IT alignment strategies for customer relationship management

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ABSTRACT

Customer relationship management (CRM) is the overall process of building and maintaining profitable customer relationships by delivering superior customer value and satisfaction. A CRM strategy involves the entire enterprise and is employed on an ongoing basis. Despite the fact that CRM projects incur huge expenditures, a large percentage fails to achieve the stated objectives. Failure in CRM initiatives could be avoided if a firm's CRM strategies are intelligently linked with its employees, customers, channels, and IT infrastructure. In this paper, we focus on those linkages, particularly on the linkages between an organization's CRM strategies and its IT infrastructure. Even though the relationships between IT and business strategies have been extensively explored in the IT alignment literature, prior research has not addressed how a firm's CRM strategies are aligned with its IT infrastructure. In this paper, we investigate the issues relating to CRM-IT alignment based on an in-depth case study of a large, well-known Internet travel agency.

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1. Introduction

The forces arising from globalization, deregulation, increasing competition, maturing markets, demanding customers, and industry convergence [7] are compelling businesses to treat customers as a critical source of profitability and sustainable growth. Relationship marketing [2,3,37], also called *customer relationship management* (CRM), has been proposed to address the issues arising due to these changes. Relationship marketing focuses on attracting, maintaining, and enhancing customer relationships [2]. The goal of CRM is to develop long-term and mutually beneficial relationships in which the buyer and the seller focus on generating more satisfying exchanges [38]. This can be achieved by increasing communication with the right customer with the right offer, through the right channel, at the right time [40].

Interest in CRM has grown rapidly due to high customer expectations, increased interest in one-stop shopping, attention to one-to-one relationships, churn in customer pool, customers' knowledge about competitors, advent of new software infrastructure, compressed marketing cycles, and increased cost of marketing. CRM is the overall process of building and maintaining profitable customer relationships by delivering superior customer value and satisfaction [23]. A CRM strategy should involve the entire enterprise, rather than only the marketing department, and should be employed on an ongoing basis [30].

Even with worldwide expenditures on CRM projects rapidly approaching the $100 billion mark, 60 to 80% of CRM projects fail to achieve their objectives [21]. Reasons for such failures include: i) wrongly assuming that CRM simply is a technology initiative, ii) losing vision of customer-centricity, iii) inadequate support of top management toward CRM initiatives, iv) underestimating the importance of change management, and v) misunderstanding customer lifetime value [21]. Even though CRM technology is important, the main focus should be on managing customer relationships. A firm should not lose its vision of customer-centricity, which empowers it to have an in-depth understanding of its customer base across all functions, divisions, and communication channels. There must be adequate support of top management for CRM initiatives to be successful.

Companies should not underestimate the importance of change management that is inherent in any CRM project. CRM initiatives often ignore the fact that it is the people within the organization who make them successful [21]. These people need to have the right customer service skills and knowledge of the purpose and functions of CRM. Also, they must be prepared for the technological changes that would affect the way they work. CRM strategies should recognize that not all customer relationships are equally profitable. The focus of CRM should be on serving those customers who have the potential of delivering the highest lifetime value to the firm [39].

Failures in CRM can be avoided if a firm's CRM strategies are intelligently linked with its employees, customers, channels, and IT infrastructure [5,7,40]. In this paper we concentrate on those linkages, particularly on the linkages between an organization's CRM strategies and its IT infrastructure. Even though the IT alignment literature

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[16,18,33,34,36] has explored the linkages between IT and business strategies extensively, prior research has not addressed how CRM strategies are linked with the IT infrastructure. In this paper, our objective is to investigate this linkage (CRM -IT alignment). The paper is organized as follows. In Section 2, we discuss why IT alignment is important for CRM. In Section 3, we review the extant literature in IT alignment. In Section 4, we present a case study and in Section 5, we analyze the case to understand IT alignment issues in CRM. Section 6 summarizes and concludes the paper.

2. Motivation

CRM is an enterprise approach that integrates channel, product, and infrastructure strategies to understand and influence customer behavior through meaningful communications [7,40]. The goal is to improve customer acquisition, retention, and profitability. The objective of customer acquisition is to get the right customers to drive growth and increase margins. The objective of customer retention is to retain loyal and profitable customers, and to expand CRM into new channels. The objective of customer profitability is to help the firm increase individual customer margins while offering the right products at the right time. A good customer relationship program creates customer loyalty, which in turn increases customer lifetime value [23]. In the customer acquisition phase, loyalty is measured in terms of transactions and products. In the customer retention phase, loyalty is measured in terms of changes in relationship orientation, such as the *share of wallet* — the proportion of potential spending by the customer [7]. Finally, in the customer profitability phase, loyalty measurement focuses on the *share of life* (also called *customer lifetime value*) — the amount that the customer will buy in his or her lifetime.

Several researchers have developed process frameworks for CRM strategy. While some of these frameworks are implicit and need to be inferred (e.g., [20,35]), others are more explicit (e.g., [29,34,39,47]). While developing customer lifetime value expressions, Ryals [35] includes tasks such as selective customer acquisition, selective customer retention, relationship pricing, service strategy, product strategy, and selective customer divestiture. This approach appears to follow a life cycle process [45]. While studying the relational information process, Jayachandran et al. [20] include tasks such as customer relationship orientation, customer-centric management, CRM technology use, and CRM performance measurement. These types of tasks indirectly form a CRM strategy process framework.

An explicit CRM strategy framework describes the CRM process clearly in terms of stages and activities. Sue and Morin [39] have proposed a process-based framework for CRM that is linear and is based on the life cycle process [45]. The framework describes the linkages between different CRM initiatives and desired outcomes. It shows, at a high level, how CRM can contribute to increased revenues, decreased costs, and ultimately increased profits. The tasks in this framework include knowing the customers, divesting unprofitable customers, increasing value addition, capturing increased value, interacting with customers, managing customer base, and measuring benefits. The framework suggests that customer knowledge is the necessary starting point for any CRM strategy. Unprofitable customers do not increase shareholder value, so discouraging or declining business from unprofitable customers is a requirement. A CRM strategy must support the addition of value to the customers in terms of relationship management, loyalty programs, good product development, etc. Multiple channels to the targeted customer segments are also needed to provide increased value in terms of convenience and reduced customer costs. Finally, the customer base needs to be managed to capture the highest profit.

In Winer's framework [47], the CRM strategy includes seven steps: create a database for customer activity, analyze the data stored in the database, select customers, target customers, engage in relationship marketing, manage privacy issues, and measure the benefits using CRM metrics. This framework also is life cycle based and linear [45]. The <initiation, maintenance, and termination> model espoused by Reinartz et al. [34] includes the following components: customer evaluation, customer acquisition, recovery management, retention, up-selling, cross-selling, referral management, and exit management.

