THE ROLE OF DATA INTEGRATION IN CRM
His e-guide explores the significant role of data integration in electronic customer relationship management (e-CRM) analytics. In the first article, industry experts introduce e-CRM, provide a foundation for their research, propose hypotheses, and present their new framework. In the second article, those experts detail their research methodology, and discuss findings and organizational implications.
E-CRM ANALYTICS: LEVERAGING DATA INTEGRATION FOR PROSPECTIVE CUSTOMER INSIGHT AND BREAKTHROUGH ROI—PART 1

In today’s globally competitive marketplace, organizations of all sizes can no longer ignore the value of business intelligence (BI) technologies and the competitive advantage they offer through optimal, or at the very least enhanced, decision making. These decision support technologies provide business value by discovering analytical insights and incorporating them into organizational processes. This value creation process requires the integration of various technologies and data—a challenging and complex endeavor for even the experts. Although we have a growing arsenal of robust programming APIs along with web-based data standards and universal communication protocols, many technologies remain disjointed. From search engines results and social networks to XML data sources to data warehouses and government databases to software-as-a-service (SaaS) applications hosted in the “cloud” in geographically dispersed data centers, the integration of these technologies to improve decision making is a growing but necessary challenge in creating business
value (Kavanagh, 2009).

Yesterday’s trends are reoccurring today as organizations continue to leverage their data resources by developing and deploying data mining technologies to enhance their decision-making capabilities (Eckerson & Watson, 2001). To address this need, organizations are implementing organizational data mining (ODM) technologies, which are defined as technologies that leverage data mining tools to enhance the decision-making process by transforming data into valuable and actionable knowledge to gain a competitive advantage (Nemati & Barko, 2001). ODM spans a wide array of technologies, including but not limited to e-business intelligence, data analysis, CRM, predictive analytics, dashboards, web portals, etc.

As a result of these marketplace trends, organizations must begin implementing customer-centric metrics as opposed to solely adopting product-centric metrics (Cutler & Sterne, 2001). This scenario has triggered increased interest in the implementation and use of customer-oriented ODM technologies such as CRM systems. CRM can be defined as the adoption, through the use of enabling technology, of customer-focused sales, marketing, and service processes (Forsyth, 2001). Customer relationship management is the process that manages the interaction between a company and its customers. The goal
of customer relationship management is to create a long-term, profitable relationship with all of an organization’s customers. It is more than just a software package— it is a technology-enabled business process. CRM vendors label these packages as CRM systems because their main goal is to analyze customer behavior and identify actionable patterns. This information is then used to improve goods and services offered to customers while increasing profitability through better relationships. CRM software provides the functionality that enables a firm to make the customer the focal point of all organizational decisions. CRM technologies incorporate some of the best-in-class processes for features such as customer service, product configuration, lead management, database marketing and customer analysis.

Customer relationship management has become a key process in the strengthening of customer loyalty and in helping businesses obtain greater profit from low-value customers. The manner in which companies interact with their customers has changed greatly over the past decade. Customers no longer guarantee their loyal patronage, and this has resulted in organizations attempting to better understand them, predict their future needs, and decrease response times in fulfilling their demands. Customer retention is now widely viewed by organizations as a significant marketing strategy in creating
a competitive advantage, and rightly so. Research suggests that as little as a 5% increase in retention can provide a 95% boost in profits, and repeat customers generate over twice as much gross income as new customers (Winer, 2001).

Most companies now realize and understand the value of collecting customer data but are faced with the challenges of using this knowledge to create intelligent pathways back to the customer. Most data mining technologies and techniques for recognizing patterns within data help businesses sift through the meaningless data and allow them to anticipate customers’ requirements and expectations while more profitably managing channel partnerships and similar relationships. These technologies also enable companies to maintain customer privacy and confidentiality while gaining the benefits of profiling, calculating the economic value of the CRM system, and discovering the key factors that make or break the CRM project. By integrating these data mining tools with CRM software, organizations are able to analyze very large databases to extract new customer insights for stronger and more profitable relationships.

