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Towards a holistic perspective of customer relationship management (CRM) implementation: A case study of the Housing and Development Board, Singapore

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Abstract

Organizations have increasingly recognized the importance of managing customer relationships, and many organizations are turning to customer relationship management (CRM) to better serve customers and facilitate closer relationships with them. This paper examines the implementation of CRM at the Housing and Development Board (HDB) in Singapore. The CRM architecture (comprising operational CRM, collaborative CRM and analytical CRM) deployed at HDB reflects a holistic approach to CRM implementation that integrates three key perspectives of CRM, namely, the business, technology and customer perspectives. Drawing from the case study, we present a holistic framework for CRM that binds information technologies with business processes for the delivery of high service quality.

Keywords: CRM; Perspectives of CRM; Holistic framework; Case study

1. Introduction

As companies' business strategies become more customer-oriented with the evolution of mass customization and personalized services, information technologies (IT) are used not only to serve various departments within an organization, but also to serve end-users of the organization's products and services. Specifically, the use of IT adds a new dimension to relationship marketing, known as customer relationship management (CRM) [23,31]. At its core, CRM is about acquiring customers, knowing them well, providing services and anticipating their needs [10]. However, a problem with CRM is that it means different things to different people [40] and organizations approach CRM differently, e.g., some may view CRM as a technology tool while others may view it as an essential part of business. Hence, there is a need for a holistic approach by organizations to integrate IT with its business processes and customer service delivery. A holistic approach helps ensure that different perspectives of CRM are explicitly considered, and that operational CRM, analytical CRM and collaborative CRM complement each other.

The Housing and Development Board (HDB) is regarded in Singapore as one of the government agencies most receptive to IT. The appointment of a senior executive as Chief Information Officer (CIO) in 1999 signaled the commitment of the agency to utilize

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IT strategically. Since then, HDB has consistently leveraged IT to streamline its business processes and provide better services to its customers. Indeed, HDB is recognized as a model organization in IT implementation (evident in its many IT-related awards), having successfully carried out business process reengineering, data warehouse implementation, knowledge management implementation and CRM implementation, among many other IT projects. As a pioneer in IT implementation among public sector organizations in Singapore, HDB presents an ideal case study from which other organizations may draw useful lessons. In particular, HDB's progressive development of its CRM systems and various other IT tools for the aim of providing customers with service excellence is worth examining. This is especially so as previous research has shown that the success rate of CRM varies between 30% and 70% [37], and there is currently a lack of successful CRM case studies (especially on public organizations) reported in academic journals. In this paper, we examine HDB's success in CRM implementation as a case study, and propose a framework for CRM encompassing business, technology and customer perspectives. We also discuss the CRM architecture as operational, collaborative and analytical systems to address the need for CRM to be approached as an integrated organizational strategy encompassing both front office and backend business operations.

The paper is organized as follows. Following this introduction, we review the literature on CRM. In the process, we lay the foundation for a holistic framework of CRM that integrates the technology, business and customer perspectives of CRM. Next, we present the background description of HDB, followed by the evolution of CRM at HDB. Subsequently, we describe the components of the CRM architecture at HDB. We then analyze CRM implementation at HDB through the holistic framework and discuss its impact on the agency.

2. Literature review

2.1. Need for CRM

As the power of the seller shifts to the buyer [10,39], organizations are realizing that competing with cheaper, better or different products is not sufficient, and competitive advantage cannot be achieved by purely differentiating products alone, but through enhanced customer relationships [25]. At the same time, customers are experiencing low switching costs and could easily redirect their loyalty from one company to another [17]. Their expectations have also risen in recent years, making CRM a necessity in today's customer-driven business environment [21].

Previous research has shown that it costs more to attract new customers than retain customers because of advertising and marketing costs [22,26,27]. This means that, instead of differentiating products, organizations should differentiate customers [19] and they should shift their emphasis on market share to customer share [23].

Research has also indicated that organizations must not only retain their customers but also expand the useful lifespan of customers with the organization [42] by means of IT. Through such technologies, one-to-one relationships [23], value creation [4,34], cost containment [13], customer value analysis, product and website customization are possible on a scale that was not possible in the past [19]. According to the 80/20 rule, 20% of customers provide organizations with 80% of sales [30], which further emphasizes the need for organizations to retain and engage in long-term relationships with profitable customers to maximize profits [9].

2.2. Perspectives in CRM

CRM researchers have derived many different but closely related definitions of CRM [10,29,32]. Schultz [33] identified two forms of CRM, one related to service marketing, which focuses on the organization's capabilities to foster relationship with the customer. The other concerns using technology such as data marts and data consolidation to deal with sales force automation. Peppers and Rogers [23] considered CRM as a business strategy that is to serve as the norm. Other definitions exist, but generally, they may be categorized into three complementary perspectives: technology, business and customer. To reflect the different aspects of CRM emphasized in previous research, we adopt a holistic view of CRM that encompasses all three perspectives. In the following sections, we discuss the three perspectives in detail.

2.2.1. Technology perspective

From a technological perspective, IT are considered an enabler that allows organizations to foster closer relationships with customers, analyze customer information and provide a coherent view of the customer [10,31]. Organizations thus require an integrated information system to provide relevant, real-time and accurate information to all employees in the organization [24]. This integrated information system usually requires integration of the marketing, sales and service functions of the organization [9,25]. Hence, in this perspective, CRM is the underlying infrastructure with

the necessary applications for understanding and interacting with customers efficiently [10,21,28].

