International Journal of Multidisciplinary Approach Research and Science
E-ISSN 2987-226X P-ISSN 2988-0076
Volume 1 Issue 03, September 2023, Pp. 266-276
DOI: https://doi.org/10.59653/ijmars.v1i03.103

Campaign Management System with Big Data Analytics in Marketing Products through Digital Channel

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Received: 15-07-2023 *Reviewed: 20-07-2023* *Accepted: 30-07-2023*

Abstract

Data is the new gold in the industrial revolution era 4.0, with the development of internet-based technology, big data, blockchain etc. a lot of data is created from this process, as well as in the banking world a lot of data is created from transactions made by customers and demographic data created when customers opening banking products, this can help companies understand client desires in meeting their financial needs, big data is the right tool for processing large data within companies and can help companies make decisions, one of the company's obstacles is in marketing their products to customers during the Covid 19 pandemic, the disconnection of interaction with customers directly affected company sales, especially banking, the infrequency of customers coming to branches resulted in difficulties for marketing companies and explaining products to sell to customers. With a campaign management system that can transmit to customers via digital channels such as WhatsApp, email and SMS and supported by big data technology, it will help companies sell products without having to interact directly, this can increase company profits and can help customers in their financial needs.

Keywords: Campaign, Big Data, Webservers, Banking, Customers

Introduction

2019 was a tough year for companies to market their products, the covid 19 pandemic forced companies to think hard to market their products effectively and efficiently, and not many companies went out of business because they could not compete with their rivals because they could not market their product well. According to (Nurcahyo, 2018), promotions carried out by companies have also changed, where many companies have switched from promotions through print and electronic media to promotions through social media with the help of internet networks. Social media such as Facebook, Twitter, YouTube etc. Social media has become a platform that customers often use when spending time online. So social media is the right tool

for marketing products when the Covid 19 pandemic hit the world, especially Indonesia. In promoting products to customers, there are still many companies that still use manual processes using Ms. Excel to process customer data that is suitable for offering their products, and then market it through digital channels such as sms, email and WhatsApp.

In the process of making and sending this promotion the system is not integrated with one another which makes this process very slow in SLA and makes this process very error prone because a lot of processes are done manually (human interaction). Currently there are also very many requests related to product offerings to customers, the more products that are made in a company, the more promotions that will be offered to customers, so the slow process will hamper the existing process and will reduce the value of the effectiveness of customer needs, nowadays it is very difficult to sell products that suit customer needs, and the needs of each customer are different, this makes it difficult for companies to market their products, with advanced technological developments, computerized support is needed to create systems for marketing a product through digital channels, so with that the authors are very interested in developing this system to help companies market their products with the help of computers that are mutually integrated with other systems that can facilitate the promotion process within the company.

Literature Review

Campaign

According to the Graphic Glossary, a campaign can be defined as a series of advertisements and relates to a design effort to display and introduce a sale or service idea on a regular basis. Social issue campaigns are not political campaigns, demonstration campaigns and not product or service promotion campaigns. A promotional activity, communication or series of planned messages that are specifically specific or to solve critical problems, can be commercial issues, can also be non-commercial issues, such as social, cultural, political, environmental/ecological issues. This series of activities is planned and carried out continuously in a certain and short time, not more than one year through a central theme in a coordinated and convergent media program. Messages are delivered individually and cumulatively with the main intention of supporting campaign objects such as brands, social issues, politics and so on(Guan & Wang, 2022; Lee et al., 2023).

Websites and Webservers

The website is a popular information delivery medium today. The website presents information using HTML so that it can display information in various data formats such as text, images and even video and can be accessed using various client applications. Besides being known to be simple and easy, the existence of server side programming technology on the web allows the presentation to be obtained by computer users connected to the internet. The Web was originally more interesting and dynamic information with organized management(Chen et al., 2020; Fernández-Arruti et al., 2023; Li, 2022; Oussous et al., 2018; Yaqoob et al., 2019).The World Wide Web (WWW) is known as the web which is a service that is an information space on the internet, using hypertext technology, users are guided to find

information by using links provided in web documents displayed in a web browser. Now the internet is synonymous with the web, because of the popularity of the web as an interface standard for services on the internet, from the beginning as an information provider, it is now also used for communication from email to chat, and also in conducting business transactions (commerce). The web makes it easy for computer users to interact with other internet actors and browse information on the internet. Web server is a computer program that has the responsibility or task of receiving HTTP requests from clients, known as web browsers, and serving them by providing HTTP responses in the form of data content, usually in the form of web pages consisting of HTML documents, and related objects such as pictures and others (Contessoto et al., 2021; Kaur & Kaur, 2020).