Data mining by itself is not a business solution; it is just an enabling technology. However, by assimilating data mining technology with customer relationship management, organizational data can be transformed into valuable knowledge to enhance business decisions that optimize customer interactions.
For example, consider a catalog retailer that wants to determine to whom they should send current information about new products. The information integrated into the data mining and CRM process is contained in a historical database containing prior customer transactions (such as sales and returns) along with their demographic and lifestyle attributes. By assimilating these two technologies, this retailer is in a better position to optimize each customer interaction by predicting the characteristics of prospects and/or existing customers who would be most likely to make a purchase.

Similarly, electronic customer relationship management can be defined as the process of acquiring a thorough understanding of an organization’s online visitors and/or customers in order to offer them the right product at the right price. E-CRM analytics is the process of analyzing and reporting online customer/visitor behavior patterns with the objective of acquiring and retaining customers through stronger customer relationships. Prior research has found that in order to understand online customers, a company must integrate its data from both online and offline sources (Mena, 2001). More recent research (King & Burgess, 2008; Chen & Chen, 2004) has also concluded that system and data integration are critical success factors in e-CRM and CRM initiatives.

In a similar light, our research and analysis also demonstrates that a
company cannot thoroughly understand its customers if it neglects integrating its customers’ behavioral data from both online and offline channels. In order to have this complete customer viewpoint, it is imperative that organizations integrate data from each customer touch-point. Our research elaborates on this key issue of integrating data from multiple sources and its enabling role in facilitating successful and value-creating e-CRM analytics.

In exploring these issues, we first conduct a literature review and provide a foundation for our research. Then we present our research framework and associated propositions. Next we detail the research methodology utilized in our study, and lastly we present and discuss our findings and their organizational implications.

**RESEARCH FOUNDATIONS AND FRAMEWORK**

Many studies (Brancheau, Janz & Wetherbe, 1996; Neiderman, Brancheau & Wetherbe, 1991; Brancheau & Wetherbe, 1987; Dickinson, Leithesier, Wetherbe & Nechis, 1984; Ball & Harris, 1982; Martin, 1982) have shown that data has been ranked as one of the top priorities for information services (IS) executives. With the growth of web-based technologies, the collection and storage of data—both internal and external—has increased dramatically. Internal data
refers to data generated from systems within an organization, such as legacy and online transactional processing (OLTP) systems. External data refers to data that is not generated by systems within an organization, such as government census data, industry benchmark data, consumer psychographic data and economic data. For instance, consumer demographic and psychographic data is available for each of the 200+ million adults in the United States, and product-based data is available for the millions of businesses in the United States. If this data is collected, integrated and formatted properly, it can prove to be immensely beneficial to a firm in better understanding its customers (Rendlemen, 2001). External data should be leveraged in a CRM system to the extent that it adds additional value to the existing internal organizational data.

More recent studies have shown favorable CRM outcomes with data integration, and from the opposite view, significant failure rates of CRM projects that ignore it. Technical issues such as capturing the wrong customer information, using misleading metrics and underestimating the difficulties involved in data mining, data cleansing and data integration are major barriers in implementing and managing successful CRM projects (Jain, Jain & Dhar, 2007; Kale, 2004; Missi, Alshawi & Fitzgerald, 2005).
Companies approach consumers through various marketing channels. Traditionally, each channel or functional area has been managed separately, and all data pertaining to a channel is housed in its own system in a proprietary format (Eckerson & Watson, 2001; SAS Institute, 2001). Technically, data integration can be defined as the standardization of data definitions and structures through the use of a common conceptual schema across a collection of data sources (Heimbigner & McLeod, 1985; Litwin, Mark & Roussopoulos, 1990). This implies that data is accessible across functional areas, making data in different corporate databases accessible and consistent (Martin, 1986). For example, if a traditional “bricks and mortar” company deploys a website and decides to integrate the web data with its legacy systems, it has to consider various technological and design issues such as data requirements, data quality, data inconsistencies, synchronization, security, etc. Once these issues are addressed, an organization must present the data in a way that is consistent and conducive to viewing across heterogeneous enterprise departments (Johnson, 2000). In a B2C company, an example of data integration might be creating an integrated customer database to enable the sales and manufacturing departments to access a single source of customer information even though they each require their own view of the customer.
The volume of data available to organizations is growing exponentially. We generate more new data every month than humanity has created from its beginning to the year 2000 (Hardy, 2010). Challenges arise when determining which piece of information about a particular customer is accurate, up-to-date and relevant. In deciding on which parts of the data should be used for analysis, the issues of incompatible data formats, metadata inconsistencies and conflicting levels of data granularity must be resolved. This is a complex and continuous procedure that requires a significant amount of resources.

