



# CRM in Telecommunications Industry – A Review

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## Abstract

Selling to an existing customer is always more profitable than selling to a new one. Organizations that provide products and services (consumed frequently) utilize CRM tactics to acquire all possible information about the client and use it to ensure that each interaction with the customer is a positive experience for the customer. The ultimate goal is to keep customers from defecting to competitors. The authors of this study investigate the function of CRM in the telecommunications business by reviewing papers published by researchers on the issue.

**Keywords** – Customer Churn, Customer Relationship Management, Customer Satisfaction, Information & Communication Technology (ICT), Information Technology (IT), Service Quality

## Introduction

"Because the aim of business is to produce a customer, the commercial enterprise has two—and only two—basic functions: marketing and innovation," management expert Peter Drucker stated. Marketing and innovation provide results; everything else is a cost. Marketing is the differentiating, one-of-a-kind activity of any corporation.

Sales orders might be generated in two ways: selling to new customers or selling to current clients. Almost all Client Relationship Management (CRM) textbooks claim that selling to a new customer is 8 to 10 times expensive than selling to an existing one. As a result, firms that offer products or services that are bought and consumed frequently, focus heavily on selling to current consumers in order to cut selling expenses and, as a result, enhance profits.

CRM is a Marketing Management field that comprises a variety of tactics for increasing customer satisfaction and, as a result, retaining customers. In the telecommunications industry customers purchase services repeatedly. It is also the fastest expanding industry in the service sector. The CRM in the

Telecommunications (Telecom) business is examined in this article. It begins by outlining the evolution of the telecom business. The next section provides a high-level overview of CRM. Following that, the research papers on CRM in the telecom business are reviewed. The study concludes with limitations and future directions.

## **Evolution in Telecom Industry**

To begin with, the technique used in telecommunications was fully manual (Pawlak, 2021). There were only a few subscribers for phones. Therefore the operator could use patch cables to manually link telephone numbers in the same exchange. If a subscriber wished to speak to a person in another exchange, the operator would transfer him to another exchange using a long-distance call (trunk-call) and the operator in that exchange would repeat the same procedure. After a number of years, the procedure was mechanized. Phones had dials for dialing numbers. A switching system replaced the human operator. Offices purchased private branch exchanges (PBX) for internal communication as well as to connect with external telephones. All this automation was mechanical. It sped up the process, but was limited by mechanical movements. Touch-tone dialing was a semi-digital breakthrough. It opened the way for many of the technologies. For example, calling by extension, retrieving and leaving messages, Interactive Voice Response (IVR), etc.

Over the years, landlines got phased out as a result of the reduced cost and greater availability of mobile technologies. As the economics of mobile infrastructure outweigh that of landlines there had been a boom of mobile devices in emerging countries. There are now more than 3.5 billion mobile customers globally. The emerging nations will add nearly another three billion in the next four years. This will necessitate an investment in infrastructure of around \$1.4 trillion. Use of mobile is now outpacing landline usage. Even more fascinating development is that data usage is outpacing voice traffic among mobile users. Mobile data traffic has increased 4,000 times in the previous ten years, according to Cisco Systems Inc. A significant shift in the Telecommunications Service Provider (telco) sector is that the voice traffic is really an insignificant part. It is now more of data—SMS (Short Message Service), chat, video, general internet usage etc. It needs infrastructure to make this possible. While most of the globe is still establishing 3G infrastructure, the 4G traffic is also rapidly increasing. In fact, the growth rate of 4G data traffic was 47 percent in 2015, surpassing the 34 percent growth rate of 3G traffic. Now, 5G infrastructure is being built because tomorrow's telcos would be unable to function without it, since the Internet of Things (IOT) will demand 1000 times the speed of 4G connectivity, which 5G provides. WiFi and femtocell technologies are used by mobile devices to dump most mobile traffic (almost 51% of it) onto the fixed wire network. The Mobile may have replaced wired networks, however the wired network remains important. Only its function has changed. Following are the significant technological implications on the future environment of telecoms.

