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Consumer Life Cycle and Profiling: A Data Mining Perspective

Kushnazarov Farruh

Abstract

With the development of technology and continuously increasing of the market demand, the concept to produce better merchandises is generated in the companies. Each customer wants an individual approach or exclusive product, which creates the concept: "one customer one product." The implementation of the one-to-one approach in the current days is the main exciting task of companies. Millions of customers lead to millions of exclusive products from the manufactures' views. It is the primary step to study the needs of customers in the market economy. The main task for a company is to know the customer and to provide their desired products and services. In order to get knowledge ahead of the customers' wishes, a system of profiling potential customers is created accordingly. This chapter provides the review of the customer lifetime from the reach customer (claim future customer's attention) to the loyalty customer (turn a customer into a company advocate). During the discussion about the customer lifetime, readers will get acquainted with such technologies as funnel analysis, data management platform, customer profiling, customer behavior analysis, and others. The listed technologies in a complex will be created as the one-to-one product or service with a high *Return on Investment* (ROI).

Keywords: customer lifecycle, funnel analysis, data management platform, customer profiling, data mining, machine learning

1. Introduction

Net profits are the most natural and most intuitive metric to determine a *Return on Investment* (ROI). However, income alone does not make great customers nor do they offer insight into maximizing customer lifetime value. The following discussion in this chapter focus on modeling prediction systems which are oriented from learning the customers' need, by analyzing geographic, demographic, firmographic, behavioral, psychographic, and other types of data. These kinds of analysis include both side (the customer and the company) benefits. The reader will learn types of data which are available to collect during the customer lifecycle and the concept of customer analytics.

Forecasting customer needs and supporting him at each stage of a customer's life cycle entails a significant increase in ROI. We will discuss in the *Customer Lifecycle* section what is it and what it includes from company view and connects with *Customer Relationship Management* (CRM). Customer lifecycle with CRM can manage a company with customers. CRM cannot adequately manage customers without data analysis of integration and automation sales, marketing or services without the help of CRM to grow ROI.

In an age of data, everyday users produce a big amount of data, and *Data Management Platform* (DMP) helps to manage all of the data related to customer lifecycle, which will be discussed in the related section. The base of DMP is called as a *DataBase* (DB) system, and we will discuss it on the section *Design of DB*—from company's IT view, it is DB system. DB oriented structured and unstructured data can be observed in the section of *Design of DB*. Nowadays, the most exited data type is the unstructured data, and this area is not thoroughly researched nor are all of the benefits found.

It is discussed in the section *Customer Analytics* the analytic model of the classified customer to find a similar customer to offer that what customer need. This section brings a vital moment when data are changed to information and information is transferred to knowledge. The petabytes of data related to the user without transformation are useless.
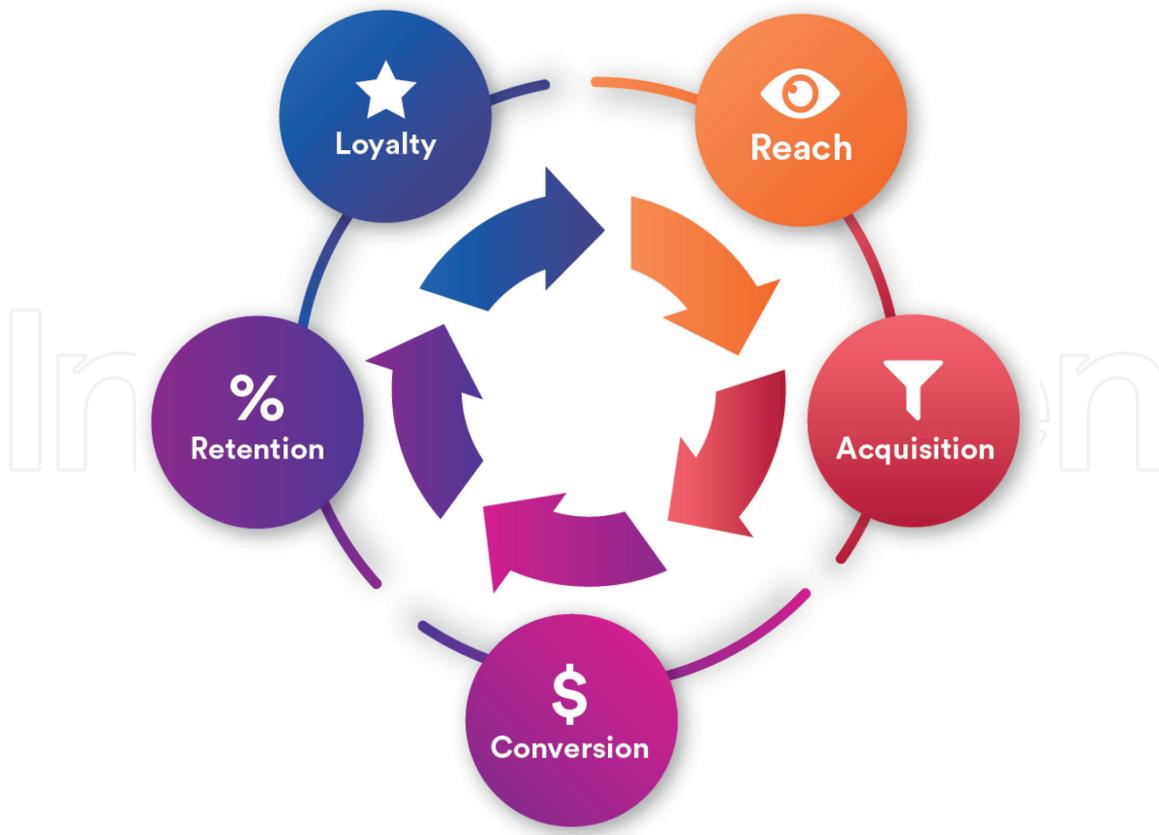
2. Customer lifecycle

