Big Data for Customer Relationship Management in Banks

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ABSTRACT

Customer Relationship Management is undergoing a paradigm shift from a single channel relationship (customer, organization relationship) to multiple channels of relationships (customer, organization and machines) where importance is given to integration and collaboration. Technological development in the field of ICT and widely use of smart mobile devices has resulted in the emergence of big data. These all changes have become the main drivers of this paradigm change. Large scale usage of pervasive computing abilities along with more usage of smart mobile devices in doing banking related activities has resulted in the growth in big data. This growth has motivated us to develop a model dealing with CRM strategies in mobile banking sector.

Keywords: Customer relationship management (CRM); Big data; Smart mobile devices; Mobile banking.

1.0 Introduction

In current data driven working environment, the marketing executives and sales representatives faces two major problems: one is the insufficiency of the data and other is data overloading. In this data-driven economy, data has become like a fuel which is must for the smooth functioning and development in banking sectors. In fact, banking and finance industries have long relied on data accuracy and reliability, whether it is census data, transaction data, research data, logistic data, public consumption data, and any data related to economic transactions that can stimulate innovation on new business opportunities, accelerate business transactions, and produce knowledge sharing. Data generated from the multiple sources have become a source of growth, and an important factor that will accelerate whole financial activities to improve innovation and competitiveness.

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So, one need to analyze and find out how customer relationship management (CRM) with the help of big data can help banks and its customers to gain better understanding of each other. This will bring a big transformation in managing customers and will also affect long-term bank-customer relationship. This study will help to provide a better understanding of banking system and the importance of CRM in banking sector. Also, it will highlight how in current situation CRM equipped with big data will bring big change in banking sector. Finally, it will also discuss the main challenges of deployment of Big data for CRM in Banks.

2.0 Literature Review

Big data is defined as a very huge volume of data that gets generated from different activities of customers and are analyzed with various technologies to identify some common trend or pattern of human development or anything related to the society.

Big data supports multiple type of analysis which gives more precise results and therefor helps to bring more accurate decision making and more efficient work. The data is growing quickly, it is expected that by end of 2020 there will be more than 16 zettabytes of useful data (16 Trillion GB), which implies growth of 23.6% per year from 2013 to 2020 (Turner et al., 2014). Big data is a new generation of managing strategies, technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data by enabling high- velocity capture, discovery, and analysis (Anshari and Alas 2015).

Whenever banks offer any new product or service, its success depends upon the customer satisfaction level towards that product or service. In the high intense competition, bank must consider its primary customers. Bank must produce such level of services and products for its customers so that customers will get attracted. (Khattak, 2010). Customer satisfaction is defined as a customers' feeling of pleasure or disappointment resulting from comparing a product's perceived performance or outcome in relation to their expectations (Kotler, 2000). For banking organizations, successful customer relationships influence the creation of brand equity, trust, customer satisfaction, relationship commitment, brand loyalty and brand awareness (Kim, et al. 2008). Customers' satisfaction can be considered as an integrated response to the evaluation of service or product delivery (Low, 2013). In other words, customer's fulfillment is central to business strategy (Czepiel *et al.,* 1974). Customer service must be viewed as an essential need for providing high quality banking and finance services, and for staying in the highly competitive business (Stanton, 2009).

2.1 Customer relationship management

Customer Relationship Management (CRM) is a strategy by utilizing ICT in attracting potential customers, retaining existing customer and extending new services to loyal customers (Anshari et.al, 2009). The main objective of businesses including in banking sector is to earn profits by providing products and services, developing competitive advantages, and satisfying customers and stakeholders through value (Almunawar and Anshari, 2012). The strategies should be laid down in such a way that they provide benefits to the organization as well as customers. The shorter cycle times, greater customer involvement in service development and reduction in operation costs by redesigning business processes that eliminates work that does not add value to customers (Chen et al., 2012). Therefore, CRM is critical components in managing long-term customer relationship.