The integration of information in the organization usually requires a centralized database, data warehouse or data marts to store all relevant information about the customer together with operational data within the organization [10,31]. The integrated system also streamlines the organization's business processes to provide more efficient work procedures, allowing the organization to become more responsive to environmental changes and changing customer needs [3,38].

2.2.2. Business perspective

The business perspective recognizes CRM as an organizational strategy [23] relating to customer demographics, understanding and predicting consumer behavior [19], segmenting customers into customer groups [9], one-to-one marketing [24], analyzing purchasing patterns of customers [11], and basically knowing who the customers are, where they are and what they need [31]. Such analysis is crucial for decision making with regards to appropriate strategies to satisfy and delight customers. CRM also helps ensure that employees have access to appropriate information during their interactions with customers, so that employees may be better placed to make appropriate decisions in response to customer needs.

After identifying profitable customers, organizations can start building long-term learning relationships with customers by engaging in two-way dialogue [8,13]. This creates an on-going relationship as the organization and the customer interacts with each other, resulting in a win–win situation [34]. Personalizing and customizing products and services and cross selling are examples of methods to increase profitability from customers. This also results in marketing efficiency as appropriate strategies are targeted at profitable customers only [31,42].

The business perspective of CRM also encompasses the transformation required in the business processes, organization structure and culture of the organization [16,39]. Goodhue et al. [10] argued that an integrated information system that supports CRM initiatives is not sufficient. Organizations also require a change in mindsets to become customer-centric. The top management and employees have to be ready for changes in job roles, business processes and organizational culture to maximize the benefits of CRM [39].

2.2.3. Customer perspective

CRM from the customer perspective focuses on the interaction points of the customer with the organization [1,14]. Customers usually are unaware and do not care about the internal business processes of an organization [3]. However, customers are heavily influenced by interaction opportunities with the organization. Interactions include call centers, frontline sales personnel, the Internet, wireless communication channels, email, fax and many others [18,21]. Such interactions instill loyalty, and serve as demonstrations of service efficiency and customer friendliness of the organization. In extreme cases, customers leave companies due to bad services and interactions [13].

Customer interactions with organizations relate to customer loyalty and "word of mouth" advertising [5,17]. Organizations are allowing more time for employees to interact with customers as they realize that customers spend more time interacting with the organization compared to the actual purchase procedure [13]. Providing a complete, coherent view of the customer to all employees, especially to those who interact with customers, could help deliver top-notch customer service [10]. As customers develop loyalty and opinions of the organization through their interactions, organizations should understand what customers want through CRM.

The above discussion suggests that an effective CRM requires business processes oriented towards customers of the organization, with the appropriate technology to provide analytical and process support to the data gathered from the organization's interaction with customers. While each perspective or some combination has received some treatment, an equal treatment of all three perspectives is lacking in the current literature. There is thus the need for a holistic approach integrating all three perspectives (see Table 1). To devise the holistic framework, we draw on the experiences of HDB. Our motivation is that an integrated framework of CRM will help further a research agenda exploring the dynamics of interactions among the three perspectives that may be discerned in previous CRM research, thereby enriching our theoretical understanding of CRM.

3. Case study: Housing and Development Board (HDB), Singapore

3.1. Methods

To explore the various aspects of a CRM system, we have undertaken an interpretive case study of HDB. The case study methodology allows a researcher to explore phenomena that occur beyond his/her control [41]. Further, the interpretive approach provides an understanding of the information and the process whereby the

Table 1
Perspectives of CRM

	Technology perspective	Business perspective	Customer perspective
Definition	CRM as the underlying infrastructure and sophisticated applications to understand customers and analyze customer information.	CRM as the strategy of identifying, understanding and predicting consumer behavior to foster long-term profitable relationships.	CRM focuses on all interaction points of the customer with the organization.
Use of IT	High-level use of IT as the underlying infrastructure for information integration benefits the organization and customers.	Medium-level use of IT to analyze consumer patterns, customer segmentation and one-to-one marketing to generate win–win situations for both parties.	Medium-level use of IT for interactions such as personalization and customization of products and services for customers.
Organizational implications	Change management required for streamlining and re-engineering the organization's business processes due to adoption of integrated information systems and centralized databases.	Transformation required in business processes, organizational structure and culture. Mindset changes to the customer-centric as the emphasis is on long-term relationships with customers.	Changes in organizational structure to allow for more value adding interaction points for customers. Mindset changes such as employee empowerment to better serve customers.
Examples of IT used	Data warehouse, data marts, analytical tools such as OLAP, slice and dice and neural network.	Data warehouse, data marts, analytical tools such as OLAP, slice and dice and neural networks.	Call support center, Internet and wireless communication channels.

information system influences and is influenced by the context [38]. Klein and Myers [15] provided a discussion on the fundamental philosophy of conducting an interpretive case study themed as seven principles, which serves as a useful guide in our study. We apply the seven principles systematically throughout the process of analyzing data and theory, and in presenting our interpretive research, taking care not to apply the principles mechanistically. Table 2 summarizes the principles and illustrates their use in our study.

