The Next Wave of CRM Innovation: Implications for Research, Teaching, and Practice

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Abstract:

Globalization and customers' ever-changing needs have created a hyper-competitive market. As a result, customer relationship management (CRM) has become a core topic of interest among both practitioners and academics. Further, over the years, with the advancements in the technology landscape, such as digital technologies, CRM has improved in myriad ways. This paper summarizes a panel discussion on CRM innovations held at the 2016 Pacific Asia Conference on Information Systems (PACIS 2016) in Chiyai, Taiwan. The panel discussed CRM fundamentals and how traditional CRM systems work in organizations. Then, the panel focused on the advancement in technology landscape such as big data, analytics, Internet of things, and artificial intelligence and how such technologies have transformed innovations in the CRM landscape. Finally, the panel highlighted the limitations in the current CRM curricula in the universities and how the curriculum today needs to reflect such advancements to enhance the union between the CRM curricula and the industry needs. Further, this paper provides future research ideas for academia and contributes to research interests on CRM in general.

Keywords: Customer Relationship Management, Big Data, Internet of Things, CRM Curriculum.

1   Background

We have entered an unprecedented time of change in customer engagement, digital technologies, and everything in between. No longer do we consider a customer as just a one-off transaction. No longer do we think about a customer as purchasing just one service or a product from an organization. Today, we talk about a global village that relates to everyone through a collection of resources that we have in us. With the advancements in the technology landscape, organizations can use mobile technologies that offer mobility; social media that offer connectedness; and analytics, big data, the Internet of things (IoT) that offer new insights for managers to initiate new strategies (Avedillo, Begonha, & Peyracchia, 2015; Lokuge, Sedera, Grover, & Xu, 2019; Nambisan, Lyytinen, Majchrzak, & Song, 2017; Tan, Tan, Wang, & Sedera, 2017). Due to the advent of these technologies, every organization—from car manufacturers to donut sellers to an educational institutes—has gained access to a global customer pool. Further, small and medium-sized enterprises (SMEs) can now access what global businesses can. As such, a small organization can innovate in the same way as a large resourceful counterpart (Sedera, Lokuge, Grover, Sarker, & Sarker, 2016b). Therefore, managing customers has become ever more important, and customer relationship management (CRM) plays an important role in how an organization manages such relationships and its operations.

Over the past decade, academics and practitioners have increasingly expressed interest in CRM (Nam, Lee, & Lee, 2019). The demand for CRM systems continues to grow as it is one of the fastest growing technology segments in the world. In its enterprise software forecast, Grand View Research recently highlighted that CRM constitutes the fastest growing software market today and will reach US$80 billion by 2025 (Grand View Research, 2017). CRM systems help organizations to automate, manage, and synchronize services and data from (pre/after) sales, marketing, customer service, and technical support. Successful implementation of CRM will ensure that an organization gains a competitive advantage and more customer interactions through multiple channels across the entire customer lifecycle (Hadi, 2015). These systems facilitate operational interactions using digital channels (as in mobile sales) and provide sophisticated analytical support to help marketing and business teams understand customer needs and campaign effectiveness (Sedera & Wang, 2009).

Since the mid-2000s, CRM strategists have been presented with a plethora of technology options that help them deliver CRM solutions to organizations. We can view these technology-driven opportunities through four perspectives. First, the advent and massive proliferation of mobile computing, cloud computing, in-memory technologies, and social media—collectively referred to as "digital technologies" (Nambisan, 2013; Sedera et al., 2016b)—have purportedly presented organizations with a novel perspective to innovate using CRM systems. Such technologies have presented organizations with access to flexible, easy-to-deploy, and cost-effective CRM solutions (Sedera & Lokuge, 2017; Yoo, Boland, Lyytinen, & Majchrzak, 2012). Therefore, such technologies have purportedly disrupted the traditional linear equation of innovation (Sedera 2011). As a result, IT sophistication is no longer proportionate to resource availability (e.g., finance and human capital) (Lokuge and Sedera 2017). Second, the consumerization of IT and the massive proliferation of mobile and social technologies have presented organizations with an opportunity to observe customers' digital footprints (Sedera, Lokuge, Atapattu, & Gretzel, 2017). Research and anecdotal commentary suggest that analyzing such digital footprints would enable organizations to provide tailor-made products and services to customers' needs and wants (Im, Grover, & Teng, 2013; Sambamurthy, Bharadwaj, & Grover, 2003; Sedera, Rosemann, & Gable, 2001). At the same time, we have learned to better handle and analyze big-data through innovations such as in-memory technologies (e.g., HANA) (Wixom et al., 2014). Third, the IoT has much potential growth and impact. Though low in penetration, many have said that the IoT will innovate and revolutionize existing customer-engagement business models and approaches (Xia, Yang, Wang, & Vinel, 2012). Fourth, the contemporary business world has particular interest in CRM and related systems. For example, in the US, 91 percent of businesses with ten or more employees use CRM systems (Taylor, 2019). According to Nucleus Research (2014), organizations continue to make investments as the average returns from CRM have increased since 2011 from US$5.60 to US$8.71 for every dollar spent. Further, the organizations can take advantage of data analytics, social media, mobile and IoT capabilities that they can integrate with CRM.

However, despite a wealth of literature on CRM, researchers have paid much less attention to understanding the innovation potential of CRM systems considering the aforementioned technology enhancements. In particular, both researchers and practitioners need to discuss CRM's theoretical and conceptual notions. As such, we conducted a panel at the 2016 Pacific Asia Conference on Information

Systems in Chiyai, Taiwan, to initiate some discussion on the importance of CRM systems for innovation and how educators can integrate such new implications into the CRM curricula to increase their relevance to real world. In this paper, we summarize the panel discussion. Darshana Sedera of Swinburne University of Technology chaired and moderated the panel, and the following members took part as the panelists: Vadlamani Ravi of Institute for Development and Research in Banking Technology—Hyderabad; Sachithra Lokuge of RMIT University, Australia; Thilini Ariyachandra of Xavier University, USA; and Saj Kumar, Vice President of Internet-of-things at SAP.

This paper proceeds as follows: in Section 2, Darshana Sedera overviews CRM systems. In Section 3, Saj Kumar discusses the Internet of things (IoT) and the artificial intelligence initiatives that SAP has done in the CRM space. In Section 4, Thilini Ariyachandra discusses how big data and how CRM has embraced these advances. In Section 5, Vadlamani Ravi discusses how the banking sector has implemented big data, the IoT, and artificial intelligence into their activities. In Section 6, Sachithra Lokuge provides some insights into how one can integrate these initiatives into a CRM curriculum and how we should improve the traditional model of CRM delivery to provide more practice-oriented learning experience to students. Finally, in Section 7, we conclude the paper by providing future research ideas of CRM innovation.

2 Overview of CRM Systems

About four decades ago, the marketing discipline witnessed a grand paradigmatic shift from focusing on products to focusing on customers that paved the way for the concept of CRM (Dyche, 2002). The advent of the Internet and the information technologies (IT) has provided firms with opportunities to connect better with the customers, respond directly to their queries, customize solutions, and maintain better relationship with them (Winer, 2001). As such, in the early days, many considered CRM a technology-based customer solution (Payne & Frow, 2005). Firms such as Oracle and Siebel have developed CRM products to track customer behaviors to identify better services that add value and increase their profitability (Gartner, 2014; Winer, 2001). However, most of these organizations started implementing CRM systems in a rudimentary way and focused only on selling products and services in a slightly different way from the previous practices (Dyche, 2002). As a result, during the past few decades, different stakeholders have possessed different opinions about CRM's usability. For example, IT departments see CRM as about technology and analytics, while marketing departments perceive it as means to perform work. To view CRM holistically, one needs to bring together all stakeholders in a business such as marketing staff, sales staff, executive-level staff, and customers. As such, CRM involves multiple segments that deal with customers such as collecting customer data, analytics, lead generation, and campaign management in a judicious combination.

Kumar and Reinartz (2006) define CRM as analyzing marketing databases and leveraging consumer technologies for better corporate practices and methods to finally maximize the lifetime value of customers. As per this definition, firms need to make every customer profitable if not equally so. As such, CRM does not follow the typical concept that only 20 percent of customers provide 80 percent of profits. On a conceptual level, one can consider CRM a curious mix of retail marketing with a heavy dose of IT. CRM does not equal to IT; rather, it constitutes a business aspect that contains lot of analytics as well. In a different perspective, one can define CRM as a science and the art of selling the right product to the right customer at the right price at the right time.