The customer lifecycle describes the points in the continuum where [1] explains (**Figure 1**):

1. Reach—claim future customer's attention;

2. Acquisition—bring them into a sphere of influence;

3. Conversion—turn them into a registered instead paying customer;

4. Retention—keep them as a customer

5. Loyalty/advocacy—turn them into a company advocate.

A customer's life cycle includes a comprehensive study of the customer's path, from the first contact to customer CRM, targeting a specific campaign, channel, or indicator. Instead of focusing on individual indicators, it is necessary to use the "always on" method to view the entire customer path on all possible physical devices and communication channels, as well as optimize message exchange to coordinate with different points of contact in this path. Since the customer's life cycle works on different platforms, it is essential that different teams work with different aspects and exchange information instantly, and all teams go in the same direction when applying the customer's life cycle strategy [2].

CRM is a tool to manage a company's cooperation with the current and the potential customers. The business relationships with customers can be improved by using data analysis with customers' data and focusing on the customer retention and the growth of the sales can also be reached ultimately [3]. The goal of CRM systems is to integrate and automate the sales, marketing, and customer support in the whole lifecycle stages. In the most cases, the CRM system has a dashboard, giving an overview of the functions listed in one customer view, on an individual page for each customer of the company. The dashboard provides information such as the sales history, marketing companies relating to this customer. Moreover, it summarizes the whole relationships between the customer and the company. The operating CRM includes three main functions: sales automation, marketing automation, and service automation.

Salesforce automation requires CPM at all stages, from the reach or first contact with a customer to the conversion into a loyalty customer [4]. It implements

Figure 1.
Customer life cycle.

sales promotion analysis, automates the tracking of the customer history (not only purchases but also actions) to motivate new purchases, and coordinates sales, marketing, call centers, and shops (online and offline). This function prevents the duplication of actions between sales teams and clients. Besides, all communication channels between both parties are automatically monitored and are automatically selected as the most convenient communication channel to the customer.

Marketing automation focuses on improving the entire marketing process, with the goal of increasing efficiency and making it interactive at the same time. This function reaches automate repetitive and routine tasks, such as sending marketing letters to customers at a specific time or posting marketing information on the social networks. The goal of marketing automation is to turn a potential customer into a retention (full-fledged) customer. CRM systems today are also used to attract customers through social networks and other nontraditional communication channels.

Service automation focuses on automating customer clearing and implements the following services: customer support services on the multichannel (telephone, email, social networks, and chat rooms of the knowledge base, ticket sales portals, frequently asked questions, chatbots[1], and much more).