We selected our interviewees from the participants of various projects at HDB and interviewed them at HDB's

Table 2
Principles for conducting interpretive studies [15]

Principle	Application in this study
Hermeneutic circle: this principle describes forming interpretations by considering interdependent meaning of parts and the whole phenomenon.	This study examines the interdependent parts communicated by the participants, relating them to the whole phenomenon of orienting CRM in the organization through the business, technology and customer parts.
Contextualization: critical reflection on the social and historical context to help readers understand the emergence of the current situation.	The context of HDB as a receptive organization, with progressive, all-round development of organizational use of IT provides a context to current developments in CRM technologies in this public sector organization.
Interaction between the researchers and the subjects: critical reflection by researcher on socially constructed data in the context of the case.	The participants emphasized the importance of CRM as a continued journey rather than a project, which is reflected in various service orientations inherent in business changes and technology choices at HDB. The authors could reflect on the impact of such organizational attitude, and incorporate it in the holistic perspective of CRM.
Abstraction and generalization: explaining and validating observations by using theory as "sensitizing device".	This study observes the permeation of the quest for service excellence at HDB, and synthesizes data with a review of CRM literature. This process highlights the need to account for the holistic approach to CRM, where organizations integrate business, technology and customer perspectives into CRM.
Dialogical reasoning: sensitivity to contradictions between data and theoretical preconceptions.	The authors began an examination of HDB through each of the business, technology and customer perspectives commonly observed among CRM studies. Each perspective served only to explain parts of the events observed at HDB, leading to the current integration of perspectives.
Multiple interpretations: sensitivity to possible multiple interpretations of events among participants.	Multiple participants interpreted HDB's service orientation within their scope of routines. Their perspectives are incorporated into the data analysis of this study.
Principle of suspicion: sensitivity to possible "bias" and systematic "distortions" in narratives collected from participants.	The project team spoke in terms of project life cycle, while participants noted CRM as an ongoing project at HDB. The study looks beyond the distortions of convenient framing of projects and narrations (in this illustration) to explain the holistic approach to CRM at HDB.

Table 3
HDB's mission statement and corporate objectives

Mission statement
We provide affordable quality homes.
We create and rejuvenate our towns.
We promote the building of communities.

Corporate objectives
- To formulate and implement housing policies and programs to provide affordable quality homes and foster cohesive communities.
- To plan, develop and upgrade towns to create a vibrant living environment of distinct identity.
- To deliver property management and housing administration services that meet the needs of our customers.
- To advance innovative and cost-effective building design and technology.
- To build a learning and caring organization that inspires creativity and develops staff to give of their best.

premises. We conducted 12 interviews with key personnel involved in the projects to understand the organizational goals and objectives of HDB; the breakdown is as follows: CIO (two interviews), project team (five interviews) and key participants from the information systems (IS) department (five interviews). In addition, we had several exchanges of emails and discussions with the interviewees to further understand the data gathered through interviews. To better understand HDB's technology strategy and vision, we had several interviews and informal conversations with the former CIO who was with HDB until 2003. All interviews were unstructured, with open-ended questions to elicit information on the nature of the participants' actions and their perceptions. Each interview lasted about 1.5 h. All interviews were taped with the participants' permission. The taped interviews were transcribed for analysis and supplemented by notes made immediately after the interviews. Secondary sources of data included project documents, reports and presentation material on the various projects at HDB.

3.2. Organizational background

HDB was set up in 1960 to provide affordable housing for the public. Currently, about 85% of Singapore's population lives in HDB apartments. In addition to providing affordable housing for the public, HDB also provides services in the allocation and management of HDB properties, aimed at fostering community cohesion. HDB also aims to be a learning organization that inspires creativity and develops its staff. Table 3 shows the mission statement and corporate objectives of HDB.

3.3. Information services (IS) department

HDB's IS department consists of about 230 employees and is certified to Capability Maturity Model (CMM) level 5, signifying the importance the organization places on developing quality IT systems while maintaining and improving current business processes. The organizational chart of the IS department is shown in Table 4.

The IS department's traditional role as being purely systems-oriented has changed, and its members are now required to think as business planners and strategists, handling IT projects with an eye on providing value-added services to both internal and external customers. The IS department is an active contributor of suggestions for new business approaches and formulation of revolutionary business plans, which were previously the mainstay of corporate departments. The CIO commented:

> "Employees should work like business planners and strategists. The days when IT personnel simply functioned within their traditional roles as developers and implementers of IT systems are long gone. Today, those in this field not only have to be competent in aspects of IT, but also need to have panache for business."

HDB began implementation of operational systems (e.g., sales, resales) in the 1980s. However, these systems were stand-alone applications as they had little

Table 4
Information services (IS) department

Director
IT security unit
Corporate information systems section
End-user services unit
Office systems unit
Business information systems section 1
Financial and accounting systems unit
Rental and car parks systems unit
Property management systems unit
Business information systems section 2
Data management and development support unit
Customer services systems unit
IT operations section
Administration unit
Quality management unit
Data center operations unit
Operations planning unit
Infrastructure management services section
Systems management unit
Network and communications unit

With effect from 1 July 2003, the position of the CIO has been renamed Director (information services) for consistency with the terminology used in the civil service.

interaction with customers and were restricted in analytical capabilities. In the 1990s, a formal Information System Plan (ISP) was drafted. The ISP is a blueprint for ensuring that various information resources in the agency are compatible and integrated. Various integrated corporate databases and applications were also developed during this period.

3.4. CRM at HDB

A major milestone which signaled the focus on CRM within HDB's organizational structure was laid on the 5th of November 2001, when the CIO approved the implementation of the CRM architecture throughout the organization. The CIO commented:

> "CRM is a journey, and over the years, we have put in place many application systems and infrastructure to support the business needs of HDB and pave the way for CRM."