Payne and Frow [29] developed a much more explicit process-based approach to CRM strategy development and management. Their process framework is based on interaction research methodology [14]. They interacted with a panel of 34 experienced executives and interviewed 20 executives working in CRM, marketing, and IT to determine generic CRM strategy processes. The generic processes that they found are *strategy development, value creation, multi-channel integration, information management,* and *performance assessment.*

The strategy development process focuses on the development of business and customer strategies. Business strategy includes conventional business strategies and newer ideas like co-opetition [6], networks, etc. Customer strategy includes creating customer segments, deciding on the granularity of the segments, exploiting e-commerce opportunities, etc. The value creation process consists of determining what value the firm can provide to the customers, what value the firm is going to receive from the customers, and how to successfully manage the exchange [29]. The multi-channel integration process focuses on decisions about the use of appropriate combinations of channels, promotion of highly positive customer experiences within those channels, and presentation of a single unified view of the customer [29]. The information management process, on the other hand, dwells on the collection, collation, and use of customer data and information from all customer touch points to generate customer insights. Finally, the performance assessment process ensures that the organization's strategic aims in terms of CRM are effectively achieved [29]. Performance measures include shareholder value and internal metrics used by the firm.

In these CRM process studies, even though researchers acknowledge the need for IT infrastructure in a CRM framework, very little is known on how CRM technology and CRM strategies influence each other. Payne and Frow [29] voice this concern by stating the need for IT planning in CRM: "to ensure that technology solutions support CRM, it is important to conduct IT planning from a perspective of providing a seamless customer service rather than planning for functional or product-centered departments and activities" (p. 173).

In CRM, information technology is used to manage a multitude of customer interaction data over multiple channels (sales force, web sites, emails, telephony, direct marketing, etc.). The data sets include customer preferences, sales information, customer life events, service calls, complaints, etc. Customer interactions tend to answer a variety of questions relating to customer acquisition, customer retention, and customer profitability. CRM technologies supporting such data sets are of two types: *operational CRM* and *analytical CRM.* Operational CRM supports the "front office" business processes, which include all customer contacts (sales, marketing, and service). Examples of operational CRM include *sales force automation, field service automation,* and *call center support.* Operational CRM uses online transaction processing (OLTP) databases to support these functionalities. Analytical CRM, on the other hand, is a set of analytical applications that help measure, predict, and optimize customer relationships. It includes an analytical infrastructure, which supports acquiring data from multiple data sources and storing the data in a robust data warehouse, along with data analytics and reporting, to provide a 360-degree view of the firm's customers. In contrast to operational CRM, which follows the traditional OLTP protocol, analytical CRM follows a relatively new type of IT protocol called online analytical processing (OLAP). This kind of dual IT infrastructure is increasingly becoming prevalent in the CRM arena.

Currently, there is a gap in the literature on how such a CRM-IT alignment can be achieved. The gap exists because of the failure to

recognize that CRM uses a dual IT infrastructure addressing both OLTP and OLAP.

3. Review of IT alignment research

Broadly speaking, the IT alignment literature can be divided into approaches that are *static or dynamic, empirical or conceptual,* and *single dimensional or two dimensional.* The static approach assumes that IT alignment with organizational strategies follows a norm and remains fixed over time, while the dynamic approach assumes otherwise. Several conceptual and empirical models conforming to this approach have been proposed since the eighties. Research relating multiple underlying areas that explain IT alignment form the dimensional approaches.

Rackoff et al. [31] have proposed a two-dimensional, conceptual model that includes strategic thrusts (competitive strategies) and strategic targets (such as customers, suppliers, and competitors) to study IT alignment. In another study, Zviran [50] found empirical significance between an organization's objectives and its information objectives. Henderson and Vekatraman [16] proposed a conceptual model that uses two dimensions to capture the alignment issues. The first dimension, called *strategic fit*, relates to how an organization associates its external domain with its internal domain. The external domain describes the business arena where the firm competes and is concerned with decisions covering business and IT strategies that differentiate the firm from its competitors. The internal domain, on the other hand, refers to the internal infrastructure, which ranges from administrative processes and infrastructure to information systems process and infrastructure. The second dimension, called *functional integration*, "specifically considers how choices made in the IT domain impact (enhance or threaten) those made in the business domain and vice versa" [16, p. 476]. Their overall strategic alignment model (SAM) includes four components (business strategy, IT strategy, organizational infrastructure, and IT infrastructure) and four linkages or perspectives — *strategy execution, technology transformation, competitive potential,* and *service level.*

The strategy execution perspective anchors on business strategy as a driver for organizational design choices and design for information systems infrastructure. It is the most common and widely understood perspective as it follows the hierarchical view of strategic management. *The technology transformation* perspective involves implementation of the chosen business strategy using appropriate IT strategy and creating the required information systems infrastructure and processes. *Both of these perspectives assume business strategy to be the driving force.* The competitive potential and service level perspectives, on the other hand, arise when management investigates how IT might give rise to new business strategies and their related organizational

implications. Here, *IT strategy is assumed to be the driving force*. The *competitive potential* perspective focuses on how to figure out the best set of business strategies and organizational infrastructure and processes that correspond to the IT strategies. Finally, the *service level* perspective focuses on how to build a good quality information systems service organization.

Chan et al. [8] used an extensive empirical study to ascertain the relationships between business strategic orientation, IS strategic orientation, and IS strategic alignment, and investigated their influence on perceived IS effectiveness and business performance. The static approach has also been followed while studying the social dimension of alignment [18,32,33].

Other researchers in IT alignment take a different position and point to the fact that alignment can be dynamic. *Dynamic alignment* assumes that changes happen in an organization and as a result alignments progress over time. There are two types of dynamic alignment: *life-cycle-based* and *punctuated-equilibrium-based*. In the life-cycle perspective, dynamics of alignment follow more of a mechanistic view [11], where a strategy is looked upon as a rational plan [24]. External environment, organizational structure, and the firm's resource attributes are the key determinants. According to Van de Van and Poole [46], a typical progression of change events in a life-cycle model follows a sequence of stages, which is cumulative (characteristics acquired in earlier stages are retained in later stages) and conjunctive (the stages are related such that they derive from a common underlying process). Various multi-stage hypothesis models (e.g., [12,17,26]) have also been proposed based on this paradigm.