CRM primarily comes in three types: operational CRM, analytical CRM, and collaborative CRM (Hadi, 2015). Operational CRM focuses on collecting data about customers at various touchpoints; hence, this CRM type provides a consistent view about customers across an organization (Iriana & Buttle, 2007). It also includes activities such as sales force automation, contact management, talent management, content management, and enterprise marketing management. In analytical CRM, organizations can solve various business problems via applying data warehouse, data mining, and text mining. Analytical CRM uses technology to accumulate and analyze customer-related data that organizations can use to implement business strategies (Payne & Frow, 2005). Finally, in collaborative CRM, organizations focus on applying methods and technologies to improve the collaboration between themselves and customers (Hadi, 2015). Organizations typically implement CRM systems to improve customer service quality and increase customer loyalty.

3   CRM and the Internet of Things

The Internet of things (IoT) has become a buzzword in the current hyper-connected technology landscape. Xia et al. (2012, p. 1101) define the IoT as "a networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence". As such, IoT enables various objects that feature software, electronics, and sensors to communicate with one another. These objects collect massive amount of structured and unstructured data that vary from basic useful data such as customer behaviors, location details and buying patterns to extreme data such as a customer's physiological information. Implementing the IoT comprises an ecosystem that includes things, communication, applications, and data analysis. According to Knowles and Rander (2017), the IoT will grow to include 200 billion devices in 2020. When analyzing the IoT and its applications, one needs to understand its core. Figure 1 below demonstrates the IoT's four key areas: sense, communicate, analyze, and act. We discuss each area in turn.

Figure 1. Key IoT Areas

First, over the last couple of years, sense has become a major doctrine in the IoT. Businesses have gone through dramatic changes, and many vendors such as Intel and Cisco have created local sensors with high computing capability, which allows them to collect new and real-time information from places where we could not imagine before. Second, data communication has also seen many changes. In particular, with 4G, 5G, and other forms of communication in the market, organizations can take the data from the ecosystem and transfer them to a platform. As such, retrieving data from various devices no longer poses a problem. The third area concerns real-time analysis. The analysis can be both at the device end (due to computing capability of the devices) and on the platform that allows the organizations to take real-time details. When managers see demand for a particular product increase, they can immediately direct their production teams and also drive their research and development (R&D) and innovation departments to react quickly to the identified changes. As such, real-time analysis enables organizational agility. Finally, the IoT requires the action process in the loop because organizations need to implement the insights that they derive from collecting, communicating, and analyzing data. IoT proponents argue that the IoT helps organizations to innovate in CRM by 1) tracking customers' and machines' behavior in real time and automating data sourcing, 2) enhancing situational awareness, 3) introducing sensor-driven decision analytics for selling and marketing products, and 4) by providing automated controls and responding to customer needs.

The extent to which organizations around the world today collect and analyze data also relates (though not exclusively) to the IoT. Here, many have endorsed in-memory technologies (e.g., SAP's HANA) as a possible solution to address the challenges arising from big data. For example, SAP HANA is an in-memory, column-oriented, relational database-management system whose architecture can handle both high transaction rates and complex query processing on the same platform. Thus, coupled with CRM, in-memory technologies purport to create a more distinctive customer experience through real-time data access, superior reporting performance, and the ability to capitalize on customer insight with zero latency. These two technologies have certainly helped organizations to innovate with their CRM solutions. This section focuses mainly on how such IoT technology has begun to dramatically change what CRM means to many organizations.

When considering the IoT, it is important to discuss about organizational trends and customers' perceptions about IoT. The IoT in retail has drastically changed the way organizations do business, and it can benefit organizations in many ways. However, most organizations do not know how they can implement the IoT to improve their sales. The organizations that have implemented the IoT utilize it to maintain inventory accuracy in their stores and to engage with consumers more closely. Implementing the IoT properly enables organizations to: 1) create new customers and markets, 2) create personalized and relevant products, 3) accelerating the pace at which they innovate, 4) provide a resilient and flexible value chain, and 5) provide efficient servicing at the point of sale (PoS). While implementing the IoT, organizations need to see and believe that they provide consumers with new services through interconnected devices. Further, with the IoT, organizations can create new consumers in new markets and gain real-time feedback from devices and from social media. Section 3.1 describes an example of IoT-enabled CRM solution.

3.1   The Connected Store

Considering the demand for IoT in the retail space, SAP has developed the connected store as one of its main solutions. SAP believes in the vision to fundamentally change the retail experience both from an operations and a consumer perspective (Lokuge and Sedera 2014). Since the operations and the customer experience connect to each other, organizations need to consider them both to create value in the retail space. A general retail location comprises a PoS machine, shelves to store products, and signage. By introducing interactive digital signage and mobile payments at these locations, organizations would gain access to direct consumer data. When customers buy products from the store, an organization can capture things such as how often the customers buy, what they buy, and so on. The organizations can then use this data to introduce new programs to consumers' loyalty. For example, implementing programs such as one-to-one marketing, loyalty programs, and viral campaigns increase revenue dramatically. SAP believes that organizations need to integrate channels to provide an omnichannel experience across brick-and-mortar, automated retail, and e-commerce organizations to stay ahead of the game. SAP expects its IoT connected store to innovate in the areas such as 1) intelligent marketing (one-to-one customer targeting, detailed market segmentation, portfolio optimization), 2) optimized operation (fleet analytics, demand-based pricing, predictive planogram optimization, forward-looking analytics), 3) supply chain management (real-time inventory, dynamic truck routing, customized product mix by location, machine-initiated inventory replenishment), 4) customer experience (cashless payments, viral features enable growth, real-time behavior capture, audience analytics), and 5) asset management (event-driven maintenance, remote control and campaign initiation, real-time analytics at the single asset level).

By implementing SAP's IoT, organizations could transform their shelves and PoS systems to smart machines and, through sensors, streamline their operation. By implementing the IoT, organizations can better obtain real-time information from any customer who resides anywhere in the world in terms of the number of times they make a purchase, the kind of products they prefer, or any kind of product that they prefer based on their interaction with the store. Historically, organizations had no easy way to access such information. Rather, they had to collect data from third-party sources, from retail stores, from the point of sale, and from their own salespeople. The IoT gives organizations the ability to obtain customers feedback about products in real time, to replenish products in real time, to schedule delivery trucks, and to perform maintenance. Further, by implementing the IoT, organizations can reduce costs associated with refilling shelves and vending machines, and they can increase consumer satisfaction by reducing out-of-stock products or out-of-service facilities.

Organizations need to consider two things when implementing the IoT: the customer journey in terms of engaging with the organization and operational excellence. Since this panel focused on CRM, the discussion here focuses only on the customer journey. The pre-purchase phase represents an important part of the customer journey. In this phase, organizations could analyze prospective customers' details such as their location, closest stores, and so on. Proximity marketing becomes relevant because, when a customer walks by a shop, organizations could use beacon technology to send a message to their mobile device. Organizations can send such messages when customers enter other locations as well (e.g., when they walk in a specific aisle). Apart from using beacons, organizations could use video cameras to obtain further details about customers' behavior inside the store. By implementing video cameras, organizations can detect customers' age and gender and determine what kind of promotions they need to push to their phone. Figure 2 depicts the future of smart retailing, a connected store.
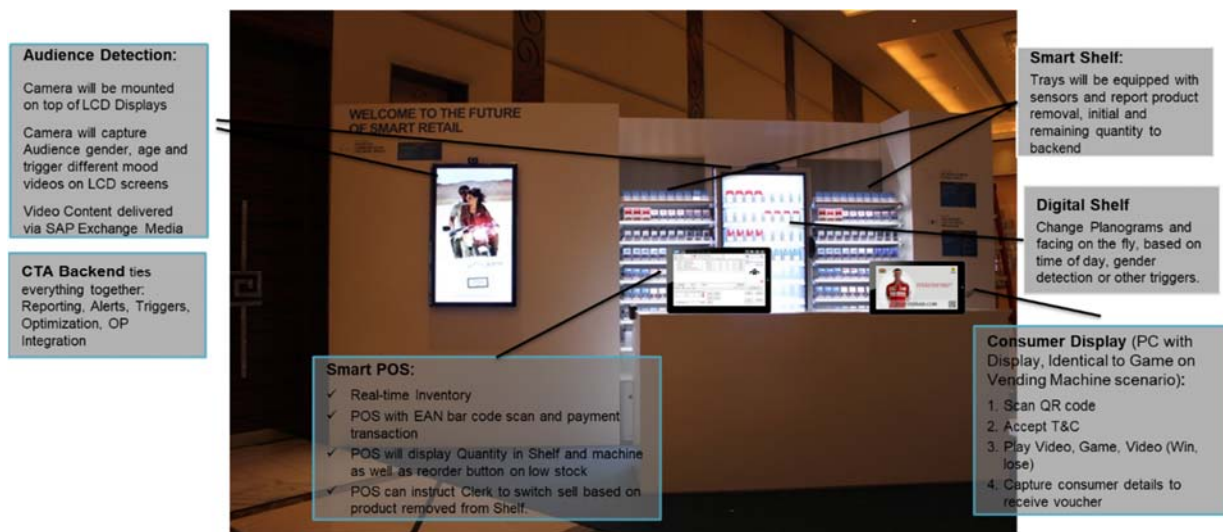
Figure 2. Connected Store