HDB defines CRM as "a management approach that enables it to identify, attract and improve its relationship with its customers by reorganizing services around customer intentions." As the definition suggests, CRM to HDB is not simply about technology, system or product, nor is it a one-off massive project for the organization. HDB uses CRM as a strategic tool to better understand its customers and improve service delivery by increasing customer satisfaction and decreasing operational costs. CRM is therefore a continuous journey to meet changing customer demands and sustain superior service quality.

3.5. Motivations and objectives for implementing CRM

As highlighted by Storbacka and Lehtinen [34], a vital concept in CRM is customer value creation. The aim is not to maximize revenue from single transactions but to build a lasting relationship with the customer. For HDB, the primary motivation behind CRM is not to earn greater revenue, but to improve the ability to create value for customers through service quality. This emphasis on quality is one of the primary reasons for HDB's focus on CRM. From a business viewpoint, HDB is a service-oriented organization and service excellence is a key area of focus. Hence, it is an organizational goal of HDB to ensure that its products and services are superior in quality and affordable.

CRM at HDB is designed to provide a varied range of transaction channels for customers while obtaining a reliable and encompassing view of the customers for the organization. CRM fulfils these functions as it has as an integral component a data warehouse that stores consistent records of customers. The records help HDB realize the goal of personalized interaction for each customer, giving it a single view of each customer, and allowing the same set of records for each customer to be retrieved for reference regardless of the department that the customer conducts his or her transactions with. The IS department played a pivotal role in advising business units within HDB on how integrated customer information could be achieved through CRM.

Further, in accordance with the Singapore government's effort towards service excellence in the form of PS21 (www.ps21.gov.sg), the true concept of CRM was emphasized and propagated through the ranks in HDB. Initiated in early 2000, PS21 stands for Public Service for the 21st century and it has two basic objectives:

1. Nurture an attitude of service excellence in meeting the needs of the public with high standards of quality, courtesy and responsiveness.
2. Foster an environment which induces and welcomes continuous change for greater efficiency and effectiveness, by employing modern management tools and techniques while paying attention to the morale and welfare of public officers.

The first objective is more tangible, relating to service quality, whereas the second objective is far more fundamental to an organization, transforming organizational strategy, culture and services. Fostering a suitable environment involves transforming mindsets and creating different organizational culture and norms. PS21 requires a change in mindset about change—not change to a specific final state but an acceptance of the need for change as a permanent state in the civil services. HDB recognized the need for strong top management support for any organizational change to succeed. The CRM project was thus championed by the Deputy Chief Executive Officer (Estates/Corporate) responsible for overseeing HDB's interactions with customers.

In line with the objectives set by PS21 for service excellence, the primary goal of CRM in HDB has been to ensure that customers receive seamless, consistent and world-class customer service. The objectives of CRM implementation can thus be summarized as follows:

(i) Ensure that both customers and HDB have a single view of each other.

(ii) Keep consistent records of customers and be proactive in serving customers.
(iii) Facilitate personalized interactions with customers.
(iv) Provide customers with a selection of channels appropriate to their needs.
(v) Provide database management facilities to support HDB's business analysts with business intelligence.

3.6. Building blocks for CRM

The CRM system at HDB was developed in-house by the IS department. The development was based on four building blocks: vision, process, customer information and technology. These building blocks represent the necessary steps taken by HDB in order to achieve its objective of customer service excellence.

HDB had a clear and concise *vision* for the CRM system from the start. The CIO reported:

> "We had always stressed quality software that served business needs at an optimal cost instead of merely chasing technology trends."

The vision for the CRM system was derived from the key corporate objective of providing high quality service in the allocation and management of HDB properties. This broader corporate objective was driven from the top by the CEO, giving the various departments within HDB the necessary push towards the common goal of service excellence.

Process was emphasized at HDB. Both internal and external business and IT processes were integrated as a single unit to ensure a consistent "picture" of customers throughout the organization. Business processes were reengineered for the streamlining of business operations and for customer needs to be better served [36]. The reengineering effort was driven by the aim to deliver a high level of customer satisfaction and it served to deliver the service quality message to employees at all levels of the organization.

Along with changes in business processes, *customer information* was also carefully developed. HDB recognized that easy and convenient access of information was crucial for the provision of personalized service to customers. In this aspect, the information system plan (ISP) that HDB developed in the 1990s gave it a head-start, serving as a ready database of customer information on HDB services over the years. In the data warehouse that was completed in 1996 [2,35], customer information was classified into three main types: customer data (name, age, sex, address, etc.), business transaction (housing loans, sales, etc.) and interaction history (when a customer wrote to HDB, called HDB, paid a visit to HDB, etc.). Such information was stored and recorded in the customer information database, which could be readily analyzed to yield better insights about customer needs.

The last building block, *technology*, enabled the previous three building blocks to gel together. Over the years, many application systems and much infrastructures were put in place to support the business needs of HDB. The CRM architecture was developed over this infrastructure and it continues to evolve as IT applications are added to support new business practices and changing customer needs as part of HDB's on-going effort to organize business processes around customer service excellence. For instance, the voice and data infrastructure supporting HDB's CRM activities was completed in 2002.

3.7. CRM technology

Fig. 1 shows the CRM architecture which HDB has developed over the many application systems and infrastructure supporting its business needs. The CRM architecture comprises three segments: operational CRM, collaborative CRM and analytical CRM. In the sections below, we describe the systems that comprise each segment and their role in the CRM roadmap of HDB.