The punctuated-equilibrium based alignment [36], on the other hand, does not assume the Darwinian style of evolution. Rather, it postulates that the evolution happens in a punctuated fashion. It proposes that "lineages exist in essentially static form (equilibrium) over most of their histories, and new species arise abruptly, through sudden, revolutionary "punctuations" of rapid change …." [13, p. 11]. Other researchers in information systems (e.g., [27,28]) have used this paradigm. Newman and Robey [25] and Sabherwal et al. [36] have used this approach to show that the changes in strategic information systems management follow the punctuated equilibrium model. According to Avison et al., "a punctuated equilibrium model suggests that even after alignment is achieved, environment changes can reduce alignment due to overemphasis, complacency and inertia, engendering a need for revolutionary change" [1, p. 229]. Table 1 provides a summary of these approaches.

4. A CRM case study

Travelocity was chosen for the case study because of its continued support for CRM and associated technologies. Since its launch in 1996,

Table 1
Comparative analysis of IT alignment research.

IT alignment paper reference	Year of publication	Static/dynamic approach	Empirical/conceptual approach	Single/two dimensional
Nolan [26]	1979	Dynamic	Conceptual	Single dimensional
Horovitz [18]	1984	Static	Empirical	Two dimension
Rackoff [31]	1985	Dynamic	Conceptual	Two dimensional
Hirschheim et al. [17]	1988	Dynamic	Conceptual	Not reported
Zviran [50]	1990	Not reported	Empirical	Two dimensional
Galliers and Sutherland [12]	1991	Dynamic	Case study	Single dimensional
Newman and Robey [25]	1992	Dynamic	Case study	Single dimension
Henderson and Venkataraman [16]	1993	Static	Conceptual	Two dimensional
Orlikowski [27]	1993	Dynamic	Empirical	Not reported
Porra [28]	1996	Dynamic	Empirical	Not reported
Reich and Benbasat [32]	1996	Static	Empirical	Single dimensional
Chan et al. [8]	1997	Static	Empirical	Two dimensional
Reich and Benbasat [33]	2000	Static	Empirical	Two dimensional
Sabherwal et al. [36]	2001	Dynamic	Empirical	Two dimensional
Avison et al. [1]	2004	Dynamic	Empirical	Two dimensional

Travelocity.com (http://www.travelocity.com) has been a successful online travel agency. It was the first web site that allowed consumers, without any help from a travel agent, to access Sabre's fare and schedule information, and to reserve, book, and purchase tickets. It is currently the fifth-largest travel company in the US. In addition to its primary US consumer site, Travelocity operates a full-service business travel agency in the US, under lastminute.com brand in Europe, and under Zuji.com brand in Asia and the Pacific regions. The site provides reservation information for more than 700 airlines, more than 50,000 hotels, and more than 50 car rental companies. It also offers more than 6500 vacation packages as well as tour and cruise departures. Travelocity was launched as a joint venture between Sabre and WorldView in 1996. The objective was to offer online visitors a way to buy airline tickets and to research about potential destinations. Over time, the site has grown to a one-stop shop for airline tickets, hotel reservations, cruise planning and booking, travel packages, etc. After being spun off from Sabre in 2000, Travelocity got re-acquired by Sabre in mid 2002. It grossed $1.1 billion in revenue in 2006. Table 2 provides a five-year snapshot of the company's phenomenal growth during the period between 1996 and 2001.

Travelocity, since its inception in 1996, has been involved in many CRM strategies [41,42]. They include customer acquisition strategies such as partnering with Microsoft (in October 1996), developing services internationally (since September 1999), and partnering with Priceline.com (in December 1999) to grow its customer base, which rose from 144,000 registered users in 1996 to 30.4 million in 2001. Other strategies include customer retention with frequent updates of its web site, continuously improving the content of the web site, and providing more customer-oriented tools.

Our analysis of Travelocity's IT infrastructure shows that it employed several diverse technologies to support its CRM activities over time, enabling it to move from simple database support to near real-time and real-time CRM infrastructure. Travelocity has developed this kind of sophisticated IT infrastructure in multiple setup stages. Figs. 1 and 2 depict three of its latest setups. All setups include Extract, Transform and Load (ETL) tools to load into the Enterprise Data Warehouse (EDW) a variety of data relevant for CRM activities, such as merchant data, campaign data, customer data, and booking and shopping data. Travelocity maintains these historical data for reporting and other analytical purposes. Technologies such as triggers and alerts, predictive modeling, and rule-based decision support through a real-time business intelligence module were introduced over time. The company has used Teradata's enterprise reference architecture as its implementation platform. Travelocity has progressively used in its setups many tools developed by Teradata such as TPump, FastLoad, and MultiLoad tools; active access via aggregate Join index, and partitioned primary index; active loading via active events using stored procedures, triggers, etc.; active workload management via Teradata Priority scheduler, and Teradata Dynamic Query Manager; and active availability via redundant hardware components, Teradata Dual Active Solution, etc.

In the later setups, Travelocity has utilized Teradata's Active Data Warehouse (ADW) technology and connected the OLAP-oriented setup with the custom-built Travelocity home page. The tight coupling of OLAP and OLTP paradigms are achieved by sub-second matching of customer's historical booking and shopping activities, deal-finding technology, and customer preferences. Without ADW, a real push toward meaningful CRM delivered via the website would suffer from performance and customer experience challenges. The company needs to understand who the customer is and develop mechanisms for personalized service and offerings. This can only be possible by marrying the historical data with current data and then allowing the users to access data in real time to solve complex business problems. The real-time focus can only be supported by putting the data in one place, removing the latency issues, and integrating operational CRM with analytical CRM technologies [9].

The results of introducing one-to-one customer relationship management capabilities at Travelocity through active data ware-

Table 2
A Five-year Snapshot of Travelocity (1996–2001).