The PoS phase comes after a customer passes the pre-purchase phase. In this phase, SAP plans to use "virtual planogramming". Virtual planogramming refers to a technique that focuses on understanding customers' profile and position products based on details about them. A virtual shelf (usually a 50-inch LCD display) displays all products. Based on the customer that encounters that aisle, the store owner could reorganize and display the related products every few seconds based on the customer's details. Virtual planogramming refers to this concept. In the PoS phase, organizations can also have the option to include an interactive vending machine that allows customers to interact more with vending machines. For example, customers can view more information about products, check similar products, check a product's rating, and so on. Finally, in the post-purchase phase, customers can use near field communication (NFC) tags to scan items in the shop. The NFC tags can store information such as a Web address or contact details, and one can use them to quickly and efficiently transfer information to mobile phones. Further, NFC tags can replace barcodes and QR codes, and customers can even make mobile payments with them.

Figure 3 depicts the future of a vending machine. This vending machine would also include additional features such as an age check. For instance, if a store sells cigarettes or alcohol or other products that would require the store clerk to check the person's age, the vending machine would include this feature. The machine can take a picture of the person's driving license and, using face recognition techniques, verify the person's identity. Further, the camera can also perform other functions as well. For example, a customer can stand in front of the machine, record a video, and send a gift to somebody else in any other location in the world. While standing in front of a vending machine, the recipient could receive this video and the gift that the person has sent to them. Connected stores involve detecting individuals' age and gender in real time and dynamically changing products' price. In the future, vending machines that see customers will recognize them. They will look at individual customers as individuals with a certain loyalty number and a loyalty profile and can offer dynamic pricing and discounts based on their profile.

Figure 3. A Smart Vending Machine

By implementing connected stores, organizations could achieve benefits such as:

1) **Customer profiling (real-time profiling):** customer profiling constitutes a significant advantage with connected stores. Such profiling includes profiling consumers' full purchase history, sizing, tastes, and budget. Imagine a customer walks into a store and the sales assistant's PoS or vending machine bleeps with the customer's information. A few moments later, the sales assistant presents the customer with hand-picked items.

2) **Targeted marketing in terms of pushing products to customers through sensors:** to drive consumption, organizations need to capture real-time data and customer's historical data such as purchase history, brand loyalty, age, and gender. Consider a customer arrives at Frankfurt Airport from Hong Kong. A sensor picks up the individual's mobile phone, which subsequently receives an email. The message lists products that the consumer has purchased or looked at in Hong Kong prior to flying. The messages show details such as price, store locations, availability with a drop-down menu in the email that allows the customer to "click and collect."

3) **Product identification technology:** due to smart sensors in vending machines' shelves, one can easily verify products' availability. The smart PoS will enable the organization to determine real-time inventory, point of sales with barcode scans, and payment transactions. The PoS system will display products' availability on shelves and vending machines and include a reorder button to reorder items. The PoS system can also instruct the clerk regarding the product availability and replenishment to reduce cycle time and increase operational efficiencies.

4) **Effective pricing tools based on the customer:** depending on a customer's profile, organizations can manage discounts and how much they sell products for. For example, with a platinum-level or gold-level customer, the store manager can offer a cheaper price for products/services or different products/services.

5) **Advance trendspotting that allows organizations to identify real-time trends:** if correlated with additional data such as geospatial or census data, sensors can enable stores to pinpoint optimal product assortment and promotions and opportunities down to a single location. The stores can quickly identify slowly rotating products and react to the information in various ways. For example, stores can change the pricing for that location or consumer group and launch promotional content on the fly to push these products or exchange them for different products that might be in higher demand at this location.

In addition to SAP's IoT products, Microsoft has also introduced Microsoft Azure connected factory that enables seamless connection, predictive maintenance, and many more advance features. In a connected workplace, a cloud-enabled space-sensing network on the Azure IoT platform helps organizations to create workplaces that respond to people's needs while optimizing their property investments. In addition to these known IoT vendors, many other organizations such as Cisco systems, Verizon Enterprises, IBM,

Dell, and Oracle provide solutions as well. As per the discussion above, by implementing the IoT, organizations can 1) create new business value and ecosystem advantages, 2) evolve their business processes to turn insights into outcomes, and 3) know where risks and opportunity exists from connected data.

3.2   Artificial Intelligence and CRM

CRM also now includes artificial intelligence (AI). Due to the IoT and other technological advancements, CRM has had to evolve to capture and analyze a constantly growing stream of information and data points about customers. Accordingly, many organizations have implemented AI in CRM through machine-based learning algorithms to analyze large CRM data sets. Amalgamating AI and a CRM system makes the latter more intelligent. For example, with a smart coffee machine that uses the IoT and connects to an intelligent CRM system, a coffee shop can track how much coffee customers consume. The store manager can track which type of coffee consumers consume and which consumers in particular buy what particular coffee. As such, the store manager can manage customer profiles, understand which coffee sells well, manage promotions, and manage the supply chain in the back end. For example, consider draught beer, a US$130 billion market globally. Every day around the world, thousands of people enjoy draught beer, yet we have seen no significant technological breakthroughs to help the industry increase its revenue. By implementing smart beer machines, managers could determine how much beer each tap in their stores serve, when the taps activate, and the beer's quality. SAP has introduced Beverage Analytics for Weiss beer, a revolutionary platform that one can install on any beer tap to monitor and analyze every single drop poured in real time. As a beverage distributor, such a platform represents one of the best ways to track and understand patron consumption. Beverage Analytics sends the data it collects to SAP's secure cloud server for analysis. In addition, CRM giant Salesforce has acquired startup AI companies such as Tempo, MinHash, PredictionIO, and MetaMind to introduce new AI initiatives.

An organization can implement AI solutions in its CRM system's sales, marketing, and services parts. Organizations can utilize AI in a CRM system's sales components to prioritize and respond to the hottest leads first, forecast, enact dynamic pricing, and automate sales cycles. In terms of marketing, an organization can use AI to automate its marketing activities, perform customer analytics, predict campaign success, analyze trends, and trigger campaigns using machine learning. For example, with Salesforce, IBM has implemented a weather forecasting app. By using this application, insurance companies can alert their customers and send early weather warning messages. Such AI initiatives will ultimately help organizations to reduce their costs and increase their customer service. Similarly, an organization can improve its CRM's service side by introducing functionalities such as chatbots and the ability to track and analyze customer satisfaction. Such functionalities from AI help organizations to increase productivity, improve how accurately they forecast, increase customer retention, and provide insights based on historical data.