3.7.1. Operational CRM

Over the years, HDB developed various operational systems (e.g., sales, resales, rental management systems) that provide functionality to staff to carry out their work tasks in serving customers. This group of systems, known as *operational CRM*, comprises the following:

> *Operational systems*—application systems (e.g., sales, resale, rental) that support customer interaction systems, front office systems and backend business processes.
> *Databases*—integrated corporate and subject databases (e.g., customer, customer interaction, sales) that support various application systems.

A key aspect of CRM is to ensure that both customers and HDB have a single view of each other. It is thus important that different operational units share consistent information about the customer. Corporate databases were set up to facilitate this sharing of data across various operational units and information systems. Hence, within the operational CRM structure, relevant customer information is stored in databases to facilitate business transactions.

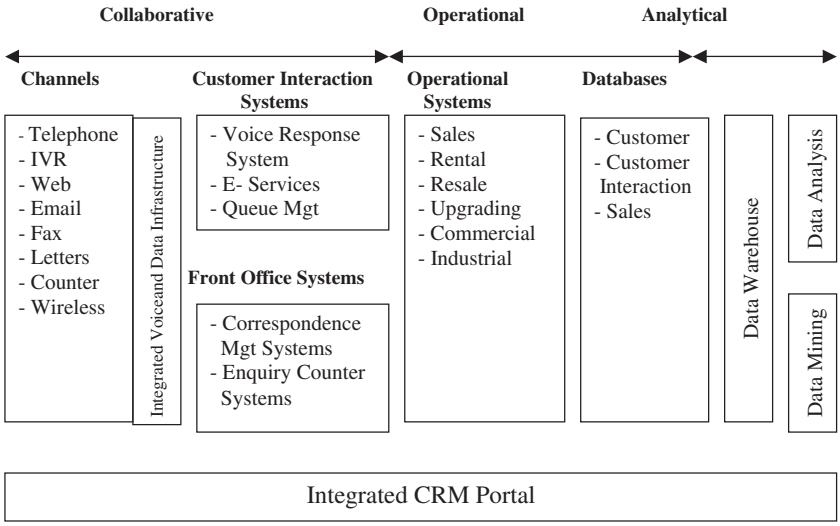

Fig. 1. CRM architecture in HDB (source: HDB).

3.7.2. Collaborative CRM

Apart from providing a robust operational CRM environment to ensure customer information is managed and maintained consistently at the backend, HDB also employs various technologies to facilitate interactions with customers, namely *collaborative CRM*, which comprises channels, integrated voice and data infrastructure, customer interaction systems, front office systems and an integrated CRM portal:

Channels—the medium by which customers interact directly with HDB (face-to-face, via the phone, web, email, fax, etc.)

Integrated voice and data infrastructure—Voice-Over-IP (VoIP) technology that allows voice and data to be transmitted over the same network. The latest investment towards CRM in HDB is the implementation of an intelligent IP-based integrated voice and data infrastructure to unify the business communication system. The "pure IP solution" (also known as the "IP-PABX" system) enables call center functions to be shared among branch offices and the headquarters. Some of the features are interactive voice response and intelligent call routing to the next available customer service officer (CSO) anywhere in HDB. With this system in place, customers no longer need to call different telephone numbers to access different services at HDB. With all its branch offices integrated through the voice communication system, the public could also reach the various branches using the same telephone number. Other channels of communication such as email, faxes and Web requests have also been implemented. Hence, customers can choose the most convenient channel to communicate and interact with HDB.

Customer interaction systems—application systems through which customers interact directly with HDB. Examples include the voice response system (for phone calls), InfoWEB (Web portal for the public to access information and services) and the queue management system (for applicants to check their queue status for HDB apartments).

Front office systems—application systems which HDB staff make use of when providing service to customers such as the correspondence management system (which manages and tracks correspondence from customers) and the enquiry counter system (for walk-in customers).

Integrated CRM portal—the gateway for customers to access information and transact electronically with HDB (*customer portal*) and for CSO to access the necessary customer information (*customer service portal*).

A well-integrated and consolidated *customer portal* helps ensure that customers and HDB staff have a consistent and holistic view of each other. The HDB InfoWEB (www.hdb.gov.sg) is the result of the effort towards building a customer community portal that aims to improve HDB's ability to acquire, serve and retain customers. The portal enables customers to easily obtain facts and details regarding sales and housing procedures. With an increasing number of e-services applications available, customers could now transact with HDB at their own time and pace, without the need to visit HDB personally. The information provided on HDB's Info-WEB is comprehensive and well-organized into user-

friendly sections that offer quick navigation to users, such as sections linking housing buyers and sellers to the relevant services. There are some e-service features such as payment of administration fees through cash card or credit card upon submission of applications. Tenders for various HDB projects are also published both online and in newspapers.

While the InfoWEB serves external customers, HDB staff members require a one-stop information access point to personalize customer service. The *customer service portal* puts together various tools and information that are required by CSOs to provide efficient service. The portal was developed in-house, leveraging existing IT infrastructure. It provides linkages to legacy application systems where a vast amount of customer and business related information resides. It also integrates with both traditional and IP-based telephony systems to provide CSOs with up-to-date customer information when they take calls from customers. The portal further incorporates knowledge management functions, where information is customized and presented in a format that helps customer service staff answer queries and share their experiences.