1. The use of interactive data is outpacing voice traffic. Machine-to-machine and other non-interactive data will soon exceed it. Therefore, networks should be designed to handle traffic of data rather than speech.
2. Therefore to survive on a data focused network, speech traffic must be converted to data traffic for functioning of the network.
3. Wi-Fi network data traffic has surpassed cellular network data traffic. To accommodate this transformation, telcos will need to revisit their designs. As additional low-frequency wavelengths become accessible (allowing carriers to stretch Wi-Fi connections further) this will become an important issue.
4. The functions of dedicated computer and other hardware may now be undertaken by economical commodity computer gear thanks to software-defined networking (SDN). In the event of dedicated hardware approaching the end of its life cycle, telcos would be better off to evaluate whether SDN method is more suited to their traffic than dedicated hardware.
5. The huge variety, speed, and amount of data which can be acquired from following traffic—GIS i.e. geographic information system data, time and kind of usage data —may be leveraged to enhance performance of the network and customer experience using sophisticated analytics.

For the first time, the number of mobile subscribers is expected to exceed eight billion, hitting 8.3 billion in the year 2019 (O'Dea, 2020). Between 2018 and 2019, the total number of subscribers increased by nearly 393 million. From 2019 through 2025, a huge growth in 5G subscribers is expected. The 5G mobile population globally is expected to approach 2.7 billion by 2025, with North America, Western Europe, and North East Asia, leading the way.

### **Customer Relationship Management (CRM)**

CRM is described by Parvatiyar and Sheth (2001) as a comprehensive method for strategically recruiting, maintaining, and dealing with chosen customers with the objective to produce more value for both the organisation and the client. It requires an integration of organization's various departments like marketing, sales, supply-chain, and customer service for creating higher efficiency and effectiveness in providing client value. Management, over a period, realised that a company's success in today's commercial environment is heavily reliant on efficiently managing customer connections. Therefore the use of a CRM system is thought vital, as it may dramatically minimise the gap between organisation and customers. This contributes to business success by way of customer loyalty, greater service, more comprehensive information collection, and effective learning by the organizational (Nguyen, Sherif, & Newby, 2007). "Any CRM system's goal is to integrate business operations and IT in such a way that the said organisation can retain existing customers, attract new ones, and maximise lifetime value of the customers (Peppard, 2000). CRM uses all traditional channels of communication to maintain profitable customer relationships (Wahab, Othman, & Rahman, 2011). For this purpose CRM includes front-office applications like sales, marketing, and customer service, and also back-office applications which help integrate and further analyse customer data. Berry and Linoff (2000) described Relationship Marketing as "attracting,

sustaining, and strengthening client connections in multi-service organisations." Establishing a connection entails making promises, sustaining a relationship is dependent on keeping promises, and strengthening a relationship is making new promises with the fulfilment of previous promises as a requirement. The principles of relationship marketing, when paired with 'customer-centric' marketing serve as a basis for CRM," according to Wetsch (2006). Despite being "philosophically consistent with RM," the focus of CRM is on technology. As a result, it is not unexpected that someone has defined CRM as "technology-enabled relationship marketing."

### **Review of papers wherein respondents were from telecom industry**

In August 2020, the writers retrieved approximately 800 CRM-related research publications from the EBSCO database. The papers were identified and classified according to the industry from which the respondents were recruited for the study. The authors were able to identify 21 studies in which the responders were from the telecom business. The first paper was published in January 1997, and the most recent in June 2017. The following is a review of these papers in the order in which they were published.

Brennan (1997) investigated the interaction between British Telecommunications plc (BT) and Cable & Wireless plc (CW) and their equipment vendors in the United Kingdom. These big telecom firms had enormous leverage over their suppliers, thereby creating a duopoly market. He suggested the following strategy for effective buyer-seller collaborations.

