the vendors typically engage in extensive marketing and seek to increase the quantity of people who purchase that product. Credit cards were selected as the merchandise. In order to obtain their credit cards, credit card sellers typically strive to target the right people. To boost sales, they make a lot of phone calls and run several adverts in various media. By using the star schema design concepts, I assumed the credit cards sales has a fact table which is the credit cards sales table and four dimension tables which are time, location, employee and card type.

8.1 CREDIT CARD SALES COMPETITION

There are numerous credit card vendors offering a variety of interest rates. Due to this, credit card issuers and retailers compete with one another by offering a variety of cards with unique benefits in an effort to attract customers. It is challenging for the sellers because of the wide range of credit cards, the sellers, and the fierce competition amongst them.

Even the marketing for this product has become challenging in order to reach their clients. Different credit card kinds should be addressed at various demographics. Special consumers should be able to choose from credit cards with excellent benefits. Due to the constraints that must be followed and the abundance of consumer data, neither a person nor a standard database programme can assist the sellers in making the proper decisions.

8.2 DATA MINING AND WAREHOUSING

A data warehouse should be established to enable the seller to apply data mining techniques in order to benefit from them and use them for credit card marketing and sales growth. The data warehouse repository should be populated with all the customer and credit card information from the merchants' standard databases and other sources.

In order to assist credit card merchants in using data mining techniques, I developed an architecture for the data warehouse. The Credit Card Sales are the focus of the Data Warehouse. It is based on data from credit cards and customers.

This data warehouse stores the historical and current information about customers and credit cards. Information Includes:

- Customer information.
- Credit card information.
- Location.
- Time
- Historical Information about employees who sold and did marketing for any credit cards

8.3 PROPOSED DESIGN
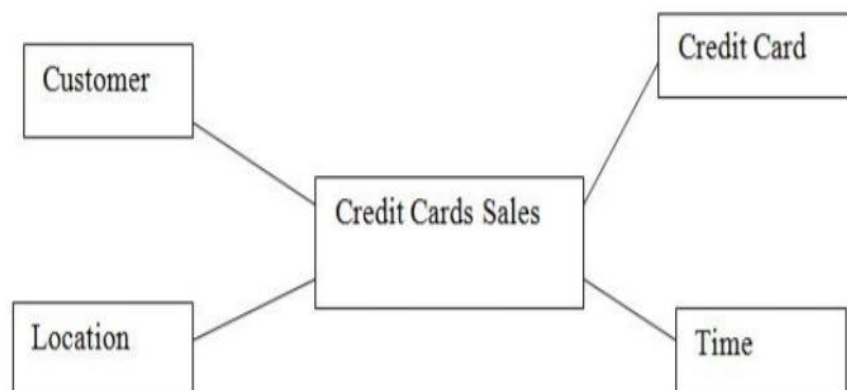
Fig. 1. Developed Star Schema for the proposed credit cards sales data warehouse

8.4 PROPOSED RESULTS

The credit card marketers will benefit from this suggested design by being able to make better choices and target the suitable clients. By utilising that design and applying data mining tools, marketers will be able to make better selections. For example:

- What credit cards are the most preferred by customers in general?
- What credit cards are the most preferred by customers in general in a specific location?
- What was the most requested credit card last month?
- What was the most accepted credit card offer by high income customers last year?
- What are the most used credit cards outside the USA?
- What credit cards are the most preferred by low income customers?

IX.   CONCLUSION

The use of knowledge management and data mining techniques and technologies has grown in importance for the support of marketing decisions due to the increase in data from a large number of daily buy transactions conducted by a large number of customers.

In order to create far better marketing selections, it can assist marketers in learning more about consumer behaviour and concealed buying trends.

The created design demonstrated that the profit might be increased by using data mining tools and processes. Sellers of credit cards frequently engage in marketing in an effort to draw in more customers. In order to obtain their credit cards, they typically aim to target the right people. To boost sales, they make a lot of phone calls and run several adverts in various media. The suggested findings demonstrated that marketers can obtain more accurate responses to several crucial questions, assisting them in choosing the proper target market for their advertising campaigns.

X.   REFERENCES

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