3.7.3. Analytical CRM

In the planning aspect of CRM, HDB implemented analytical CRM by means of a data warehouse.

Data warehouse—an integrated store of data that provides information for strategic and tactical decision making. It also includes capabilities such as data mining and data analysis using online analytical processing (OLAP). HDB's business analysts require vast amounts of information for planning, monitoring, analyzing business activities and proposing policy changes. The data warehouse supports the business intelligence needs of business analysts, allowing them to extract intricate and up-to-date information so that they may propose designs of housing that better suit customer needs. Also, the impact of changes to government policies (usually made known in budget announcements and expected to be implemented in a short time frame) can be quickly assessed through these systems.

4. Analysis of HDB's CRM system: towards holistic CRM implementation

HDB's CRM implementation reveals an interesting holistic approach to business, technology and customer perspectives. In this section, we present a holistic CRM framework derived from HDB's experience. Through the framework, we show that CRM does not merely relate to managing customers or business processes, but also encompasses an organization's business processes and the appropriate technology infrastructure supporting these business processes. Linking the business processes and technologies is the strategic placement of customers at the heart of the infrastructure. Thus, operational, analytical and collaborative components underpin the entire CRM architecture in the organization. We examine the framework in depth next, analyzing each of its components (Fig. 2).

4.1. Business: strategic vision towards business process changes

CRM requires the organization to have a strategic vision [21]. This vision needs to be embedded within the organization, its processes and its members [7]. It is achieved through organizational orientation towards customers through its attitudes, processes and data available throughout the organization [10]. By combining its vision and process orientation towards customers, an organization obtains the stable business platform to deploy its customer relationship management [6].

At HDB, the vision for quality service originates from the organization mission. Further, the vision for CRM has it as a journey and not a project with a life cycle. The CIO championed this vision, reflecting the top management's commitment to strong customer orientation. The pervasive service quality awareness is a key contributor towards the entire organization making a concerted effort in developing strong customer relationships. The awareness was made possible with the reengineering of business processes to improve customer satisfaction [36]. The key lesson here is the importance of a strategic

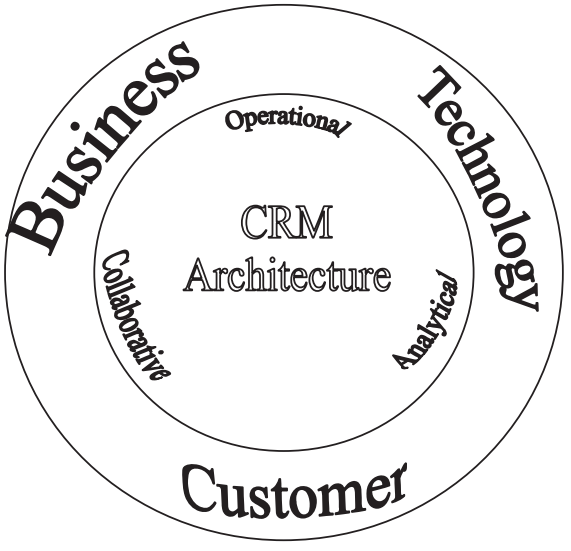

Fig. 2. Holistic framework for CRM.

vision for CRM and service quality awareness that is consistently emphasized by the top management and diffused throughout the organization.

4.2. Technology: enabling customer focus in business processes

Technology by itself has never been the solution to a business need. The application of technology has to be embedded into the business processes of the organization with a vision and purpose. Information about customers is often spread throughout the organization and technology enables the integration of such pockets of data to create a single view of the customer. Technology also integrates multiple channels of communication with the customer to provide a unified view of the organization to the customer and enables customization [7,10]. Enterprise-wide information systems and data warehouses, which provide a storehouse of organizational data, are often cited as key enablers of CRM infrastructure [19,20].

HDB developed a data warehouse with the early adoption of IT. The data warehouse gives a consistent view of the customer. The CIO commented:

> "We went after quality, consistency and integration in all our systems development."

The data warehouse helps HDB define its data consistently despite the array of information systems developed to support various business activities. Data consistency eases multi-channel integration, allowing HDB to launch its e-services and unifying its distributed regional offices into a single virtual call center where customers may reach different branches at the same phone number. Hence, an important lesson for managers is to get the basics right first, i.e., ensure data consistency and ease access to an integrated database or data warehouse prior to launching CRM applications.

4.3. Customer: delivering responsive and efficient customer service

Customers are at the heart of the CRM architecture. However, successful implementation of CRM depends on more than recognizing the importance of customer service delivery. While technology allows services to be provided through the medium that the customer prefers, the organization must maintain a unified view of its interactions with the customer across different channels. Consistent data sharing across channels is required, and that in turn calls for efficient and integrated systems support within the organization. Business processes should also be geared towards interaction with customers at a personal level [6].

Through a diverse set of systems (such as the CRM portal, customer interaction systems, front office systems, etc.), HDB set in place the backend systems for a single view of the organization from the customer's perspective. From the organization's perspective, a unified view of the customer was provided for across the various services and channels of communication with the customer. A CRM project member commented:

> "We designed our CRM based on a single view for the customer to improve customer experience. This system brings together all our channels, and seamlessly links our various branch office CSOs to the customer."