- (1) Create criteria for selecting product categories that are eligible for collaboration.
- (2) Determine which product categories should be targeted for collaboration.
- (3) Create criteria for finding potential partners.
- (4) Create a short list of potential mates and then choose one.
- (5) Begin discussions with pre-selected partners.

Many businesses use complaint management as a way to increase client commitment and establish customer loyalty. Complaint management solutions assist businesses in resolving and consequently learning by handling service failures with a purpose to again establish the reliability of the organization as perceived by the consumer. Tax et al. (1997) discovered that the most of the complaining consumers were unsatisfied with their perception of recent handling of complaints by the organizations. They established, using justice theory, that consumers assess complaint occurrences based on the results they obtain, the methods used for arriving at the solutions, and the character of the personal treatment received in the process. They also discovered that, while satisfaction with processing of complaint had a direct influence on trust as well as commitment, earlier favorable experiences offset the consequences of bad handling of complaint to a limited amount, supporting a quasi "brand equity" approach. Their sample frame, however, included workers of a telecom firm who were asked to participate as "everyday customers," rather than as employees of their employer. As a result, the findings need to be confirmed by doing the same study on actual clients.

CRMs are software packages (like ERP- Enterprise Resource Planning). Their parameters are-adjustable to integrate and manage all aspects of customer interactions within the organization. CRMs therefore significantly improve the ability of the organizations to handle customer service, marketing, sales, online transactions, and sales orders. Organizations that seek to use CRM software typically confront employee reluctance to change and adjust to the new way of working. Gefen and Ridings (2002) investigated user perceptions of the responsiveness of the implementation team and cooperative goals, perceptions of user of the CRM's accurate setup, and user's desire to use the CRM. According to the implications of Social Exchange Theory, their data showed that the influence of real and perceived responsiveness on user readiness to embrace the CRM was mediated by user perceptions about the accuracy of the CRM configuration. The findings also showed that real responsiveness influenced these views via perception of responsiveness.

Customer satisfaction does have a strong effect on loyalty to organization, as per the marketing researchers (Mithas et al., 2005). The research on relationship commitment highlights two distinct elements of commitment which drive loyalty: 1) Emotional commitment produced via human connection, i.e. trust and reciprocity, and, 2) Calculative commitment, resulting from switching costs (Bendapudi and Berry, 1997). Loyalty is frequently viewed as the actual retention, and it is the pillar of any CRM. Effective CRM techniques vary greatly based on the elements that influence retention. If a company's key driver of retention is customer happiness, it should increase the quality of product or service or provide lower prices. If calculative or emotional commitment is a key to loyalty, then, a company should cultivate more direct ties with consumers and also create barriers to switch to rivals. These tactics may however be affected by the circumstances that customers are confronted with the organization. (Bolton et al. (2003). As per Gustafsson et al. (2005), customer satisfaction consistently has a negative influence on turnover (and a positive effect on the retention). When combined with customer pleasure, emotional commitment, on the other hand, does not predict attrition. Their findings imply that when the satisfaction is quantified as the overall performance rating, it does predict turnover. Their findings further indicate the constant impacts of customer happiness, past turnover, and calculative commitment, on retention. Prior turnover also moderates the link between satisfaction and retention.

Prins and Verhoef (2007) in their research evaluated how the timeliness of the adoption of a new e-service among current consumers is impacted by direct marketing communications and mass marketing communications. In their study the communications in mass marketing addressed both 1) particular new service, and 2) the brand, from 1) the primary provider and 2) rivals. They assessed the impacts of the above marketing materials on the timing of adoption using a split-hazard technique, for customers who never adopted the new e-service. Over a 25-month period, they examined adoption behavior of 6000 consumers of a Dutch telecommunications company. The empirical findings indicated that service promotion reduces the time of adoption, even though begun by rivals. Further, an investigation of the interactive effects of relationship qualities and marketing activities indicates that particular mass marketing initiatives have a stronger influence on loyal consumers.

