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UNDERSTANDING THE IMPACT OF INFORMATION QUALITY ON CUSTOMER
RELATIONSHIP MANAGEMENT

By
Dana L. E. Harrison

A Dissertation Proposal

Presented in Partial Fulfillment for the
Degree of
Doctor of Business Administration
In the
Coles College of Business
Kennesaw State University

Kennesaw, GA
2016

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Dana L. E. Harrison
2016

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ABSTRACT

UNDERSTANDING THE IMPACT OF INFORMATION QUALITY ON CUSTOMER RELATIONSHIP MANAGEMENT

By

Dana L. E. Harrison

Information represents a valuable firm resource. The quality of this resource can benefit or adversely impact social and/or economic outcomes within the organization. Previous studies predominately establish that a global measure of information quality has a positive relationship with the success of technology adoption. But there is limited understanding of the impact of information quality on outcomes other than technology adoption.

This study investigates the multi-dimensional aspect of information quality and advances the proposition that it acts as a strategic success factor to customer relationship performance. Specifically, this study explores information as a resource for the firm and suggests that higher quality information will yield better decisions, which in turn, induces higher customer perceived relationship investment and relationship quality. This research builds upon resource based view theory to conceptualize information as a firm resource and will empirically investigate information quality as either an enhancement or impediment to organizational success of customer relationship management. Finally, this contributes to cross domain literature consisting of information systems and marketing which is currently underexplored. If organizations can identify vulnerability in the

information quality structure, information can then be calibrated to reflect necessary improvements.

Using a survey of 303 participants from multiple respondent groups (e.g., information producers, custodians, consumers and managers), findings suggest that information quality dimensions have different effects on perceived customer relationship management. Due to the exploratory nature of the study and complexity of the model, results were analyzed using PLS-SEM. Results of the study (1) build upon previous information systems literature to identify and analyze information quality dimensions that are a relevant consideration in today's digital era (2) contribute to resource based view theory literature by establishing that information quality resources represent a strategic success factor to customer relationship performance, and (3) expand upon customer relationship management literature by discovering that information quality drivers distinctively impact management levels in a contrasting manner thereby effecting perceived customer relationship investment and perceived customer relationship quality. In terms of managerial implications, results provide valuable insight that information quality initiatives are a business issue worthy of recognition since the use of information is inextricably linked to performance measures. If organizations continue to struggle with information quality, the information will remain an impediment to customer relationship management success and economic performance.

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CHAPTER 1: INTRODUCTION

It is estimated that 40% of all business initiatives fail to achieve their value due to deficiencies surrounding information quality (Friedman & Smith, 2011). Although alarming, the figure isn't necessarily surprising since a recent industry survey indicates that 90% of upper level managers lack sufficient information to undertake critical business decisions (Kielstra, 2007). In addition, 54% of managers express concern about making poor decisions based upon poor information quality (e.g., inaccurate, incomplete data) (Kielstra, 2007).

Although organizations are confronted with large amounts of information (Glazer, 1991) and processing requirements as a result of advancements in technology (Hair, 2007) it is the quality of information from customers, channel members and competitors that contributes the most to more effective marketing decisions (e.g. Day, 1994; Glazer, 1991; Morgan, 2012; Shankar et al., 2011). Information quality is a product of information systems (Delone & Maclean, 1992) and is defined as “data that are fit for use by data consumers (Wang & Strong, 1996)”. Furthermore, the quality of information “captures the degree to which a firm has broad and up-to-date information about (Homburg, Droll & Totzek, 2008)” its industry and stakeholders. Since information is the lifeblood of an organization (Kielstra, 2007; Grant, 1996; Liebeskind, 1996) and is considered a key marketing asset (e.g., Glazer, 1991; Jaworski & Kohli, 1993), the

quality of information has important implications for firm operations and ultimately profitability.

Existing literature suggests that information influences strategic marketing mix activities such as pricing, advertising, product development, supply chain decisions and marketing planning (e.g., Day, 1994; Grewal, Roggeveen, Compeau & Levy, 2012; Grewal, Ailawadi, Gauri, Hall, Kopalle & Robertson, 2011; Morgan, Vorhies & Mason, 2009). Firms depend upon information for decision making to enhance relationships downstream, upstream and within the firm itself (Shankar et al., 2011). Due to the organizational reliance on information for decision making both internal and external to the firm, it is likely that the quality of information significantly contributes to the ability to leverage customer relationships.

Information quality dimensions have often been identified as the most significant success factor (O’Kane & Collins, 2014) or “holy” grail (Rigby & Ledingham, 2004) of customer relationship management (CRM). Prior research has indicated a relationship between various CRM perspectives (e.g., processes, strategies, philosophies, capabilities and technologies) (Zablah, Bellenger & Johnston, 2004) and numerous outcomes, including customer prioritization (Zablah, Bellenger, Straub & Johnston, 2012), customer retention (e.g., Hillebrand, Nijholt & Nijssen, 2011; Jayachandran, Sharma, Kaufman & Raman, 2005), customer satisfaction (e.g., Jayachandran et al., 2005; Mithas, Krishnan & Fornell, 2005; Srinivasan & Moorman, 2005), firm efficiency (e.g., Karshnikov, Jayachandran & Kumar, 2009), customer loyalty (e.g., Kumar & Shah, 2004), improved customer word-of-mouth, market effectiveness (e.g., Reimann, Schilke & Thomas, 2010) strengthening the supply chain (e.g., Goodhue, Wixom & Watson, 2002) and firm

profitability (e.g., Ernst, Hoyer, Krafft & Krieger, 2011; Krashnikov et al., 2009; Thomas and Sullivan, 2005; Reimann et al., 2010; Reinartz, Krafft & Hoyer, 2004). Based upon the broad compilation of potential outcomes affected by information quality, CRM strategies forged with inaccurate information can be expected to lead to detrimental effects. If the acquired information is of poor quality, the ability to proactively plan and reactively respond to customers in a strategic manner could be compromised.

Improving information quality is becoming a focal point for organizations (Thoo et al., 2014). Among the reasons is that, organizations could be facing a 25% decrease in revenues if CRM leaders ignore the effective management of information (O’Kane & Collings, 2014). Due to limited research on the relationship between information quality and CRM, and the substantial impact on organizational outcomes, exploration of information quality and implications on customer relationship performance is warranted.

A report by IBM concluded that 90% of data that currently exists was created within the last few years due to the increasing use of information technology through use of computer mediated environments (CME) (“Apply new analytics tools,” retrieved 2015). Moreover, there is a growing understanding that CME’s play a role in producing information critical to decision making (Setia, Venkatesh & Joglekar, 2013; Yadav & Pavlou, 2014). Strategic co-creation of value between customers and the organization relies heavily upon the information produced through the CME’s robust information technology infrastructure (Drnevich & Croson, 2013). Although technologies are creating efficiencies to cohesively structure the velocity, variety and volume of information into a single location, organizations are still grappling with the influx of imperfect information (Russom, 2013; Watts, Shankaranarayanan & Even, 2009,).

Information technology governance, such as the management of information assets and technology purchase decisions, has previously been associated with the IT department (Kantrowitz, 2014). Interestingly, however, marketers are beginning to control technology purchases with budgets now anticipated to increase beyond those of the IT department in the next few years (McClellan, 2012) and software firms are vying for this expanded target market to include marketing executives (Kantrowitz, 2014). Due to marketing's expansive role in the purchase of technology, organizations should collectively examine costs and benefits associated with obtaining a single view of customers (Neslin & Shankar, 2009) through generation of quality information.

Few studies in IS (Petter, DeLone & Mclean, 2013) or marketing (Neslin et al., 2006; Verhoef et al., 2010) have investigated information quality dimensions as they relate to customer performance outcomes (Setia et al., 2013). Studies do recognize, however, that the quality of information can improve profitability through increased customer level responses (Fruchter & Zhang, 2004; Shaffer & Zhang, 2002; Yadav & Pavlou, 2014). Information quality dimensions, such as integration of information from various sources, can serve as a prerequisite to managing customer relationships throughout all relevant channels (Neslin et al., 2006) and yield higher levels of performance (Zahay & Griffin, 2004). If use of information is warranted through positive net benefits, consideration should be given to analyzing the quality of information available to organizations.

Research has yet to explore the impact of various levels of quality that should be captured to effectively manage customer relationships. For example, what is the impact of data quality on customer relationships? Is the cost of producing high quality

information a desirable strategy relative to strategic customer relationship management efforts by the organization? Specifically, questions related to information characteristics have continued to perplex organizations, with Neslin et al. (2006), Verhoef et al. (2010), and Yadav and Pavlou (2014) recognizing areas related to information focused research as insufficiently represented in current academic research.

The purpose of this paper is to explore the impact of information quality resources accessible to organizational decision makers on customer relationship performance. Specifically, over twenty dimensions of information quality will be examined to determine the dimensions that most impact decision making among managers. In addition, decision making by functions (marketing, sales, information systems/information technology, customer service and operations) and different management levels (first level manager, middle management, top management - vice-president, executive vice-president, and director, top management - C-level) could be driven by different information quality dimensions. These relationships will be analyzed to determine the impact on customer relationship management. By doing so we can more fully understand the factors that influence relational and economic performance.

This study makes several contributions to the academic literature as well as practitioners. First, this study contributes to the CRM literature by conceptualizing information quality as a strategic success factor to customer relationship performance. Organizations are understandably cautious in accepting the financial expense when considering increasing the costs of managing enterprise information quality. However, the risk of utilizing imperfect information is also burdensome when considering the severe potential threat on economic or social impact. Second, this study builds upon cross domain literature

consisting of IS and Marketing which is currently underexplored and ripe with opportunity (Setia et al., 2013). This research will be among the first to empirically investigate information quality as an impediment to organizational success of customer relationship management. Despite an increase in academic and industry acknowledgment that these areas need further review, there is limited understanding about the impact of data quality on customer performance. Finally, if areas of weakness can be identified within the information quality structure, organizations can calibrate information to reflect necessary improvements.

CHAPTER 2: LITERATURE REVIEW

Chapter 2 is organized as follows: First, a literature review and synthesis of resource based view theory and relationship management theory is presented. Next, the constructs proposed in the conceptual model are introduced and defined followed by the theoretical linkages between constructs. The chapter concludes with development of the hypotheses as a means of clarifying the conceptual framework.

2.1 Theoretical foundation

Resource based view (RBV) theory provides a framework from which to explain and predict an organization's competitive advantage (Barney, Ketchen & Wright, 2011; Kozlenkova, Samaha & Palmatier, 2014; Slotegraaf, Moorman & Inman, 2003).

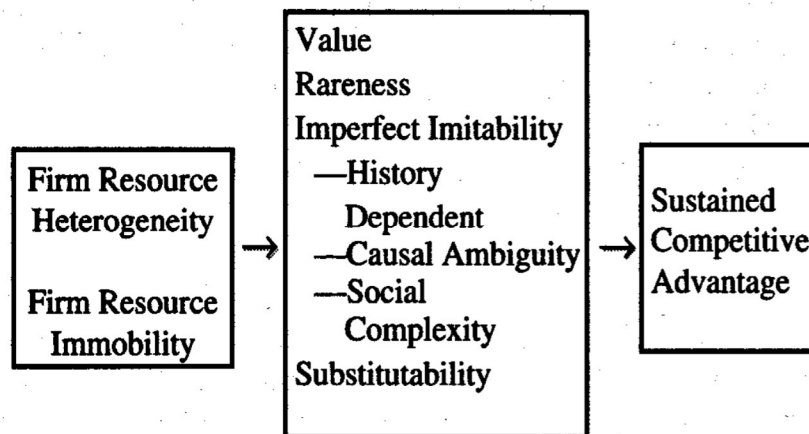
Resource based view theory considers deployment of resources, as well as capabilities, that meet certain criteria as important competitive differentiators in firm performance (Wernerfelt 1984; Barney 1991). Resources can be defined as assets, information, knowledge and processes that exist within the boundaries of a firm (Amit & Schoemaker, 1993; Barney, 1991). Theory argues that organizations have varying stocks of resources and mature capabilities resulting in different profitability levels of firms within and across industries (Hunt, 1997). The heterogeneous combination of resources and capabilities represents integral components to generating economic rents.

Organizations possess many valuable resources. These resources and capabilities are valuable when there is some benefit to the organization. Resources and capabilities

are rare when a substantial number of other organizations are unable to possess or exploit the valuable resource in a similar manner (Barney, 1991). Firms can realize a competitive advantage when resources are valuable and rare (Barney, 1986; 1991), and when the strategies are not being implemented by current or potential competitors (Barney, 1991).

Resources with characteristics that qualify as a competitive advantage don't inherently imply sustainability of these advantages. Rather, resources capable of producing sustainable competitive advantages should reflect additional attributes (see Figure 1). To represent a sustainable competitive advantage, RBV contends that resources and capabilities must also exhibit inimitable and non-substitutable attributes (Dierickx & Cool, 1989; Barney 1991, Newbert, 2007).

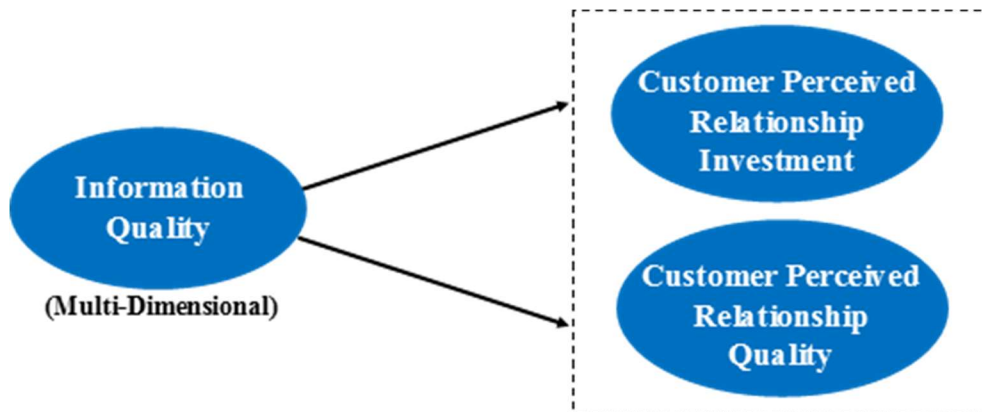
Figure 1: Resource based view theory (Barney, 1991)



Sustainable competitive advantage is based upon the possibility of competitive duplication. Since many resources are built through substantial effort, evolve differently over time for each firm, and are protected by intellectual property copyrights, competitors are often unable to reproduce the strategic implementation of resources and capabilities. If competitors are unable to duplicate critical benefits achieved from the implemented strategy, there is potential for a firm to experience a sustainable competitive advantage through above normal economic performance (Barney, 1991).