The backend analytical systems also help the organization evaluate its interactions with customers to understand and better serve their needs. Through its various programs towards developing customer service and improving customer satisfaction, HDB positioned itself for closer and more personal interactions with customers. An important lesson is that CRM implementation should be viewed as a continuous process of service enhancements to customers. This view is evident in the following quote on CRM philosophy from a project manager:

> "We see CRM not as a single project, but as a continuous journey of our organization."

4.4. Operational CRM: business systems and processes enabling CRM

The scope of operational CRM includes systems enabling the business processes of the organization. Such systems and processes relate to improving the systematic processing of services delivered to the customer. In a typical organization, such functions may relate to backend business process tasks such as the processing of service claims. This definition of operational CRM also emphasizes the importance of relating business processes to service delivery.

HDB developed its operational CRM through a series of systems that support reengineered business processes. The CIO championed the cause for quality software that was consistent within the organization and gave a unified view of the customer through the data warehouse. Components of the operational CRM that has been put in place include systems that support sales,

rental, resale, upgrading, and commercial and industrial management activities within HDB. These functional systems are each supported through individual databases, which are connected to the data warehousing system. The lesson here is that business systems and processes must be linked to customer databases to enable operational CRM to facilitate efficient and effective customer services.

4.5. Collaborative CRM: communicating with customers

The use of advanced information technologies enables multiple channels of communication between an organization and its customers. These channels provide opportunities for an organization to collaborate with its customers. The systems that comprise these channels of customer interaction are also known as touch points. Together with the infrastructure that enables deployment of related services, the systems form collaborative CRM. This part of the CRM infrastructure reflects how the organization matches customers with business functions to create and sustain customer relationships.

HDB's collaborative CRM includes customer interaction systems, which enable self service through the Web and delivery of customer service through various other channels such as the call center or other front office systems such as the correspondence management system. The collaborative CRM infrastructure presents a unified view of HDB to the customer across different channels. At the same time, the integrated infrastructure cuts across the channels to provide a platform that delivers up-to-date information on interactions between HDB and its customers. Giving customers the choice of channels by which to interact with HDB is important to raising service quality, but it would not be possible without the infrastructure that allows HDB to maintain consistency across its functions and customer communication channels.

4.6. Analytical CRM: knowing your customers

Analytical CRM comprises data relating to customers, their interactions with the organization and the analytical tools that are used by the organization to mine such data [19,31]. This data is closely related to the business processes and the services delivered by the organization to its customers. Capturing such data from the entire organization is important. Organizations generally possess segments of data concerning its customers across several business functions. To understand its customers better and derive greater value from its CRM operations, an organization should integrate its data to allow better analysis [20].

At HDB, the implementation of the data warehouse provided the technological infrastructure for a data repository. This was achieved through embedding systems with customer service orientation. HDB also linked its business processes consistently with the systems, a target that all systems development within the organization adhered to. Hence, data integration and data integrity facilitated analytical CRM by ensuring accuracy and consistency of customer information for analysis of trends that might affect demand for HDB's services (e.g., popularity of a type of housing over others).

5. Impact of HDB's CRM system

Six benefits for HDB from its CRM system may be identified: shift of emphasis from product/transaction to customer experience/relationship, reduced cost of service delivery, improved customer service, improved efficiency, facilitation of top management planning and ease of maintenance.

5.1. Shift of emphasis from product/transaction to customer experience/relationship

HDB's CRM initiative indicates a two-dimensional shift for the agency. As Fig. 3 illustrates, there is a shift from transactional thinking to relationship thinking at one dimension, and a shift from product-based thinking to customer experience-thinking at the other. Customer relationships in HDB were traditionally treated as a series of purchase events; however, individual business transactions are no longer the focus. Rather, it is customer experience throughout the duration of the relationship between the organization and the customer that is of paramount importance. For HDB, customer

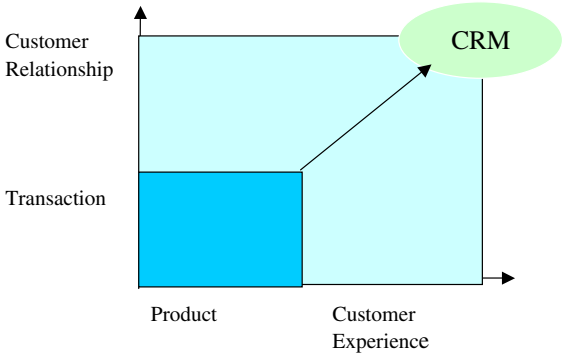

Fig 3. HDB's two-dimensional shift.

experience is enhanced through its holistic approach to CRM, bringing about a mindset change among its staff to become more customer-focus. One staff member commented:

> "HDB is a service oriented organization. Service excellence is the organization focus. CRM gets us to view services from the customer perspective. It enables us to improve our internal processes to serve customers better."

5.2. Reduced cost of service delivery

The availability of many channels (e.g., Web, phone, fax) enables customers to choose the appropriate channel to transact with HDB. HDB realizes significant savings when customers use the Web services it provides since transaction cost is lower when customers "serve" themselves. Time and effort needed to process hardcopy application forms are also saved as electronic application forms are more easily amended than hardcopy forms. With the implementation of the VoIP infrastructure, significant cost savings are achieved for the call center, as evident in the following quote from a senior manager:

> "The voice and data infrastructure using VoIP integrates voice and data networks into one. When a call comes in, it goes through the data network, and is intelligently routed to CSOs available in various branch offices, essentially forming a virtual call center. The benefit is that we achieve load balancing since workload is evenly distributed among CSOs at all branch offices. VoIP also enables us to slash the cost of inter-office calls, which are now routed through the Internet. We save on telephone charges."