Database and Big Data

A database is a structure that is generally categorized in 2 ways: A flat database and a relational database. Relational databases are preferred because they make more sense than flat databases. MySQL is a relational database (Cantú et al., 2021; Contessoto et al., 2021; Fazekas et al., 2022; Kristanto & Sholik, 2022). Big data is data that exceeds the processing capacity of the existing database system. The data is too big and too fast or does not match the existing database architectural structure, so to get value from the data, one has to choose an alternative way to process it (P.G, 2018). (Attaran et al., 2018; Chaurasia et al., 2018; Dinh et al., 2020) coined the term Big Data Analytics (BDA), which is related to business & analytics (BI & A), where most of the technology involves data mining and statistical analysis. Recent literature shows that there is a lot of room for further BDA research(Abdel Sabour & Al-Waeli, 2023; Ali et al., 2020; Aziz & Long, 2023; Dicuonzo et al., 2019; Giebe & Menrad, 2023).

Research Method

The research method is a scientific method that is used to obtain data that can later be analyzed for specific purposes and determine solutions to the problems being examined, in this paper the authors carry out the following research methods to find the problems encountered to find solutions or solutions to find the best solution.

Data Collection

1. Observation Method, In carrying out this observation method, the author directly involved in processing promotions carried out at one of the banks in Indonesia, the authors carry out all the processes that must be carried out to carry out promotions at the bank to bank customers, this is necessary so that the author can collect specific and complete data to analyzed so that it can be optimized into a computerized process.
2. Interview Method, In conducting research, the author also spoke with the company's stakeholders to confirm the process and ask for inputs that could facilitate implementation in accordance with the provisions in the company so that this process could run optimally.
3. Literature Study Method, The author collects several references related to promotion with digital channels so that the author can get a point of view from existing journals or other writings.

System Analysis and Design

The analytical method used is SWOT analysis, in this analysis several points are considered namely Strengths, Weaknesses, Opportunities and Threats so that we can understand what we need in system design.

Table 1. SWOT Analysis

Strenght	**Weakness**
• The company has many products that can be offered to customers. • Adequate Human Resources to carry out computerized processes. • Having adequate infrastructure.	• The process is still using standard tools (MS Excel). • Length of data processing. • Processes are not integrated with one another. • The process of uploading data to be sent to digital vendors does not use the SOA method.
Opportunity	**Threat**
• Having potential customers to offer existing products. • The company supports technology development in this field.	• Changes in other companies' strategies in marketing the product. • The rapid development of technology causes us to be late in adopting it.

After the authors identify existing problems using SWOT analysis, then the authors will conduct an analysis to find strategies using the SWOT matrix, this SWOT matrix can clearly describe how the external opportunities and threats faced by the company and can be adjusted to the strengths and weaknesses it has. This SWOT matrix can produce 4 (four) possible alternative strategies, namely S-O (Strengths-Opportunities), W-O (Weaknesses-Opportunities), S-T (Strengths-Threats) and W-T (Weaknesses-Threats) strategies.

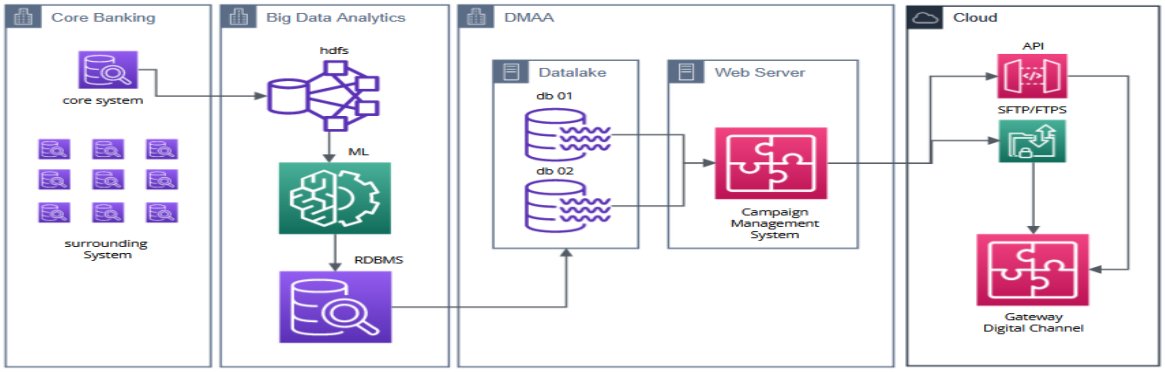
Table 2. SWOT Matrix

Internal-External	**Strenght**	**Weakness**
Opportunity	Utilizing existing infrastructure and human resources in increasing revenue in product sales and improving process performance into an integrated system.	Developing processes that are currently running into processes in a computerized and integrated system that can help companies to sell their products.
Threat	Developing systems that are integrated and supported by big data analytics that can accurately recommend customer needs so that they can compete with other companies	Create systems that are mutually integrated with other systems so that they can compete with other companies that have developed technology first and can compete with other companies

	in marketing products using digital channels.	in marketing their products through digital channels.