RBV theory represents a strategic management perspective to achieving a competitive advantage. The competitive advantage that is obtained from resources and capabilities can potentially be sustainable over time. Through adoption of the theoretical foundation for the current study, RBV provides insights and explains conditions under which organizations could strategically benefit from resources and capabilities (see Figure 2). As currently proposed, RBV recognizes information as a resource for the firm and suggests that higher quality information will yield better decisions, which in turn, induces higher customer perceived relationship investment and relationship quality.

Figure 2: Proposed Conceptual Model



2.2 Construct Definitions

Information quality as examined in previous research includes multi-dimensional aspects. One aspect is information access, which is the extent to which data are available. That is, how easily and quickly the information can be accessed (Wang & Strong 1996). A second aspect is information integration, which is the extent to which data are available from different data sources (Wang & Strong, 1996). A third aspect is information format, which represents how well the information is presented or delivered (e.g., data visualization) (Wang & Strong, 1996). The fourth aspect, information currency, is the extent to which the age of the data or information is appropriate and up to date (Wang & Strong, 1996). A fifth aspect, information accuracy, is the extent to which data is perceived as correct, reliable, and precisely measured (Wang & Strong, 1996). The sixth aspect, information completeness, measures the extent to which data quantity or volume is appropriate and exhibit sufficient breadth, depth, and scope for the task at hand (Wixom & Todd, 2005).

Any one or all of the above mentioned aspects are likely to influence customer relationship performance. Due to the variety of information aspects previously examined in the literature, the information quality aspects that will be studied in this dissertation will be selected based on initial qualitative research.

Two outcome measures will be used to assess customer relationship performance. One outcome is the perception that the seller invests resources, efforts and attention to maintain or enhance customer relationships (De Wulf, Odekerken-Schroder & Iacobucci, 2001; Ganesan, 1994). The second outcome focuses on an overall assessment of the strength of a relationship (Crosby, Evans & Cowels, 1990; De Wulf et al., 2001;

Garbarino & Johnson, 1999; Smith, 1998). A summary of the constructs that will potentially be used as measures in this study is provided in Table 1.

Table 1: Summary of Proposed Constructs Employed in the Conceptual Model

Information Resources		
Information Access	The extent to which data are available or easily and quickly retrievable or the ease of which information can be accessed.	Wang & Strong, 1996; Jayachandran et al., 2005
Information Integration	The extent to which data are available from differing data sources.	Jayachandran et al., 2005; Wang & Strong, 1996
Information Format	The perception of how well the information is presented or delivered (e.g., data visualization).	Wang & Strong, 1996
Information Currency	The extent to which the age of the data or information is appropriate and up to date.	Wang & Strong, 1996
Information Accuracy	The extent to which data is perceived as correct, reliable, and precise.	Wang & Strong, 1996
Information Completeness	The extent to which data quantity or volume is appropriate and exhibit sufficient breadth, depth, and scope for the task at hand.	Wixom and Todd, 2005
Relationship Management Performance		
Customer Perceived Relationship Investment	The perception that the seller invests resources, efforts and attention to maintain or enhance the relationship.	De Wulf et al., 2001; Ganesan, 1994
Customer Perceived Relationship Quality	Overall assessment of the strength of a relationship.	Crosby, Evans & Cowels, 1990; De Wulf et al., 2001; Garbarino & Johnson, 1999; Smith, 1998

2.3 Information Quality

Organizations are dedicating significant monetary or personnel investments toward procurement of advanced customer relationship management solutions (e.g., Zablah, et al., 2004; Mullins et al., 2014). A key reason organizations purchase information systems is to improve decision making information (e.g., Teo & Wong, 1998). Based on extensive IT systems, organizations are now capable of integrating structured and unstructured data, as well as channels to obtain higher quality customer information, which in turn provides deeper insights.

Customer information is the most complex type of information in companies (Davenport, Harris and Kohli, 2001) derived through the use of information technology. Since the technology can be easily acquired (Barney, 1991), it has been suggested that the information itself should be the focus of further investigation by researchers (Glazer, 1991). Previous research also advocates exploration of information characteristics (e.g., integration, quality), rather than focusing specifically upon the technology that produces it (e.g., Neslin et al., 2006; Verhoef et al., 2010; Yadav & Pavlou, 2014). Finally, research proposes opportunities for theory development opportunities (Yadav & Pavlou, 2014).

Organizations can complete advanced analyses of customer, market and competitor information based upon the variety and volume now available (Day, 2011). For example, organizations have access to information that enables them to understand customers and co-create value with them. Yet, the value of information to the firm is dependent upon the quality of the resource. Consistent with RBV theory, this information is recognized as a market-based asset (Glazer, 1991) and thus firms that possess superior

information resources can potentially obtain above normal economic returns (Barney, 1986).

A possible perspective is that information exists as a common valuable resource and that all firms have access to information, therefore it is not rare. If the ability to obtain imitable information is strategically equivalent, then organizations would simply mimic acquisition efforts by competitors to achieve the same valuable resources.

Similarly, if a large number of firms have the ability to obtain high-quality information, the results would be reflective of comparable success. But considering the high failure rates that accompany technology investments (e.g., CRM & ERP) (Ryals, 2005; Krasnikov et al., 2009), it is unlikely that high-quality information is attainable by organizations in equal terms (Glazer 1991; Goodhue et al., 2002).

Marketing studies within the context of B2B and B2C environments observe that customer relationship management depends heavily upon customer information. For example, information can be used to tailor offerings to correspond with customer needs (Mithas et al., 2005), improve cross selling, develop more accurate forecasts, assess product demand (Bharadwaj, 2000), and enhance firm response capability (Jayachandran et al., 2004). Moreover, diverse (Burt, 1992), integrated information increases the quality of services that can be provided (Payne & Frow, 2004). It is apparent that information resources influence firm performance (Setia et al., 2013). Yet, research lacks clarity surrounding the impact of specific dimensions of information quality on the subsequent performance of customer relationship management efforts.

Due to the overlap of information definitions in previous literature, this research conceptualizes the term information in a holistic manner (e.g., data, information and

knowledge) as a valuable firm resource. Moreover, information resources are characterized as valuable when they enhance efficiency and effectiveness (Glazer, 1991), and when they are of higher quality provide a foundation from which organizations can explore opportunities and respond appropriately (Day, 2011).

Information quality can be viewed as a multidimensional construct (Wang & Strong, 1996). Literature refers to information as data that are relevant, concise (Tushman & Nadler, 1978), accurate, timely (Tushman & Nadler, 1978; Tayi & Ballou, 1998; Wang & Strong, 1996), and complete and consistent (Tayi & Ballou, 1998; Wang & Strong, 1996). Although information quality has been previously considered from the developer perspective, the dimensions were also recognized from the information consumer perspective (Wang & Strong, 1996). Specifically, four broad categories of information quality dimensions that include twenty attributes have been identified (Wang & Strong, 1996).

As illustrated in Figure 3, twenty of the most important information attributes from a consumer perspective are consolidated into four categories: intrinsic, contextual, representational and accessibility (Wang & Strong, 1996). Intrinsic data quality (e.g., believability, accuracy, objectivity, reputation) implies that data have quality in their own right (Wang & Strong, 1996). Contextual data quality (e.g., value added, relevancy, timeliness, completeness, appropriate amount of data) expresses that data quality must be considered within the context of the requirements pertaining to the information consumer (Wang & Strong, 1996). Representational data quality (e.g., interpretability, ease of understanding, representational consistency, concise representation) signifies a lack of process or weakness for dispensing data in a manner that is intelligible and clear (Wang

& Strong, 1996). Finally, accessibility data quality (e.g., accessibility, access security) represents the processes for providing readily available and obtainable data (Wang & Strong, 1996). Simplified definitions of the four categories of data quality are provided in Table 2 (Wang & Strong, 1996; Abate, Diegert & Allen, 1998).

Figure 3: A conceptual framework of information quality (Wang & Strong, 1996)

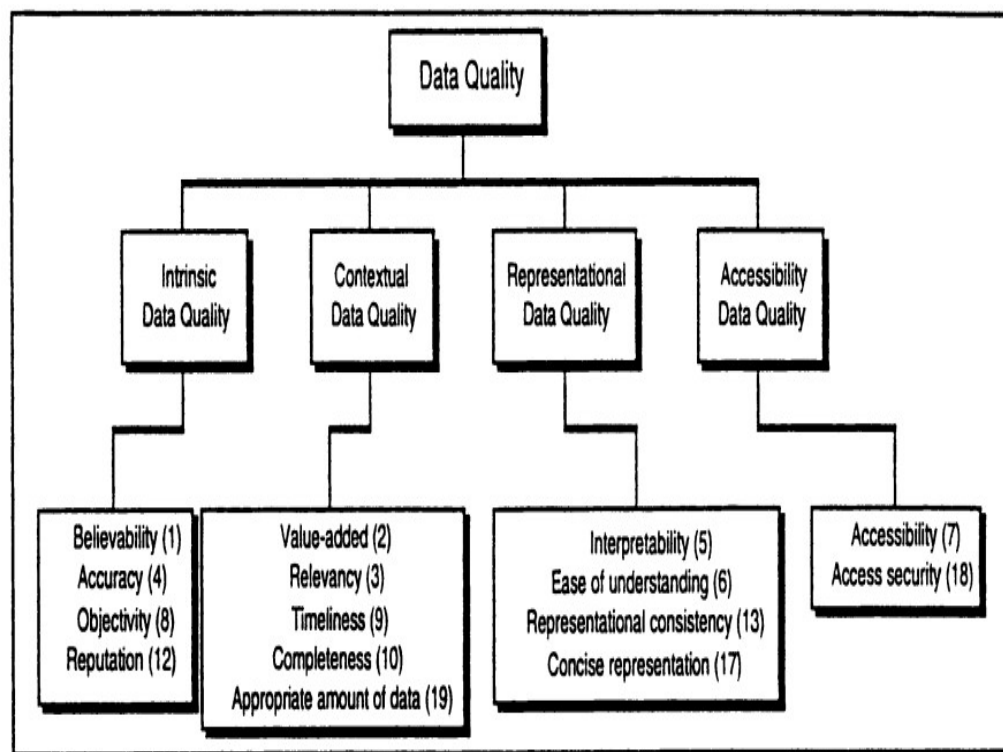


Table 2: Four categories of information quality

Category	Definition
Intrinsic Data Quality	Denotes that data have quality in their own right.
Contextual Data Quality	Highlights the requirement that data quality must be considered within the context of the task at hand.
Representational Data Quality	A lack of process or weakness in the current process for supplying data that are intelligible and clear.
Accessibility Data Quality	A lack of process or weakness in the current process for providing readily available and obtainable data.

Previous research measures a limited number of information quality dimensions or assesses information quality as a global construct. In general, research predominantly includes attributes such as accuracy and consistency (e.g., Nicolaou & McKnight, 2006; Redman, 1995; Zahay, Peltier, Krishen & Shultz, 2014). But, completeness and format have also been integral dimensions of information quality (e.g., Nelson, Todd & Wixom, 2005). Finally, other attributes that have been examined include interpretability (Wang, Reddy & Kon, 1995) and timeliness (Ives, Olson & Baroudi, 1983).

Information quality literature routinely emphasizes different characteristics between domains (e.g., IS, Marketing, Accounting). For example, information systems literature is a major contributor to the topic of information quality and predominantly identifies information quality as a determinant of technology success (e.g., DeLone & McLean, 1992). Specific attributes such as accessibility (O'Reilly, 1982) accuracy, completeness, comprehensiveness and consistency are found to reduce the amount of time and effort involved in supporting decision making among end users by data suppliers (e.g., Wixom & Watson, 2001). In contrast, accounting and auditing literature frequently examines data reliability (e.g., Johnson, Leitch, and Neter, 1981; Knechel, 1985). Finally, marketing literature generally discusses information quality dimensions such as integration and access (e.g., Jayachandran et al., 2005).

Analysis of the information systems domain provides a foundation for evaluating the information quality construct. Despite garnering attention within the context of technology adoption models, information quality has played a limited role as a driver for alternative outcomes. Specifically, Nelson, Todd and Wixom (2005) find that although

information quality has a positive impact on information satisfaction in both predefined reporting software and query tools, there is no indication that the construct is related to system satisfaction. Nonetheless, several studies examine the role of information quality dimensions beyond drivers of technology adoption. For example, Goodhue, Wixom and Watson (2002) demonstrate that the quality of information has a positive impact on improving and strengthening the supply chain. Rai, Patnayakuni and Seth (2006) also consider information quality within a supply chain scenario. Their study shows that integration of an IT Infrastructure (measured through the subconstructs of data consistency and cross-functional application integration) positively impacts supply chain process integration. Mithas, Ramasubbu and Sambamurthy (2011) propose and support that information management capability (measuring processes directly related to producing information quality, availability, reliability, timeliness, accuracy and security) has a positive impact on customer management capability. Similarly, Nicolaou and McKnight (2006) show that information quality positively impacts trusting beliefs of exchange partners and negatively impacts risk perceptions of the data exchange. When considering the impact on customer related capabilities, Setia, Venkatesh and Joglekar (2013) study the banking industry in India and conclude that information quality has a positive relationship on customer service capabilities. Finally, Wixom and Todd (2005) found that survey respondents believe information quality has a positive impact on information satisfaction. Findings of these studies are summarized in Table 3.

Marketing studies provides less guidance regarding the impact of information quality on decision making, focusing primarily on information quality elements and information processes. For example, Arnold, Fang and Palmatier (2011) studied financial

services and general retail organizations to assess customer knowledge depth and diversity, but examined only a limited number of information quality dimensions. Becker, Greve and Albers (2009) surveyed CRM project managers of B2C companies in four industries (financial services, retail, information technology and utilities) and reported that technical implementation (consisting of 19 items which captured different facets such as information acquisition and information accessibility) consistently impacts CRM process-related outcomes related to customer initiation and maintenance, but not retention. Ernst, Hoyer, Krafft and Krieger (2011) surveyed R&D and Marketing managers representing a variety of industries and concluded that more extensive CRM process implementation (e.g., customer information management including information process and quality items, customer segment value management and multi-channel management) in a new product development context results in improved performance. Although three dimensions were used to capture CRM processes, customer segment value management and customer information management had the strongest impact on CRM processes. In the context of both B2B and B2C services and manufacturing industries, Homburg et al., (2008) found that current information is necessary in determining the most valuable customers and addressing needs properly. In SBUs of top US firms, Jayachandran, Sharma, Kaufman and Raman (2005) conclude that relational information processes (information reciprocity, information capture, information integration, information access, information use) have a positive impact on customer relationship performance. Although initially testing relational information processes as a global construct, the authors eventually examined only relational information processes as individual dimensions, and found that all dimensions influenced customer relationship

management performance. Finally, in the context of information quality within the decision making context of the organization, Low and Mohr (2001) as well as Menon and Varadarajan (1992) illustrated that the quality of marketing information predicts marketing information use and perceived usefulness. These examples of previous research in marketing, while beneficial in understanding some relationships, lack a consistent approach to represent the multi-dimensional aspects of information quality, as summarized in Table 4.