Desai, Sahu, and Sinha (2007) investigated, in a select Indian firms in the banking, telecommunications, and retail sectors, how information technology and dynamic capability affected success of CRM. The dynamic capabilities comprised of i) detecting, adapting, and responding to sudden changes in environment (ii) integration of resources and (iii) redesigning, re-deploying, recombining, and also renewing resources. It is an organization's capacity to continually improve, restructure and innovate resources to meet changing environmental demands. IT competency relates to two aspects: (1) the comprehensiveness of the firm's CRM software package, and (2) IT competence i.e., knowledge preservation and facilitation of knowledge generation in the CRM process. Their findings demonstrated the significance of dynamic capacity in boosting CRM effectiveness across three sectors. The value of dynamic capability was evident even in slightly dynamic markets, contradicting the literature's implicit assumption that dynamic skill is only essential in hypercompetitive environments. India's telecom business has evolved into one amongst the most highly competitive in the world. They found that beta value for telecommunications sector was the highest for dynamic capability in influencing CRM performance factors. It supported the previous view that in hyper-competitive environments telecom organizations experience a growing gap between the learning opportunities and needs, versus actual learning performance. Telecom companies must strengthen their dynamic capacity in order to live.

One question multiservice providers regularly ask is “which clients are most likely to terminate (or improve) their relationships and which customers are the most valued”. Firms generally regard the duration and breadth of customer connections as useful "rules of thumb" from which proper CRM decisions may be made when addressing these problems (Bolton and Tarasi (2017). Schweidel, Bradlow, and Fader (2011) demonstrated that customers who have discontinued a specific service may cancel all services in the immediate future, but they may also acquire additional services. For service providers this is a provocative finding of interest. Their findings also highlight the need of looking beyond the prior era, as is common in most contemporary research, and consider how consumers have grown over their whole relationship to predict their future course of actions.

How can businesses maximize the benefit of Information Technology while making relatively little additional investments? For managers this is a crucial subject, and it has piqued the interest of academics (Villanueva et al., 2007). One successful strategy for achieving this aim is to motivate users to expand their usage of pre-implemented technology (Hsieh et al., 2012). This approach highlights the significance of people making meaning out of the introduced technologies. (Jaspersen et al., 2005). Utilizing a technology, for employees, is cognitive process in which users make meaning out of the technology, which influences their later interactions. (Daft and Weick, 1984). Thus, sense-making is a beneficial paradigm for expanding our knowledge of person participation in making deeper, richer, and more extensive use of technology.

According to the findings of a research conducted by Hsieh et al. (2012), employees' post-adoptive sense-making is affected by two factors: 1) technology and 2) work system. They discovered that sense making influences the long-term usage of CRM systems. Employees' sense-making at technology level gets affected by their appraisal of the quality of technology. Employees' sense-making at the level of work system gets affected by their judgement of the quality of service. If the technology and service are poor, specific methods to collect employee feedback on these two factors may be designed. This can be done through employee engagement at technology level and at work system level through coordination of work system. Such alignment will offset the negative effects of the poor quality technology and bad quality of service, allowing for longer usage. Importantly, they discovered that longer use increases employees' service capability, resulting in improved objective performance. Their findings underscore the crucial role of employees' sense-making regarding installed technology in promoting longer usage of IT and boosting work performance.

Cui, Wong, and Wan (2012) discovered that for many binary classification issues in CRM and marketing, typically, a severely uneven class-distribution is found in empirical data. It generally contains a very small quantity (e.g., 5% purchasers) of real positives as against bulk (95 percent non-buyers) of true negatives. Furthermore, false negative mistakes (like loss of membership fees or subscription) prove sometimes far more expensive than the false positive errors (like the cost of contacting customers through mailing). Frequently the predictive model that is not sensitive to the differential costs of misclassification mistakes performs poorly in finding buyers and increasing profit. Other situations where the model performs badly include (a) customer up-gradation —how sizable incentives can be provided to select customers most likely to upgrade and thereby contribute to profits, (b) simulating customer retention and churn—find ways to prevent the valuable customers from switching to a rivals, and (c) defaulters—How the customers not paying back their sizable loans can be identified.