CHARACTERISTICS OF CHANGES IN THE GLOBAL BUSINESS ENVIRONMENT ANDIMPLICATIONS FOR BUSINESS EDUCATION

The campaign management system and bigdata analytics are the right solutions to improve the current system processes in the company, especially the campaign management team, in 2018 implemented Big data analytics using Cloudera as the bigdata platform in the company, this is the first step in digitizing the existing processes in the campaign management team, big data as it is known has the ability to process large data which is used to process data models to generate leads that are in accordance with the programs offered which of course suit customer needs, regardless of big data as the lead data model the main problem in the campaign management team is the process that is currently running which is done manually, this is what makes the process that occurs in the campaign management team inefficient, so the author will focus on discussing the campaign management system which will be integrated with bigdata analytics. The author describes the topology that exists in the company which explains the flow of data that goes down from corebanking and then down to bigdata and is analyzed using modeling which is then made into a datamart which will be used by the campaign management system to generate leads that match the products that will be offered to the company's customers.



Picture 1. Data Processing

Bigdata Processing

In big data, the processes running in the company still use the Supervised learning method, which is basically the algorithm is trained manually to find the most suitable function, this is necessary because each program offered has different targets, so a supervised learning method is needed in carrying out the modeling process by company data scientists, algorithms need data to be trained so that the system can learn the patterns analyzed, in the modeling process usually use regression models, classification, K-Mean, Native Bayes, Decision Tree, depending on the results of the accuracy in each model, and for the tools used is Jupyter

Notebook using python language. These tools are a favorite of data scientists because there are already available libraries that can be used immediately such as hard, TensorFlow, Scikit-learn, SciPy and many more according to the required analysis needs.

Picture 2. Bigdata Interface

In this picture the author wants to explain that data scientists will assist in the process of preparing data modeling that will be used as a datamart in the form of a rating for each suitable customer offered in the form of a rating of 1 – 10, this rating is made based on the parameters that have been determined according to the product to be offered, in Figure 3.3 is a sample datamart produced by data scientists according to the program created and will be stored in the datamart which will then be used by the campaign management system as leads, in reading ratings 1-10 it can be assumed that customers with a rating of 10-8 will potentially take The product that will be offered is based on the history of transactions made and other supporting data.

Table 3. Sample Rating Modeling

CIF	Customer	PROGRAM 1	PROGRAM 2	PROGRAM 3	PROGRAM 4	PROGRAM 5
NSB0000001	Customer Name 1	5	1	7	8	10
NSB0000002	Customer Name 2	3	6	3	3	3
NSB0000003	Customer Name 3	5	6	3	3	3
NSB0000004	Customer Name 4	6	6	4	4	4
NSB0000005	Customer Name 5	6	6	3	4	8
NSB0000006	Customer Name 6	6	9	3	8	8
NSB0000007	Customer Name 7	3	9	8	8	3
NSB0000008	Customer Name 8	3	9	8	8	10
NSB0000009	Customer Name 9	3	8	8	7	10

Campaign Management System Processing

The campaign management system is a solution to the problems faced, based on the results of the analysis that has been carried out by the author of the processes that are running in the company, it can be seen that some of the problems faced, which include:

1. The process of processing data related to leads made to select customers who have the potential to buy the product is still done manually using standard tools (Ms.Excel), this takes a lot of time when processing customer data.

2. The process of sending to 3rd parties (vendors) is also still done manually by uploading files (Ms.excel) on the portal prepared by 3rd parties (vendors).
3. In the process of receiving campaign requests, it is still done manually using a form in the form of .pdf which will be sent via email which will be signed using a digital signature to the relevant superiors.