The CRM system collects data from all possible communication channels, such as the company's website, telephone, e-mail, various messengers,[2] campaign marketing materials, social networks [5], and others. The CRM system is used to facilitate the work of the enterprise, while the enterprise recognizes their clients from all sides and creates their target audiences. After defined target audience with the help of CPM, it

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[1] Chat bot (also known as smart bots, chatbot, bot, chat chat, interactive agent, conversation interface (The artificial spoken object) (this is a computer program or an artificial intelligence using hearing or text methods.

[2] Messengers—app for messages and voice calls, documents, and user location.

needs to learn how to meet the needs of a specific audience in the best way. A specific audience can be interpreted as a group of people with the same behaviors and needs to be created by machine learning algorithms.

Traffic analysis [6] is the process of intercepting and examining data in order to deduce information from patterns in a customer profile [7]. In general, the higher the number of traffic units observed and stored, the more information can be obtained from the detailed customer's profile and habits. Traffic analysis can be performed in the context of artificial intelligence, counter-intelligence, or pattern-of-life analysis.

CRM systems contain:

- DMP technology with the purpose to aggregate all information related to customers and to merge the information about products. These data will be the key performance indicators. Hence it is recommended to use NoSQL DB (4.1).

- Opportunity management helps the enterprise to manage unpredictable growth and demand, using a forecasting model with sales history data to predict sales [8].

- System for tracking and measuring marketing campaigns over multiple channels and networks and collect customer clicks and sales for further customer analysis.

- To reach mobility of CRM using SaaS (Software as a Service). This means data and the functionality of CRM will be available through Internet and can be accessed by any devices (including the embedded devices). CRM as SaaS is much convenient to be used instead of using CRM on one local network or the local computer. SaaS cannot be purchased but it is available by typically paying a recurring subscription fee to the software vendor, and by using CRM, there is no need for any big investment at the beginning.

- A basic CRM system includes a contact management system that integrates emails, messengers, documents, jobs, faxes, and scheduling for individual accounts. CRM system is available for all types of markets (finance, accounting, legal, IT, and others).

- E-commerce takes the full advantage of the CRM system, by focusing on automation marketing, sales force, and service process. Like cart rescue, re-engage users throw communication channels (email, social media, messengers, and others), rationalization, or special offers.

- Customer-centric relationship management is a new sub-discipline focusing on the customer preferences instead of the customer leverage, and the main goal is to add values by engaging customers in the individual ways and in the interactive relationships ways [9].

- Membership-based system (based on the nonprofit organizations) aims to collect membership levels, volunteering, and communication with individuals, sponsors' demographics, constituents, fundraising, and membership directories.

2.1 Compare CRM platforms

The observation of CRM by customer experience continues to be at the top of the executive agenda by the different institutions. The Gartner's CEO, CIO, CMO, and

other executive surveys are of one popular observation of CRM. The majority of participants use the external service providers to help them with their initiative, program or project. Gartner [10] identifies the market for CRM and *Customer eXperience* (CX) implementation services as the project services to support enterprises to create a CX strategy and to design, build, integrate, and deploy process and technology changes that improve the interaction between enterprises and their customers.

CRM and CX projects are aimed at achieving goals through sales, marketing, customer service, local service, digital commerce leaders, and digital company executives. These goals may include increasing the customer satisfaction, attracting new customers, retaining the existing customers, creating a unified customer view, cross-selling customers, increasing the frequency of campaign responses, increasing the use of digital channels, increasing customer protection or recommendations, and price increasing account [10].

Gartner assesses suppliers on two criteria: the completeness of vision [11] and the ability to perform. Using a methodology that Gartner does not disclose, these component estimates lead to the seller's position in one of the four quadrants (**Figure 2**):

- **Leaders**—CRM suppliers in the leaders quadrant have total high points for their versatility, vision completeness, and ability to perform the assigned tasks. These suppliers have the greatest prestige, and marketing and sales capabilities necessary for adopting new technologies, while they demonstrate a clear understanding of the market needs, are innovators and ideological leaders. Also, there are formulated plans which can be used by the customers and potential customers while developing infrastructure and strategies. Another criterion of leaders is to have representatives in all continents of the world. Last but not least, suppliers should have the stable financial performance and the broad platform support.

- **Challengers**—a vendors in the Challenger quadrant is involved in the market and works well enough to pose a serious threat to sellers in the leadership quadrant. They have strong products, as well as a fairly reliable market position and resources to maintain the steady growth. They are financially secure, but not sufficiently developed and expanded as the vendors in the quadrant of leaders.