Date	CRM events	CRM perspectives	Results
March 1996	Travelocity was launched. Online system providing compelling content for customers and selling airline tickets to its customers is introduced. Contents include weather reports, hotel recommendations, restaurant reviews, etc.	• Strategy based • Technology based	400,000 visits/month and 144,000 registered members
Mid 1996	Added more features for customers… Hotel reservations, car rentals, vacation packages	• Strategy based • Technology based	
October 1996	Partnership with Microsoft to help Expedia … Ticket sells were done by Travelocity	• Strategy based	
End of 1996	Site was refined to make it easier to use for visitors/customers	• Strategy based • Technology based	400,000 registered members
1997	More partnership efforts continued as Travelocity built 12,000 customized web sites for travel agents… the objective was to capture the biggest possible share of overall travel bookings	• Strategy based • Technology based	$100 million in gross travel bookings
September 1997	Started going international with Canada, UK, Germany and Japan	Strategy based	
October 1998	Merged with Preview Travel and the merged company is called Travelocity.com	Strategy based	Third most-visited E-Commerce site in the world … has 17 million registered members and 8 million monthly visitors
December 1999	Partnered with Priceline.com	• Strategy based	
March 2000	Travelocity.com became separate company and went public… had 45,000 hotels, 700 airlines and 50 car rental companies	• Strategy based • Technology based	
Mid-2000	Redesigned web site … added group shopping tool for customer's travel planning	• Technology based	21.6 million registered members
End of 2000			Gross travel booking reached $2.5 billion … Top-ranked online travel provider with 8.72 million visitors
Jan 2001	Added more new products and services … such as a database of sightseeing tours, Hawaiian cruise (based on a new partnership) for customers	• Strategy based • Technology based	Registered membership increased to 30.4 million

housing have been impressive. By adding more personalized and compelling content to emails, Travelocity witnessed an eight to twelve times improvement in performance. It experienced seven times more click-through and a lift of three to five times in bookings by bringing higher levels of personalization across its web site. Table 3 describes the setups Travelocity had used over the years, starting from the use of spreadsheets to the most current use of ADW. It also includes our analysis of CRM and the managerial implications that these different IT infrastructure setups have.
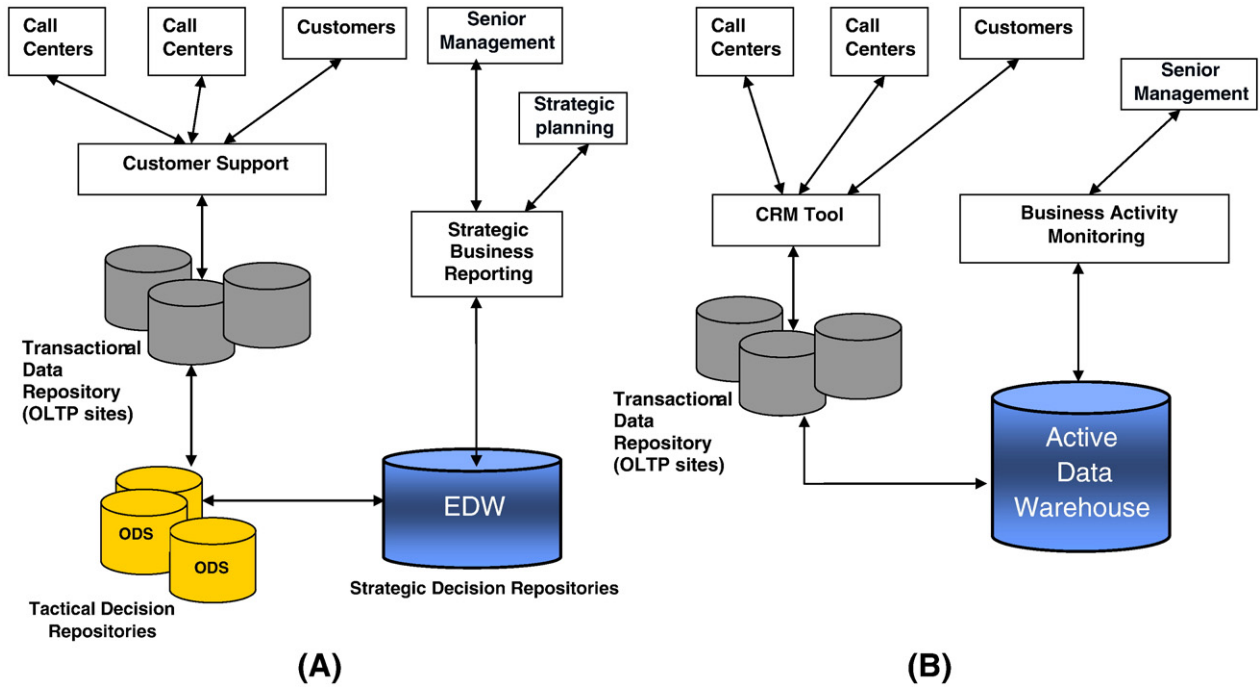
Fig. 1. CRM technology setups 4 and 5 in travelocity (Adapted from Hooper and Johnston [19]).

5. Research methodology

We employ a qualitative case study approach as the research methodology because that is deemed to be the most suitable for addressing the question, *How are CRM strategies linked with the IT infrastructure*? Case study is the most common qualitative method used in information systems research. Typically, a case study method is preferred "when 'how' or 'why' questions are being proposed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" [48, p. 16].
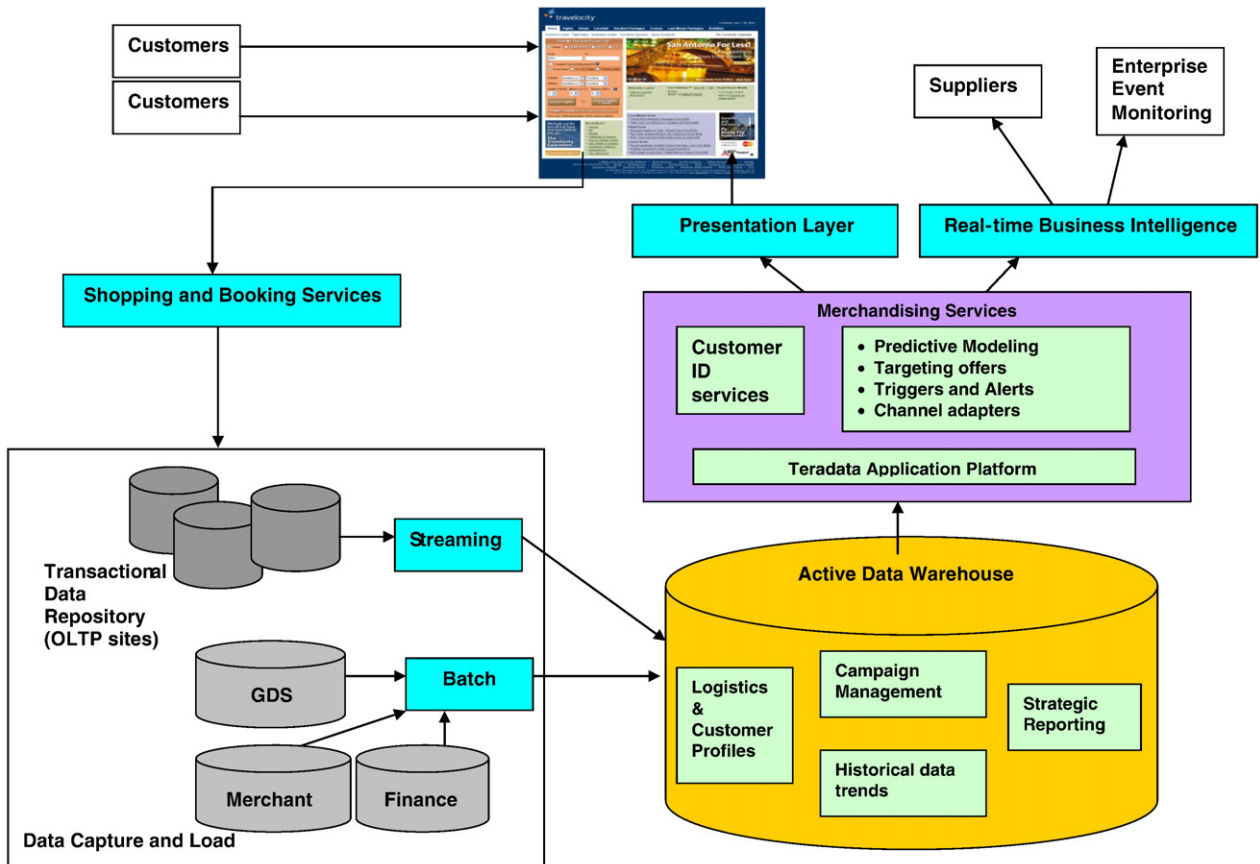