Table 3: Example of IS studies that include information quality dimensions.

Study	Sample	Propositions	Results
Goodhue, D. L., Wixom, B. H., & Watson, H. J. (2002). Realizing business benefits through CRM: hitting the right target in the right way. <i>MIS Quarterly Executive</i> , 1 (2), 79-94.	Case Studies	N/A	The quality of information has a positive impact on improving and strengthening the supply chain, improving the ability to identify key loyalty drivers, and quantify how much CLV can be attributed to service/experience.
Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How Information Management Capability Influences Firm Performance. <i>MIS quarterly</i> , 35 (1), 237-256.	Sample consists of 160 observations from 77 firms and intra-organizational units of Baldrige data.	Proposes that information management capability (measuring processes directly related to producing information quality, availability, reliability, timeliness, accuracy and security) has a positive impact on customer management capability.	Supported. Information management is positively related to customer management.

<p>Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: an empirical examination within the context of data warehousing. <i>Journal of Management Information Systems</i>, 21 (4), 199-235.</p>	<p>Sample consists of 461 participants representing various functions from seven organizational members of the Data Warehousing Institute.</p>	<p>Proposes that information quality has a positive impact on information satisfaction and system satisfaction.</p>	<p>Partially supported. The study tests the proposition within the context of three business technologies. It is determined that completeness, accuracy and format are significant drivers of information quality. Although information quality has a positive impact on information satisfaction in both predefined reporting software and query tools, there is no indication that the construct is related to system satisfaction.</p>
<p>Nicolaou, A. I., & McKnight, D. H. (2006). Perceived information quality in data exchanges: Effects on risk, trust, and intention to use. <i>Information Systems Research</i>, 17 (4), 332-351.</p>	<p>The sample consists of 95 purchasing managers and mature MBA students employed as full-time in technical functions (programmers, engineers, business experts, marketing managers, controllers).</p>	<p>Proposes that information quality (global measure consisting of currency, accuracy, relevance, completeness and reliability) positively impact trusting beliefs of exchange partners and negatively impacts risk perceptions of the data exchange.</p>	<p>Supported. Information quality positively impacts trusting beliefs and negatively impacts risk perceptions.</p>
<p>Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm performance impacts of digitally enabled supply chain integration capabilities. <i>MIS quarterly</i>, 30 (2), 225-246.</p>	<p>Sample consists of 110 respondents serving within a supply chain or IS capacity from manufacturing or retail industries.</p>	<p>Proposes that IT infrastructure integration for SCM (comprised of data consistency and cross-functional application integration) positively impacts supply chain process integration.</p>	<p>Supported. IT Infrastructure integration for SCM positively impacts process integration. Although both sub-constructs used to measure IT infrastructure integration were found to be significantly related, data consistency (a dimension of information quality) provides a larger contribution.</p>

Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. <i>MIS Quarterly</i> , 37 (2), 565-590.	Sample consists of 170 matched responses from branch/IS managers and customers from a single bank in India which included multiple branches.	Proposes that information quality (Completeness, Accuracy, Format, Currency) has a positive relationship with customer service capabilities.	Supported. Information quality is a significant determinant of customer service capabilities.
Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. <i>Information systems research</i> , 16 (1), 85-102.	Sample consists of 465 respondents from members of the Data Warehousing Institute.	Proposes that information quality, comprised of completeness, accuracy, format and currency, has a positive impact on information satisfaction.	Supported. The results indicate the quality of information significantly impacts information satisfaction.

Table 4: Example of marketing studies that include information quality dimensions.

Study	Sample	Propositions	Results
Arnold, T. J., Fang, E. E., & Palmatier, R. W. (2011). The effects of customer acquisition and retention orientations on a firm's radical and incremental innovation performance. <i>Journal of the Academy of Marketing Science</i> , 39 (2), 234-251.	Sample consists of two respondents within 225 SBUs of financial services and general retail organizations.	Customer knowledge depth positively relates to radical and incremental innovation performance. The level of customer knowledge diversity positively relates to radical innovation performance and negatively impacts incremental innovation performance.	Supported. Measuring characteristics of information completeness termed customer knowledge development, the study determines that depth of customer knowledge positively relates to radical innovation performance and diversity of customer knowledge negatively relates to incremental innovation performance.

Becker, J. U., Greve, G., & Albers, S. (2009). The impact of technological and organizational implementation of CRM on customer acquisition, maintenance, and retention. <i>International Journal of Research in Marketing</i> , 26 (3), 207-215.	Sample is comprised of B2C companies in four industries (financial services, retail, information technology and utilities). Respondents consisted of 90 CRM project managers.	Proposes technical implementation (consisting of 19 items which captured difference facets such as information acquisition and information accessibility)	Partially supported. Find that technological implementations consistently impact CRM process-related outcomes related to customer initiation and maintenance, but not retention.
Ernst, H., Hoyer, W. D., Krafft, M., & Krieger, K. (2011). Customer relationship management and company performance—the mediating role of new product performance. <i>Journal of the Academy of Marketing Science</i> , 39 (2), 290-306.	Sample consists of 183 SBUs/companies. Participants included R&D and Marketing managers from a variety of industries.	The greater the firm's CRM process implementation (e.g., customer information management, customer segment value management and multi-channel management) in a new product development context, the greater their performance.	Supported. Although three dimensions were included to capture CRM processes, customer segment value management and customer information management, which includes a combination of information processes and quality items, had the strongest impact on CRM processes.
Homburg, C., Droll, M., & Totzek, D. (2008). Customer prioritization: does it pay off, and how should it be implemented? <i>Journal of Marketing</i> , 72 (5), 110-130.	Sample consists of 310 managers responsible for customer prioritization, within services and manufacturing industries, among B2B and B2C organizations.	Proposes that customer information quality allows delivery of higher value through customer prioritization.	Supported. Current customer based information is necessary in determining the most valuable customers and addressing needs appropriately.

Jayachandran, S., Sharma, S., Kaufman, P., & Raman, P. (2005). The role of relational information processes and technology use in customer relationship management. <i>Journal of Marketing</i> , 69 (4), 177-192.	Sample consists of 172 senior marketing, sales and customer services managers within SBUs of top US firms.	Proposes that relational information processes (information reciprocity, information capture, information integration, information access, information use) has a positive impact on customer relationship performance.	Supported. Find that relational information processes are positively related to customer relationship performance. Although the author initially tested relational information processes as a global construct, the authors eventually examined the relational information processes as individual dimensions upon a reviewer request. There was a significant, main effect of all dimensions on customer relationship management performance.
Low, G. S., & Mohr, J. J. (2001). Factors affecting the use of information in the evaluation of marketing communications productivity. <i>Journal of the Academy of Marketing Science</i> , 29(1), 70-88.	Sample consists of 421 marketing executives from a variety of industries.	The greater perceived information quality of marketing information in analyzing the productivity of marketing communications, the more likely the information will be used to make decisions.	Supported. The quality of marketing information does predict marketing information use.
Menon, A., & Varadarajan, P. R. (1992). A model of marketing knowledge use within firms. <i>Journal of Marketing</i> , 56 (4), 53-71.	N/A	The greater perceived information quality, the greater the perceived usefulness and utilization of information.	Not tested empirically.

Although industry articles regarding information quality are more prevalent, academic research has not developed a foundation for analyzing the importance of information quality as it relates to customer relationship performance. As Frow and Payne (2009) note, research regarding information is woefully underdeveloped. There is a difference in generating information, possessing quality information and understanding how to use it (Reed & DeFillipi, 1990). Instead, studies tend to focus on information

activities or processes (Moorman, 1995). In particular, prior research focuses heavily on information flows (Klein & Rai 2009), information processing (Hult, Ketchen & Slater, 2004), information processes (Jayachandran et al., 2005), technology (Krasnikov, Jayachandran & Kumar, 2009), information acquisition, generation and dissemination (Hult et al., 2004; Kohli, & Jaworski, 1990), information use (Deshanpande & Zaltman, 1982; Menon & Varadarajan, 1992; Moorman, 1995), organizational learning (Fiol & Lyles, 1985; Huber, 1991; Levitt & March, 1988; Sinkula, 1994; Slater & Narver, 1995) and information sharing (Barua, Konana, Whinston & Yin, 2004). Overall, the literature points out that companies attempt to keep up with competitors through technology adoption rather than on improving and investing existing customer information (Day, 2003). Furthermore, information quality is very seldom studied on a dimensional level as it relates to its value in customer relationship performance (Petter et al., 2013).

While some organizations achieve beneficial levels of information quality, based upon the cost of investment, producing high quality information might be unreasonable. Due to the velocity, variety and volume of customer data, however, it seems irrational to conceive that organizations can build and consistently maintain a perfect information resource. Organizations need to understand the extent to which factors are affected by individual information quality dimensions. As the organization improves information quality, it seems more likely that the desired performance impact could be realized (Teo & Wong, 1998). If information quality deficiencies are not addressed or managed properly, the flawed resource will become more prominent as organizations acquire additional information. Ultimately, firm decisions will be impacted by the lack of quality

information thereby producing a recurring challenge of poor decision making.

2.4 Customer Relationship Management

Customer relationship management (CRM) includes relationship initiation, maintenance and termination (Reinartz et al., 2004). Previous research advocates that marketing should be the purveyor in the development of customer relationships (Gummesson, 1999; Reinartz et al., 2004; Kotler, 1990). CRM performance builds upon relationship marketing theory that emphasizes the development of collaborative relationships between organizations and customers (e.g., consumers, customers, suppliers, distributors) (Berry, 1983; Gonroos, 1990; Zablah et al., 2012). Literature suggests that economic and social benefits arise from extended relationships with customers (e.g., Berry 1983; Dwyer, Schurr, and Oh, 1987; Morgan & Hunt, 1994), and often recognizes that customer relationships are vital to the long-term success of the firm (Slotegraaf et al., 2003; Reinartz Krafft & Hoyer, 2004).

Successful customer relationships require substantial resource commitments (Dwyer, Schurr & Oh, 1987) and have important firm implications (Hunt, 1997). Customer relationship management relies heavily on the application of information resources that are held by the firm (Payne & Frow, 2004; Ryals & Payne, 2001). Furthermore, sustaining competitive advantages is significantly dependent upon the company's ability to manage information from customers (e.g., Hogan, Lemon & Rust, 2002) and competitors. This study builds upon RBV and relationship theory to propose a connection between the quality of information (as a firm resource) and in turn how it influences customer relationship performance.

Research indicates that the health of customer relationships can be measured as an output of strategic resources, capabilities and processes (e.g., Jayachandran et al., 2005; Setia et al., 2013). Customer-provider relationship outcomes have been previously measured using a variety of facets (e.g., relationship quality, satisfaction, trust, commitment) (Palmatier, Dant, Grewal & Evans, 2006). The current study proposes customer perceived relationship investment and customer perceived relationship quality as consequences to the quality of information possessed by the selling firm.

2.4.1 Relationship Investment

Relationship investment is representative of the seller's investment of "resources, efforts and attention to maintain or enhance" the exchange relationship (De Wulf et al., 2001, P. 35). For example, the quality level of resources that are expended by the seller should contribute to producing additional value to the customer. Sellers will contribute to positive relationships when they are able to appropriately obtain and apply resources to benefit customers. The current study conceptualizes relationship investment from the perception of the customer (e.g., Zablah, et al., 2012).

2.4.2 Relationship Quality

Relationship quality can be defined as an overall assessment of the strength of a relationship (Crosby et al., 1990; De Wulf et al., 2001; Garbarino & Johnson, 1999; Smith 1998; Palmatier et al., 2006). Previous literature has examined relationship quality as a multi-dimensional construct (e.g., trust, commitment, satisfaction), and has demonstrated that using each factor individually does not accurately represent the

relationship (De Wulf et al., 2001; Palmatier et al., 2006). While dimensions vary (e.g., De Wulf et al., 2001; Mullins et al., 2014; Palmatier et al., 2006), research signals that trust and satisfaction represent key dimensions of the construct (e.g., Boles, Johnson & Barksdale, 2000; Crosby et al., 1990; Leuthesser, 1997).

Consistent with previous research, this study conceptualizes relationship quality as a multidimensional construct encompassing trust and satisfaction (Crosby et al., 1990; Geyskens, Steenkamp, Scheer & Kumar, 1996; Grayson & Ambler, 1999; Moorman, Zaltman & Deshpande, 1992; Morgan & Hunt, 1994; Palmatier et al., 2006). Trust “exists when one party has confidence in an exchange partner’s reliability and integrity (Morgan & Hunt, 1994, p. 23).” The perception of trust is based upon the customer’s belief that the seller maintains qualities such as honesty, competence, benevolence and responsibility (e.g., Brashear, Boles, Bellenger & Brooks, 2003; Doney & Cannon, 1997; Dwyer & LaGace, 1986; Ganesan, 1994). Satisfaction represents a cumulative evaluation of the customer’s affective state towards the exchange relationship (e.g., Anderson & Narus, 1990; De Wulf et al., 2001; Crosby et al., 1990; Dwyer & Gassenheimer, 1992; Frazier, Gill, & Kale, 1989; Ganesan, 1994; Gaski & Nevin, 1985; Mohr, Fisher, & Nevin, 1996). Prior research suggests that satisfaction can take economic and non-economic forms (Geyskens, Steenkamp & Kumar, 1999). The focus of the current research, however, is on psychosocial aspects of the relationship thereby eliminating the need to examine economic outcomes. Literature indicates that trust and satisfaction are fundamental factors capable of assessing the relationship exchange performance (e.g., Palmatier et al., 2006; Ruekert & Churchill, 1984) and have been linked to relationship longevity (e.g.,

Day & Wensley, 1998; Dwyer, 1980; Hunt & Nevin, 1974; Rapp, Trainor & Agnihtri, 2010).

2.5 Hypothesis Development

Prior research suggests that information will enhance the firms' anticipation (Gorla, Somers & Wong, 2010) and response to customer needs (Drnevich & Croson, 2013; Homburg et al., 2008; Jayachandran et al., 2005). Market information enables organizations to understand and deliver higher value to customers. It is the intention of organizations to establish and maintain customer relationships to enhance and sustain performance. Thus, information must be available to assist in developing applicable responses to customer needs (Jayachandran et al., 2005).