4   Big Data and its Impact on CRM

Organizations typically implement a CRM system to better understand their customers and provide a means to build sustainable relationships with them. We can classify CRM processes into three types: strategic, operational, and analytical (Iriana & Buttle, 2007). Strategic CRM processes focus on creating customer-centric business culture where one directs investments decisions towards optimizing customer value. Operational CRM processes focus on automating processes and managing workflow across the sales, marketing, and services divisions. Finally, analytical CRM processes focus on leveraging customer data to increase customer satisfaction and organizational value. In the past, due to market competition, most organizations automated CRM processes using business process-management technologies and enterprise CRM applications. However, they used these systems in an independent manner. Moreover, organizations relied purely on data that their in-house systems collected. With the proliferation of social media, organizations can now obtain data about how consumers feel about them and their behavior from external systems (mostly in an unstructured format). Going forward, to be competitive, organizations must go beyond automating their CRM processes by making them more intelligent and embedding analytics into their operational CRM processes and operational CRM applications. Further, with the advent of social media, organizations have access to seamless data about customers, which enables them to exploit data for gaining competitive advantage. As such, big data—large-volume, complex, growing data sets with multiple, autonomous sources—holds promise and challenges to organizations. Google Chief Executive Officer Eric Schmidt stated at Google's 2010 Atmosphere convention that "We now create as much

information every two days, as we did from the dawn of civilization to 2003". This data volume can cause confusion paralysis if one does not harvest it correctly. For instance, customer retention, acquisition, upselling, cross-selling, satisfaction, and loyalty all become challenging to conduct due to the volume of available data. Figure 4 illustrates the sources that lead to this volume and variety.
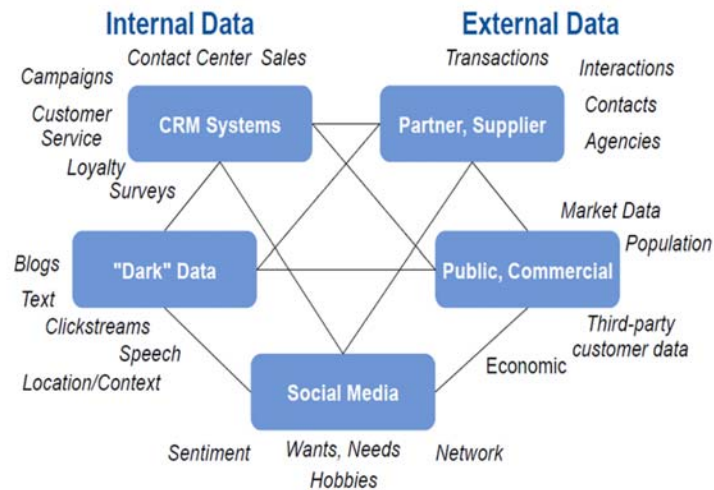

Figure 4. Sources of Big Data for CRM (Laney, 2015)

When looking at the sources of big data in general, organizations usually consider email, multimedia, mobile and social media sentiments, friend networks, influencers, and other external public sources of data such as weather and sensors. The addition of machine sensors in devices also provides a means to collect more data from operational data sources. Further, dark data—which refers to data that one acquired through various sources but not used in any manner for decision making—represents an interesting new data type that has gained momentum. Thus, CRM systems can include third-party customer data from commercial entities, a host of data from social media, and dark data. Organizations gather dark data through various business activities and computer network operations that managers have not previously used to garner insights. For instance, dark data can refer to aggregated emails that an organization sends and/or receives from customers or internal email interactions on product development based on customer service encounters. Organizations can now include these previously untapped data sources in CRM analyses due to the growth in big data analytics.

Big data has become the next big force of change in CRM. Organizations can use big data in their CRM in many ways, such as for marketing, sales, customer-service, and customer experience-management purposes; however, big data can also paralyze organizations. To be successful in CRM, organizations need to identify the area that they can gain the most and initially implement it in that area to gain organization-wide momentum. Organizations need to manage and analyze different data types to obtain insights. Table 1 summarizes the characteristics of the three different data types available to an organization: structured data, hybrid data, and unstructured data. Different sources also provide data for an organization to make informed decisions. For example, organizations typically rely on data that they receive from enterprise resource planning (ERP) systems, PoS systems, and many other systems that they deal with daily basis. However, in contemporary business, organizations need to analyze different sources such as social media, sensors, and so on.

When many people think about big data, they mostly recognize it in terms of text and multimedia, which exemplify unstructured data. Yet, not many organizations utilize unstructured data to gain insights. As such, governance processes for managing such data in the CRM remains in its infancy. We still do not know this data's return on investment since the techniques for analyzing and schemas for storing it continue to evolve and have not reached maturity. Hybrid data involves structured and unstructured elements coming together. For example, clickstream data and sensor data such as RFIDs have some textual and unstructured aspects but also some structured aspects.

Table 1. Data Characteristics

Criteria	Structured data	Hybrid data	Unstructured data
Example	ERP, SCM, POS	Clickstream, sensors	Text, multimedia
Users	1000s	10s	10s
Governance	High	Low	Little to none
Value	High, known	Low	Unknown
Point of creation	Internally	Both	Externally
Schema	Well defined	Known	Changing
Modeled	On write	As needed	On read
Usage	Reports, KPI	Analysis	Discovery
Scope	Corporate	Department	Individual
SCM: supply chain management; KPI: key performance indicators.			

Organizations need to understand these data types since such understanding will determine the nature of insights they can derive. For example, organizations can use structured data gained through ERP, CRM, and PoS systems to understand the products and services that customers buy, and which products have a high chance to fail. In addition, organizations can use data that they gather on sales forecasts, campaign response rates, win/loss, call tracking, and so on to further enhance these insights. On the unstructured side, organizations could gather data from social media. The way organizations aggregate good and bad comments and sentiments that customers post regarding products provide them with a better overall view of their customers' purchase behavior and product sales data. In turn, organizations can react better to the sales numbers and other structured data that they have by combining it with unstructured data.

By gathering hybrid and unstructured data, organizations can address what they should do when an individual customer calls to inquire about a product, whether they should follow Amazon in conducting predictive analytics, and whether they should look at customer behavior patterns on social media and offer customers a discount. Using hybrid data, organizations can do online personalization, dynamic video creation, and contextual marketing. Further, using unstructured data, organizations can promote social/mobile conversations and conduct offer management. With different types of data and resources, organizations can ask deeper and richer questions and, consequently, make deeper and richer decisions. For example, by collecting data in real time, an organization could ask how much of a product they have sold in a certain 30-minute period and, thus, better ascertain what action it should take at that moment. Figure 5 presents an example of the questions that organizations could ask and the insights they could gain by implementing a big data-centric CRM.

Organizations can apply Phillips-Wren, Iyer, Kulkarni, and Ariyachandra's (2015) big data framework when implementing big data initiatives in the CRM space. Figure 6 illustrates a CRM-focused big data framework that Teradata developed and sample techniques, processes, and data sources relevant to CRM.

While considering CRM-centric big data initiatives, organizations could focus on different aspects such as consumers, stores, and ecommerce. The big data environment that organizations use for CRM has different value densities. In other words, transaction data, such as ERP and CRM data, have high-value density because these databases store compact and not sparse data. They provide value right away. On the other hand, social media, sensor data, weblog data, or clickstream lack density because they may not provide a steady data stream. As such, organizations should not treat all data equally for CRM.