Fig. 2. CRM technology setup 6 in travelocity (Adapted from Hooper and Johnston [19]).

Table 3
Different CRM Technology Setups, Activities, and Implications at Travelocity.com.

CRM technology setup	CRM activities	CRM implications	CRM technological support
1	• Understand what product, service or interaction provide the most value • Utilize this information to modify products, services and processes to retain more customers	• Able to drive steady growth by reacting to market dynamics and historical trends by tweaking product, pricing and placement.	• Collect data from various sources like online data stores, financial reporting systems, etc. • Create small databases holding various views of data and use of Excel spreadsheets • Generate reports
2	• Gain new insight into customer interactions based on why certain customers bought and others only shopped	• Insights derived from the aggregated data drive a mixture of product enhancements, loyalty systems development and differential level of services	• More disparate data bases are built • Technology basedSeparate line of business are viewed and analyzed by the line of business owners
3	• Increase level of integration of customer information across stakeholders • Leverage pertinent information to provide insightful services to customer and sales organization	• Centralized data strategy provides business users of 360-degree view of customer profitability • Greater insight of increased share of wallet from the segmented customers • Additional investment in loyalty program development	• Increasing difficulty and complexity of data aggregation; roll up problems • Operational CRM deployed
4	• Leverage insights from multiple subject areas like customer interactions, historical product and pricing perspectives, and segmentation information	• Personalization and relevant CRM offer delivery through existing email channel • Creates significant lift in conversion up to 12 times non-personalized content	• Data warehouse is deployed • Analytical CRM system deployed with the objective to streamline and automate product, pricing and customer selection • Combination of manual and automated process hinder full and efficient rollout of CRM across the enterprise
5	• Extend to deliver relevant merchandising message to new customer touch points such as web site, search engine, RSS and call center • "Deal finding" and customer selection are automated	• Web site reflects the best and most relevant offers to customers while assisting them through shopping and buying processes • The conversion lift at this stage has been 300%–500%	• Data warehouse is connected to the enterprise in an "active mode" delivering real-time CRM through the use of "tactical queries" using a service layer with rules like propensity to buy, personal buying patterns, preferences and last minute pricing
6	• Active enterprise intelligence enabling alerts and notification of key business performance indexes • Provide internal (like line of business owners and operations) and external stakeholders (like customers and suppliers) access to insights gleaned from the data through messaging technology	• Industry-leading ways to adjust business at a very fast rate • Beating the competition	• Active data warehouse is needed with event management services
7	• Extend the technology across the enterprise • Further automation of CRM business process • Higher integration of data and tools needed to act upon customer touch points • Increase of share of wallet and loyalty • Better customer satisfaction	• Financial implications are exponential as customers feel the efficiency of shopping and purchasing	• Higher level of integration and automation across the CRM platform • flowing into CRM system needs to be at or near real time • Technology basedClose-loop analytics (delivering CRM messages and capturing responses must be "round tripped" back into the Data Warehouse and CRM platform where they can be used to increase campaign effectiveness and share of wallet) for complex customer buying patterns

Yin [49] defines the scope of a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident. There are many benefits of case study research [49]. It allows for examination of the data within the situation in which the activity takes place, as well as use of both quantitative and qualitative analyses of the data. Also, the detailed qualitative accounts often produced in case studies not only help to explore the data in a real-life environment, but also help to explain the complexities of real-life situations, which may not be captured through experimental or survey research.

Among four different styles of case study research [48], we follow the single-case study approach in our research. We use this approach as the Travelocity case offers an opportunity to observe and analyze a phenomenon that was previously inaccessible to CRM inquiry. Yin [48] calls this type of case study "revelatory." To conduct the case study, we follow the suggested steps, which include development of questions to study, determining the unit of analysis, linking data to the intention, and development of criteria for interpreting the findings [48].

Our task at first is to look at the "why" and "how" questions in CRM-IT alignment research. Based on the CRM technology setups in Travelocity (see Table 3) and our research objective of determining IT alignment with CRM strategies, we focus on two questions: (a) *Why did Travelocity need so many IT setups?* and (b) *How did these IT setups help Travelocity align its IT infrastructure with the company's CRM strategies?*

To address these questions, we have conducted the case analysis as follows. We address the first question by noting that CRM is not only a set of strategies but is also a process [4,10,37] as suggested by [20,29,34,35,39,47]. Such a process model typically incorporates four sub-processes: relationship formation, relationship management and governance, relationship evaluation, and relationship evolution. The relationship formation process involves the decisions that need to be made regarding the initiation of CRM activities for a firm with respect to a specific group of customers or an individual customer. In the relationship formation process, the firm wants to define the purpose of engaging in CRM activities, select partners for the relationships, and

develop programs or activity schemes for CRM engagement. Once the CRM programs are formed and rolled out, the relationship programs must be managed and governed. The activities in this category can span communication, employee motivation, and performance monitoring [37]. Each of these activities will once again depend a lot on the type of customers that the firm has. Companies need to undertake periodic assessments of the results of the CRM activities to see if these activities and programs are meeting the expectations and whether they can be sustainable in the long run. Finally, CRM activities go through relationship evolution due to an ever-increasing need to develop better customer, channel, and product strategies.