CRM with Web 2.0 (Social CRM) features can be used to empower customers, allowing them to access their financial activities-related information, interact with customer services professionals, or even interact with other customers. This will open the opportunity to improve banking services to customers and at the same time help improving their knowledge on financial literacy through efficient online services, consultations, and knowledge sharing (Almunawar and Anshari, 2012). Social CRM can be used by banking as a tool and strategy in meeting their customers' expectations. As such, Social CRM must be aligned with the organization's mission and objectives in order to bring about a sustained performance of business objectives and effective customer relationship. Customers can own the data on the Web 2.0 site and exercise control over that data (Anshari and Alas, 2015). For instance, when a bank acquires a new customer through marketing orientation, the customer will determine the value of each activity received from the organization. When the customers perceives the value is positive, they will be happy and satisfied. Otherwise, they may consider finding another banking organization for better value& satisfaction.

2.2 Big data

Big data is at an early stage, as most related technology and analytics applications were first introduced only around 2010 (Gantz and Reinsel, 2012). Big data is a new generation of managing strategies, technologies and architectures, designed to economically extract value from very large volumes & wide variety of data by enabling high-velocity capture, discovery, and analysis (Laney, 2015). There are three main characteristics of big data: the data itself, the analytics of the data, and the presentation of the results of the analytics (Anshari and Alas, 2015). Big data is defined as an extremely large volume of data that are analyzed with technology to show the patterns of

human development or anything related to the society since big data leads to more precise analysis thus helps to bring more accurate decision making and more efficient work. Big data is high volume, velocity and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision-making (MGI: McKinsey Global Institute, 2015). Big data sources can be created by people or generated by machines like sensors gathering climate information, satellite images, GPS signals, digital pictures and videos, and transaction records.

The growth in big data is not only because a growing number of smart phone users, but also trigger by other smart mobile devices or pervasive computing abilities that is multiplying quickly (Anshari and Alas, 2015). For instance, marketing officer in a remote area can collect and transmit real-time data on every transaction made. Many of these smart mobile devices are able to interact with their users over mobile networks pervasive computing. Pervasive computing exchanges data and interact with people or computers and other smart devices. More than 30 million interconnected pervasive computing are now deployed worldwide, in areas such as security, health care, the environment, transport systems or energy control systems, and their numbers are growing by around 30% a year (Gafni and Geri, 2013).

One of the most important sources of big data is the Open Government Data (OGD). There is a growing trend in OGD initiative in many countries. When the society becomes relying on internet, social networks, and mobile technology, then OGD will accelerate the impact of big data for economic growth in the region. OGD proactively publishes real time data to be used by the public for triggering new ideas of business initiative, and improve decision making for corporations and SMEs. There is an ongoing paradigm shift on the issue of government data from the perspective of data as being (secret) assets or proprietary of the government to the paradigm that the government's data as public goods that will provide more benefits when they are shared to the public in real time so that people gains value from the extracted data (Mutchler *et al.,* 2011). After the financial crisis in 2008, OGD was considered a way to create value from data which can be freely used, reused and distributed by anyone where it gives more value, influence, and more impact when it is shared with the public to the more open environment (Ritter, 2015). The value of OGD as part of the big data source will definitely play an important role in driving the success of banking sectors.

2.3 Smart mobile devices

Smart phones are becoming ubiquitous and are owned by both youngsters and old people, It is widely used throughout Asia, North and South America, Europe, and varies in use in another region (Park and Chen, 2007). The increase in number of users

using smart phones shows that people are now partial to smart phone and ought to own at least one.

The behavioral intention to use was largely influenced by perceived usefulness and attitude toward using smart phone (Oulasvirta *et al.,* 2012). Using one of the survey conducted of sixteen hundred managers and professionals of the consulting staffs in America as an epitome, 70% admitted of checking their smart phone each day within an hour after getting up, and 56% did so within an hour before going to bed and 26% confessed to sleeping with their smart phones (IDC, 2015). Smartphone's ability to a quick access of social networks and communication encourage users to check their phone repeatedly. Repetitive checking of smart phone is considered a compulsive behavior (Masters and Menn, 2015). Hence, this research is going to emphasize on the impact in utilization of mobile banking.

3.0 Method

This study builds on recent reviews of CRM and big data application in business environment. We employed thematic literature analysis of discussions that most importantly linked papers and articles. We chose only English-language articles, published in peer-reviewed journals. After removing duplicates and articles beyond the scope of this study, we reviewed and extracted each keyword, then applied them in identifying component of CRM with big data enabled and identifying the challenges. We developed the analysis in the proposed model based on the findings.