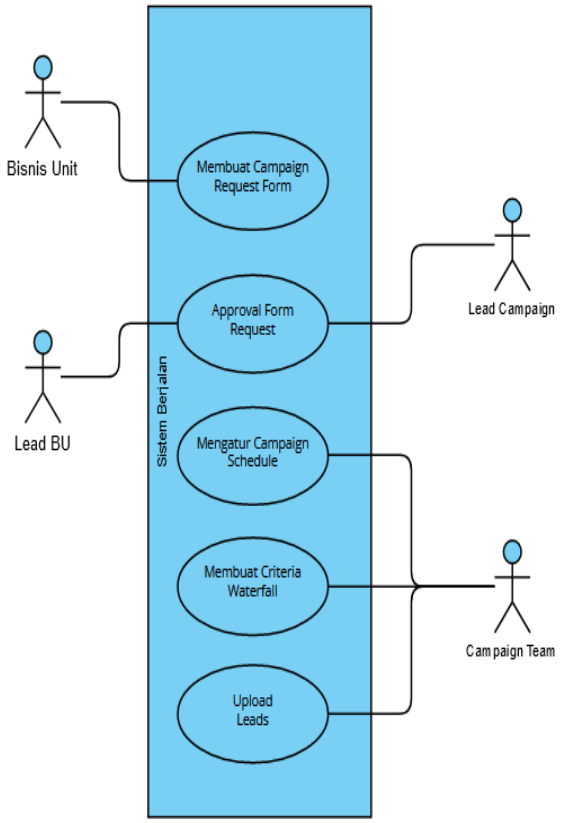
From the problems faced, the authors provide alternative solutions to problems faced which can help companies in facilitating processes that have been running including the following:

1. The need for a separate process using big data analytics in processing leads that will be used so that the customers offered are right on target because the modeling process has been carried out, and the resulting leads will be stored in a datamart in the RDBMS which will be ready to be used by the campaign management system.
2. A system that can be integrated in realtime or bulk is needed which can be sent to 3rd parties (vendors) using SOA (webservice) or ftp bulkfiles, so that users do not need to access web portals owned by 3rd parties (vendors) to send promotions via digital channels.
3. It is necessary to create a campaign management system as a platform to receive campaign requests and create web-based criteria that can be used by the campaign team to become an integrated work system.

Running System:

Use case diagrams, Based on the picture 3. Use Case Diagram can be described:

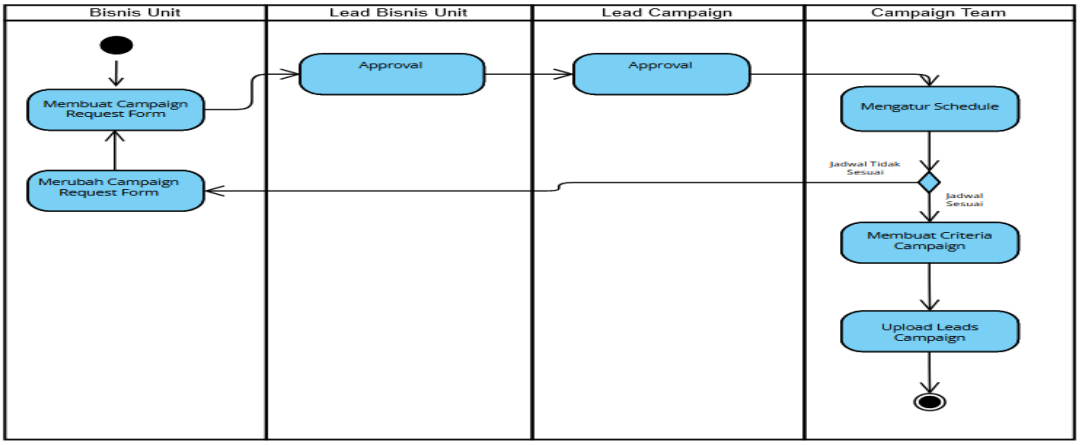
1. There are 4 actors: Business Unit, Lead Business Unit, Campaign Team and Lead Campaign Team
2. There are 5 use cases carried out by 4 actors.