To develop an in-depth understanding of IT alignment in CRM, we gathered information from Travelocity. Extensive interviews were conducted with key executives from Travelocity. The executives were from different areas, including marketing product management, merchandising systems solutions, marketing operations, and enterprise business intelligence. Some of these interviews were conducted at the Travelocity campus in Dallas, while others were done in workshops that we had arranged to study CRM and related issues. We also acquired several conference presentations and public web documents describing Travelocity's CRM strategies and its IT infrastructure.

To drive steady growth by reacting to market dynamics and historical trends, Travelocity pursued a CRM process that includes many CRM activities (see Table 3) to understand which products and services provide most value. It appears that CRM strategies tend to grow along with the advances in underlying technologies. In other words, it appears that the IT infrastructure forces CRM strategies to move to higher levels of maturity. Fig. 3 depicts CRM strategy evolution at Travelocity, which is described in detail below.

Stage 1. In the first stage, the objective is to *know what happened.* The company built a small database for queries and reports addressing a specific business requirement. Tightly-coupled database applications, focusing on a single subject, were built efficiently. Data loading was typically passive and the CRM events were recognized after they had happened. This kind of enabling technology provides a short-term yield and is
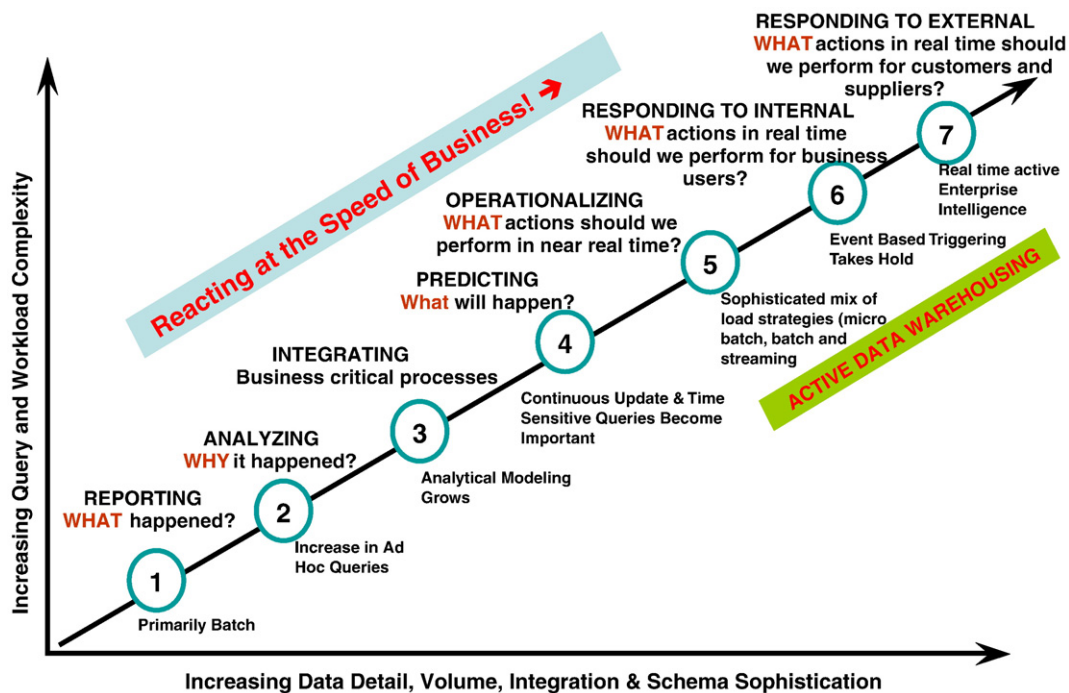

Fig. 3. Evolving CRM strategy in travelocity (1996–2009).

usually stove-piped. In this setting, the interactions were managed by customized database application programs. Usually, these programs are not easy to maintain and are not very flexible in supporting changes that happen routinely in interacting with customers.

Stage 2. In this stage, the company wanted to *know why CRM events happened.* Databases still provided the enabling technology. Applications remained tightly coupled. Queries were generally ad hoc and no single version of truth existed. Data loading was still passive and CRM events were user driven. The system was hard to integrate even though the executive expectations were typically high. Management did not use customer data and did not recognize the missed opportunities.

Stage 3. In this stage, the CRM objective was to *automate horizontally integrated business critical processes* involving front-office customer touch points (such as sales, marketing, and customer service) via multiple, interconnected delivery channels, and to use collaborative services, such as e-mail and conferencing, to facilitate interactions between customers and organizations, and among members of the organization around customer information. Following an evolutionary path, operational CRM was developed using packages such as Siebel, SAP, and Oracle. A broad range of customer interactions, spanning call center support, lead generation, order management, field services, and other services, was covered. The firm started to support CRM activities for the first time by tightly coupling the operational CRM tool with the database. The CRM events were still user driven and data loading was still passive.

Stage 4. As CRM evolved at Travelocity, the need to control and integrate data on customers became more important. The firm needed "strategic insights" and wanted to *know what would happen.* The users were management personnel, back-office service providers, and trading partners. Strategic insights were drawn by using analytical CRM on detailed data. An enterprise data warehouse [22] was built offline with integrated subject areas to reflect a single version of the truth. Transactional data was loaded from the operational sources into the EDW (see Fig. 1A) offline in a passive mode. Tactical decisions were usually supported by operational data stores (ODSs) [22]. These ODSs typically supported front-end operations like lookups, tactical decision making, and analytic support (e.g., scoring and modeling). Historical detailed data, multiple complex queries, integrated information structure, and centralized knowledge management were hallmarks of this phase. Analytical CRM focused on the backend analysis of the data collected from the interactions and employed analytical tools such as statistical, data mining, OLAP, and decision support techniques.

Stage 5. An important fact to consider when the firm is building its CRM is the ability to respond to customers in a timely fashion. In this stage (see Fig. 1B), Travelocity wanted to *know what actions should be performed.* The answer lies in the integration of operational CRM and analytical CRM. Near real-time response (sometimes called right-time response) became important. It allowed the integrated CRM system to process the interactions and react within a short time, leading to better customer experience. For example, a prospective customer might get an email from a web site with attractive offers the day after her initial visit to the site. The customer interactions were usually loaded offline to a data warehouse. The analysis was done using data warehouse and analytic tools like rule-based systems and data mining. Typically, an active data warehouse was used to support the activities. An ADW extends the capabilities of traditional EDW and moves it toward supporting tactical

decision-making. It is essentially a relational data warehouse environment that supports real-time loading, fast response time, aggregated data queries with drill-down capabilities, and dynamic flexibility to cater to changing business needs. An ADW provides information directly to customers and suppliers. The move to *operationalize* the data warehouse in an active way by Travelocity provided access to fresh and relevant data, coupled with historical trends, enabling new views of a customer's current and previous activities.