5.3. Improved customer service

The CRM system includes a customer service portal, which allows consolidation and constant updating of customer information. The system provides CSOs with up-to-date and personalized customer information when they answer telephone calls from customers. For example, a customer calling to follow up on a complaint need not repeat his/her complaint as the CRM system will have a record of the previous conversation with HDB, which the CSO now handling the call can view on his/her computer screen. In addition, since calls from various branch offices are consolidated, customers no longer need to call individual branch offices at different phone numbers but a single phone number. A system user noted:

> "A lot of relevant information is now easily accessible. In the past, each piece of information had to be called up separately, which was time consuming and inconvenient when you were talking to the customer."

The CRM system also enables HDB to better understand customer needs, preferences and expectations, which in turn allows for better adaptation to customer specifications and requirements. Particularly, the CRM system allows HDB to have an integrated view of the customer, which translates into consistent and quicker responses to requests. Conversely, customers also gain an integrated view of HDB with InfoWEB, which provides a one-stop center for information, transactions and enquiries.

The impact of CRM is evident from the results of a survey on customer satisfaction. The proportion of customers reporting satisfaction with HDB's counter, phone and correspondence services was 100%, 98% and 97%, respectively [12]. One HDB staff member indicated the reason for the high customer satisfaction:

> "We don't have a quick account of how much the CRM system has helped us in terms of savings. What is important is the convenience to customers. It saves a lot of time for them."

5.4. Improved operational efficiency

HDB is now more operationally efficient as the integrated customer service portal contributes greatly towards reducing the overall workload of staff. To staff, the portal serves as an easily accessible source of information on each customer, resolving the past need for information to be manually retrieved from different repositories. Customers can also now find out relevant information and make enquiries through HDB's InfoWEB any time of the day instead of having to either call or write in as before. InfoWEB also helps CSOs better serve customers, as evident in the following quote from an HDB staff member:

> "The InfoWEB provides links to various web services. The CSO can go to same webpage as the customer, and guide the customer over the phone to the right link."

The CRM system also allows HDB to share data and collaborate with other government agencies, streamlining government processes and reducing duplication of work. With automation, paper work, manual administrative work and human errors are reduced, contributing to more efficiency.

5.5. Facilitation of business planning

HDB's CRM system allows for greater ease and simplicity in gathering data on customers. Analytical CRM tools are used to transform such data into useful information to help business analysts plan, monitor and analyze business activities and propose policy changes. Particularly, business analysts can extract information to help them devise designs of housing that are better suited to customer needs. At the top management level, information from the CRM system allows the planning of housing estates that are more appealing to customers. One senior manager commented:

> "CRM enables us to collect many types of data. For example, we can know about the customer's interaction history with us, when the customer lodged a complaint, when we reply, etc. Overall, CRM leads to better insights about customers, which helps us see how we can improve and plan for services that are of value to customers."

5.6. Ease of maintenance

The CRM system and HDB InfoWEB were developed in-house by the organization's own IS department. This provides HDB with flexibility and responsiveness in making adjustments and changes to the system when the need arises. Since system upgrades are often initiated by HDB's own employees (based on customers' feedback), it is more cost-efficient and easier to align the corporation's goals with the CRM architecture. In addition, troubleshooting and regular maintenance of the system are easier and cheaper than if the job were to be outsourced to an external vendor.

6. Conclusions

The importance of developing an integrated strategy towards CRM has long been emphasized in the literature [39]. However, researchers have emphasized the importance of business processes in CRM [10], or technology as an enabler in CRM [24]. In this paper, we have presented a holistic framework integrating all three perspectives of CRM, namely, business, customer and technology.

Drawing on the successful CRM experience of a government agency in Singapore, we have shown how a holistic approach to CRM delivers remarkable results. HDB, the organization in our case study, approached CRM in a manner that encompasses operational CRM, collaborative CRM and analytical CRM. HDB invested much time and funds in its goal to better serve its customers, and this has led to the implementation of an integrated CRM architecture to support its corporate objective of providing quality services to its customers. The end result has been the successful implementation of CRM. The achievement is reflected in the numerous awards that HDB has won: In January 2002, HDB was one of the 20 organizations selected for the Intelligent20 Award for the innovative use of technology. In March 2002, the CIO of HDB was named IT Person of the year by the Singapore Computer Society in recognition for his leadership in the use of IT within HDB and promoting IT certification within the industry. HDB thus serves as an instructive case of successful IT and CRM deployment. However, other viable approaches to CRM may also exist. Future research can examine the different approaches used by various organizations in implementing CRM and improve on the holistic framework proposed in this study.

Previous CRM research has generally focused on the private sector. Though public sector organizations are not profit oriented and are more concerned with cost reduction, the objective of CRM as a means to achieving superior service quality is relevant to both private and public sector organizations. Future research can examine differences in CRM practices among private and public sector organizations.

This case study contributes towards better understanding of CRM implementation and expands the paradigm of customer service to include integration with business processes and technology adoption. Overall, this case study should be useful in helping researchers and practitioners better understand the importance of a holistic approach to CRM as well as the potential impact of CRM on the organization. The study also fills a void in the literature as there are few cases of successful CRM implementation in the public sector published in academic journals. By examining successful cases of CRM implementation, practitioners can adapt and learn from other firms' experiences.

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