Although data integration is such a complex challenge, organizations successfully tackling this issue have derived great benefits from it. For example, Staples Inc. integrated all customer and sales data from their store, catalog and online efforts into a common database (SAS Institute, 2001). Integrating all this information allowed Staples’ marketers to monitor and predict how customers migrate from one channel to another and how they utilize the channels to get what they need. Staples can identify what products are purchased at a store versus their Staples Direct catalog or through their online store. This valuable information gives Staples an edge over its competition and allows marketers to target specific products to customers through preferred channels and perform cross- and up-selling to customers across multiple channels.
A recent report from Forrester Research (Ostrow, 2009) forecasts interactive marketing (which includes mobile marketing, social media, email, display advertising and search marketing) to grow over the next five years. Of these online mediums, social media marketing is projected to grow at an annual rate of 34% —from $716 million in 2009 to $3.1 billion by 2014. By then, social media will be a bigger marketing channel than both email and mobile, but only a fraction of the size of search or display advertising ($31.6B and $16.9B, respectively). Consequently, some of this growth comes at the expense of offline advertising. Forrester estimates that online advertising will grow from 12% of total marketing spend in 2009 to 21% by 2014, thereby reducing the amount spent on offline advertising.

This finding raises a number of allocation questions. How do organizations determine which marketing media to use, where their customers spend most of their time, and what their customers’ lifestyles are? To better answer these questions, online marketers must build a 360-degree (holistic) view of their customers in order to track purchasing behaviors, preferences, likes and dislikes. This holistic view requires organizations to integrate their data to track every customer transaction (customer purchases, returns and complaints) in all customer touch-points (stores, email, mobile, search marketing, social
media and direct mail).

Forrester Research predicts online retail sales will account for 8% of all U.S. retail sales in 2014, up from 6% last year. More impressive is that by 2014, more than half of total retail sales (53%) will be affected by the web—for example, consumers going online to do product research or contact customer service (Engleman, 2010). In another survey, e-business executives report rising costs of acquiring customers online—current online acquisition costs total half of store acquisition costs, an increase from one-third of the cost reported a year ago. To minimize these marketing costs, organizations should concentrate on satisfying and serving existing customers and understanding the engagement of those customers with their companies (Johnson & Davis, 2009). These findings suggest that if you want to compete in today’s marketplace and increase profitability in the coming years, you need to go beyond web cookies and meta-tags—you need to build an integrated offline and online customer profile.

**PROPOSITIONS**

Extensive research and case studies have shown that data integration is one of several critical factors in successful CRM implementations. To realize measurable business value, firms must combine physical resources (such as
computers and networks) and informational resources (online and offline customer databases, call records, email correspondence and other customer service interactions) in their CRM systems (Foss, Stone & Ekinci, 2008). With today’s demanding customers communicating through multiple marketing channels, organizations must be cognizant of customer preferences to optimally manage their delicate yet vital relationship with them. This leads us to our first two propositions:

**Proposition 1:** The more data sources a company integrates, the better the customer insight, thus creating more value for the company.

**Proposition 2:** Integrating online data with data from the firm’s offline operations will lead to better customer insight, thus creating more value for the company.

Timeliness of data is an important component of user satisfaction (Doll & Torkzadeh, 1988; Ballou, Wang, Pazer & Tayi, 1998; Adams & Song, 1989). Users need to have up-to-date information about customers’ needs and preferences (Swift, 2002) to thoroughly understand and satisfy those needs. Traditional customer-centric measures such as recency, frequency and monetary statistics should be captured and incorporated into CRM analytics. Without integrated data (from online and offline sources), these statistics will not accurately
represent the customer.

A recent survey of 231 online marketers by an innovative Internet marketing company found that businesses that blog multiple times a day acquire more customers than those who blog less frequently. In fact, 100 percent of companies who blog multiple times a day have generated customers from their blog compared to 90 percent of respondents who blog daily and 69 percent of respondents who blog two or three times a week (HubSpot, 2010). This finding shows the additional value obtained by frequently updating and refreshing marketing and e-CRM data.