Stage 6. In this stage, the focus is more inward, geared toward management. Travelocity was interested in supporting many internal business activities that needed real-time response. That enabled business users to react rapidly in response to changing business conditions. The objective was to reduce the latency between a business event and the time it takes for the business to react to the event. Ideally, this latency should be zero, which means that the business would be able to react in real time. The enabling technology continues to be integrated CRM with active data warehousing, focusing on real-time business activity monitoring applications such as error handling, order management, strategic reporting with business intelligence (BI) tools, and key performance indicator (KPI) monitoring.

Stage 7. Finally, the company was interested in responding to its customers and suppliers in real time. Real-time response means that integrated CRM system "needs to provide automated open access to customer data, analytic software needs to continuously model customer data, and business rules need to continuously react to changes and deliver these changes to each customer contact point" [15, p. 6]. CRM was targeted outward toward the customers by promoting cross selling and instant emails. The enabling technology included integrated CRM with ADW as in stages 5 and 6.

In summary, it appears that CRM strategies do get influenced by the underlying IT infrastructure. At Travelocity, the evolution of CRM strategies happens incrementally [1,36,43] and the cumulative change eventually becomes large-scale. This also assumes that the changes in an organization follow the same path and take place along the same course, always moving forward toward an end.

We now examine this evolutionary path to discover *how IT alignment works in CRM.* We know that the IT alignment literature is full of studies that focus on complicated IT structures based on OLTP. OLTP protocol refers to a class of systems that facilitate and manage transaction-oriented applications, typically for data entry and retrieval. OLTP protocol in CRM is used to manage customer interactions with the firm by supporting activities such as sales force automation, call centers, prospect management, and campaign management. CRM Systems built using the OLTP protocol follow the Systems Development Life Cycle (SDLC) or the Object-Oriented Analysis and Design (OOAD) approach, which emphasizes support for the underlying customer relationship process, thereby promoting close IT alignment.

The CRM domain, however, employs the OLTP and OLAP protocols together (see Figs. 1 and 2). OLAP is used primarily to answer multidimensional analytical queries and is part of the broader scope of BI, which also encompasses relational reporting and data mining. It is typically used to support the firm's marketing analytics, sales analytics, customer analytics, etc. Most of the technological support for the OLAP protocol in CRM comes from the data warehousing, reporting service, and data mining technologies. Instead of supporting a process, these technologies provide support for management decisions. The two protocols OLTP and OLAP are vastly different as they use different data viewing mechanisms, employ different query complexities, and utilize different data management styles (e.g., databases for OLTP, as opposed to both databases and data warehouses for OLAP).

To explore the influence of OLAP capabilities on IT alignment models, we examine the evolution of IT infrastructure at Travelocity and propose the following attributes: *data load, data access, events, CRM analytics, enterprise integration, workload management,* and *availability* [44].

5.1. CRM events

Events are notifications needed for CRM activities. There are two types of events in CRM: *pull* and *push*. Pull events are created by the users, managers, and customers. These events are actions that usually get detected by the firm after something has happened, like a series of lodged complaints, historical trends, etc. Push events, on the other hand, support proactive CRM activities by the firm targeted at users, managers, and customers. Examples include customer detection, service calls, delivery management, etc.

5.2. Data load

Data load is the ability to insert data into the database or data warehouse to support CRM activities. A load is considered to be *infrequent* if the data inserts to the database/data warehouse supporting the CRM activities are done quite infrequently, say, once a day or less. A load is considered to be *frequent* if the data is loaded twice a day or more often without impacting the decision making workload. These frequent loads can occur multiple times daily, hourly, or as real-time continuous feeds [44].

5.3. Data access

Data access to the database or data warehouse is through queries. We divide the data access into *regular*, *active*, or *strategic*. A *regular* access is characterized by standard queries. Examples include customer queries to monitor package deliveries, supplier requests to view inventory levels, etc. An *active* access indicates the capability to query data for tactical decisions in a very short timeframe, for example, queries to retrieve information to support customer interaction with or without analytics. An access is *strategic* if the queries are used for strategic decisions. An example would be matching customer history with current sales offers to provide a personalized offer moment after contact.

5.4. CRM analytics

In order to support CRM activities such as lead generation, prospect qualification, field service, and call scripting, several different types of analytics could be used. These include standard database applications, predictive analytics, rule-based analytics, and complex data mining activities.

5.5. Enterprise integration

Enterprise integration essentially connects modules of information to the processing architecture and is characterized by tight coupling or loose coupling. Tightly coupled systems have strong interconnections between software modules. In database application-oriented systems, the integration involves a tight coupling of the program units with each other and with the database. Operational CRM [39] is essentially a data base application and so the integration is tightly coupled. The same is true in analytical CRM [39]. Integration is loosely coupled in the service-oriented architecture which is prevalent in the active data warehouse environment. Utlser [44] calls this kind of integration "active"; it enables the data warehouse to span the organization using real-time enterprise reference architecture to ensure interoperability and optimal performance [44] to deliver real- or near real-time data needed by the enterprise.

5.6. Availability

Availability typically requires that the platform selected must meet the availability requirements of a business [44]. The availability can be traditional, predetermined service level, or business critical with near real-time service. Traditional availability can be seen in the database application-oriented systems where business criticality is not important. In operational and analytical CRM, the availability is dependent on a predetermined level of service determined by the service level agreements (SLAs). However, delivering real-time CRM challenges this thinking and demands mission-critical status out of serving systems.

We now define earlier evolution stages using these attributes. Each stage has a specific CRM objective necessary to support CRM events occurring in the organization. The IT infrastructure for each stage is defined by attributes such as data load, data access, CRM analytics, enterprise integration, and availability. For example, *stage 1* is defined as an IT alignment position that has a CRM objective of "what really happened?" This question is raised once some CRM events (like lodged complaints) are detected. To provide support for such a stage, the IT infrastructure is database-oriented with traditional report-oriented applications focusing only on a single subject area. It is generally tightly coupled with the database. Table 4 provides the definitions of the other stages as well.