- **Visionaries**—vendors are innovators; the products are presented to them on a large scale. It is important for the end user relative to exploitation or finance and not yet demonstrated the ability to capture market share or sustainable profitability. Visionary vendors are private companies, and in most cases, big enterprises want to buy them. When a vendor visionaries are bought by enterprises, the risks associated with installing their systems will decrease accordingly.

- **Niche players**—vendors in the niche player sector are often narrowly specialized for a specific market or vertical segments. This sector may also include suppliers who are adapting their existing products to enter the market in question or larger suppliers who have difficulty in developing and implementing their vision.

2.2 DMP

DMP is used to collect and manage companies and customer data. Digital marketing is the main purpose of using DMP [12]. Because of the massive amount of data the analytical tasks like segmentation, prediction and creating customer profile impossible to reachable without DMP all levels of the customer lifecycle.

Figure 2.
Magic quadrant for CRM and Customer Experience Implementation Services, Worldwide (2018).

For example, DMP's customer segment targets on the online advertising campaigns. DMP uses big data and artificial intelligence algorithms to process large sets of user data from the various sources.

DMPs are used in the following tasks:

1. Data collection—collects data from the multisources. Data sources from the different parts, usually it is called as the first-, second-, and third-party data.
   The first-party data are the data which are generated inside the company data, the second-party data are generated by partnership agreements with other companies or together with partner companies, and the third-party data are the part of data which are bought from data markets customer and product-related data gathering:

   • Offline sources (e.g., CRM systems and surveys);

   • Online sources—mobile and desktop devices (e.g., the mobile applications, online campaigns, the landing pages, websites, social networks, and instant messengers).

2. Integration—it needs to integrate all data collected from the multisources to create a customer profile. This process is called as "Integration." With machine

learning algorithms, integration leads to a decent result. During integration, DMP creator should be careful on the points such as the data security, the data quality, and the data trustability.

3. Data management—the collected and integrated data should be transferred to a readable and understandable view or transform to the mode of "information." The machine learning and deep learning algorithms are the mostly used tools to [6] create the individual customer segments and customer profiles.

4. Activation—the managed data will be used by a different team in an enterprise to implement it on the market. With the help of using NoSQL D, it does not spend more than a half an hour time to finish steps from data collection to activation. The data stored and organized on the DMP platforms are used to target the selected audience groups by all possible channels.

2.3 Design of DB

The data related to a customer should be saved in somewhere, and that place is called as the DB system. So a DB is a core of custom profile and CRM systems. The structure of the DB will be saved for the whole time during the company existence. The structure of the DB should be taken into account the future development and enlargement of the company for at least 10–20 years. For example, if a company plans to open the future branch office in other places, this condition should be taken into account when creates a DB. Otherwise, it will bring huge money losses for the company in the future, especially when DB with a different structure while transferring data from one DB to another DB.

A DB should include the perspective of:

- Business intelligence: includes strategies, technologies, and information systems aiming to improve decision-making based on the past performance using reporting, OLAP, dashboards, balanced scorecard, scoreboards, data visualization, data storytelling, and others.

- Data analytics: includes strategies, technologies, and information systems aiming to identify patterns and predict trends and behaviors with the help of data mining, text mining, machine learning, deep learning, cognitive systems, and others.

- Big data includes strategies, technologies, and information systems aiming to capture, process, store, analyze, and visualize complex data sets using batch processing, streaming processing, NoSQL, HPC, MPP, In-Memory, and others.

- Data management: includes strategies, technologies, and information systems aiming to provide information management capabilities with the methods of data governance, data quality, master data management, and others.

- Data brokerage: includes strategies, technologies, and information systems aiming to create data marketplaces for raw data or insights.

In twenty-first century, most company's challenge is to decide to choose *Structured Query Language* (SQL)- or *Not Only SQL* (NoSQL)-oriented DB. SQL is a structured DB, and functions like the yellow pages in which the company name,

address, phone, and short information about it are stored. NoSQL DB includes the structured data; it can be document-oriented or distributed, for example, it works as the file folders that hold everything related to a customer such as the personal information in a text format, the picture of the customer, the transactions of a customer, the social network (Facebook and Instagram) accounts ID, and the shopping preferences.