The level of information quality that organizations possess could translate into a more refined decision making by managers of the selling firm. Greater uncertainty through disparate information will lead to less informed, and potential immobilization of decision making. Thus, decision making results should be strengthened if enterprise-level data, where opportunities or changing customer needs can be identified, is accessible to all relevant members within the organization. Information quality dimensions should manifest as important antecedents to anticipating and reacting to customer needs (e.g., Setia et al., 2013) thereby signaling an investment in the exchange relationship (see Figure 4).

H1. Information quality is positively related to customer perceived relationship investment.

Information is an integral component in building and maintaining customer relationships (Jayachandran et al., 2005). In order for organizations to develop and

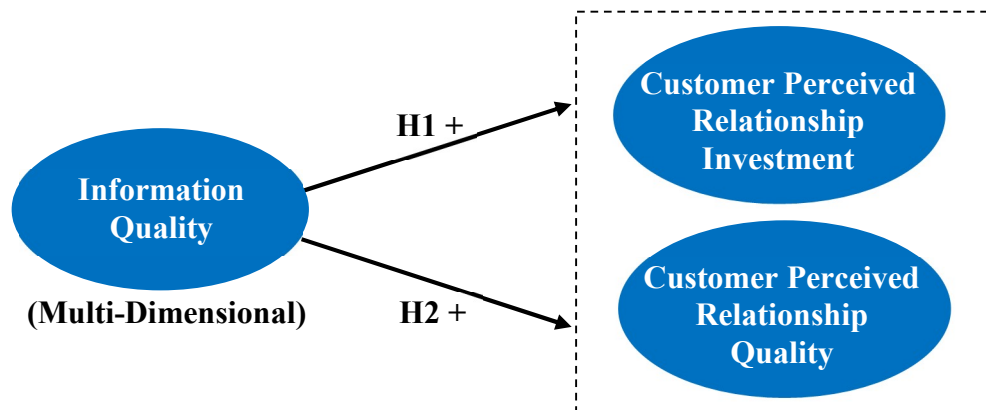
maintain relationships with customers, it is necessary to understand customers and their experiences. Information should improve a firm's ability to identify customer needs thereby enhancing the value of the relationship. If the organization can meet the needs of customers, they would be less likely to select or defect to competitors (Mithas et al., 2005). Deeper competitor, market and customer insights can provide organizations a foundation for further developing customer exchange relationships.

Although current data-intensive environments provide access to rich information, the organization is often equipped with deficient information (Kielstra, 2007). Previous research is somewhat contradictory in determining the effect of information related constructs on firm performance. One study suggests no relationship between information quality and customer satisfaction (Roh et al., 2005). But research in general shows that information use can improve firm value and have a positive impact on firm performance (Boulding, Staelin, Ehret & Johnston, 2005). In addition, research has indicated that distorted information can have a negative impact on organizations (Gorla et al., 2010). Specifically, the quality of customer data can have a detrimental impact on organizations through, for example, supply chain management (Dey and Kumar, 2010), products/service enhancements, marketing information support, product control costs (Gorla et al., 2010), organizational efficiency and enhanced customer value (Thomas & Sullivan, 2005). Therefore, it is anticipated that information quality will have a positive impact on customer perceived relationship quality (see Figure 4).

H2. Information quality is positively related to customer perceived relationship quality.

Increasing the quality of firm information to make incremental or substantial improvements will impact budget decisions. Organizations could determine that increasing information quality is not worth the cost based upon the potential outcome. Through examination of information quality as a multi-dimensional construct, organizations can better understand which dimensions are most likely to enhance customer relationship quality. Moreover, insights gained from this study will potentially determine which information quality dimensions should be addressed to increase as well as sustain performance.

Figure 4: Proposed Conceptual Model with Hypothesized Relationships



CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Chapter 3 is divided into six sections that propose methodological choices that will be adopted in this study. The first section provides an overview of the current research design. The second section offers details surrounding the pretest. The third section provides an overview of the sample and procedures proposed for data collection. The fourth section consists of an operationalization of the constructs and a summary of the items that will be adapted for the questionnaire. The fifth section explains the proposed analytical approach. The sixth section discusses common method variance and the applicable remedies.

3.1 Design

The methodological approach used in this study is a cross-sectional, quantitative survey design. Data was collected online and a survey was used to assess the relationship between selected information quality dimensions and customer relationship management performance. The proposed approach was consistent with recommendations from the marketing and information systems literature, as summarized in Chapter 2.

3.2 Pretest (Qualitative)

Pretest. Interviews among industry and academic experts were conducted to identify the information quality dimensions appropriate for the study and to support conceptual model development. In addition, to assess the content validity of the survey, the items measuring each construct were validated by the interview participants who were knowledgeable academic and industry experts. Qualitative questions were also included in the interviews to obtain additional feedback from participants. Since this study is exploratory in nature and among one of the first empirical studies to specifically examine the multi-dimensional aspects of information quality in depth, it was beneficial to confirm that the current conceptual framework captures data quality attributes that are important to data consumers. Feedback received from pretest participants was incorporated into revisions of the questionnaire.

3.3 Quantitative Research

Pilot test. Two pilot tests were performed to further analyze the survey instrument and verify existing issues. The first pilot test examined issues stemming from survey questions. Following minor revisions surrounding several constructs, a second pilot test was performed to confirm survey questions remained valid.

The sample for first pilot test was obtained using a Qualtrics panel of 55 managers of varying functions in B2B organizations. The sample for the second pilot test was obtained from a self-managed online survey of 68 managers of varying functions in B2B organizations. Results were analyzed and the survey required no significant alterations.

Final study sample and procedure. The data from this study was obtained through a Qualtrics panel of cross-industry, business-to-business managers from companies with more than 100 employees. Specifically, the sample frame focused on managers or executives in the areas of Marketing, IS/IT, Operations, Customer Service and Sales. Utilizing respondents from a variety of disciplines provides knowledge across internal firm boundaries. The cross-industry approach allows for greater generalization of results for examining information quality in organizations of varying sizes as well as its impact on customer relationship performance from the context of a value added reseller (buyer).

For the final study information was collected from multiple respondent groups (e.g., information systems executives or managers, marketing executives or managers). Information systems managers act as information producers whereas marketing departments managers represent information consumers. Due to the varying roles of participants within the organization, key respondents from several domains were identified (e.g., operations, marketing, sales, customer service, information systems and information technology).

Because of the complexity of the theoretical model, the likelihood of data that is not normally distributed, and the focus on prediction of information quality, the analytical method chosen was partial least squares structural equation modeling (PLS-SEM). When using PLS-SEM, the minimum sample size should be determined by the larger of either (1) 10 times the greatest number of formative indicators measuring a single construct, or (2) ten times the greatest number of structural paths directed at a particular construct in the structural model (Barclay, Higgins & Thompson, 1995; Hair et al., 2011). Power also should be considered, as recommended by Hair et al. (2016). Based on these

considerations, it was determined that a minimum of 150 respondents was sufficient. Ultimately, a sample size of 303 was obtained, which far exceeded general guidelines on sample size.

3.4 Questionnaire and Measurement

Measures were adapted from previously established scales when available. Revisions were completed to appropriately adjust for the context of this study. A pretest was undertaken to determine specific dimensions used to assess information quality, and details of the anticipated dimensions are discussed in the following section.

Information Access. Access is defined as the extent to which data are available or easily and quickly retrievable (Wang & Strong, 1996), or the ease of which information can be accessed (Jayachandran et al., 2005). Four items were adopted from Jayachandran et al., (2005) to measure this concept. The items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.” The ten-point scale was chosen for this construct and several others because it increases variability in responses, an important consideration in statistical analysis, and has been found to work well in B-to-B studies in the past (Hair, Celsi, Money, Samouel, and Page, 2016).

Information Integration. The information integration scale from Jayachandran et al. (2005) was used to measure the extent to which data are available from differing data sources (Wang & Strong, 1996). The four items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Format. The format items measured how well the information is presented or delivered, as defined by Wang & Strong (1996). Five items from the information format scale (Wixom & Todd, 2005; Nelson, Todd & Wixom, 2005) were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Currency. Currency measured the extent to which the age of the data or information is appropriate and up to date (Wang & Strong, 1996). The three item information currency scale from Wixom & Todd (2005) and one reversed item from Lee, Strong, Kahn & Wang (2002) was used and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Accuracy. Accuracy examined the extent to which data is perceived as correct, reliable, and precise, as defined by Wang & Strong (1996). The study used the three item information accuracy scale from Wixom & Todd (2005). The items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Completeness. Information completeness is defined as the extent to which data quantity or volume is appropriate and exhibit sufficient breadth, depth, and scope for the task at hand. The three item information completeness scale from Wixom and Todd (2005) was used and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Relevancy. Relevancy measured the extent to which information is applicable or helpful in decision making. Six items from Lee, Strong, Kahn and Wang (2002) were used, and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Easily Understood. Information that is easily understood examines the comprehensible nature of information for decision making. Five items from Lee et. al., (2002) were used and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Consistency. Information that is consistent is represented similarly between sources or throughout the organization. Four items from Lee et. al., (2002) were use and they were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Easily Managed. Easily managed information measures the degree to which information is easily updated or customized (Lee et al., 2002). The eight item scale was adopted from Lee et. al., (2002), and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Variety. The variety of information consists of diverse levels of information from varying sources. The three item scale was adapted from Lee et. al., (2002) and the items were rated on ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Information Appropriate Amount. The appropriate amount of information considers the quantity and volume of information available in decision making as defined by Wang and Strong (1996). The four item scale measuring the appropriate amount of information was adopted from Lee et. al., (2002) and the items were rated on a ten-point Likert-type scales, with 0 = “Strongly Disagree” and 10 = “Strongly Agree.”

Customer Perceived Relationship Quality. Customer perceived relationship quality measures the overall assessment of the strength of a relationship (Crosby, Evans

& Cowles, 1990; De Wulf et al., 2001; Garbarino & Johnson, 1999; Smith, 1998; Palmatier, Dant, Grewal & Evans, 2006). This study adopts a multi-dimensional perspective of customer perceived relationship quality that includes trust and satisfaction. Satisfaction was measured using the five item scale by Dywer and Oh (1987). Trust was measured using the eight item scale from Doney and Cannon (1997). These items were measured using a 100-point Likert type scale (0 = Strongly Disagree, 100 = Strongly Agree).

Customer Perceived Relationship Investment. Customer perceived relationship investment examines the extent to which a customer perceives that a provider “devotes resources, efforts and attention aimed at maintaining or enhancing” the relationship (De Wulf et al., 2001, p.35). The four item customer perceived relationship investment scale by Zablah et al. (2012) was used and the items were measured using a 100-point Likert type scale (0 = Strongly Disagree, 100 = Strongly Agree).

3.5 Analytic Approach

Confirmatory Factor Analysis (AMOS) was initially used to examine and validate the measurement model, including examining convergent and discriminant validity. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test the hypothesized relationships within the conceptual model using the SmartPLS software (Ringle, Wende & Becker, 2015). Partial Least Squares (PLS-SEM) is a “variance based method to estimate structural equation modeling (Hair, Hult, Ringle & Sarstedt, 2016, p. 30).” Researchers have been increasingly using PLS-SEM because the method is very

flexible when analyzing complex predictive models with a large number of variables and relationships (Hair, Sarstedt, Pieper & Ringle, 2012; Hair et. al., 2016). The approach is capable of producing robust results with both large and small sample sizes (Hair et al., 2016). Given the strengths of PLS-SEM and the exploratory nature of the research, it is an appropriate methodological procedure to assess the current structural model.

3.6 Common Method Variance

Common method variance (CMV) can occur when data from both exogenous and endogenous constructs are collected from the same respondent at the same time (Podsakoff & Organ, 1986). When CMV is too high the result can be common methods bias (CMB). To reduce the likelihood of common methods bias, it has been suggested that independent and outcome variables be gathered from different respondents (Podsakoff, MacKenzie & Podsakoff, 2012), but this often is not possible in empirical research. Moreover, there is contradictory research regarding CMV that suggests self-reported measures do not produce bias (Conway & Lance, 2010). Since responses to constructs were obtained from the same individual at the same time, measures were taken to minimize the likelihood that CMB would emerge. To reduce the likelihood of CMB, the scale points and anchor labels of scales were varied between constructs in the design of the questionnaire (Podsakoff, MacKenzie & Podsakoff, 2003). Moreover, statistical remedies were applied (Podsakoff et al., 2012) to further minimize the likelihood of CMB. We provide further analysis of CMV in Chapter 4.

The questionnaire was designed to be answered as self-reported responses. Although attempts were made to collect data for independent and outcome variables from multiple sources, the current study methodology does not permit this approach. The measures included in this study assess the extent to which information quality is an outcome of the information systems and not a consequence related to tasks of the marketing department. Since this study is concerned with information quality from the consumer (user) perspective and customer relationship performance outcomes, it is reasonable to consider individuals representing a variety of job functions are accurate resources that can offer adequate, unbiased responses.

CHAPTER 4: RESULTS

Chapter 4 focuses on study results and includes four sections. First, procedures used to assess the constructs in the measure development process are outlined. Second, the measurement model properties are evaluated. Third, the hypothesized relationships are examined. Research results are assessed and reported in the fourth section.

4.1 Measurement Model Development

One pretest and two pilot tests were conducted to support measurement model development. The pretest focused on selecting the most important information quality dimensions. Results from the two pilot studies were used to assess potential measurement issues with the survey. Results from the pre-test and pilot studies are summarized in the following sections.

4.1.1 Qualitative Pre-Test

The pre-test was qualitative and designed to obtain an improved understanding of information quality dimensions applicable in the current digital age. In-depth interviews were conducted with nine industry and academic experts. Industry interviews were conducted with information producers, custodians, consumers and managers (Strong, Lee & Wang, 1997) (e.g., IT/IS, Marketing, Sales, customer service and Operations

Executives). Each telephone interview lasted approximately 70 minutes. Sample quotes in support of each section are labeled anonymously with their respective title. The industry and academic experts discussed areas most critical to decision making, including the information available. Although respondents ranked the similar information quality priorities in a different order, responses fairly consistently indicate that use of information depended upon the purpose. An academic IT expert and consultant for a large organization revealed that many times the information source is inaccessible and isolated from the broad range of decision makers within an organization.

“Due to integration issues and confidentiality of information in existing systems, data consumers in the organization don’t have unfettered access to meaningful information” (Academic Information Systems Expert and Industry Consultant).

One marketing executive captured the essence of other attitudes by suggesting information use was based upon the type of decision and whether “information was a source of truth.” A second marketing executive commented that information in his organization was dispersed too widely in five software systems to support multiple functions.

“The lack of equally diffused information causes innovation and personnel performance issues throughout the company. Accounting, sales, marketing, partners all place information into different systems. Departments have their own repository of customer and secondary industry information. The information is not well integrated which leads to false, unsound reports for top management, partners which reduces trust among customers” (Vice-President, Sales).