Traditionally, it was acceptable for organizations to update their customer database on a monthly or quarterly basis. But in today’s fast-paced electronic economy where critical decisions are made daily, companies strive for more current information, requiring systems to update their databases much more frequently (daily, hourly, or in real time). This leads us to our next proposition:

**Proposition 3:** Data that is more frequently refreshed will lead to better customer insight, thus creating more value for the company.

Past experiences or product quality are not the only reasons why customers make purchases. There are factors external to an organization such as new marketplace competitors, economic factors, competitor promotions, online social
media and other similar factors that alter our buying preferences. The explosive growth of social media and its user-generated content are now becoming more effective at driving sales than traditional marketing channels. Consider the following statistics that support the growing importance of leveraging online and external data sources:

- Over 40% of marketers using social media sites Twitter, LinkedIn, Facebook and company blogs have generated a customer from that channel (HubSpot, 2010).

- Over half (51 percent) of consumers are using the Internet before making a purchase in shops, educating themselves on the products and best deals available (Bazaarvoice, 2010).

- Brands with the highest “social media activity” (including reviews) increased revenues by as much as 18% (Bazaarvoice, 2010).

In his book Web Farming (1998), Richard Hackathorn advocates that organizations must integrate external data into their data warehouse to gain a
complete picture of its business. Sources of external data may include government databases, customer demographic and lifestyle data, online customer preferences, census data, geographic data and weather data. This leads us to our next proposition:

**Proposition 4:** Integrating external data with internal data will lead to better customer insight, thus creating more value for the company.

In many instances, companies focus their limited resources on their core competencies and outsource many remaining business functions, sometimes retaining the services of application service providers (ASP) and specialized hosting partners to manage online and ecommerce functions (Eckerson & Watson, 2001). Whether an organization’s business processes are performed in-house or outsourced, the collaboration and integration of systems and data from multiple functional areas is complex and difficult. A prior Data Warehousing Institute Industry Report (Eckerson & Watson, 2001) found that organizations are challenged when integrating web technologies into their existing legacy and IT systems. Some of the reasons behind this challenge are scalability issues, managing large clickstream databases, immaturity of technology, lack of experience, and the complexity of modeling web data for analysis. But despite the integration challenges, the benefits realized are significant.
In a prior survey of 800 information technology executives by the Meta Group, four out of five companies did not have a 360-degree view of their customers even though 92% of the firms surveyed ranked increasing customer knowledge as a top priority (Cooke, 2000). This study reported that although business and information technology managers in these companies are interested in obtaining customer knowledge, a number of serious obstacles prevent them from doing so, i.e. building the right data architecture and obtaining useful analytical tools to integrate and use this data effectively.

For successful CRM analytics, an enterprise-wide, customer-centric data repository should be utilized rather than a channel specific data repository (Beck & Summer, 2001; Swift, 2002; Johnson, 2000). Vasset (2001) suggests an enterprise-wide, customer-centric data warehouse should be the foundation of any CRM initiative. A common trend in many organizations today is the management of data and other information in independent silos by different departments and teams. In addition, these teams sometimes leverage different tools for data quality, data integration, data governance and other data management tasks. The Data Warehousing Institute (TDWI) has defined unified data management (UDM) as a best practice for coordinating diverse data management disciplines and aligning them to business goals. UDM encompasses many
disciplines, including data integration, data quality and master data management. A recent TDWI Best Practices Report based on 179 respondents found that the leading two benefits of organizations that practice UDM are better business decisions and better data quality (Russom, 2010). This leads us to our last proposition:

**Proposition 5:** Deploying an enterprise-wide data warehouse as the CRM backbone will lead to better customer insight, thus creating more value for the company.

Research in customer relationship management is growing as it is gaining greater acceptance within organizations. Customer relationship management has received considerable attention from researchers in many diverse disciplines. Although there is a growing pool of literature that addresses many aspects of the application of customer relationship management for business solutions, there are few scholarly publications that focus on the study of customer relationship management from an e-commerce perspective. Given the complexity of the issues involved in data integration, the enormous benefits that electronic customer relationship management can offer, and the role data integration plays in achieving e-CRM’s goals, we developed an e-CRM Value Framework (Figure 1) to study data integration issues and their impact on the
overall value attained from e-CRM projects. Through this framework, we empirically test our five propositions to determine the impact each factor has on creating e-CRM value for an organization. The results of our analysis reveal that four of the five factors support this new framework and have a significant influence on creating value for an organization.