Organizations also need to consider different data-processing techniques. Organizations can easily accomplish structured data processing via traditional Structured Query Language (SQL), whereas multi-structured data requires custom programming. A unified data architecture framework can support multi-structured data. Different vendors tout products with the ability to do so. For instance, Teradata has a product called Teradata Listener that can ingest and distribute data streams by using NoSQL, SQL, and other languages together to process data. This environment operates at a CRM's backend; thus, users cannot see it. In addition to Teradata, other popular big data service providers include Tableau, Logi Analytics, DataStax, Cloudera, and Attunity.
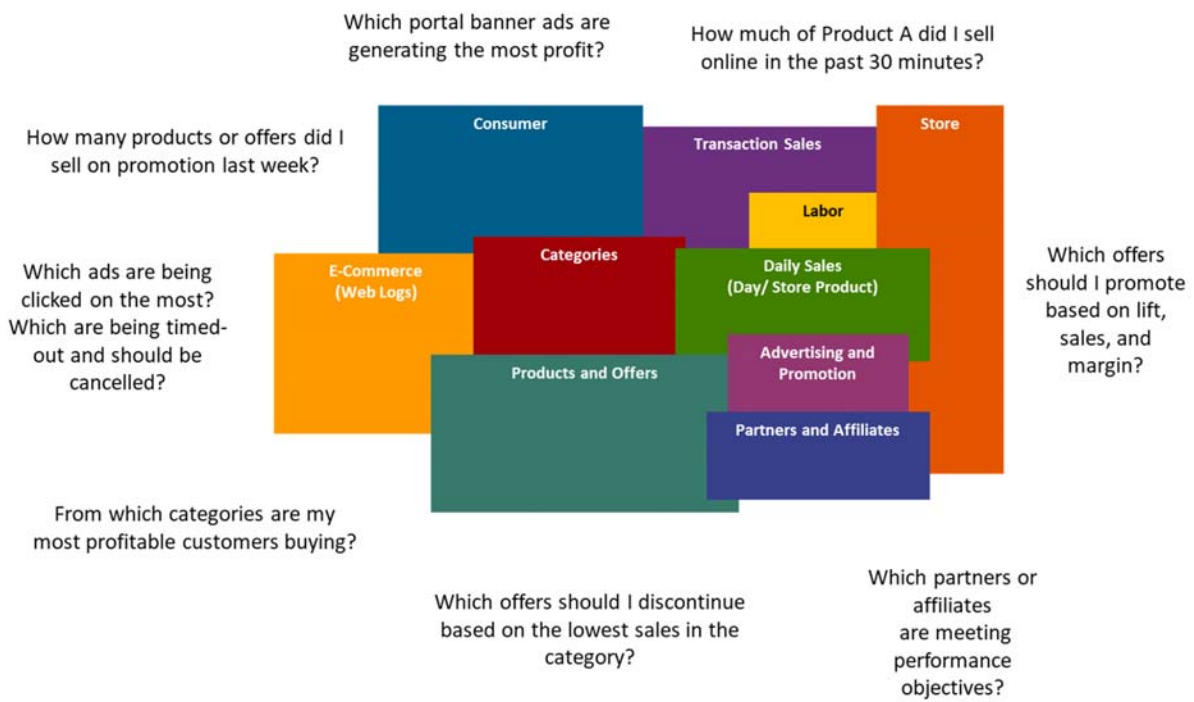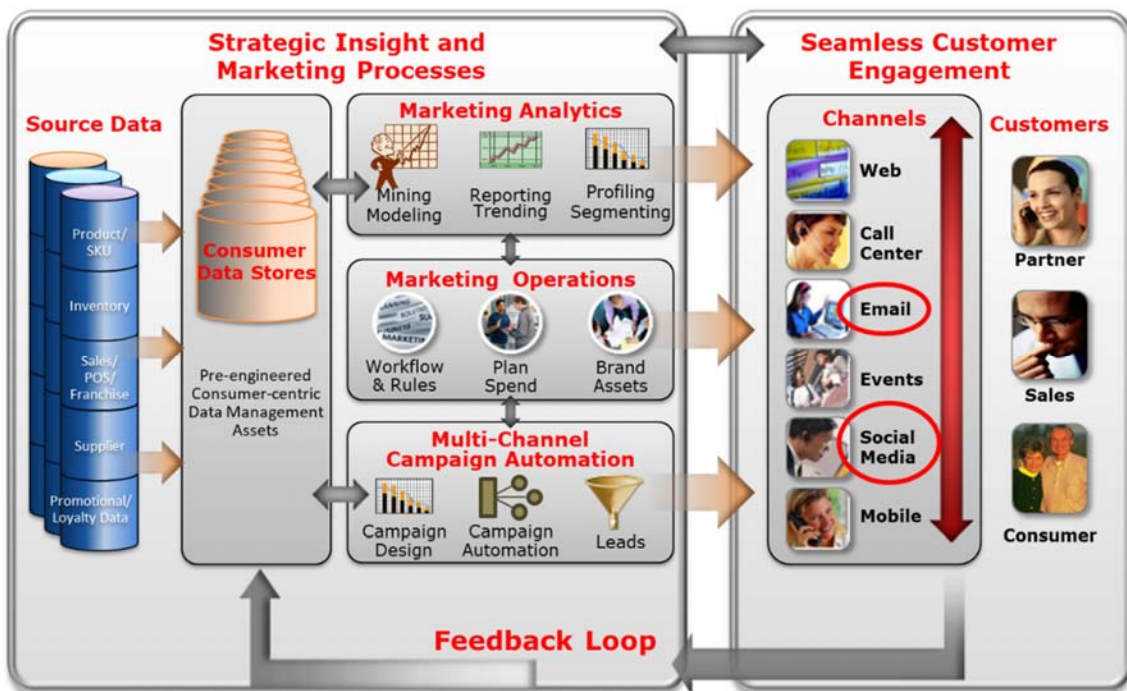
Figure 5. Big Data-centric CRM (Forbes, 2015)

Figure 6. CRM Big Data Framework (Schrader, 2014)

4.1   Pros and Cons of Application of Big Data to CRM

When discussing big data and CRM, Ford Motor Company in the US stands out as a great exemplar. Ford neared death during the 2000s. At that time, the company began to use its business operations data, along with all multimedia and Web data on customer activity, to enhance and identify what customers wanted. Big data and CRM presented Ford with an excellent opportunity to improve its products to meet market needs, which helped it to recover. As John Ginder, Systems Analytics and Environmental Sciences Lead at Ford has said:

> We recognize that the volumes of data we generate internally — from our business operations and also from our vehicle research activities as well as the universe of data that our customers live in and that exists on the Internet—all of those are huge opportunities for us. (Incite Group, 2012)

According to a Gartner survey (Hare & Heudecker, 2016), one can find the biggest opportunities for big data analytics in the marketing and sales areas, which again highlights the importance of using big data analytics in marketing and CRM. Given the increase in the number of people who use smartphones, organizations have a huge opportunity to collect social media data and use it in CRM. In addition to social CRM, sentiment analyses use data on customers' friend networks to examine if the marketing campaigns used for customers may work on their friends. Further, organizations can use big data analytics to help look for key influencers that can help drive their marketing campaigns.

Even though using big data in CRM has many positives, it also has some disadvantages. The most prominent issues include privacy and the legal issues related to adopting big data in CRM. In general, in big data CRM projects, organizations typically create and analyze customers' profiles. For example, targeted advertising requires an organization to collect insights from analyzing customers' personal and usage data. Many customers may find organizations that collect, store, and analyze their sensitive data intrusive. In most cases, customers have no idea what sort of information they share on social media. However, organizations scrutinize such social information to gain insights for their businesses. Nevertheless, organizations continue to adopt and conduct big data analytics in the CRM space to gain customer insights and successfully compete in the marketplace. When considering CRM big data projects globally, it has become a main priority and a growth sector in the Asia-Pacific region as compared to the rest of the world. An early 2016 study indicated that 45 percent of the Asia-Pacific region prioritized and invested in big data technologies compared to about 38 percent for the rest of the world (Forbes, 2016). Additionally, the Asia-Pacific region has increased its investment in big data by over four percent compared to North America (3%) and Europe, the Middle East, and Africa collectively (2.5%). Therefore, despite the negatives associated with big data, it seems organizations should implement it to thrive.

5   CRM Innovation in Banking Industry in India

India, the second most populous country with a population of over 1.3 billion, has one of the fastest growing economies in the world (Nayak, Goldar, & Agrawal, 2010). It constitutes the 11th-largest economy by market exchange rate and the third-largest country by purchasing power parity (World Economic Outlook Database, 2014). Further, India has the fastest-growing telecommunication market with the third highest number of users of smartphones behind the US and China (Lomas, 2013). Conversely, India has a chronic socio-economic imbalance and significant demographic diversity due to its various cultures, languages, values, and religions. Amid such disparity, the commercial banking sector in India—like all other organizations—needs to provide high-quality service to retain existing customers as acquiring new ones involves considerable cost (Mishra, Mishra, Praharaj, & Mahapatra, 2011). As such, the banking sector has also introduced technology-intensive channels such as Internet banking, telephone banking, mobile banking, and automated teller machines (ATMs). Further, with advances in the technology landscape, the banking sector has had to implement holistic CRM (i.e., CRM systems that include all three CRM types) to retain their customers. In this section, the discussion highlights how banking organizations in India have applied advances in CRM

A customer's lifecycle has six life stages: adolescent, student, beginner-earning, high-earning, pre-retirement, and retirement. Organizations need to fully understand customers when dealing with them. To obtain such an understanding, some banks in India have implemented data warehouses—large-scale data repositories that cache historical data about customers (Jarke, Jeusfeld, Quix, & Vassiliadis, 1999). Organizations typically apply such technologies to make informed decisions that provide a competitive advantage (Larson & Chang, 2016). However, organizations need to have proper analytics in place to use

a data warehouse effectively and efficiently. When organizations build their CRM properly, they gain immense benefits such as quick and seamless access to customer data, enhanced customer satisfaction, enhanced customer lifetime value, improved customer share, better global participation, and better ability to identify new business opportunities (Sedera, Bose, Shankararaman, Lokuge, & Kumar, 2016a; Vun, Harun, Lily, & Lasuin, 2013). Banks such as Garanti Bank in India have applied IBM banking data warehouse (BDW) techniques to analyze their customer-related data (Polatoglu & Ekin, 2001). They have created data patterns using customer demographics, transaction data, usage data and product/service data to gain insights.