Picture 3. Use Case Diagram

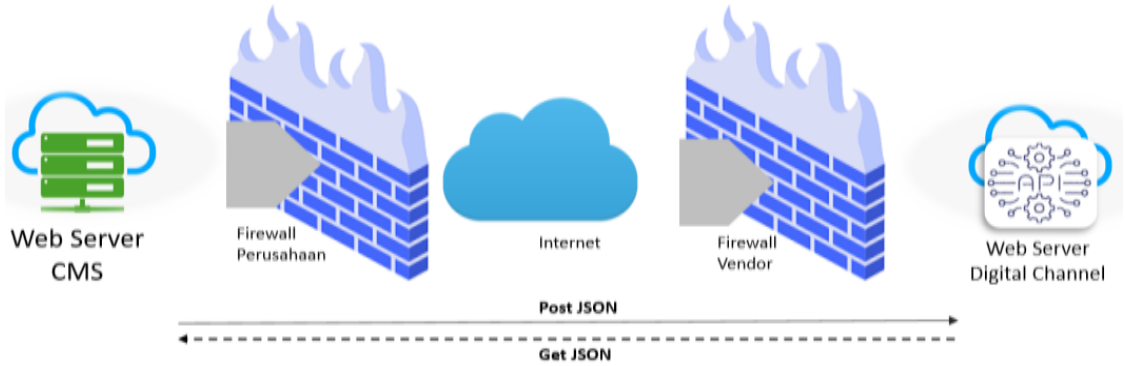
Activity Diagram

Based on the picture above it can be described: There are 4 actors: Business Unit, Lead Business Unit, Campaign Team and Lead Campaign Team. There are 7 activities carried out by 4 actors. There is 1 Decision made by the Campaign Team. There is 1 decision made by the Lead BU. There is 1 Decision made by the Lead Campaign.



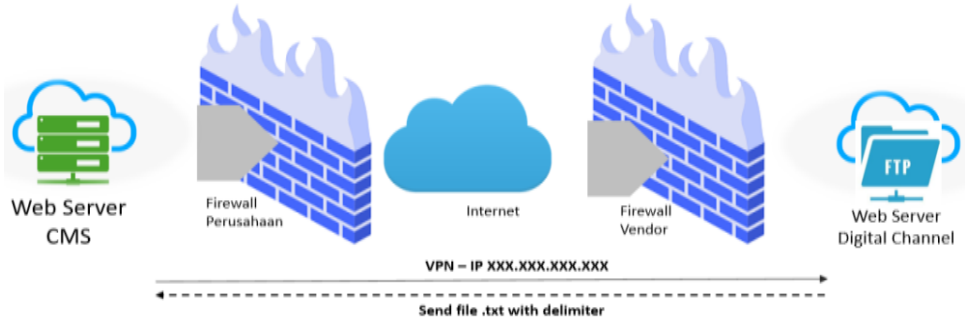
Picture 4. Activity Diagram

In the explanation above, the campaign management system will assist the campaign team in receiving requests from business units and will record delivery schedules into the system. Using the campaign management system, no programming skills are required to produce quality campaigns. Simply input the desired parameters in campaign management. system that is integrated with big data analytics, the campaign team can send promotions through digital channels. In sending promotions will be carried out automatically after the campaign team enters the schedule and criteria desired by the business unit, after that the campaign management system will automatically send to digital channels via API or bulkfile FTP to company digital channel vendors as needed.



Picture 5. Topology JSON

Delivery via the API uses the JSON format, JSON is a data exchange format that is very light and easier for humans to read and write, making it easy for computers to translate and create, in general all modern programming languages support data structures [3], therefore JSON can be said to be able to perform multiplatform communication.



Picture 6. Topology FTP Transfer

File Transfer Protocol (FTP) is still the favorite media used to transfer files over the internet, especially large files, as well as in campaign management systems, if the records requested by a business unit are larger than 5,000 records, the process sending will use FTP file transfer, this is indeed done to save server processing capacity, because using fire will take up a large server capacity but can send quickly.

Summary

Based on the research conducted by the author, the author can see some of the obstacles companies face in marketing their products through digital channels which are grouped into the points below:

1. The process that is currently running is still done manually which takes a lot of time, especially in preparing customer data that is in accordance with the target product you want to promote, and this process is prone to errors because it is wrong in the lookup or filter because it still uses standard tools such as ms .excel.
2. The processes carried out are not integrated with each other, especially in preparing data, storing promotions request schedules to customers and sending data that must be uploaded through the digital channel vendor portal (sms, email & whatsapp).
3. In receiving requests from business units related to promotional needs and schedules, the customer still uses paper (hardcopy) and has the potential to lose documents and forget them in the promotional delivery schedule that has been set.

Conclusion

The author has conveyed the conclusions from the research conducted, the author will also provide advice to companies so that this research can be useful and implemented within the company so that it can run well, the author will provide in the points below:

1. The need for Bigdata analytics in generating leads periodically using analytics tools such as Jupyter Notebook (Python) so that it can be run according to the schedule according to the results of the analysis carried out to get customers who match the products offered.

2. A web-based system must be created that can be used to communicate with digital channel vendors by using SOA (Webservice) if a realtime campaign is needed or ftp bulkfile if a broadcast campaign is needed.
3. A system is needed that can accommodate requests from business units to record all needs such as customer criteria that you want to target and the desired schedule in accordance with a predetermined campaign period.

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