![e-CRM Value Diagram]
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E-CRM Analytics: Leveraging Data Integration for Prospective Customer Insight and Breakthrough ROI—Part 1

E-CRM Analytics: Leveraging Data Integration for Prospective Customer Insight and Breakthrough ROI—Part 2


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E-CRM ANALYTICS: LEVERAGING DATA INTEGRATION FOR PROSPECTIVE CUSTOMER INSIGHT AND BREAKTHROUGH ROI—PART 2

RESEARCH METHODOLOGY

Our study was comprised of two parts. The first part was a literature review in which we looked at the results of previous studies on data integration and its inherent complexity. Based on this literature review, we designed a questionnaire to explore organizational data sources, how these data sources are integrated, the data architectures utilized for this integration, and the key integration issues facing organizations. The second part of the survey addressed e-CRM topics such as specific benefits realized, ROI expectations, user satisfaction levels and the creation or absence of a new competitive advantage. Demographic information was also collected on respondents and their organizations.

An initial survey instrument containing 17 questions was reviewed by three industry professionals to ensure appropriate and unambiguous content. The objective of this survey was to gain insight into the various data sources organizations integrate and to reveal that despite its complexity, data collection
and integration for electronic customer relationship management can create value for an organization. Respondents were asked to identify benefits they had achieved or expected to achieve from their e-CRM project. Specifically, we probed responders on specific data integration procedures in their organization such as number of data sources integrated, integration of online and offline sources, integration of external data, data refresh rates and whether these data sources were centralized (in a data warehouse) or decentralized.

Additional survey questions solicited information regarding ROI, user satisfaction levels, competitive advantages and both the quantity and types of data sources integrated in respondents’ e-CRM projects. These questions utilized a Likert scale to allow users to rate the success of their e-CRM initiative based on four equally weighted factors—ROI, competitive advantages, business benefits attained and user satisfaction.

Next we transformed the responses from the questions about ROI, user satisfaction, competitive advantage and benefits realized into a derived measure representing total value to an organization. We defined total value as being a combination of ROI, competitive advantage, business benefits attained and user satisfaction. The equally weighted scores obtained from these questions were added together and used as a measure of overall value generated by
the e-CRM initiative. This total value figure was calculated as follows: total benefits + user satisfaction + competitive advantage + ROI = total value. The total benefits figure was calculated by summing the total number of benefits reported. This value ranged from 0 to 12. Some of the benefits reported were the increased ability to cross-sell/upsell to customers, enhanced product/service customization, increased customer retention and better customer service and inventory management. User satisfaction of the new e-CRM system ranged from 1 (not satisfied) to 7 (very satisfied). Measuring competitive advantage was calculated as the likelihood (1 = very low, 7 = almost certain) the e-CRM project enabled the company to achieve a sustainable competitive advantage, and measuring ROI was calculated as the likelihood (1 = very low, 7 = almost certain) the e-CRM initiative generated the expected ROI.

In measuring each organization’s total value, we argue that a larger number represents more total value to the organization than a smaller number. For example, an organization with an e-CRM system that delivered eight benefits (8), created very satisfied users (7), enabled a competitive advantage (7) and delivered close to expected ROI (6) (total value = 28) would be much more valuable to an organization than a system which delivered three benefits (3), unhappy users (1), a questionable competitive advantage (1) and unsatisfactory
ROI (1) (total value = 6). Using this basis for total value, we conducted statistical analyses using ANOVA to determine the correlation between our framework’s five e-CRM factors (propositions) and the total value the project created for the organization.

A website was developed for the survey and hosted at the Department of Information Systems and Operations Management at the University of North Carolina at Greensboro. A request to complete the survey was distributed to about 340 entities in the Information Systems and Operations Management Department database of organizations. This database contains data about organizations, consultants and professionals specializing in CRM technologies. A total of 115 useable responses were received and analyzed from both U.S. and international organizations, providing a 34% response rate.