In addition to Garanti Bank, some banks in India have successfully implemented CRM in a holistic manner. Some examples include Axis Bank, HDFC Bank, ICICI Bank, State Bank of India, Kotak Mahindra Bank, and Bank of India. Anecdotal evidence about these banks' CRM initiatives suggests several critical success factors: 1) establishing a strong case with business requirements, 2) obtaining executives' commitment, 3) picking the right team, 4) building a strong change management plan, 5) prioritizing users and involving them in the project, 6) analyzing processes and redesigning as necessary, 7) using a phased approach, 8) ensuring data quality, 9) measuring progress with tangible goals, and 10) providing adequate training and support.

Social analytics in CRM has become a key ingredient in most Indian success stories. In particular, successful companies have used social analytics to provide tailor-made solutions by segmenting the market through demographics and socio-economics. They also flourish through multiple channels such as mobile and social media. Considering the role of social media in CRM, most banks perform sentiment analysis to predict possible churn. For instance, many consumers do not simply leave a bank: they may have talked about the bank on their social media or contacted the bank's call center (i.e., highly unstructured data). However, organizations can analyze such data with text-mining tools. Further, organizations can personalize and recommend certain products with data that they collect from social media.

Beyond big data, the IoT has also enabled many pathways for the banking industry. For example, banks can collect data from swipe cards, mobiles, tablets, ATMs, card readers, and laptops. They can use data about customers, their transactions, and the devices that they use. Based on this information, they can offer different services to customers. Further, organizations can connect with customers in myriad ways. They can provide financial advice based on their usage, habits, and so on. According to Infosys (2018), banks can provide special financial advice and offers to customers who participate in agricultural activities. Based on the harvest, crop yield, product type, and so on, banks can provide flexible financial terms for their customers due to the IoT. Accordingly, they can improve their profitability and increase customer loyalty (Lokuge, Sedera, Atapattu, & Samaranayaka, 2016).

Apart from the above advantages, social media and CRM allow organizations to better detect fraud. According to Kanniainen (2010), security represents an essential part in today's banking industry as the number of fraudulent transactions has increased. As such, fraud prevention has become a priority for banking organizations (Sullivan, 2010). Organizations can also detect fraud more accurately and efficiently using social media data apart from operational, usage, and financial data. Proactive fraud management using data analytics provides an opportunity for banks to gain customers' confidence and trust.

6 Making the "Real Markets" the Focus of CRM the Curriculum

Since the 1950s, organizations have moved from a product orientation to market orientation and, thus, signposted the advent of contemporary marketing practices (Sheth, Sisodia, & Sharma, 2000). In marketing, common knowledge dictates that acquiring new customers costs five times more than retaining existing customers (Blattberg & Deighton, 1996). As a result, organizations have focused on relationship marketing, which has created an enormous urge for CRM (Kotler & Armstrong, 2010). As organizations shifted their focus from the product to market, organizations started collecting and analyzing information about customers and the market (Hung, Hung, Tsai, & Jiang, 2010). Further, they have identified the need to use IT such as CRM systems to help organizations provide personalized solutions for their customers (Dyche, 2002). Further, Web 2.0, social media, mobile, and the IoT have facilitated collaboration and connection and challenged organizations to follow customer-oriented practices. Accordingly, universities have an opportunity to introduce a curriculum for CRM that favors industry requirements. In discussing the avenues for expanding the CRM curriculum, the panel focused on three key areas: relevance, process, and rigor.

6.1   The Need for a new Curriculum for CRM

Today, business schools around the world teach subjects that focus on marketing management and emphasize customers. As such, CRM would constitute a central concept for all business schools around the world. Many institutions around the world offer graduate certificate courses, graduate diploma courses, undergraduate, and master's courses on CRM. In particular, many institutions incorporate CRM as courses in business, marketing, and IT/IS programs. Even though educators consider such courses an established curriculum, the business community has criticized them for not reflecting the real business world. The current CRM curriculum focuses on completing a business scenario from the end user's perspective (e.g., sales personnel, marketing personnel, and customer services personnel). This functional-view approach can help one understand a CRM system's end-to-end business capabilities. For example, the existing curriculum covers the whole business process from creating master data to managing customer services. In between, it covers areas such as campaign management, customer segmentation, lead forwarding, lead acceptance, sales methodology and customer support. Yet, it does not cover technical information about a CRM system. A real organization configures its CRM system to align with its organizational needs, synchronizes the system with other available systems, integrates it with multiple databases, and transfers data from legacy systems. Yet, the current CRM curriculum does not cover these aspects.

Further, when analyzing a CRM analyst's responsibilities, one can see that organizations expect them to manage the CRM database, data's integrity, and the CRM's technical aspects. Further, as industry requires CRM analysts with technical knowledge, the expected graduation outcomes should cover such knowledge. However, the CRM curriculum commonly focuses on aspects such as scoping, gap analysis, customizing, solution delivery, trainings, and testing. As a result, graduates who complete current CRM courses would not have the exposure to a CRM system's technical aspects. Thus, if organizations recruited these graduates, they would lack job readiness, and the organizations would need to provide the necessary training and making sure the graduates can fulfill their responsibilities. Accordingly, organizations would face higher costs when hiring a new employee, and hiring would ultimately become a cumbersome, costly initiative. As a result, organizations demand a knowledgeable workforce (Rosemann, Sedera, & Sedera, 2000). While universities could produce suitable, industry-favorable graduates, they do not currently perceive that they will gain revenue or reputation from doing so. However, to break the vicious cycle, we require a new curriculum that suits industry needs.

6.2   The New CRM Curriculum

While educators widely use the "curriculum" notion, many definitions for the term exist. Some researchers define a curriculum as learning and teaching materials for a single course, while others argue that a curriculum also includes applied tools and methods in a course (Prifti, Levkovskyi, Knigge, & Krcmar, 2018). According to Prifti et al. (2018, p. 784), a curriculum refers to:

> Knowledge and skills students are expected to learn, which includes the learning standards or learning objectives they are expected to meet; the units and lessons that teachers teach; the assignments and projects given to students; the books, materials, videos, presentations, and readings used in a course; and the tests, assessments, and other methods used to evaluate student learning.

Following this definition, we define CRM as "creating, developing, and enhancing individualized customer relationships with carefully targeted customers and customer groups to maximize their total customer lifetime value. As such, CRM courses should not only focus on the theoretical aspect but also maximize the practical knowledge to enhance its relevance to industry.