4.0 Results and Discussion

In a highly competitive environment, bank's awareness towards big data is still needed much attention to cope with growing data requirements. Big data comes from multi channels, data exchange of individual, community, business, and government. Customers that are voluntarily contributing a huge amount of digital footprints will generate a massive value in delivering banking services. CRM with big data enabled is important because banking sector is challenged not only to retain existing customers but also to acquire potential customers for the services, retaining them to use the services, and extending various services in the era of big data whereas big data transforms big value for organization as well as customers

In conventional CRM strategies, customers in banking sector are viewed as recipient of services. Since they have been perceived as a recipient of services, they become target of predefined CRM strategies (marketing, sales, and customer services)

with less personalization, customization, and empowerment. CRM with big data enabled change the paradigm of customer from recipient to the partner of service.

How the paradigm is changed in CRM with big data enabled? Fig. 1 is the components of CRM with big data enabled. CRM is a front-end system in any organization, which is directly dealing with customers. Big data sources are gathered from structured data sources and unstructured data sources relating the customers or potential customers. Structured data sources can be from social networks and IM activities of customers; While, unstructured sources can be gathered from CCTV or vehicle registration numbers. In banking system, structured data sources are CRM data, social networks conversation, Web Application activities, Web search, e-commerce transaction. Whilst unstructured data sources can come from CCTV recording, face recognition at ATM, audio files, or RFID from plate registration number. For instance, CCTV recording at ATM station captures activities of customer in ATM. Bank can gain many values from the habit and behavior of customers in using ATM like time spending, mostly long queue time, idle time, and workload for each machine. Customers can receive personalize service when they visit ATM through big data analytic from face recognition data in ATM, e-banking transaction history, Web click behavior. Customer who frequently search car through search engine, he will see a short advertisement of car that may closely fit with his interest and budget. Customers are in queue for ATM will receive pop up message in their Smartphone containing bank's promotion product that may interest them. CRM team can design tailoring pop up message for customers in queue by combining data from CCTV, face recognition machine, and e-commerce record of respective customer.

From those multitude data sources, big data analytic works to form patterns, trends, habit, and behavior of customers. CRM team design strategies for marketing, sales and customer services based on those personal habit and behavior of customer. While customer will receive push message, alert, notification or suggestion based on their pattern. For banking organization, CRM with big data enabled can be designed in many layers from the lowest level of social media monitoring to the level where banking generates forecasting data, customers' trends, decision making, and personalize service based on customers' interest. Big data analytic will gather any personalize information that draws interest of each customer.

4.1 Customization and personalization

In the competitive commercial market, poor service and distrust in service lead customers to switch from a service provider to another, because poor service indicates inefficiency, higher cost, and lower quality of care. Nowadays, customers have more

choices in where they seek financial and banking service and how they interact with their service providers. A great customer service can lead to major improvements in the banking system, and personalization of services can become value added in providing services. Therefore, CRM with big data offers superb customizable and personalization of banking services. Customizable banking service adjusts the banking services that fit for each customer in either mobile banking or internet banking. Meaning each customer will be having different set of interfaces especially in the CRM domain (marketing, sale, and customer service) program.

Customizable services empower customers banking to be in control what he wants to have in their e-services and what he does not want in it. For instance, mobile banking customers can enable and disable some services in their mobile bank application. For instance, based on customer's web internet habit, some customers have interest to read e-news through his smart phone. In this regards, mobile banking can offer him extra service free e- news in their mobile banking extras. In the long term, bank can expect customer's dependency and loyalty towards mobile banking services. Similarly, some customers may interest in weather forecasting so that mobile banking extras can provide regular alert for weather update.

4.2 Mobile banking and big data

The explosion of big data emerges from variety of data sources including from excessive using of smart mobile devices can extend the functionalities of smartphone to become 'smarter mobile banking'. CRM with big data enabled may offer an extra service as a value added for customers. For instance, customers are offered big data in transport that can alert customers with smartphone to find the best route in reaching the nearest bank or intended destination without being trap in jam due to accidence. Since big data is able to compile, integrate, and analyze and broadcast to the users who retrieve those information. If there is an accident in specific location, then source of data that accident has happened can be generated from various means either structured data or unstructured data. The data of accident is recorded by nearest CCTV with the details location then it is sent to the traffic controller system. Police who investigating also makes update about the event from his mobile device to the central traffic controller system. People who pass by the location also broadcast the event by updating status in social media (Facebook, Instagram, Tweeter, etc) and IM (WhatsApp, Line, etc). Then, big data analytic tool gathers all the data from those sources (CCTV, police report, social media, IM, etc), then alert massage will be pushed to each customers' smartphone who going to pass the congested place. The 'smart message' can only send to smartphone's owner based on the vehicles registration number that are captured and they are going to

the direction where the accident happen. Therefore, big data offers a better service that intelligently advises the best value for users using smartphones.