We are now interested in finding out how the IT alignment in CRM evolves through the different stages. To answer this question, we relate the strategic alignment model (SAM) [16] with Table 4. Based on the perspectives of the model, we revisit the stages defined in Table 4. Initially, in stages 1 and 2, because the CRM objectives are to find out what and why certain CRM events happen in the firm (e.g., why did a large number of visitors come to the web site or what happened after coupons were sent out), IT alignment follows a "strategy execution perspective". This means that the business strategy is the driver (or *anchor* shown by red dot in the figure) for aligning it with the IT infrastructure. The CRM objective in Stage 3, on the other hand, is to develop an integrated IT infrastructure to better serve the customers. IT alignment now has a "service level perspective". In stage 4, the IT infrastructure forces the company to be more competent in analytics to understand and predict what will happen. IT alignment in this stage therefore has a "technology transformation perspective." In stages 5, 6, and 7, the focus is more toward developing a competitive advantage and therefore IT alignment has a "competitive potential perspective". There seems to be no fixed anchor for IT alignment in CRM (Fig. 4).

Finally, even though the IT alignment evolves in CRM, switching of anchors repeatedly is similar to the punctuated-equilibrium based alignment model [36]. Instead of switching between evolutionary and revolutionary periods in punctuated-equilibrium model, switching happens among perspectives or linkages due to the push or the pull CRM strategy, as was seen in the Travelocity case. Hence, evolution of IT alignment in CRM happens due to switching among the perspectives or linkages as defined by the Strategic Alignment Model.

6. Conclusion

This paper addresses IT alignment issues in CRM. Based on a detailed case analysis, we find that IT alignment in CRM is quite unique. Unlike the current IT alignment literature (as discussed in Section 3), which focuses only on OLTP systems, IT infrastructure in CRM uses both OLTP and OLAP protocols. These two processing protocols are vastly different from one another. They differ in data viewing mechanisms, in query complexity, in reporting mechanisms, and in their objectives (e.g., OLTP is used to manage transaction-oriented business tasks while OLAP enables business planning and decision support).

Table 4
CRM-IT Alignment Stages and Attributes.

CRM-IT alignment stages	CRM objectives	CRM events	CRM enabling information technologies	Data load	Data access	CRM analytics	Enterprise Integration	Availability
1	To know "what happened?"	Pull	Database application oriented	Infrequent	Regular — focusing on single subject area	Application-based	Tightly coupled	Traditional
2	To know "why it happened?"	Pull	Database application oriented	Infrequent	Regular — focusing on many subject areas	Application-based	Tightly coupled	Traditional
3	To automate horizontally integrated business activities	Pull	Operational CRM with up-to-date data support using a database	Infrequent	Regular — focusing on many subject areas	Application-based analytics (e.g., dash-boarding, predictive analysis, forecasting, etc.)	Tightly coupled	Predetermined service levels to users exist
4	To know "what will happen?"	Pull	Analytical CRM with standard data warehouse support	Infrequent	Strategic	Sophisticated analytics (rule-based, data mining, etc.)	Tightly coupled	Predetermined service levels to users exist
5	To know "what actions we need to perform in near real time for customers?"	Push and pull	Integrated CRM with active data warehouse support	Frequent	Strategic; active	Sophisticated analytics (rule-based, data mining, etc.)	Loosely coupled (also called Active) uses SaaS	Business critical (near real time)
6	To support its business users in real time and to know "what actions we need to perform for the business activities?"	Push and pull	Integrated CRM with active data warehouse support	Frequent	Strategic; active	Sophisticated analytics (real time BI)	Loosely coupled (also called Active) uses SaaS	Business critical (near real time)
7	To respond to its customers and suppliers in real time and to know "what actions we need to perform?"	Push and pull	Integrated CRM with active data warehouse support	Frequent	Strategic; active	Sophisticated analytics (rule-based, data mining, etc.)	Loosely coupled (also called Active) uses SaaS	Business critical (Near real time)

Our analysis reveals that IT alignment in CRM is dynamic and follows an evolutionary path. The evolution goes through stages starting from "what happened" to responding to customers in real time. The stages of evolution are characterized by different enterprise integration philosophies, different enabling CRM technologies, different CRM analytics, and so on. The stages are also marked by distinct CRM events that toggle between pull CRM events and push CRM events. All these make the evolution process quite complicated. We found that IT alignment in CRM switches its anchors as it evolves. That is, in some stages, it anchors on business strategy, and in others it anchors on IT strategy. Each time, it changes its perspectives of alignment.

In this study, we conducted an in-depth case analysis of a large company, which leverages its powerful IT infrastructure for pursuing CRM initiatives, to develop the conceptual underpinnings of CRM-IT alignment. An interesting future direction would be to conduct a field study with a larger sample of companies and see if our observations hold.
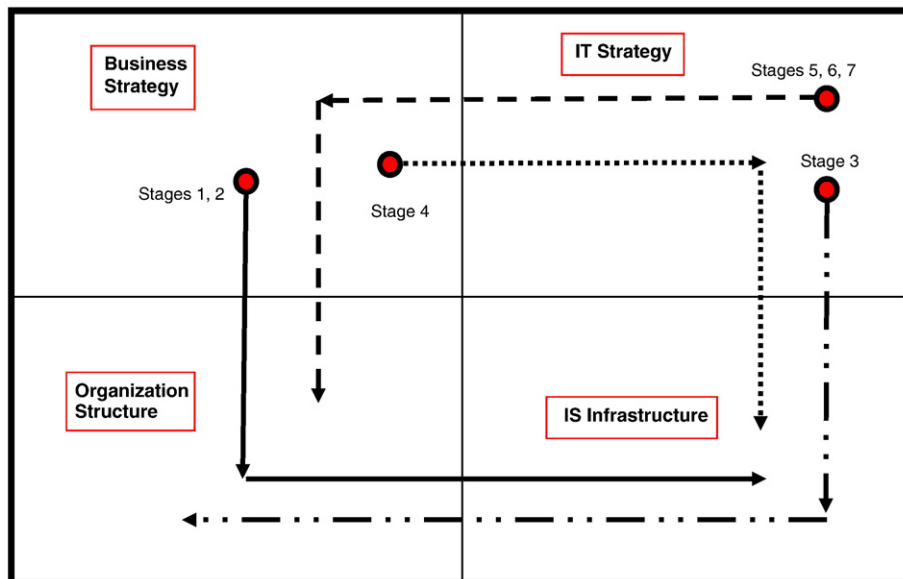

Fig. 4. Multiple perspectives in IT alignment with CRM strategies.

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