While analyzing a CRM's components, panelists highlighted that CRM represents a discipline that transcends marketing, information systems, and business (see Figure 7). CRM includes concepts that emerge from business disciplines such as strategic management as customers constitute a strategically important entity for organizations. The marketing discipline directly contributes to CRM by providing concepts such as channel management, lead generation, campaign management, and so on. CRM also includes topics that lie at the intersection between management and marketing, such as customer lifecycle management, customer portfolio management, and customer retention and development. Usually, in most business schools, when educators teach CRM, they focus on teaching these topics.
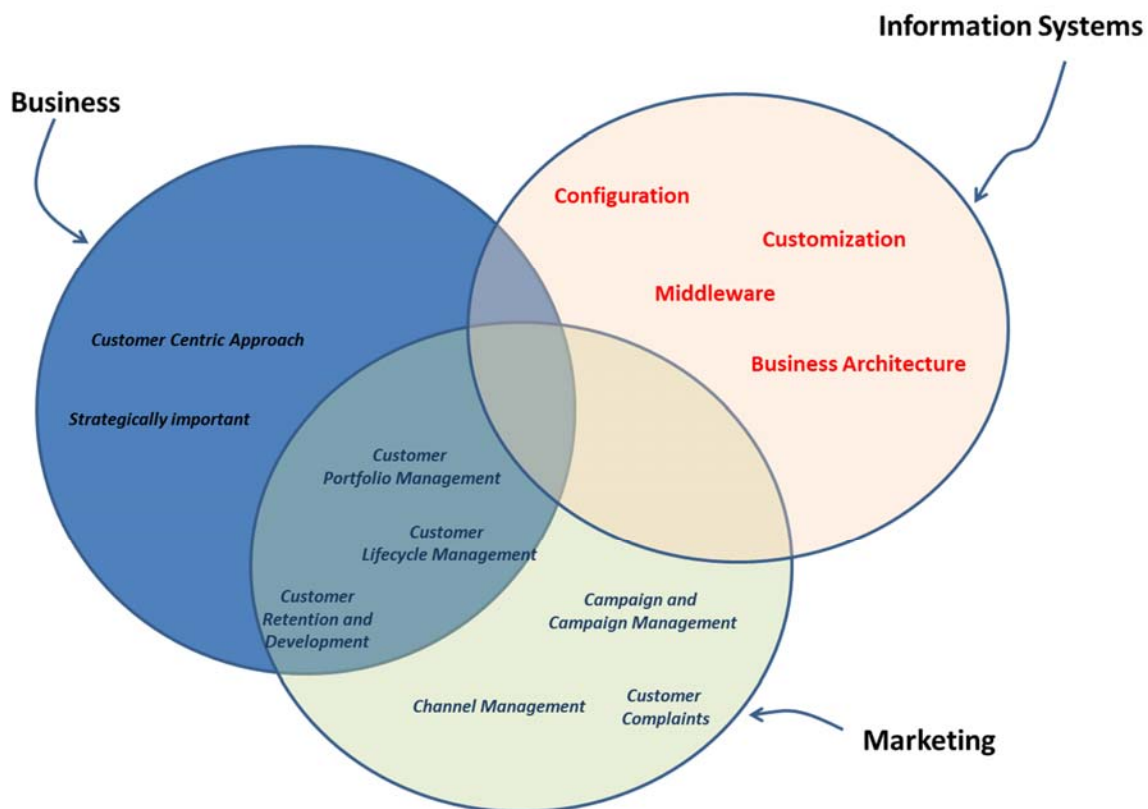
Figure 7. The CRM's Transcending Nature

In the contemporary business environment, a CRM analyst will need business knowledge, marketing knowledge, and information technology knowledge. Many technologies have emerged in the CRM arena that a CRM analyst needs to know how to use. As a result, IT and information systems (IS) schools have begun offering CRM subjects in their courses, which focus more on configuration, middleware, customization, and business architecture. However, in order to enhance CRM's relevance and rigor, such courses also need to balance these subjects appropriately. Usually, a CRM course in a business school will focus on fundamentals of business and marketing and then move to industry placements, while IT/IS schools will focus on CRM's technical aspect. For example, students who have completed a CRM course from a business school might not understand CRM middleware or configuration/customization at all. On the other hand, students who have completed a CRM course from an IT/IS school might not adequately understand CRM fundamentals. To maximize CRM's relevance and the rigor, all schools should follow a strategy that incorporates both business and technical aspects.

In 2015, the Queensland University of Technology initiated a new CRM curriculum that includes CRM's business and technical aspects. Educators developed the curriculum with the support from industry and, thus, maintained a balance between its rigor and the relevance. Table 2 depicts the new CRM curriculum's lecture and tutorial schedule.

As Table 2 shows, in the first three weeks, the course addresses CRM's fundamentals and focuses on highlighting its business aspects. In the fourth week, the course addresses CRM's technical aspects. The fifth week includes a guest lecture from an experienced CRM consultant/analyst who shares insights about the industry. Further, this lecture focuses on the technical knowledge that a CRM analyst requires. The sixth and seventh weeks focus on CRM configuration and customization. In these weeks, the course discusses the architecture, customization requirements, configuration types, and so on. From the eighth to eleventh weeks, the course favors business topics. However, the tutorials for these weeks take on a technical flavor as students discuss how organizations implement each CRM topic. Finally, in the final two weeks, the course focuses on CRM analytics—one of the most important additions to the CRM curriculum as most industries nowadays request CRM analysts with analytical capabilities. Each week, students attend a two-hour lecture and a two-hour tutorial session to discuss and to experiment with the concepts

they learn from the lecture in the laboratory. Instructors can conduct the tutorial sessions using suitable software such as SAP CRM, Oracle, Sugar CRM, and so on. Using real software in the course adds value to students.

Table 2. Lecture and Tutorial Schedule

Lecture schedule	Tutorial schedule
Week 1: Introduction	CRM features and functions overview
Week 2: CRM business fundamentals	CRM master data and organizational model
Week 3: CRM lifecycle management	CRM partner channel management
Week 4: CRM technical architecture	MVC, BOL, GenIL, BusLogic—assignment I
Week 5: Guest lecture—case study (business)	UI customization, role-based architecture
Week 6: Configuration and customization I	Configuration and customization
Week 7: Configuration and customization II	Data replication, administration, data exchange, monitoring and error handling
Week 8: CRM campaign strategy	CRM campaign management
Week 9: Guest lecture—case study (technical)	Assignment II
Week 10: Customer planning and acquisition	Customer acquisition
Week 11: Retention and development	Customer retention and development
Week 12: Customer experience analysis and analytics	Customer experience analysis and analytics
Week 13: The future of CRM and BRF+	BRF+

6.3 Challenges

While we need a new CRM curriculum, it comes with many challenges. First, the CRM curriculum needs to balance rigor and relevance and, thus, both business and technical topics. However, if a business school offers the subject, the lecturer/facilitator might not have required knowledge/background about CRM's technical aspects. As such, instructors may find it difficult to locate suitable resources to deliver the subject. However, instructors can minimize this constraint via including guest lectures from the industry.

The curriculum's breadth versus its depth poses another challenge. Here, breadth refers to the variety of topics that the curriculum covers, whereas the depth refers to how deeply and to what extent it provides details about a given topic. While the curriculum needs to cover various topics, universities need to ensure they cover them deeply enough as well. Considering institutions face limited resources and time, covering CRM in enough depth and breadth represents a common challenge for the CRM curriculum. However, educators can minimize this challenge by understanding the students they teach, the course level (i.e., undergraduate vs. post-graduate course), and how long they have to teach it (i.e., short course vs. normal offering). Similarly, educators face challenges in managing mature versus young students because it can influence the degree to which the CRM curriculum should include business versus technical topics. For instance, young adults typically have less industry experience, which means they need a CRM course that more broadly covers topics compared to mature students. In contrast, mature students would require a specialized CRM course. In classes with predominantly mature, industry-experienced students, instructors can find it beneficial to include real-world examples and case studies. However, when educators teach both mature and young students, they need to balance the topics in terms of depth and breadth.

Educators also face a challenge in using fictitious versus real projects. While educators need to ensure the subject stays relevant to industry, they can find it challenging to introduce real projects to assignments since they require knowledge, experience, expertise, and time to manage. Even though educators can easily manage and edit fictitious projects to introduce concepts, they might not provide the expected outcomes for students. Thus, while these challenges exist, educators have many opportunities to introduce such industry-flavored subjects. Such subjects will not only generate profit for universities but also create new bridges with the industry.

7   Conclusion

Organizations around the world increasingly demand CRM (Nam et al., 2019). By implementing a CRM system, organizations can better focus on their overall customer engagement strategy and, thus, manage, automate, and synchronize their services and data from their sales, marketing, customer-service, and technical-support activities. Further, by providing the opportunity for organizations to efficiently manage their marketing, sales and services, CRM systems offer competitive advantages to organizations. With the advent of digital technologies such as social media, mobile, business analytics through big data, and the Internet of things, organizations can use CRM systems in more advanced ways to cater to their customers and employees. In general, all organizations look for technologies that can help their employees to fully engage with their customers. Further, through these digital technologies, organizations can gain the potential to uniquely customize services and/or products for unique customer requirements. However, despite a wealth of literature of CRM, the panel commenced with the premise that researchers have focused little on understanding CRM systems' innovation potential in light of the aforementioned technology enhancements.