Even in organizations with an assortment of information, information quality issues are present. Moreover, the lack of integrated information creates extensive exploration and reduces the ability to make timely decisions. Respondents raised concerns that through the numerous software solutions, the volume is substantial, yet relevancy, understandability and consistency are a persistent issue.

“Volume is not an issue nowadays, it is the negative outcome of the volume or data digestion. Seamless integration is the challenge. Complex organization problems require meaningful output of information because of the downstream impact on the customer” (Academic Information Systems Expert and Industry Consultant).

Due to formatting or on screen visualization, many respondents expressed concerns that information managers sometimes struggled to fully understand data necessary for information consumers. Therefore, depending upon the user, information in general is not routinely managed in an efficient manner.

“Data managers know what a dashboard is but are often unaware of what the data consumer needs. For this reason, we are seeing more monitoring of the situation than predicting opportunities. Unless visualization is specifically developed for the data consumer, it is often difficult to understand what the story is trying to convey in a timely manner” (Academic Information Systems Expert and Industry Consultant).

These sentiments were uniformly articulated through industry and academic expert interviews. The interviews resulted in twelve information quality dimensions consistently emerging as having the greatest influence on decision making potential (See Table 5).

4.1.2. Quantitative Pilot Studies

Two quantitative pilot studies consisting of a Qualtrics panel and a separate researcher managed study were used to gauge potential measurement issues and refine the survey items. Respondent characteristics were similar and included B2B managers in the areas of operations, information systems/information technology, marketing, sales and customer service. A total of 60 managers completed the first pilot study and 69 managers completed the second study.

Following each study, internal consistency reliability and convergent validity were examined. Tables 5 and 6 show the construct outer loadings, composite reliability (CR), Cronbach's alpha (CA) and average variance extracted (AVE). Data in the outer loadings range column indicate the lowest and highest item loading on each the construct (see Tables 5 & 6). Outer loadings $< .70$ for pilot study 1 and 2 were examined to determine if revisions were necessary. Overall, CR, CA and AVE were relatively high for all constructs.

Results detected a limited number of concerns regarding item phrasing. Two respondents suggested a few minor changes to terms that could be potentially confusing. For example, brief explanations that preceded information quality questions were simplified. During the first pilot study, the question was introduced by the following text: when considering the statements below, please rate the quality of information provided by your IT system. Based upon feedback from pilot survey participants, the introduction of each information quality dimension was then updated to more directly introduce the items. Each dimension specifically guided the particular set of survey items with the

following text: the next series of questions are only about the information obtained from IT systems for decision making. In addition, following the second pilot study the lowest loading item was eliminated from the information quality dimension – format (.209). Items of concern were adjusted prior to launching the final study.

Table 5: Pilot Study 1

Construct	Outer Loadings Range	CR	CA	AVE
Completeness	.820 - .941	0.96	0.95	0.81
Accuracy	.616 - .937	0.95	0.93	0.72
Format	.658 - .955	0.98	0.97	0.81
Timeliness	.772 - .946	0.96	0.95	0.81
Relevancy	.871 - .952	0.98	0.97	0.87
Easily Understood	.841 - .965	0.96	0.95	0.84
Consistency	.850 - .956	0.97	0.96	0.80
Easily Managed	.655 - .937	0.96	0.95	0.68
Variety	.888 - .958	0.95	0.91	0.85
Appropriate Amount	.867 - .896	0.94	0.91	0.78
Integration	.138 - .929	0.88	0.81	0.62
Access	.842 - .926	0.97	0.96	0.82
CPRQ - Satisfaction	.534 - .922	0.92	0.88	0.70
CPRQ - Trust	.360 - .923	0.90	0.86	0.54
CPRI	.371 - .929	0.88	0.81	0.66

Table 6: Pilot Study 2

Construct	Outer Loadings Range	CR	CA	AVE
Completeness	.637 - .945	0.95	0.95	0.77
Accuracy	.502 - .752	0.91	0.88	0.59
Format	.209 - .921	0.96	0.94	0.72
Timeliness	.817 - .919	0.96	0.95	0.78
Relevancy	.796 - .918	0.97	0.96	0.84
Easily Understood	.793 - .962	0.95	0.94	0.80
Consistency	.601 - .857	0.88	0.85	0.51
Easily Managed	.505 - .888	0.93	0.92	0.56
Variety	.815 - .932	0.91	0.86	0.78
Appropriate Amount	.863 - .900	0.93	0.91	0.78
Integration	.380 - .868	0.84	0.74	0.52
Access	.767 - .923	0.96	0.95	0.77
CPRQ - Satisfaction	.388 - .921	0.88	0.83	0.62
CPRQ - Trust	.399 - .900	0.91	0.88	0.57
CPRI	.286 - .954	0.87	0.79	0.65

4.1.3 Final Study Characteristics

The final study sample was obtained using a Qualtrics panel. A total of 309 surveys were completed. Following review of the data, six straight-liners were removed for a total of 303 valid responses. Participants represented a diverse sample in terms of management level, functional classification, firm size, and industry category. As indicated in Table 7, respondents represent five functions; operations (22%), information technology/information systems (25%), marketing (17%), sales (19%) and customer service (17%). Respondents were equally split by firm size with 34% from small companies (100-500 employees), 33% from medium sized companies (501-2000) and 33% from large companies (>2000). Moreover, a diverse set of industries were represented; warehousing (1%), manufacturing (31%), information (17%), transportation

and logistics (6%), professional scientific or technical services (27%), wholesaling and distribution (7%) and management of companies or enterprises (11%).

Table 7: Final Study Sample Characteristics

<i>Respondent Data</i>	
<i>Number of respondents</i>	303
<i>Management Position</i>	
C-level	17%
Top Management (EVP, VP)	69%
Middle Management (Division)	40%
First Level Management	20%
<i>Primary Functional Area</i>	
Operations	22%
IT/IS	25%
Marketing	17%
Sales	19%
Customer Service	17%
<i>Company Type</i>	
B2B	39%
B2B/B2C	61%

<i>Company Information</i>	
<i>Public/Private</i>	
Private company	65%
Public Company	35%
<i>Firm Size by employees</i>	
100-500	34%
501-1000	19%
1001 – 2000	14%
>2000	33%
<i>Primary business category</i>	
Warehousing	1%
Manufacturing	31%
Information	17%
Transportation/Logistics	6%
Professional Scientific or Technical Service	27%
Wholesale/Distribution	7%
Management of Companies or Enterprises	11%

4.2 Evaluation of the Measurement Model

4.2.1 Data Distribution

Upon initial examination of the data, normality was assessed. Lack of normality can invalidate statistical tests. Researchers suggest guidelines for skewness and Kurtosis (Hair et. al., 2010). However, sample size should also be considered. Issues associated with small sample sizes are less likely to be present in large sample sizes (Hair et. al., 2010). A normality analysis was performed on all items in the study. All of the skewness and kurtosis values fell within -2 and +2 with the exception of five items that fell below -4 and above +4 and were well within the parameters established by Kline (2011). These items (33_1, 33_2, 33_4, 35_2 and 35_3) were reviewed to determine normality. Based upon these guidelines and the large sample size (e.g., sampling error is reduced by the increased statistical power), it was determined that non-normal data would not impact the study.

4.2.2 Common Method Variance

Common method variance (CMV) suggests an external component is influencing the item response. When CMV is too high it suggests a potential issue in the measurement method that could alter the meaning of responses. When measurement error related to CMV is too high, it is referred to as common methods bias (CMB) and could produce false conclusions surrounding relationships. CMB is likely present if more than one-half of the variance can be explained by a single factor that was not a designed component of the study.

Survey respondents completed the questionnaire and answered questions related to both independent and dependent variables. Counteractive measures to reduce potential CMB as suggested by Podsakoff, MacKenzie, and Podsakoff (2003) were included in the questionnaire design. Predictor and outcome variables were separated by unrelated measures, scale points were varied and circumstances surrounding instructions to respond to the particular items were different (Podsakoff et. al., 2003). These remedies were incorporated into the study to reduce potential common method bias issues related to the method of data collection. Erring on the side of caution, a Harmon Factor test, deemed a valid measure by recent research (Fuller, Dickerson, Atinc, Atinc & Babin, 2016), also was executed. Results from the Harmon test (45%) demonstrated that CMB was not present and therefore does not threaten the validity or interpretability of results.

4.2.3 Measurement Model Results

Taking into consideration the expanded set of information quality dimensions previously identified by Wang and Strong (1998) within the context of data consumers, a hierarchical top-down components model was established. The top down higher order model contains three reflective/formative constructs that are unidimensionally defined but include sub-dimensions (Hair et. al., 2016). This model creates a parsimonious representation of twelve information quality dimensions into three categories (Hair et. al., 2016)

The Amos software was used to perform a confirmatory factor analysis (CFA). A CFA assesses measurement theory based upon theoretically identified relationships pre-designated by the researcher. Through use of a CFA, the quality of measures can be

examined. Results from the analysis generated metrics that evaluated measurement model fit, convergent validity, and discriminant validity. Detailed results of construct properties are discussed in the following paragraphs.

The CFA first examined model fit to confirm the measurement model theory. Several indexes should be analyzed to assess fit (Hair et al. 2010). In addition to the χ^2 results, it is recommended that a minimum of two other fit indexes be examined (Hair et al., 2010). Examination of the fit indexes in Table 8 demonstrates the measurement model fits the data well (Table 10). Figures surpass requirements to achieve good fit ($\chi^2 = 2349.05$, 1119 d.f., CMIN/DF = 2.09, CFI = .94, SRMR = .04, and RMSEA = .06).

Table 8: Goodness of Fit Indexes

Goodness of Fit	
Chi-square	2349.047
Probability level	.000
Degrees of freedom	1119
CMIN/DF	2.09
SRMR	0.04
CFI	0.94
RMSEA	0.06

The measurement model was next tested for convergent validity. Outer loadings were examined initially (Table 9). Items with loadings lower than .7 were considered for elimination (Bagozzi, 1980; Hair et. al., 2010). A minimum of three items per construct was retained to reflect content validity and meet identification requirements. Upon final evaluation, 51 of the original 68 items were retained to measure 15 constructs.

In regards to convergent validity, the 51 indicators were significant and loaded on their respective constructs ($> .70$) with the exception of one variable (28-4; loading = .59) that was considered minimally acceptable as a measure of the construct (Hair et al. 2010) (Table 9). Composite reliabilities ranged from .86 to .95 (Table 10) and average variance extracted is between .68 and .87 (Table 9). Based upon established benchmarks (Fornell & Larcker 1981; Gerbing & Anderson 1988), the results provide evidence of high within construct, shared variance. Further examination was conducted using the SmartPLS software and results were similar (see appendix).

Given that convergent validity meets appropriate guidelines, the analysis now turns to consider discriminant validity. It is important to determine the extent to which constructs can be distinguished from each other (Anderson & Gerbing 1988; Fornell & Larcker 1981). As shown in Table 10, the square root of the average variance extracted of each construct exceeds the highest correlation among other constructs. Based on the recommended criterion (Fornell & Larcker 1981), discriminant validity was confirmed since the square root of average variance extracted for each construct is greater than the shared variance with other constructs.

Table 9: Outer Loadings from AMOS CFA

Item		Variable	Estimate	Item		Variable	Estimate
Q19_1	<---	Complete	0.9	Q26_3	<---	Easily Managed	0.87
Q19_2	<---	Complete	0.92	Q26_5	<---	Easily Managed	0.78
Q19_3	<---	Complete	0.95	Q26_7	<---	Easily Managed	0.87
				Q26_8	<---	Easily Managed	0.92
Q20_1	<---	Accuracy	0.93				
Q20_3	<---	Accuracy	0.95	Q27_1	<---	Variety	0.75
Q20_4	<---	Accuracy	0.92	Q27_2	<---	Variety	0.88
				Q27_3	<---	Variety	0.88
Q21_2	<---	Format	0.94				
Q21_4	<---	Format	0.94	Q28_1	<---	Appropriate Amount	0.94
Q21_5	<---	Format	0.75	Q28_2	<---	Appropriate Amount	0.97
Q21_7	<---	Format	0.95	Q28_4R	<---	Appropriate Amount	0.59
Q21_8	<---	Format	0.84				
				Q29_1	<---	Integration	0.89
Q22_1	<---	Timeliness	0.91	Q29_2	<---	Integration	0.8
Q22_3	<---	Timeliness	0.92	Q29_3	<---	Integration	0.78
Q22_4R	<---	Timeliness	0.82				
Q22_5	<---	Timeliness	0.91	Q30_3	<---	Access	0.9
				Q30_4	<---	Access	0.94
Q23_1	<---	Relevancy	0.94	Q30_5	<---	Access	0.91
Q23_3	<---	Relevancy	0.95				
Q23_6	<---	Relevancy	0.92	Q33_1	<---	Satisfaction	0.95
				Q33_2	<---	Satisfaction	0.94
Q24_1	<---	Easily Understood	0.89	Q33_4	<---	Satisfaction	0.86
Q24_2	<---	Easily Understood	0.91	Q33_5	<---	Satisfaction	0.78
Q24_4	<---	Easily Understood	0.88				
Q24_5	<---	Easily Understood	0.94	Q34_5	<---	Trust	0.97
				Q34_6	<---	Trust	0.96
Q25_2	<---	Consistency	0.89	Q34_7	<---	Trust	0.86
Q25_3	<---	Consistency	0.81				
Q25_4	<---	Consistency	0.91	Q35_1	<---	CPRI	0.94
				Q35_2	<---	CPRI	0.89
				Q35_3	<---	CPRI	0.92

Table 10: Correlations, Means, Standard Deviations, and Average Variance Extracted (Fornell - Larcker)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Satisfaction	0.88														
2. Complete	0.64	0.92													
3. Accuracy	0.69	0.79	0.93												
4. Format	0.60	0.78	0.70	0.89											
5. Relevancy	0.72	0.82	0.80	0.85	0.93										
6. Consistency	0.64	0.73	0.71	0.83	0.85	0.87									
7. Timeliness	0.61	0.77	0.78	0.78	0.89	0.78	0.89								
8. Access	0.68	0.80	0.70	0.86	0.88	0.85	0.81	0.92							
9. Variety	0.47	0.71	0.51	0.62	0.63	0.60	0.51	0.61	0.84						
10. Appropriate Amount	0.63	0.77	0.68	0.80	0.84	0.81	0.74	0.85	0.68	0.85					
11. Easily Managed	0.62	0.81	0.68	0.81	0.78	0.83	0.71	0.81	0.66	0.77	0.86				
12. Integration	0.64	0.75	0.61	0.80	0.75	0.74	0.68	0.81	0.70	0.73	0.82	0.83			
13. Easily Understood	0.66	0.76	0.72	0.88	0.87	0.87	0.75	0.86	0.54	0.79	0.80	0.74	0.90		
14. Trust	0.84	0.62	0.59	0.61	0.69	0.58	0.61	0.63	0.45	0.58	0.60	0.62	0.64	0.93	
15. CPRI	0.86	0.59	0.56	0.59	0.68	0.56	0.56	0.64	0.47	0.59	0.59	0.59	0.65	0.90	0.91
Composite Reliability	0.93	0.94	0.95	0.94	0.95	0.90	0.93	0.94	0.87	0.88	0.91	0.86	0.94	0.94	0.94
AVE	0.78	0.86	0.87	0.79	0.87	0.76	0.80	0.85	0.70	0.85	0.74	0.68	0.82	0.86	0.84
Mean	8.26	6.86	7.42	7.39	7.77	7.59	7.39	7.32	7.50	7.41	7.29	7.14	7.74	8.19	8.35
Standard Deviation	1.67	2.42	2.09	2.20	1.91	2.06	2.18	2.31	2.05	2.12	2.17	2.21	1.89	1.85	1.78

Notes:

1. The square root of average variance extracted for each construct is in bold along the diagonal

4.3 Structural Evaluation

In addition to validation of the measurement models through CFA using AMOS, prediction of the endogenous constructs was a primary objective of this research. Covariance-based SEM (CB-SEM) was chosen to validate the measurement theory of the constructs. But PLS-SEM is the preferred structural modeling method when prediction is a focus of the research (Hair et al., 2016). The reason is that while it is possible to estimate latent variable scores in CB-SEM solutions, the estimated scores are not unique. That is, an infinite number of different sets of latent variable scores that will achieve model fit equally well are possible for a CB-SEM solution, and the scores therefore are considered indeterminate (Kline, 2011, p. 245). Since latent variable scores are required to predict the endogenous constructs, the indeterminacy limitation makes CB-SEM extremely unsuitable for prediction (e.g., Dijkstra, 2014). In contrast, PLS-SEM always produces a single specific (i.e., determinate) score for each composite for each observation and is therefore the preferred method when the research objective is prediction (Hair et al. 2016).