The core of SQL DB is developed by IBM in 1970, whose DB consists of several tables with columns and rows. Records were written in a column by the schema of rows, and types of data (name, phone number, age, and others) show the relationship between the tables and field types. In a SQL DB, the important part during the construction period is that the schema must be clearly defined and get into account all future updates and upgrades data [13].

An effective way for SQL DB is to store data in an organized database. The well-designed schema helps to omit or minimizes data redundancy and prevents tables from asynchrony, as a critical feature for business. Just imagine what will happen if the record financial transactions do not synchronize. For example, a customer bought a product using credit card, but in credit card app, this transaction is not shown. Non-well-designed DB schema can cause many headaches due to its rigidity. For example, the customer address is not included in the fields, but probably the company will have customers from different countries. Unfortunately, customers could not enter address information. Hence to solve this issue, we need to recreate the table.

SQL is a programming language used for DB, but nowadays kinds of literature get used to calling the DB that using SQL as the SQL DB or the type of DB which can be called as the relational DB; the architecture of DB is designed as the relational DB. Examples of SQL DB are MySQL, Sybase, Oracle, or IBM DM2, which executes queries, retrieves data, and edits data by updating, deleting, or creating new records. SQL is a lightweight declarative language that does the much heavy lifting for the relational DB, acting like a DB's version of a server-side script. One particular advantage of SQL is its simple-yet-powerful *JOIN* clause that gives the opportunity developers to retrieve the related data to store across the multiple tables with a single command.

The reason of popularity SQL DB is that it can fit naturally into many old software stacks. This DB is well understood and widely supported.

Popular SQL DB and RDBMS's

- MySQL—open-source DB, one of the favorite DB for CMS sites and blogs.

- Oracle RDBMS—an object-relational *DB Management System* (DBMS), mostly used for running online transaction processing, data warehousing. Oracle RDBMS can implement on a private and public cloud environment. The good part of Oracle is that it has SQL and NoSQL DB.

- IBM DB2—IBM product is built based on the SQL DB but which handle advanced "big data" analytics. IBM DB2 is a family of DB server products.

- MS SQL Server—developed by Microsoft. The primary query language used is Transact-SQL. Used to work with DB ranging in size from personal to large enterprise-wide DB; competes with other DBMS in this market segment Microsoft-developed RDBMS for enterprise-level DB that supports both SQL and NoSQL architectures.

- PostgreSQL—object-relational and open-source DBMS, an enterprise-level, can use SQL and procedural languages (Perl, Python).

If data requirements are not clear from the outset, or if a company is dealing with vast amounts of the unstructured data, the likely company cannot afford to develop a relational DB with a well-defined schema. In such cases, it has an excellent way to solve the problem, that is, to implement NoSQL DB, which is more flexible than SQL DB. The unstructured data can be the data from the Internet, sensor data, social networks data, personal settings, audio data, photos, location information, video data, online activity, utilization rates, etc. Those unstructured data can be stored in one document that can be easily modified, found, but without categorization as the SQL DB does.

Another essential advantage of NoSQL is the ease of access. SQL DB is closely related to applications written programming languages, but NoSQL DB can often solve this problem by using APIs that allow the developers to execute queries without having to learn SQL or understand the underlying architecture of their DB system.

Type of NoSQL DB:

- The key-value model is the least complicated NoSQL option where data are stored without a schema or consisting of the indexed keys and values. Examples: Cassandra, Azure, LevelDB, and Riak.

- Column storage—or storage with full columns that stores data tables in the form of columns, not rows. This is more than just an inverted table—column partitioning provides the excellent scalability and high performance. Examples: HBase, BigTable, and HyperTable.

- Document DB—similar as a key value and complicating the process, each data in each document in the type of DB have a unique key that is used to be obtained. A database of documents is an excellent option for storing, retrieving and managing document-oriented data. Document-oriented DB store and works with unstructured data, but still, data may somewhat structured. Examples: MongoDB and CouchDB.

- DB graphs—some data are interrelated and are the best represented as a graph. This method can be very complicated—examples: Polyglot and Neo4J.

Popular NoSQL DB:

- MongoDB—about the popular NoSQL system, is mostly used by startups. Document-oriented DB with JSON-like documents is used in a dynamic diagram instead of relational tables that are used on server sites, such as Craigslist, eBay, and Foursquare. It is open source, with the customer service.