The customers' purchase likelihood and also profit contribution are intrinsically difficult to anticipate. It is therefore crucial to separate low-profit contributing customers from high-profit ones, for obtaining ranking of the customers as per profit. Priority sampling is used to accomplish this. Cases having a higher profit margin have a better probability of being chosen in priority sampling. Cases with a smaller profit but a greater frequency have a chance to appear in numerous sampling runs. As a result, the likelihood of a positive example being included is determined by the profit and frequency of customer's presence in the sample. This way, a normalized profit distribution across the clients in the training data set may be established. If the customer purchasing data has uneven/skewed profit and class distribution then, it becomes significantly difficult to assess variable costs of false negative mistakes. This results in difficulty in marketing operations for projecting high-value consumers. Under resource constraints, including cost-sensitive factor in forecasting model enhances the ROI (return on investment). Their research developed a cost-sensitive learning system based on priority sampling that prioritizes high-value clients. They tested the strategy on three different data sets. They then compared its results to those of other solutions. According to their findings, priority sampling outperforms the other strategies in terms of increasing

profitability. A suitable learning algorithm may be used in decision making systems in order to help marketing department. It will also strategically boost firms' competitiveness.

Lalitha and Prasad (2012) investigated CRM Components in Quality of Service in the Telecommunications Sector in India. They found no significant differences in perceptions of customers of availability, contacts, and good relationships as factors affecting customer satisfaction. One can take them as the components of functional and technical quality of service that customers bother about. As a result, service providers should pay attention to these quality elements as well as technical quality dimensions when offering services. Zablah et al. (2012) investigated the Performance Implications of CRM Technology Use in Telecommunications Companies. They defined CRM interaction support tools as technology that enable operations such as improving customer information collection, exchanging customer information across workers, and inter-functional staff coordination. They, on the other hand, used the phrase CRM-customer prioritisation-tools to name the technology that assist activities including sales, marketing, and service resource allocation choices, as well as activities that are used to assess the effectiveness of these decisions.

They studied a sample of 295 customer businesses nested inside ten telecom firms. They found that if the firms adopt technologies to support CRM interactions, it improves consumers' perception of relationship, independent of the size of customer account. Using CRM prioritising tools, on the other hand, tends to have favourable benefits on larger customers and conversely negative effects on firm's smaller customers. The findings also indicated that, customer views of the exchange-relationship can predict organisational performance. The relationship among the two factors is substantial for bigger customer accounts. It is inconsequential for smaller accounts of the firm. The study's findings served to explain a few of the contradictory findings published in literature about CRM technology use and performance implications. They imply that use of technology may improve organisational short term performance.

CRM solutions are being implemented in more and more firms to assist service activities of front-line workers. With the notion that CRM may improve workers' service quality, the management frequently requires CRM system, that has been established, to be used by employees. However if the employees are not satisfied with the CRM system, problems arise in the organization. Hsieh et al. (2012) studied one of the China's largest telecom service organizations. They gathered periodic data from employees and also from archival data sources of the firm. They wanted to understand the relationship between the mandated use of CRM and the user satisfaction of front-line employees that would ultimately affect service quality. Their findings indicate that employee service quality (abbreviated as ESQ) improved with workers' overall user satisfaction (abbreviated as UserSat) with CRM, usage of which was mandated by management. ESQ was also positively affected by job devotion (abbreviated as JD), and embodied service knowledge (abbreviated as ESK). Surprisingly, UserSat's effect on ESQ and JD's and ESK's effects on ESQ were equivalent on positive side. More importantly, UserSat and ESK had a substitutive influence on ESQ. It meant that UserSat has a stronger/weaker impact on ESQ for the employees who had lower/higher ESK. They also found that ESQ predicts customer satisfaction with customer service workers (abbreviated as



CSWCSE) and ESQ mediates the effects of JD, UserSat, and ESK on CSWCSE. These findings highlight the significance of user happiness in affecting employee task outcomes in the situations when the usage of CRM system is made mandatory.