7.1   Consolidation Framework

The panel focused on the advantages of analytics, social media, big data, and in-memory technologies that can assist organizations to predict, prevent, and avoid various socio-economic issues and plan for appropriate interventions. The panel discussed many such advances in the current technology landscape. Further, the panel provided a curriculum on CRM to reflect such changes in the CRM landscape. Based on the new technological advances, the panel also discussed relevant topics that the new curriculum needs to cover. In conclusion, the panel highlighted the importance of CRM innovations for practice, teaching, and research. To summarize the panel discussion and to provide guidance for future discussions on this topic, we employ Payne and Frow's (2005) conceptual framework for CRM strategy (see Figure 8).
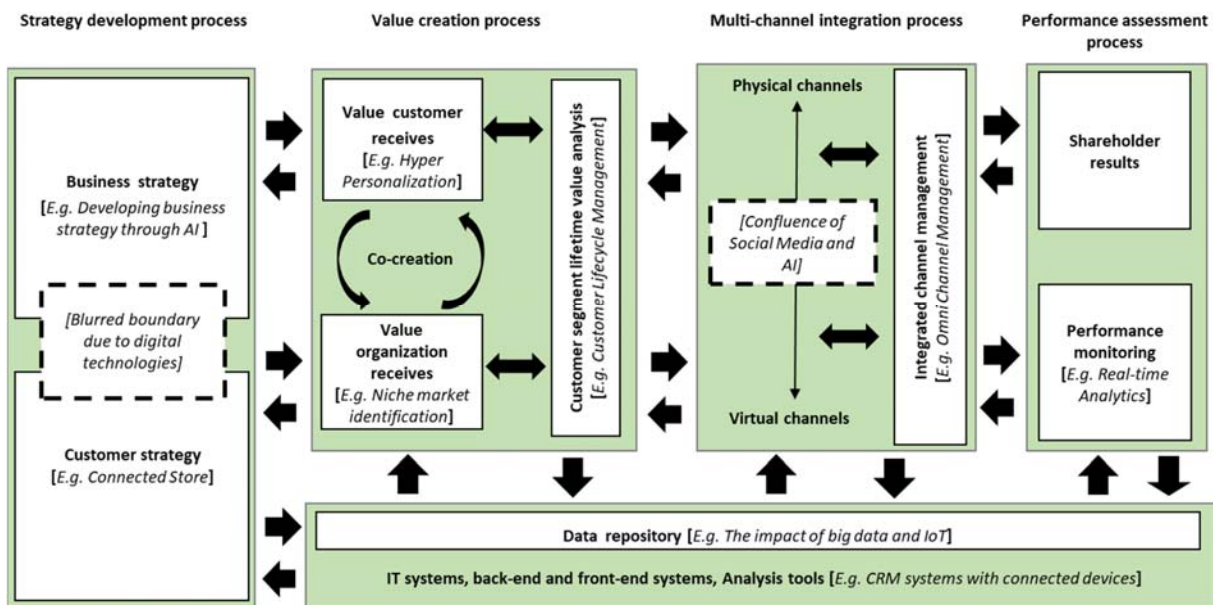

Figure 8. CRM Consolidation Framework (Payne & Frow, 2005, p. 171)

Table 3 provides and defines the key notions that the CRM literature discusses about each process. For convenience, we use the same key notions from the CRM strategy framework and highlight the topics that the CRM literature has discussed thus far. Overall, Figure 8 breakdowns CRM's key concepts, processes, and value chains. The panel highlighted the changes that occur in CRM strategy development, value creation, multi-channel integration, and performance-assessment processes in relation to the changes in technologies. We indicate these changes and examples in Figure 8 with square brackets and italicized text.

Table 3. CRM Overview Table

CRM area of research	Definition and study areas
Strategy-development process	The strategy development process focuses on the interaction between business strategy and customer strategy and how it determines the success of CRM strategy. Study areas include the antecedents of CRM strategy implementation (Askool & Nakata, 2011), customer strategy (Yu, Nguyen, Han, Chen, & Li, 2015), customer knowledge management (Campbell, 2003), knowledge creation (Khodakarami & Chan, 2014), and the impact of disruptive technologies (Christensen & Overdorf, 2000).
Value creation process	Value creation focuses on determining the value a firm can provide to its customers, determining the value the firm gains, and managing the value exchange. Study areas include customer segmentation (Bukhari & Kazi, 2016), value for customers (Prahalad & Ramaswamy, 2004), value for firm (Richards & Jones, 2008), value co-creation (Hidayanti, Herman, & Farida, 2018), and ecommerce (McCole & Ramsey, 2005).
Multi-channel integration process	The multi-channel integration process focuses on appropriate combinations of channels to use that ensures the customer experiences and attaining a single unified view of the customer. Study areas include online channels (Butler, 2000), strategic channel alignment (Müller-Lankenau, Wehmeyer, & Klein, 2006), integrated channel management (Peppard, 2000) eCRM (Reid & Catterall, 2015), and social CRM (Trainor, Andzulis, Rapp, & Agnihotri, 2014).
Performance-assessment process	The performance-assessment process focuses on ensuring that a firm delivers its strategic aims appropriately and improves in the future. Study areas include performance monitoring (Kımıloğlu & Zaralı, 2009; Mitussis, O'Malley, & Patterson, 2006), Shareholder results (Kalaignanam, Kushwaha, Steenkamp, & Tuli, 2013).
Data repository	Focuses on collection, collation, and use of customer data and information from all customer contact points to generate insights. Study areas include data mining (Bahari & Elayidom, 2015), data quality (Even, Shankaranarayanan, & Berger, 2010), information systems (Laudon & Laudon, 2002), and privacy (Fletcher, 2003).

Christensen and Overdorf (2000) discuss the impact that disruptive technologies have on CRM. However, considering the advances in digital technologies, we need to research and revisit CRM fundamentals. Therein, this panel clearly contributed to both research and practice in better explaining the changes that contemporary technologies such as the IoT, big data, social media, and analytics may yield.

7.2   Guidance for Future Research and Practice

The panel provided several pathways for future research that focus on the availability, adoption, and rapid integration of digital technologies into CRM systems. The panel envisaged that IoT-led CRM will become a key disruptive technology in the future. When organizations integrate IoT devices with CRM systems, they can generate personalized customer interactions. In addition, such systems have low latency, which means organizations can immediately respond to customers. Furthermore, the panel introduced the "CRM of things" as an emerging phenomenon that practitioners and researchers could pay more attention to. Moreover, future research can observe how the advent of the IoT contributes to large data repositories with the potential for organizations to derive new insights into their customer offers, derive new products for niche markets, create better customer engagement channels, and create product bundles.

The panel introduced the notions of "dark data" and its potential impact on CRM. As we discuss in Section 4, dark data has recently gained momentum. Dark data refers to third-party customer data from commercial entities and data from social media in CRM systems. As dark data represents a relatively new phenomenon, IS researchers can investigate areas such as its consequences, benefits, integration, platform nature. Moreover, the panel demonstrated how organizations can employ social media to offer hyper-personalization. As a result, they can execute their business strategy and the customer strategy more accurately. In relation to using social media (including data) in CRM, privacy, ethics, and customer segmentation strategies will remain prominent researchable areas.

From a slightly more technical standpoint, researchers can also observe the openness of platforms, platform architectures, and business processes and how organizations innovate through technologies. Moreover, AI, machine learning, and big data analytics can provide future CRM research a specific edge. Therein, the panel saw an opportunity for researchers in data mining, machine-learning algorithms, and assessments that determine the suitability of systems and techniques. Finally, the panel recognized the need to measure strategic CRM initiatives' outcomes as a key future direction. For example, measuring

hyper-personalization through digital technologies would provide novel insights that both practitioners and academics would find valuable. The panel saw the potential for researchers to engage in new and emerging topics such as technology use, technology adoption, and business value but also contribute to a body of knowledge that uniquely pertains to CRM. As such, we request researchers to better understand the extended boundary conditions between traditional information systems paradigm and the novel CRM notion.

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