- Apache CouchDB is a real DB for the Internet, it uses the JSON data exchange format to store its documents; JavaScript for indexing, merging, and converting documents; and HTTP for its API.

- HBase is an open source DB, an Apache project, and is developed as part of Hadoop, column repository, written in Java and provides the features similar to the BigTable.

- Oracle NoSQL—Oracle's entry into the NoSQL category.

- Apache Cassandra DB—Cassandra is a distributed DB created by Facebook, who does an excellent job in handling vast amounts of the structured and the

unstructured data. Cassandra is well able to be built up. Examples of platforms that implemented Cassandra are: Instagram, Comcast, Apple, and Spotify.

- Riak is an open source key-value DB. It has fault-tolerant replication and automatic data distribution, which provides the satisfied performance in most cases.

NoSQL DB gains its popularity for its speed and scalability; there are still situations where a highly structured SQL DB may be preferable. Therefore, big data are the real NoSQL motivator here, doing things that traditional relational DB cannot. It is driving the popularity of NoSQL DB.

Storage of large amounts of data, that unstructured data, required no restrictions on the types of data that should be stored together and are allowed to add various new types of possibilities reached by NoSQL DB, especially with the document-based DB, and store data in one place, without having to pre-determine what "types" of data they are.

Scaling NoSQL DB requires data to be easily distributed across the multiple servers. Using standardized (affordable and small) equipment in the place or the cloud eliminates the need for additional software, and NoSQL DB, such as Cassandra, is designed to scale across multiple data centers without further problems. Hence, cloud storage will be a great way to save money and time.

Rapid development, a development like Agile sprints, launching fast iterations, or the need for frequent updates of the data structure without much downtime between versions—the SQL DB will slow down the company's work while NoSQL data should not be prepared in advance.

3. Customer analytics

Customer analysis is the process where the customer behavior data are used to make critical business decisions through the market segmentation and the predictive analytics. Companies use this information for marketing, site selection, product upgrade, and customer relationship management. Marketing provides services to reach the satisfaction of a customer. Customer analysis uses data starting from the production or the service until the end of the cycle at the consumer, during that period, all possible technologies are used to include as more as possible data related to the customer and product or the service to reach the accurate prediction [6].

The worth situation is when the company or retailers have the limited visibility to their customers [14], to omit this need to implement analytics related to a customer, customer tracking and market research solutions with investment—customer analytics used in resolutions ranging from the product promotion, dynamic pricing of products, and distribution management. The primary users of customer analytics are retailers, by developing personalized communications and offer to customers, as well as various marketing programs for the segments [14]. Other benefits from customer analytics are: customizing prices with a special discount, prioritizing product development efforts, and developing a distribution strategy. Collecting and including data like behavior, loyalty, and demographic, lifestyle, preferences value, and predictive behavior data are a crucial point to bring benefits to both sides (customer and company), that is, increasing the accuracy of customer analytics.

Usually, in companies, it happens that customer data are not accurate or with mistakes, and it also happens because of a wrong structure DB or DB logic not following business logic. One of the errors of the DB structure is creating different customer ID for each customer lifecycle level; this will bring massive time-wasting

during customer analytics. DB for customer analytics should be simple and with zero delays to grab the data from a DB.

3.1 Predicting the customer behavior

Predicting the customer preferences and shopping habits is a process of collecting and analyzing data. This information consists of many aspects, such as demographic data, behavior data, location information, purchase goods, payment methods, subscriptions, the loyalty of the customer, surveys results, etc. With consumer, the most profitable customer's segment can be found in profiles. When a group of particular customer segment is increasing sharply, this indicates changes in business orientation and plan for next period buying or producing products. We need to get into account that data related to different activities and travelers will bring significant weight for prediction how much a customer will purchase during traveling or prepare for the event without the customer analysis it is impossible to plan and make decisions for further developing and the acquiring plan.

3.2 Knowledge discovery in DB (KDD)

KDD is the method of identifying models in big data sets involving methods at the crossing of machine learning, deep learning, statistics, and DB systems. KDD is an interdisciplinary subfield of computer science and statistics with an overall purpose to extract information with inventive methods from a data set and transform the information into an understandable structure for further use. KDD is used for predictive models using the similar customer interactions to predict future events, and segmentation methods are used to place customers with the similar behavior and attributes in separate groups. This group and prediction help marketers to optimize their campaign management, targeting processes, and predict the quantity of product.