Customer turnover has become a major issue, and it is one of the most critical difficulties that many services business are facing. Both types of churn viz. drifting of low value and high value customers, results in losses. However the loss of high value and loyal customers is more detrimental to the business than that having low value. Therefore, businesses must develop a model to predict churn of high-value consumers. Abbasimehr, Setak, and Soroor (2013) suggested two-phase approach for predicting attrition of customers having high-value in their study. During phase 1, called identification phase, customers' social network-based attributes are used to determine the high-value customers. The data of a high-value client is utilised as input to Phase 2 in order to create prediction model about the churn. The framework was built using data from a large telecommunications operator. The K-means method was used to cluster the consumers. After sorting clusters, the top-cluster was chosen based on cluster ratings. "The data from the top cluster was used to construct the model for churn prediction. The Adaptive neuro-fuzzy inference system (ANFIS), and locally linear neuro-fuzzy (LLNF) were used on churn data in conjunction with the locally linear model tree (LoLiMoT) learning algorithm. The above approach was compared with generally used neural networks, such as multilayer perceptron (MLP) and radial basis function (RBF) networks. The comparative results indicated that neuro-fuzzy approaches were better in predicting churn than neural network models."

Husain, Al-Tameem, and Gautam (2013) studied the use of information and communication technology (ICT) in CRM. They investigated CRM based organisational intellectual capital (IC) by examining the efficiency and efficacy of ICT for interactions between firms and their consumers and also for social interactions. They aimed to comprehend the influence of ICT on knowledge discovery, exploitation, or a mix of the two. They argued that while ICT improves organisational efficiency, it degrades effectiveness and consumer relational capital. They came to the conclusion that, while strong ties cost more, they generate better customer relationships, allowing for a competitive edge. Customers are happier with an organization's direct connections and interactive communication than with passive involvement through ICT-oriented procedures like process management, automated call centres, and websites enabling online commerce. Their research finds that firms that prioritise efficiency only for the purpose of cost-cutting will find their consumers dissatisfied, develop poor customer connections, and eventually confront decreased organisational learning and innovation capacities.

Service businesses find it extremely difficult to expand the customer base if they have attrition rates of very large scale. Customers continue to defect despite their considerable retention efforts. However for many businesses, "lost" consumers may provide a lucrative "last resort" chance. "Regaining clients who have left the company may enable these companies to not only recoup their lost revenues, but also to grab income from competitors. Certain significant considerations however remain, such as 1) whether lost consumers are worth the cost in reacquisition and 2) will the reacquired customers be lucrative. Kumar,

Bhagwat, and Zhang (2015) studied empirically how likelihood of reacquisition, second-lifetime duration, and second-lifetime profitability are affected by (a) first-lifetime experiences and behaviors of lost customers, (b) reasons why they defected, and (c) the attractiveness of the win-back offer made to lost customers. According to their study, the lost customer is more likely to accept the win back offer if his first lifetime bond with the organization was greater.”

Strategic allocation of resource in emerging markets is quite a difficult issue. This is true especially in competitive and dynamic market conditions where assessing the degree of expenditure and investments to acquire the clients and to retain them becomes important. Min, Zhang, Kim, and Srivastava (2016) gathered operating data from 41 telecommunications markets from 1999 to 2007. They then developed a model which examines, for a new service, firms' investments in acquiring and retaining the customers. According to the empirical findings, per customer acquisition cost of the firm is more sensitive than retention cost per customer to the firm's market position and competition. The businesses with highest market share have a considerable cost advantage in acquiring customers. This advantage expands as the firm penetrates the market more. These companies may not have cost advantage over competing firms in customer retention. This study's findings give guidance for enterprises' strategic resource allocation in competitive service marketplaces for acquiring and retaining customers.