The SmartPLS 3 software (Ringle, Wende & Becker, 2014) was used to assess the structural model, including predicting the endogenous constructs. As with CB-SEM, the results of PLS-SEM include parameters that enable the researcher to assess the size and significance of the structural relationships. More specifically, the results include path coefficients, statistical significance, the variance explained in endogenous constructs (R^2), f^2 , and predictive relevance (Q^2 = external validity). These parameters are described in the following paragraphs.

PLS-SEM is a non-parametric statistical method. Therefore, to determine statistical significance of the structural relationships it is necessary to apply bootstrapping. Bootstrapping produces subsamples from the original sample to calculate the significance of the hypothesized path relationships (Hair, et. al., 2016). A total of 3,000 bootstrap samples were used to ascertain performance surrounding the information quality path model (Hair et al. 2016).

Table 11 and Figure 5 provides concise information related to the hypothesized relationships. Hypotheses H1a, H1b, and H1c propose that higher levels of contextual, intrinsic, and representational information quality are expected to positively impact customer's perception of the amount of investment devoted to the relationship by the provider. The path relationship between representational information quality (IQ) ($\beta=.37$) and customer perceived relationship investment (CPRI) are positive and significant ($p<.05$). Therefore, H1c is supported. Hypothesis H1a and H1b also posit that contextual and representational information quality are positively related to customer perceived relationship investment (CPRI). The results indicate the path relationships were positive ($\beta=.25$; $\beta=.02$) but not significant ($p=.05$; $p=.46$). Contrary to the prediction, the hypotheses are not supported.

Hypotheses H2a and H2b propose that higher levels of contextual and intrinsic information quality will be associated with higher levels of customer perceived relationship quality (CPRQ). Both of these hypothesized relationships were positive ($\beta=.28$; $\beta=.35$) and significant ($p<.05$). H2c also hypothesized that representational information quality would have a positive impact on customer perceived relationship

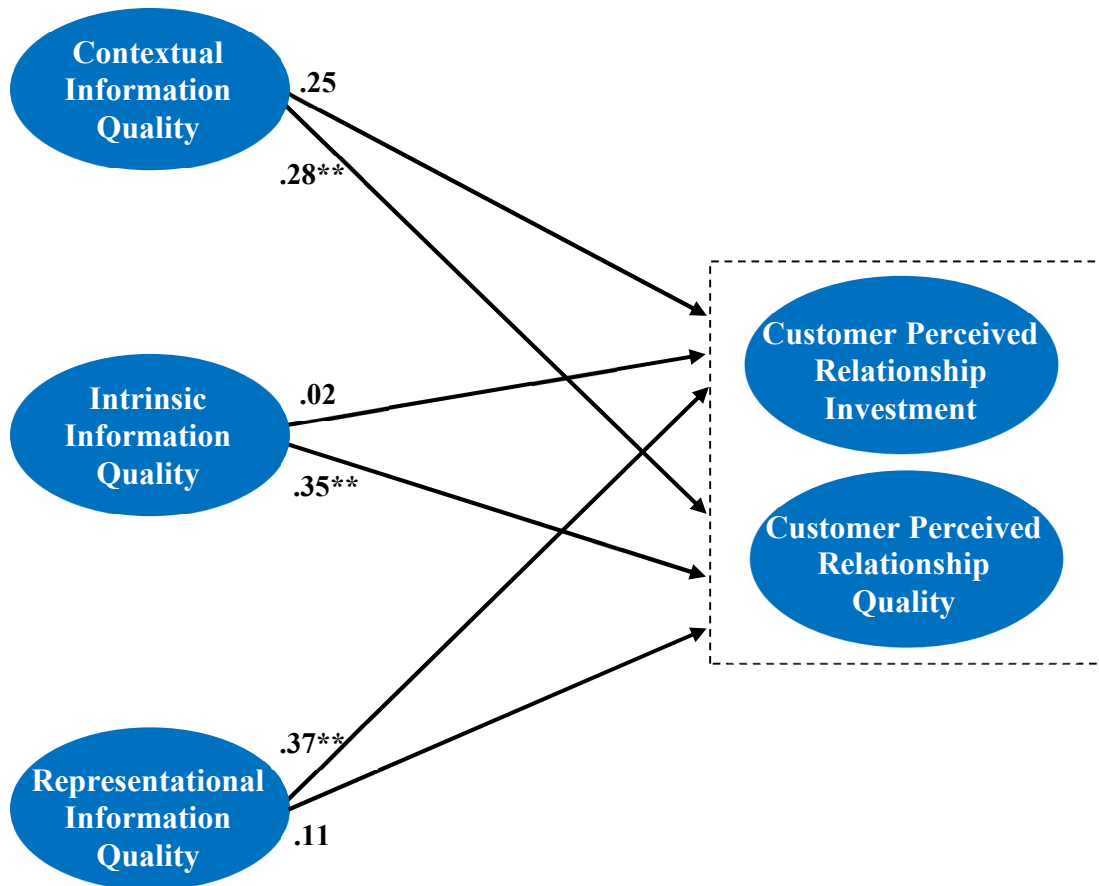
quality (CPRQ). Although the path relationship was positive ($\beta=.11$), it was not significant ($p>.10$).

Table 11: Hypothesized Relationships

Customer Perceived Relationship Investment					
Hypotheses	Predictor	β	t Value	p Value	Result
H1a	Contextual IQ	0.25	1.61	0.05	Rejected
H1b	Intrinsic IQ	0.02	0.10	0.46	Rejected
H1c	Representational IQ	0.37	2.37	0.009**	Accepted

Customer Perceived Relationship Quality					
Hypotheses	Predictor	β	t Value	p Value	Result
H2a	Contextual IQ	0.28	1.95	0.03**	Accepted
H2b	Intrinsic IQ	0.35	2.76	0.003**	Accepted
H2c	Representational IQ	0.11	0.94	0.18	Rejected

Figure 5: Structural Model with Path Coefficients and Significance Levels



Note: The numbers represent path coefficients.

** $p < .05$; *** $p < .01$

4.3.1 Overall Model Explanatory Power

Similar to other structural modeling methods, PLS-SEM calculates the R^2 as an indication of predictive accuracy. The R^2 indicates the variance explained in the endogenous constructs by the exogenous constructs. In addition, adjusted R^2 values should also be examined with complex models since these values are adjusted based on

the number of exogenous latent variables relative to sample size. In addition, it has been suggested that the adjusted R^2 should be considered when comparing models with variations in complexity (Hair et. al., 2016).

Results in Table 12 show the impact of exogenous constructs on the endogenous constructs (Hair et al., 2011). The impact of overall information quality on customer perceived relationship investment (CPRI) and customer perceived relationship quality (CPRQ) was significant and meaningful. More specifically, based on the adjusted R^2 information quality explains 38% of the variance of the endogenous construct customer perceived relationship investment (CPRI) and 52% of the variance in customer perceived relationship quality (CPRQ).

Table 12: Explanatory Power of the PLS-SEM Model

Endogenous Constructs	R^2	Adjusted R^2
Customer Perceived Relationship Investment	0.383	0.376
Customer Perceived Relationship Quality	0.526	0.521

The PLS-SEM software applies a blindfolding procedure to estimate Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974; Hair et. al., 2016), a measure of external validity of the structural model predictions. Blindfolding uses the sample to omit every d th data point as selected by the researcher. The process entails omission of the data points as determined by the original settings and is complete when the model is estimated (Hair et. al., 2013). Through a non-parametric blindfolding procedure, PLS-SEM provides the Q^2 values to perform an overall assessment of the model's predictive relevance (external validity). Recommended guidelines for interpreting Q^2 values

include: a value of .02 indicates a weak effect, .15 a moderate effect, and .35 a large effect (Hair et al., 2016). Table 13 indicates large predictive relevance for customer perceived relationship investment (CPRI) (.332) and customer perceived relationship quality (CPRQ) (.417).

Table 13: Predictive Relevance

Endogenous Construct	Q ²
Customer Perceived Relationship Investment	0.332
Customer Perceived Relationship Quality	0.417

4.3.2 Path Coefficient Multi-Group Analysis

A multi-group analysis (MGA) was conducted using SmartPLS. Two separate MGA analyses were performed. A closer examination of the data yielded interesting results. First, an MGA comparison of functions (marketing, sales, information technology/information systems, customer service and operations) were examined (see appendix). There were no differences in path relationships between the functions (marketing, sales, information technology/information systems, customer service and operations) among the respondents. When the second MGA analysis was performed in a comparison of management levels (first level manager, middle management, top management - vice-president, executive vice-president, and director, top management - C-level – see appendix for definitions), however, it appears that differences exist. Complete results are represented in Table 14.

When considering contextual information quality and customer perceived relationship investment (CPRI), significant differences exist between first level managers

and top management (VP, EVP, Director). ($t=1.834$, $p<.10$), as well as, between middle level management and top management (VP, EVP, Director). $t=1.798$, $p<.10$). Similar results are reported when analyzing contextual information quality and customer perceived relationship quality (CPRQ) between first level managers and top management (VP, EVP, Director). $t=1.981$, $p<.05$) and between middle level management and top management (VP, EVP, Director). ($t=1.648$, $p<.10$). Significant differences were also evident when analyzing intrinsic information quality and customer perceived relationship investment (CPRI) between first level managers and top management (VP, EVP, Director) ($t=2.051$, $p<.05$), as well as, between first level managers and top management (VP, EVP, Director) ($t=2.128$, $p<.05$). The only group difference that resulted in the path relationship for representational information quality and customer perceived relationship investment (CPRI) was between middle management and top management (c-level) ($t=1.748$, $p<.10$).

In general, lower level management (first level management and middle level management) exhibits a strong, significant relationship between contextual information quality and customer perceived relationship investment (CPRI) ($\beta=.512$; $p<.05$) ($\beta=.504$; $p<.05$) and customer perceived relationship quality (CPRQ) ($\beta=.616$; $p<.01$) ($\beta=.444$; $p<.05$). Whereas, there is no existing relationship between information quality and customer perceived relationship investment (CPRI) or customer perceived relationship quality (CPRQ) with top management (e.g., VP, EVP, director, C-level). However, top management (VP, EVP, director) displays a strong, significant relationship between intrinsic information quality and customer perceived relationship investment (CPRI) ($\beta=.532$; $p<.05$) and customer perceived relationship quality (CPRQ) ($\beta=.748$;

$p < .01$). Yet, results indicate that top management (C-level) has a positive, significant relationship between representational information quality and customer perceived relationship investment (CPRI) ($\beta = .882$; $p < .01$). These results suggest that successful customer relationship management could be dependent upon the dimensions of information quality are available to managers throughout a company. The successful outcome of customer relationship management is largely dependent upon the quality of information available for enhancing decision making among different level managers.

Table 14: Group Differences - Welch-Satterthwait Test

Comparison: First Level Management and Top Management (VP, EVP, Director)			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.82	1.83	0.07*
Contextual -> CPRQ	0.93	1.98	0.05**
Intrinsic -> CPRI	0.89	2.05	0.04**
Intrinsic -> CPRQ	0.72	2.13	0.04**
Representational -> CPRI	0.06	0.13	0.89
Representational -> CPRQ	0.13	0.34	0.74
Comparison: Middle Management and Top Management (VP, EVP, Director)			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.79	1.80	0.08*
Contextual -> CPRQ	0.73	1.65	0.10*
Intrinsic -> CPRI	0.55	1.46	0.15
Intrinsic -> CPRQ	0.52	1.61	0.11
Representational -> CPRI	0.16	0.43	0.67
Representational -> CPRQ	0.09	0.22	0.82
Comparison: Middle Management and Top Management (C-level)			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.51	1.21	0.23
Contextual -> CPRQ	0.08	0.25	0.80
Intrinsic -> CPRI	0.00	0.00	1.00
Intrinsic -> CPRQ	0.14	0.32	0.75
Representational -> CPRI	0.65	1.75	0.09*
Representational -> CPRQ	0.31	0.85	0.40

Notes: * $p < .10$, ** $p < .05$; *** $p < .01$

4.4 Summary of Results

Overall, this study explored an expanded information quality framework. Specifically, research examined information quality resources available to organizational decision makers and the consequent impact on customer relationship management. The study was designed to include various organizational perspectives (e.g., information producers, custodians, consumers and managers) (Strong, Lee & Wang, 1997) and management levels (first line managers, middle management and top management). It was discovered that decision making among management levels is driven by different information quality factors. Moreover, results provide insights that information quality dimensions have different effects on perceived customer relationship management.