RESULTS AND DISCUSSIONS

Demographics

Figure 1 reveals demographic information from the survey respondents. Respondents work in a wide variety of industries with the majority (49%) from CRM/technology firms and 25% from the transportation, healthcare, advertising and financial industries. Job categories for respondents range from
executive management to business managers with the majority employed as CRM professionals (54%) followed by analysts (17%). Organizational revenues represent a fair mix of both small and large companies. Forty-four percent reported sales of less than a $100 million while 37% reported sales of greater than $500 million. In regard to CRM project statuses, the majority of respondents (39%) had started their CRM initiative over a year ago while 24% had started their CRM initiative less than three months ago. The majority of respondents (65%) were also clicks 'n bricks (web and store) companies while 23% were purely web retailers. In addition, 45% of respondents worked for organizations whose primary web operations were business to business (B2B) while 35% worked for organizations classified as business to consumer (B2C).

![Figure 1: Respondent Demographics (N = 115)](image-url)
B2B vs. B2C

Next we conducted a cross-tabular analysis to gain better insights into B2B and B2C organizations. As previously noted, 45% worked for B2B companies and 35% were from B2C companies. There was one consumer to consumer (C2C) firm while the remainders comprised the “other” category, which we presume were information-based companies such as news agencies and magazines whose revenue is primarily supported through advertising.

The survey data were analyzed across nine categories (Figure 2). The only category that showed a significant difference between the two types of firms was the data refresh rate. Forty-two percent of B2B companies refreshed their data at least once a day while 58% of B2C companies did the same. The other categories revealed very similar results when comparing the two types of firms.
Next we looked at the sources of data integrated by B2B and B2C firms (Figure 3). It was revealed that, in general, B2B firms integrate more data than B2C firms.
firms. The top four sources of data collected were customer demographics, online sales, offline sales, and customer communication data such as call center data, email data, etc.

Figure 3: B2B vs. B2C Data Sources (N = 115)
Next we compared the challenges and problems encountered between the firms (Figure 4). We observed that the top three problems faced by B2C firms were lack of planning, change management issues and organizational politics. The top three problems B2B firms faced were change management issues, organizational politics and lack of user buy-in. It is interesting to note that all of the top three problems of both B2B and B2C firms are organizational problems, not technical. As far as technical problems, 24% of B2B firms versus 40% of B2C firms identified data quality as a problem. In addition, 29% of B2B firms lacked user training while only 15% of B2C firms reported the same problem.
Figure 5 displays the benefits attained between the two types of firms. In general, more B2B firms benefit from their CRM implementations than B2C firms. One interesting finding is that 51% of B2B firms reported customer service benefits while only 45% of B2C firms reported the same benefit. Apparently,
B2B organizations are more effective at servicing their customers than B2C companies, which might be due to less complexity in servicing the relatively lower volumes of business customers in comparison to the much larger numbers of consumer customers. We previously reported that one of the biggest problems with B2C firms’ CRM projects was lack of planning. This problem may be a key reason behind the overall lower benefits realized in B2C firms. Although Figure 4 shows that 35% of B2B firms reported users not buying into the project, Figure 5 implies that, in general, B2B firms achieve more benefits from their CRM projects.
Figure 5: B2B vs. B2C Benefits (N = 115)

Proposition Testing

See Table 1 for ANOVA results and proposition findings. All propositions were found to be significant (p = 0.05) in their relationship to total value except for
proposition 3, which proposes more total value if data is refreshed daily. A more detailed explanation and analysis of each proposition follows.

![Table 1: ANOVA Results (N = 115)](image)

Table 1: ANOVA Results (N = 115)  
Correlation of Measure vs. Total Value

For proposition 1, respondents were asked to specify the number of data sources they integrated into their data repository for the purposes of their e-CRM project. The total number of data sources integrated was calculated. Using analysis of variance (ANOVA), we determined the relationship between the total number of data sources integrated and the total value was significant.
This finding suggests that total value increases as organizations integrate more data sources in their e-CRM projects.