Analyzing customer's data is the primary role in a CRM system after the information is collected from the multiple sources. In most cases, analytics after the created model or some correlation could not show the result in a marvel way, due to lucking of presenting results in business. After the displayed result of analytics, managers can make better decisions [6]. Analytical models could be correlation, segmentation, and pattern recognition methods to analyze the data. The analytics results improve services and targets to the related customers and products, identifying problems and weak part of services or products. For example, one online education company found an increasing weekly session on springtime, but after analyzing, it mostly defined student in a school and university take more class to prepare exams on spring. This result could be used to advertising an individual product on spring period and offer courses related to exam and update products.

3.3 Customer profiling defined

The definition of customer profiling is "a description or analysis of a typical or ideal customer for one's business" Harper Collins Publishers. Customer profiling is a marketing tool that businesses use to understand their customers and helps to make better business decisions [15]. Profiling results in customer profiles which describe customers based on a set of attributes.

Customer profiling helps to understand customers, highlighting who they are, what they look like, what their interests and wants are, etc. This insight recognizes the customer's characteristics and traits. Having a better understanding of customers helps the company to communicate with the target customers more effectively.

Analyzing transaction data can identify patterns and trends among customers by segmenting the needs from the profiled customers. As a result, the customer profile is not only based on demographic information but also takes into account the past behavior. Analyzing of a customer profile is by the product type, value, frequency, and patterns of spending. It provides a clear picture of most profitable customers by analyzing the different patterns of behavior or spending by customers. Next step after understanding the customers' type is to develop a strategy allocating the resource for each segment group and optimizing marketing budget and improving return on investment.

3.4 Customer profiling models

Profiling is typically reached by funnel groups and leak out customers according to similar features, providing a segment of customers. Collecting demographic, social, and behavioral data make it possible to classify and measure customer or potential customers according to the different social categories, habits, incomes, living standards, preference, age, wealth, and location. These features can be used in the segmentation and drain customers.

Behavioral classifications give the best result in the segmentation of customers because it is based on the customer's general behavior, likes, and interests. Behavioral classification provides a more in-depth and more reliable look at the customer base and what drives them and motivates them when making purchasing decisions. MOSAIC, ACORN, and Personicx are all well-known examples of the classifications of profiling behavior and hobbies, as well as demographic and social variables.

3.5 Customer segmentation

If customer segmentation powerful tool is used in all customer lifecycle, at least double increase in the sales can be reached. The advantage of customer segmentation is that they can be targeted at each customer segment using an individual approach, rather than one size suitable for all technologies, focusing on a specific segment facilitates communication with customers using a message related to them, and providing a more personalized approach with appropriate marketing communications.

The most common forms of customer segmentation are:

- Geographic segmentation: considered as the first step to the international marketing, followed by the demographic and psychographic segmentation.

- Demographic segmentation: based on variables such as age, sex, generation, religion, and occupation and education level.

- Firmographic: based on the features such as the company size (either regarding revenue or number of employees), industry sector or location (country and region).

- Behavioral segmentation: based on the knowledge of, attitude toward, usage rate, response, loyalty status, and readiness stage to a product.

- Psychographic segmentation: based on the study of activities, interests, and opinions (AIOs) of customers.

- Occasional segmentation: based on the analysis of occasions (such as being thirsty).

- Segmentation by benefits: based on RFM, CLV, and others.

- Cultural segmentation: based on the cultural origin.

- Multi-variable segmentation: based on the combination of several techniques.

Customer segmentation techniques are:

- Single discrete variable (CLV, RFM, and CHURN)

- Clustering: K-means, hierarchical

- Latent class analysis (LCA)

- Finite mixture modeling (e.g., Gaussian mixture modeling)

- Self-organizing maps

- Topological data analysis

- PCA

- Spectral embedding

- Locally-linear embedding (LLE)

- Hessian LLE

- Local tangent space alignment (LTSA)

- Random forests, decision trees

- Deep learning

The customer profiling enterprises can increase ROI rapidly and most effectively. Customer profile will help to find potential customers and effectively target customers. These prospects should have a higher propensity to accept the offer and, therefore, provide more cost-effective means of targeting new customers.

4. Conclusion

In conclusion, customer profiling and segmentation provide the tools to fully understand the customer base and increase customer engagement and potential target customers.

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