CHAPTER 5: DISCUSSION AND IMPLICATIONS

Chapter 5 provides a more in-depth analysis and explanation of hypothesized relationships from the previous chapter and consists of four sections. First, Chapter 4 results are further elaborated upon to include additional depth. Second, managerial implications stemming from study results are discussed. Third, limitations of the study are presented. Finally, future research opportunities are suggested.

5.1 Discussion of Results

Unlike prior research, this study conceptualized that information is a critical decision making resource within the organization. Therefore, the quality of information is not limited to four predominantly investigated dimensions in academic research – accuracy, completeness, currency and format (Wixom & Todd, 2005; Setia et al., 2013). Building upon resource based view theory (RBV) and information quality categories previously discussed in Chapter 2, context, intrinsic and representational information quality (Wang & Strong, 1998) was explored and tested to address shortcomings in research.

The results of this study are threefold. First, this study expands upon previous marketing information systems literature to identify and analyze information quality dimensions that are a relevant marketing consideration in today's digital era. Second, the hypothesized relationships suggest information quality represents a strategic success

factor to customer relationship performance. Third, information quality drivers distinctively impact management levels in a contrasting manner. These findings are explored further in the following paragraphs.

Consistent with RVB theory, these findings suggest that an expanded set of information resources do impact organizational performance. Both qualitative and quantitative results supported this viewpoint. Ultimately, the current study identifies twelve information quality dimensions that deserve critical review when analyzing the effect of intangible resources on present-day organizations (appropriate amount, completeness, timeliness, relevancy, variety, accuracy, consistency, integration, easily understood, easily managed format, access).

Contextual information quality entails information that is contextually appropriate for the decision making task (Wang & Strong, 1996). Contextual information quality consists of appropriate amount, completeness, timeliness, relevancy and variety. Overall, this category of information quality had a moderate relationship with customer perceived relationship quality but no relationship with customer perceived relationship investment. Just because the information exists, employees are still a critical component in working directly with customers. Relational tactics by employees such as time and effort could potentially resonate more with customers (De Wulf et al., 2001). These findings suggest that other factors could be involved in the link between employees and customer perceived relationship investment. However, since customer trust and satisfaction have been regarded as important predictors of organizational performance (Palmatier et al., 2006), results indicate that companies should in fact place more focus on developing a cohesive approach to guaranteeing contextual information quality for their employees.

This type of information enables employees to initiate rapid decisions for the company and customers.

Interestingly, it was discovered that employees serving in various management capacities are impacted by different drivers of information quality. Perceived customer relationship investment and quality are both enhanced when first level managers and middle management have access to information that is appropriate in volume, complete, timely, relevant, and contains a variety from which to make decisions. These types of management levels work closely with employees and customers on a daily basis. Therefore, it is understandable that contextual information quality would strengthen decision making ability, thereby giving them tools to meet the needs of customers.

Intrinsic information quality (accuracy, consistency and integration) demonstrated the most pronounced impact on customer perceived relationship quality. Companies that experienced information that was accurate, consistent and well integrated also gained higher levels of trust and satisfaction among customers. This finding was surprising given that trusting and satisfied customers would tend to perceive a higher level of investment from the provider. The assumption is that organizations have shifted towards a customer centric approach to acquire, maintain and retain customers (Reinartz, Krafft & Hoyer, 2004). Therefore, if information quality contributed to customer perceived relationship quality, it was anticipated that information quality would also improve customer perceived relationship investment. These findings suggest that even though customers were trusting and satisfied, organizations might be lacking a relational approach from which to enhance the customer's perception of investment in the relationship (De Wulf et al., 2001).

Other group differences were discovered among managers. Customer relationship management investment was significantly impacted when top management (EVP, VP, Director) decisions were driven by information that was accurate, consistent and integrated. These managers establish and implement long-term goals for the organization. These strategic decisions could signal that the selling organization is invested in the relationship with customers. Therefore, it appears to be most important for top management (EVP, VP and Director) to make flawless decisions based upon dependable, connected information from throughout the organization.

Interestingly, representational information quality (access, easily understood, easily managed, format) had a substantial impact on customer perceived relationship investment but no impact on customer perceived relationship quality. This category encompasses dimensions directly related to the results of information systems (Wang & Strong, 1996). The outcome of this particular resource could be similar to investing in and using technology that was found by Zablah et al. (2012) to be related to customer perceived relationship investment. Specifically, representational information quality means that information can be clearly interpreted from the system output (Wang & Strong, 1996). Just because the firm has invested in the technology that provides this category of information quality, it doesn't equate to valuable insights that can be used in producing appropriate outputs. Furthermore, the mere existence of accessibly, easily understood, easily managed and well-formatted information doesn't translate automatically into trust or satisfaction among customers.

Results further indicate customer relationship investment is driven by top management (C-level) that has access to information which is easily understood,

managed, and well formatted (clear visualization). Previous research indicates that top management also plays an important role (Alshaw, Missi & Irani, 2011; Liang, Sarah, Hu & Xue, 2007; Srinivasan, Lilien & Rangaswamy, 2002) in the implementation and adoption of technology. Through actions by top management (C-level) in regard to support of these foundational systems, customers could possibly sense the level of commitment expected from the seller.

Direct comparisons to previous research are difficult to make. This study identified and examined a large quantity of dimensions within a hierarchical model that are not thoroughly probed in literature, and specifically how these dimensions relate to customer relationship management. This study offers foundational support, however, that it is necessary to expand beyond the current stream of research to examine an extensive set of information quality dimensions which have far-reaching implications for organizations. Results of the current study suggest that some dimensions are not only more important in predicting customer relationship management success, but that customer outcomes rely upon the dimensions available to different management levels.

5.2 Managerial Implications

Results provide valuable insight that information quality initiatives are a business issue worthy of recognition. Organizations are using information to make decisions. The use of information is inextricably linked to performance measures. If organizations continue to struggle with information quality, the information will remain an impediment to customer relationship management success and economic performance.

A recent white paper by the Economist (2015), reported that the top data concerns facing companies include maintaining data quality (41%) and managing data volume (33%). In fact, the issues were pervasive across organizations that were financially ahead or behind others in their industries. The ability to manage these aspects is principal to managing customer relationships. The lack of information quality isn't just an organizational challenge. Poor information quality can amplify inefficiencies and tarnish reputation among customers.

The prevalence of analytics over the last few years has placed even greater pressure on the importance of information quality that necessitates an even more thorough understanding of the dimensions of information quality. Managers can calibrate information to reflect necessary improvements based upon the importance of dimensions pursued within this study. In addition, software companies can reconsider the information quality dimensions that are necessary in strategic decision making by their customers. These prerequisites can be incorporated into the production of more tailored solutions.

5.3 Limitations

The complex model necessitated hierarchical components to further understand the relationships with customer perceived relationship investment and relationship quality. Rather than examine dimensional relationships, the study focused on three overall categories from which the dimension represents. Although this is a contribution to literature, future studies that further explore dimensional priorities should also be considered.

In addition, cross sectional data collection limited results to reflect only one point in time. Therefore, future studies could explore the impact of information quality on customer relationships following improvement by the organization. Furthermore, this study uses a single respondent (key informant) to answer the survey items. Although consistent with previous literature (Jayachandran et al., 2005) and considering that common method bias did not present an issue, obtaining dyadic data to include both sellers and buyers would enhance the current perspective. Limitations were, therefore, beyond the scope of the current study, but provide an avenue for future research.

5.4 Future Research

Given limitations and the state of information related academic literature, there is substantial opportunity to further explore the role of information quality on organizational success. Although an initial set of important dimensions were established, additional qualitative case studies could provide a more definitive examination of the twenty plus dimensions identified in research over the last thirty years. For example, Wang and Strong (1998) conducted an important qualitative study of information consumers before the digital age. Has the value of certain dimensions changed or become extinct due to advancements in technology or processes? Would it be advantageous to examine the digital resources to establish a theoretical foundation from which to proceed with research?

In addition, it should be noted that interview feedback suggested changes in the level of information quality could potentially impact the quality of other dimensions (e.g., integrated information and consistency of information across functions or platforms).

Therefore, some dimensions could potentially act as antecedents to other dimensions.

Future research could explore the inter-relationships of information quality dimensions to extract a more detailed understanding of the possibly connection between dimensions.

Second, results suggest that information quality categories impact customer relationship success differently. For example, representational IQ has a more significant impact on customer relationship success. At the same time, however, similar results are not exhibited through contextual and intuitive IQ. Can these relationships or lack thereof be dependent upon other factors such as organizational size or respondent level of information use?

Third, further exploration of perceived information quality within organizations should be considered. This study determined that path relationships between customer relationships are impacted when managers of varying levels have access to different types of information quality. However, the study did not examine the mean analysis of how functions (marketing, IT/IS, customer service, sales, operations) or managers perceived the quality of information within their organizations. Do data consumers maintain different perspectives than data producers? These considerations could lead into research that investigates the process of controlling the information from its inception or process redesign (Batini, Cappiello, Francalanci & Maurino, 2009), as well as, information governance. These questions and more provide abundant opportunities for future research surrounding information.

There is an emphasis on utilizing data and analytics to enhance marketing strategy within organizations but an absence of academic research that analyzes the information that produces those insights (Yadav & Pavlou, 2014). Fundamental questions remain as

to the specific dimensions that should be further explored in information quality research. There appears to be a gap in research logic as it relates to information quality dimensions. The results obtained from this study signify the great potential in developing an expanded theoretically based approach to information quality research

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APPENDICES

Appendix A - Construct Scales

<i>Information Completeness</i>	Strongly Disagree	Strongly Agree
Please rate the quality of information provided by your branch's IT systems used in the customer service processes. The IT systems used:	1	10
_____ provide a complete set of information.		
_____ produce comprehensive information.		
_____ provide all the information needed.		

<i>Information Accuracy</i>	Strongly Disagree	Strongly Agree
Please rate the quality of information provided by your branch's IT systems used in the customer service processes. The IT systems used:	1	10
The IT systems used in this branch produce correct information.		
There are few errors in the information obtained from the IT systems.		
The information provided by the IT systems is accurate.		

<i>Information Format</i>	Strongly Disagree	Strongly Agree
The information provided by the IT systems is:	1	10
_____ well formatted.		
_____ well laid out.		
_____ clearly presented on the screen.		

<i>Information Currency</i>	Strongly Disagree	Strongly Agree
	1	10
The IT systems provide the most recent information.		
The IT systems produce the most current information.		
The information from the IT systems is always up-to-date.		

<i>Information Integration</i>	Strongly Disagree	Strongly Agree
	0	10
We integrate customer information from the various functions that interact with customers (such as marketing, sales, and customer service).		
We integrate internal customer information with customer information from external sources.		
We integrate customer information from different communication channels (such as telephone, mail, e-mail, the Internet, fax, and personal contact).		
We merge information collected from various sources for each customer.		

<i>Information Access</i>	Strongly Disagree	Strongly Agree
	0	10
In our organization, relevant employees find it easy to access required customer information.		
In our organization, relevant employees can access required customer information even when other departments/functional areas have collected it.		
In our organization, relevant employees always have access to up-to-date customer information.		
In our organization, relevant employees are provided the information required to manage customer relationships.		

<i>Information Relevancy</i>	Strongly Disagree	Strongly Agree
	0	10
Information is applicable for decision making.		
Information is helpful for decision making.		
Information is relevant for decision making.		
Information is interesting for decision making.		
Information is useable for decision making.		
Information is appropriate for decision making.		

<i>Information Easily Understood</i>	Strongly Disagree	Strongly Agree
	0	10
Information is clear without ambiguity.		
Information is easily comprehended.		
Information is easily understood.		
Information is readable.		
The meaning of the information is easy to understand.		

<i>Information Consistency</i>	Strongly Disagree	Strongly Agree
	0	10
Information is always presented in the same format between sources.		
Information is compatible with previous data.		
Information is easily attributed to a source.		
Information is consistently represented between sources.		

<i>Information Easily Managed</i>	Strongly Disagree	Strongly Agree
	0	10
Information is easily managed.		
Information is easily manipulated (updated,		
Information is easily joined or combined with		
Information is easily changed/updated.		
Information is easily Uploaded/Downloaded.		
Information can be used for multiple purposes.		
Information is easily aggregated.		
Information can be easily integrated.		

<i>Information Variety</i>	Strongly Disagree	Strongly Agree
	0	10
Information is available from several differing sources.		
Our organization has a variety of information.		
Our organization has a variety of information sources.		

<i>Information Appropriate Amount</i>	Strongly Disagree	Strongly Agree
	0	10
The quantity of information is appropriate.		
The volume of information is appropriate.		
The amount of information is not sufficient for our needs.		
The amount of information does not match our needs.		

<i>Customer Perceived Relationship Quality</i>	Strongly Disagree	Strongly Agree
	0	100
Satisfaction		
In general, I am very satisfied with my firm's relationship with the selling firm.		
Overall, the selling firm is a good company to do business with		
I am dissatisfied with the services my firm gets from the selling firm.		
All in all, the selling firm is very fair with my firm.		
Overall, the selling firm's policies benefit my firm.		
Trust		
The selling firm keeps promises it makes to my firm.		
The selling firm is not always honest with my firm.		
My firm believes the information that the selling firm provides us.		
The selling firm is genuinely concerned that my firm succeeds.		
When making important decisions, the selling firm considers my firm's welfare as well as its own.		
I trust the selling firm keeps my firm's best interest in mind.		
The selling firm is trustworthy		
My firm finds it necessary to be cautious with the selling firm.		

<i>Customer Perceived Relationship Investment</i>	Strongly Disagree	Strongly Agree
	0	100
This service provider has made various efforts to enhance its relationship with our firm.		
This provider really cares about keeping our firm as its customer.		
All things considered, this provider has put a lot of effort into its relationship with our firm.		
This service provider routinely takes steps to ensure that our firm remains its customer.		

Appendix B - Information Quality Dimension Definitions
(as defined by Wang & Strong, 1996)

Information Quality Dimension	Definition
Believability	The extent to which data are accepted or regarded as true, real and credible.
Value-added	The extent to which data are beneficial and provide advantages from their use.
Relevancy	The extent to which data are applicable and helpful for the task at hand.
Accuracy	The extent to which data are correct, reliable, and certified free of error.
Interpretability	The extent to which data are in appropriate language and units and the data definitions are clear.
East of Understanding	The extent to which data are clear without ambiguity and easily comprehended.
Accessibility	The extent to which data are available or easily and quickly retrievable.
Objectivity	The extent to which data are unbiased (unprejudiced) and impartial.
Timeliness	The extent to which the age of the data is appropriate for the task at hand.
Completeness	The extent to which data are of sufficient breadth, depth, and scope for the task at hand.
Traceability	The extent to which data are well documented, verifiable, and easily attributed to a source.
Reputation	The extent to which data are trusted or highly regarded in terms of their source or content.
Representational consistency	The extent to which data are always presented in the same format and are compatible with previous data.
Cost effectiveness	The extent to which the cost of collecting appropriate data is reasonable.
East of operation	The extent to which data are easily managed and manipulated (i.e., updated, moved, aggregated, reproduced, customized).
Variety of data and data sources	The extent to which data are available from several differing data sources.
Concise	The extent to which data are compactly represented without being overwhelming (i.e., brief in presentation, yet complete and to the point).
Access security	The extent to which access to data can be restricted and hence kept secure.
Appropriate amount of data	The extent to which the quantity or volume of available data is appropriate.
Flexibility	The extent to which data are expandable, adaptable, and easily applied to other needs.