One interesting insight was that only 22% of respondents integrated all four dimensions of clickstream data, as described by Ralph Kimball and Richard Merz (2000), namely session, page, event and referrer. The session data type is a high-level diagnosis of the complete web session. Examples of segmenting web sessions by customer behavior include “Product Ordered”, “Quick Hit and Gone”, “Unhappy Visitor” or “Recent, Frequent and Intense Return Shopper” (Kimball, 2000). Referrer data identifies how the website visitor arrived at the website. A simple descriptive analysis of the percentages of different ways a visitor arrived at a website provides valuable information about how to better allocate an organization’s advertising budget. The page dimension stores data about the various attributes of each web page visited. For example, some attributes would be the page name (Product X Description, Payment Page, etc.), when it was visited, how long the user stayed on that page and where the user’s next destination was.

For proposition 2, respondents were asked whether or not they integrated offline data with their online data. Sixty-two percent said they integrated these data sources while 30% did not. The remaining 8% were unsure. Using ANOVA,
we determined the relationship between those who integrated offline and online data and total value was significant (p = 0.019). Therefore, we propose that organizations that integrate both online and offline data in their e-CRM projects have significantly more benefits than organizations that do not integrate their data.

For proposition 3, respondents were asked how often they updated/refreshed the data in their data repositories. We segmented all responses into two groups – those who refreshed their data at least once a day and those who did not. Using ANOVA, we determined the relationship between frequently refreshed data (at least daily) and total value was not significant (p = 0.317). This proposition was rejected. Therefore, we propose that organizations that refresh their data at least once a day do not have a significantly higher value than organizations that refresh their data less frequently.

For proposition 4, respondents were asked whether or not they integrated external data into their central data warehouse. Seventy-four percent integrated external data in some form while 26% did not. Of those who did integrate, 62% said that external data comprised less than 20% of the total data used for analysis. Using ANOVA, we determined the relationship between integrating external data and total value was significant (p = 0.050). Therefore, we propose
that organizations that integrate external data in their e-CRM projects enjoy significantly more benefits than organizations that do not integrate external data.

For proposition 5, respondents were asked to identify the data repository used for their e-CRM systems. Fifty-one percent of companies implemented legacy databases, operational data stores (ODS) or data marts as their data repositories, while 49% implemented CRM-specific databases or central data warehouses as their data repositories. Using ANOVA, we determined the relationship between the total value derived by these two segments was significant (p = 0.011). We discovered the total value derived by the group using a decentralized data repository (and not a data warehouse or a CRM-specific database) was significantly lower than the group who used a data warehouse or CRM-specific database. Therefore, we propose that organizations that implement a centralized data warehouse or CRM-specific database as their e-CRM data repository enjoy significantly more benefits than organizations that do not implement these types of data repositories.

In summary, the above propositions show that data integration is essential to accurately assessing customer needs and thus allows the firm to achieve greater e-CRM and organizational value. Therefore, we propose our e-CRM
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value framework (minus proposition 3—daily data refresh) is a model for generating greater total benefits and a competitive advantage for organizations engaging in e-CRM projects. To achieve the greatest amount of benefits, we suggest organizations use a data warehouse as their e-CRM data repository. This data warehouse should contain a healthy number of data sources and house all integrated data including online, offline and external data. With this architecture in place, companies are able to achieve greater profitability by obtaining a better understanding of its customers and its relationships with them.

CONCLUSION

We have presented a new e-CRM value framework to better examine the significance of integrating data from all customer touch-points with the goal of improving customer relationships and creating additional value for the firm, ultimately leading to a competitive advantage. Various issues such as the number of data sources, integrating offline, online and external data, and data architectures are discussed. We also compared and contrasted the CRM efforts of B2B versus B2C organizations and revealed some of the challenges and opportunities each face. Our findings suggest that despite the cost and complexity, data integration for e-CRM projects contributes to a better understanding
of the customer and leads to higher ROI, greater number of benefits, improved user satisfaction and a greater chance of attaining a competitive advantage. Thus, when all else is equal, a company’s total value increases when a company integrates data from online, offline and external sources.

We hope that our empirical research and findings can assist practitioners and managers in identifying more efficient and effective ways of creating CRM value through data integration. It should be noted that we have only discussed the data-related issues of integration. Future research on this topic should investigate and identify managerial, financial and strategic issues that affect organizational value. In addition, other technical issues to explore include the impact of data quality and the integration role of web services.

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