Santouridisa and Verakib (2017) analysed probable relationships between CRM practises, relationship quality, and customer happiness, with an emphasis on how satisfaction's dependence on CRM strategies is mediated by the relationship quality. “Two factors were used to define relationship quality: relationship satisfaction and trust. The findings showed two CRM practises aspects, dubbed customer care and communication. Customer service considerably influences customer satisfaction positively.” Furthermore, the characteristics of CRM practises favourably influenced relationship quality. The mediating effect of quality of relationship on customer happiness and CRM practices was supported.

CRM efforts have historically been geared around increasing the profitability of the targeted clients. Ascarza, Ebbes, Netzer, and Danielson (2017) showed that in corporate contexts with networked external environment, a Marketing-CRM campaign intended at modifying the behaviour of certain consumers spreads through social network, influencing the behaviour of customers, who are not targeted. “Using a randomised field experiment with 6,000 customers of a telecomm service provider, they discovered that targeted customers' social connections with non-targeted customers increase later's consumption making them less likely to defect as a result of a campaign which did not target them or offered any direct incentives. They anticipated a 1.28 social multiplier.” Which means the effect of the marketing campaign on targeted consumers' first-degree connections is 28% of that on targeted customers. In line with network externality account, they show that because of the increased communication between the targeted customers and non-targeted consumers linked to them there is a rise in the activity of non-targeted customers. These findings show that organisations should consider effect of marketing campaign on targeted customers as well as possible spill-over effect on non-targeted ones but connected with target consumers.

Many businesses have used technology-driven social learning platforms like crowdsourcing customer assistance or social customer relationship management to enable knowledge exchange among consumers. Several of these self-organizing online customer assistance groups have observed the formation of the core–periphery knowledge exchange network structure. Sun et al. (2017) analyzed why this type of structure evolves and its consequences for information sharing within that community. A network is created to share endogenized knowledge. Their approach acknowledges dynamic but interrelated character of knowledge sharing and seeking decisions. It allows them to get motivated by knowledge gains and building of social status in expectation of possible future reciprocal benefits from peers.

They applied this model to a panel dataset from a social customer service group for a telecom corporation. They showed that being related to other persons with greater social status adds value to a user in this community. As a result, a user is more likely to respond to queries from individuals in the centre (highly connected) rather than questions from those on the peripheral (not so well connected). They discovered that before asking a question, users consider the possibility that their query will be answered. With the formation of core–periphery network members, peripheral persons feel discouraged to ask queries since they have a very low expectation of obtaining a response. As a result, the core–periphery structure has established a barrier to information transfer to new clients who require it the most. Their counterfactuals demonstrate that concealing the identity of the information seeker helps in breaking down the core–periphery structure thereby improving sharing of knowledge in the established community.

## Conclusion

The above-mentioned research studies threw light on various elements of CRM in the telecommunications business like Supplier Relationship Management, Customer complaints, Implementation of CRM software, Commitment, Loyalty, Customer Satisfaction and its effect on churn, Effects of direct marketing communications, CRM Performance, Methods to choose profitable customers, Employee service quality, Customer acquisition costs, Reacquiring customers, Effect of CRM campaigns on non-targeted customers, and Knowledge sharing among the customers. This study, however, has some limitations. The study considers the articles published up to year 2017 for assessment due to the limited available articles. The future researchers may consider other areas of CRM such as customer life value, relationship quality, cross selling and purchasing, and so on which have been rarely explored on the telecom sector. The Covid pandemic of 2020 has caused huge obstacles to all company processes, especially CRM. The future researchers may conduct a study regarding the impact of COVID on CRM in telecom sector. A new research (Post Covid) on all of the topics highlighted by the experts examined in this paper might provide an altogether new viewpoint on CRM deployment in the telecom business. The study has some implication to the policy makers and the telecom operators. The study may help the telecom operators in understanding and exploring the ways in which they can implement the CRM in their organizations. Finally, we conclude that the CRM is extremely helpful in ensuring customer satisfaction and therefore in their retention in any service organizations like telecom sector.

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