4.3 Forecasting and decision making

The online activities of users, when captured and studied help to understand the pattern and trends in user's habits. These patterns and trends are useful to predict the future problems . This is due to its capabilities to gather data at a massive speed and able to distinguish the value of the data. For instance, with the aid of data generated from multiple sources like social networks or IM, banking organizations have more control and understanding of their 'loyal customers' behavior based on their clicks, comments, sharing contents, purchase, budget, etc. Understanding customers' behavior and pattern are possible since customers are voluntarily detailing their thought, opinions, interest, preferences, and they are voluntarily promoting best products and services to their circles. By the use of all these data, CRM with big data is able to know their customers likes, dislikes, expectation and their future course of actions and accordingly satisfies the customers by offering as per their expectation. In return, their business would expand by attracting more customers from reading the positive reviews by those loyal customers.

4.4 Push marketing strategy

Prevention is better than cure; this is applicable in case of big data enabled CRM system also. CRM with big data enabled should be more effective and less expensive if it can proactively address customer's problems. These proactive strategies will improve customer services. For instance, we give a simple scenario-identifying battlefield to win new customers or keep existing ones. Before customers engage in any service or product, customers spend a lot of time researching on their own, and gathering information takes place even before engaging with a marketing staffs or sales representative. It becomes the job of the marketing staffs to accurately predict what product or service will best fits, attract, and engage customers. Marketing staffs get connected with the potential customers in their social networks and trying to understand the views or type of person interest. Then, marketing teams design the most promising leads and develop highly targeted messages and campaigns through notification, push message, or alerts responding to the needs of potential customers with personalized content that influences engagement decisions. This effort of customer support will increase loyalty, revenue, brand recognition, and business opportunity for banks.

4.5 Value creation

Organization should acknowledge the potential and promise of big data, the

value and impact in realizing big data. For instance, customers are producing a massive of data every day. However, customers are very hard to realize the value of their own data produced voluntarily to the public. However, when organization has abilities, tools, and mechanism to store, retrieve, explore, and visualize the data then they could see value. Organization can comprehend of the value of data for better decisions such as understanding their customers' habits, forecasting marketing trends, managing their services effectively. Similarly, it is applied in the context of banking sector that is a vast quantity of data produced can be managed, retrieved, analyzed to solve common problems in a banking like consumer distrust, inferior products or services, financial disaster prevention and response, regional business trends and forecasting, consumers' demand and supply. Banking is challenged to come up with the initiative to provide Enterprise Resources (ER) solutions focusing on CRM with the capability of 'Big Data Enabled'. For instance, a new generation of CRM will be empowered with mining a real time all of customer data, the interactions of the sales force with them, and combines the results with external datasets on industry and news, social networks of the customers, geographic and demographic patterns, to determine which forecasts are the most likely to make a transaction in the near future [32]. We also will witness more Web technology adopts big data enabled that can detect patterns of users based on their clicks, visiting a web page, and even social media conversation.

5.0 Conclusion

With the growing competition among banking service provider, managing the customer relationship and providing better services through big data CRM is a strategy that needs to be carefully planned. Big data in CRM could come from various sources like public, government, and business. This data gets generated when people interact with other people through SNS and also when they interact with various devices that are sensor enabled. The fast growing mobile and wearable technology fuels big data, which is commercially available data that users may will to share. Big data analytic shapes the pattern and behavior of targeting markets and potential audiences since user-generated data are stored accessed and analyzed. CRM with big data is standing at a new business reality: those communities that can take advantage of big data as the valuable new resource it is will be in the best position to become players in high intense global market competition. Big data become valuable asset for any organization because it helps them understand the things their customer behavior and demands.

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