Appendix C - Qualitative Interview Questions

Interview Reference Topics

The topics below represent initial opening statements for interviews.

The goal is to have the interviewee discuss the comprehensive processes involved with the following open ended items:

1. The type of information that is collected within the organization.
2. When and where the information is collected? (e.g., departments, technology solutions)
3. How the information is collected?
4. How or why is the information used? (marketing mix decisions, decisions that could impact customer relationships)
5. How is quality surrounding information collected? What concerns exist? How do they impact the company?
6. What are the attributes/dimensions of information quality that are considered important in regards to use in decision making?

Appendix D - Participant Letter Instructions: Qualitative Interview

You are invited to participate in a research study conducted by Dana Harrison, a doctoral student at Kennesaw State University. Participation is voluntary. Please read the information below and ask questions regarding anything that you do not understand.

The purpose of this study is to investigate the information resources available to organizational decision makers on customer relationship performance. Organizations can use the findings to suggest information resource improvements and to identify factors influencing customer relationship performance.

To participate in the study you must be 18+ years of age. If you decide to participate, you will complete a brief telephone interview that will require approximately 20 minutes of your time. Please respond to the questions thoughtfully and honestly. No direct benefits for participants are anticipated from the study and there are no known risks anticipated through taking part in this study.

By scheduling a brief telephone interview, you are agreeing to participate in this research project. Your responses are completely confidential and no identifying information will be reported with the collected responses. Please indicate your participation by marking the circle below. If you choose to participate, Dana Harrison will contact you by telephone to schedule the interview.

THIS PAGE MAY BE PRINTED AND KEPT BY EACH PARTICIPANT

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. All participants in this study must be at least 18 years old. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #0112, Kennesaw, GA 30144-5591, (678) 797-2268

Your time is sincerely appreciated. If you have any questions or concerns, please contact Dana Harrison, Doctoral Candidate at (423) 946-8106 or through email: dharr124@students.kennesaw.edu.

Please select one option below:

- ☐ I agree to participate.
- ☐ I do not agree to participate.

Appendix E - Participant Letter Instructions: Quantitative Interview Questions

You are invited to participate in a research study conducted by Dana Harrison, a doctoral student at Kennesaw State University. Prior to participating in this study, you will be asked a set of introductory questions to determine if you qualify to complete the remainder of the survey. Please read the information below and ask questions regarding anything that you do not understand.

The purpose of this study is to investigate the information resources available to organizational decision makers on customer relationship performance. Organizations can use the findings to suggest information resources improvements and to identify factors influencing customer relationship performance.

To participate in the study you must be 18+ years of age. If you decide to participate, you will complete the following online questionnaire that will require approximately 20 minutes of your time. Please respond to the questions thoughtfully and honestly. No direct benefits for participants are anticipated from the study and there are no known risks anticipated through taking part in this study.

By completing this survey, you are agreeing to participate in this research project. You will not be identified personally and Internet Protocol addresses will not be collected by the researcher. Responses are confidential. Please indicate your participation by marking the circle below.

THIS PAGE MAY BE PRINTED AND KEPT BY EACH PARTICIPANT

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. All participants in this study must be at least 18 years old. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #0112, Kennesaw, GA 30144-5591, (678) 797-2268

Your time is sincerely appreciated. If you have any questions or concerns, please contact Dana Harrison, Doctoral Candidate at (423) 946-8106 or through email: dharr124@students.kennesaw.edu.

Please select one option below:

- ☐ I agree to participate.
- ☐ I do not agree to participate. *[If respondent chose this answer, the question below was presented.]*

Are you sure you do not want to participate?

- ☐ I do NOT want to participate. *[If respondent chose this answer, the respondent is directed to the End of Survey message.]*
- ☐ OK, I WILL participate.

Appendix F – Outer Loadings from PLS-SEM

Item	Outer Loading	Item	Outer Loading
Q19_1	0.942	Q26_5	0.846
Q19_2	0.955	Q26_3	0.89
Q19_3	0.956	Q26_7	0.907
Q20_1	0.955	Q26_8	0.933
Q20_4	0.951	Q27_1	0.846
Q20_3	0.961	Q27_2	0.906
Q21_5	0.817	Q27_3	0.927
Q21_8	0.886	Q28_4R	0.743
Q21_2	0.939	Q28_1	0.943
Q21_4	0.948	Q28_2	0.957
Q21_7	0.953	Q29_3	0.865
Q22_4R	0.88	Q29_2	0.884
Q22_3	0.93	Q29_1	0.912
Q22_5	0.931	Q30_3	0.944
Q22_1	0.939	Q30_5	0.945
Q23_6	0.947	Q30_4	0.955
Q23_1	0.957	Q33_5	0.855
Q23_3	0.963	Q33_4	0.907
Q24_4	0.948	Q33_1	0.941
Q24_1	0.915	Q33_2	0.941
Q24_2	0.943	Q34_7	0.921
Q24_5	0.944	Q34_6	0.962
Q25_3	0.901	Q34_5	0.966
Q25_2	0.915	Q35_2	0.934
Q25_4	0.938	Q35_4	0.936
		Q35_3	0.946

Appendix G – AVE and CR Results from PLS-SEM

	AVE	Composite Reliability
Contextual	0.65	0.96
Appropriate Amount	0.79	0.91
Completeness	0.90	0.96
Timeliness	0.85	0.95
Variety	0.80	0.92
Relevancy	0.91	0.97
Intrinsic	0.64	0.94
Accuracy	0.91	0.96
Consistency	0.84	0.94
Integration	0.79	0.91
Representational	0.71	0.97
Access	0.90	0.96
Easily Understood	0.86	0.96
Format	0.83	0.96
Easily Managed	0.80	0.94
CPRQ	0.80	0.96
Satisfaction	0.83	0.95
Trust	0.90	0.96
CPRI	0.88	0.95

Appendix H – Total Effects from PLS-SEM Bootstrapping

Relationship	β	t Value	p Value
Access -> CPRI	0.081	2.345	0.010
Access -> CPRQ	0.025	0.934	0.175
Access -> Representational	0.220	32.491	0.000
Access -> Satisfaction	0.024	0.935	0.175
Access -> Trust	0.024	0.935	0.175
Accuracy -> CPRI	0.007	0.100	0.460
Accuracy -> CPRQ	0.150	2.791	0.003
Accuracy -> Intrinsic	0.424	26.122	0.000
Accuracy -> Satisfaction	0.146	2.777	0.003
Accuracy -> Trust	0.143	2.772	0.003
Appropriate Amount -> CPRI	0.050	1.605	0.054
Appropriate Amount -> CPRQ	0.057	1.980	0.024
Appropriate Amount -> Contextual	0.202	24.816	0.000
Appropriate Amount -> Satisfaction	0.055	1.984	0.024
Appropriate Amount -> Trust	0.054	1.986	0.024
CPRQ -> Satisfaction	0.972	190.947	0.000
CPRQ -> Trust	0.957	127.300	0.000
Completeness -> CPRI	0.058	1.613	0.053
Completeness -> CPRQ	0.066	1.982	0.024
Completeness -> Contextual	0.234	31.663	0.000
Completeness -> Satisfaction	0.064	1.986	0.024
Completeness -> Trust	0.063	1.987	0.023
Consistency -> CPRI	0.007	0.100	0.460
Consistency -> CPRQ	0.136	2.859	0.002
Consistency -> Intrinsic	0.384	24.729	0.000
Consistency -> Satisfaction	0.132	2.846	0.002
Consistency -> Trust	0.130	2.840	0.002
Contextual -> CPRI	0.249	1.605	0.054
Contextual -> CPRQ	0.281	1.980	0.024
Contextual -> Satisfaction	0.273	1.984	0.024
Contextual -> Trust	0.269	1.986	0.024
Easily Managed -> CPRI	0.091	2.300	0.011
Easily Managed -> CPRQ	0.028	0.929	0.176
Easily Managed -> Representational	0.249	25.921	0.000
Easily Managed -> Satisfaction	0.027	0.929	0.176
Easily Managed -> Trust	0.027	0.929	0.176
Easily Understood -> CPRI	0.105	2.320	0.010
Easily Understood -> CPRQ	0.032	0.928	0.177
Easily Understood -> Representational	0.285	35.200	0.000

Easily Understood -> Satisfaction	0.032	0.928	0.177
Easily Understood -> Trust	0.031	0.928	0.177
Format -> CPRI	0.122	2.345	0.010
Format -> CPRQ	0.038	0.934	0.175
Format -> Representational	0.332	41.088	0.000
Format -> Satisfaction	0.037	0.934	0.175
Format -> Trust	0.036	0.934	0.175
Integration -> CPRI	0.006	0.100	0.460
Integration -> CPRQ	0.122	2.793	0.003
Integration -> Intrinsic	0.346	22.551	0.000
Integration -> Satisfaction	0.119	2.779	0.003
Integration -> Trust	0.117	2.773	0.003
Intrinsic -> CPRI	0.017	0.100	0.460
Intrinsic -> CPRQ	0.353	2.815	0.002
Intrinsic -> Satisfaction	0.343	2.801	0.003
Intrinsic -> Trust	0.338	2.795	0.003
Relevancy -> CPRI	0.065	1.607	0.054
Relevancy -> CPRQ	0.073	1.990	0.023
Relevancy -> Contextual	0.260	33.022	0.000
Relevancy -> Satisfaction	0.071	1.995	0.023
Relevancy -> Trust	0.070	1.996	0.023
Representational -> CPRI	0.368	2.332	0.010
Representational -> CPRQ	0.114	0.933	0.176
Representational -> Satisfaction	0.110	0.933	0.176
Representational -> Trust	0.109	0.933	0.176
Timeliness -> CPRI	0.071	1.591	0.056
Timeliness -> CPRQ	0.080	1.960	0.025
Timeliness -> Contextual	0.285	28.347	0.000
Timeliness -> Satisfaction	0.078	1.964	0.025
Timeliness -> Trust	0.077	1.965	0.025
Variety -> CPRI	0.040	1.597	0.055
Variety -> CPRQ	0.045	1.954	0.025
Variety -> Contextual	0.159	14.052	0.000
Variety -> Satisfaction	0.044	1.959	0.025
Variety -> Trust	0.043	1.960	0.025

Appendix I – Group Differences - Welch-Satterthwait Test

Comparison: Customer Service and IS/IT Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.315	0.663	0.51
Contextual -> CPRQ	0.292	0.571	0.57
Intrinsic -> CPRI	0.16	0.311	0.757
Intrinsic -> CPRQ	0.066	0.172	0.864
Representational -> CPRI	0.081	0.133	0.895
Representational -> CPRQ	0.243	0.501	0.619
Comparison: Customer Service and Operations Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.019	0.04	0.968
Contextual -> CPRQ	0.123	0.251	0.803
Intrinsic -> CPRI	0.158	0.394	0.695
Intrinsic -> CPRQ	0.48	1.179	0.243
Representational -> CPRI	0.039	0.076	0.94
Representational -> CPRQ	0.338	0.758	0.452
Comparison: Marketing and IS/IT Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.33	0.589	0.558
Contextual -> CPRQ	0.34	0.652	0.517
Intrinsic -> CPRI	0.364	0.633	0.529
Intrinsic -> CPRQ	0.513	1.252	0.216
Representational -> CPRI	0.036	0.062	0.951
Representational -> CPRQ	0.149	0.348	0.729

Comparison: Marketing and Operations Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.004	0.007	0.995
Contextual -> CPRQ	0.075	0.15	0.881
Intrinsic -> CPRI	0.047	0.098	0.922
Intrinsic -> CPRQ	0.1	0.232	0.817
Representational -> CPRI	0.078	0.165	0.87
Representational -> CPRQ	0.053	0.138	0.891
Comparison: Sales and IS/IT Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.371	0.824	0.413
Contextual -> CPRQ	0.046	0.109	0.914
Intrinsic -> CPRI	0.928	1.467	0.147
Intrinsic -> CPRQ	0.415	0.973	0.334
Representational -> CPRI	0.506	1.001	0.321
Representational -> CPRQ	0.385	1.062	0.292
Comparison: Sales and Operations Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI	0.037	0.081	0.935
Contextual -> CPRQ	0.37	0.935	0.354
Intrinsic -> CPRI	0.61	1.121	0.267
Intrinsic -> CPRQ	0.001	0.003	0.998
Representational -> CPRI	0.548	1.449	0.153
Representational -> CPRQ	0.289	0.935	0.354

Comparison: Customer Service and IS/IT Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI 35	0.315	0.663	0.51
Contextual -> CPRQ	0.292	0.571	0.57
Intrinsic -> CPRI 35	0.16	0.311	0.757
Intrinsic -> CPRQ	0.066	0.172	0.864
Representational -> CPRI 35	0.081	0.133	0.895
Representational -> CPRQ	0.243	0.501	0.619
Comparison: Customer Service and Operations Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI 35	0.019	0.04	0.968
Contextual -> CPRQ	0.123	0.251	0.803
Intrinsic -> CPRI 35	0.158	0.394	0.695
Intrinsic -> CPRQ	0.48	1.179	0.243
Representational -> CPRI 35	0.039	0.076	0.94
Representational -> CPRQ	0.338	0.758	0.452
Comparison: Marketing and IS/IT Functions			
Relationship	Path Coefficients-diff	t-Value	p-Value
Contextual -> CPRI 35	0.33	0.589	0.558
Contextual -> CPRQ	0.34	0.652	0.517
Intrinsic -> CPRI 35	0.364	0.633	0.529
Intrinsic -> CPRQ	0.513	1.252	0.216
Representational -> CPRI 35	0.036	0.062	0.951
Representational -> CPRQ	0.149	0.348	0.729

Appendix J – Management Levels

Management Level	Description
First Level Management	Implements plans/jobs (e.g., team leader, assistant manager)
Middle Management	Interprets, plans and sets actions (e.g., division manager, department manager)
Top Management	Participates in the establishment and implementation of long term goals. (e.g., EVP, VP, Director)
Top Management	Participates in the establishment and implementation of long term goals. (e.g., C-Level)

Appendix K – PLS Path Model

