Relationship quality and satisfaction: Customer-perceived success factors for on-time projects

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Abstract

Project managers have traditionally evaluated project success using the “iron triangle” of time, costs, and quality. In recent years, however, customer satisfaction and other client relationship attitudes have emerged as additional criteria in assessing project success. This paper explores the comparatively under-researched areas of customer satisfaction and client relationship quality in project management. Specifically, we differentiated between projects that were completed on-time and those that were not on-time. We then explored the drivers of customer satisfaction and relationship quality at different stages in the project for each respective group. Data was collected from 588 customers who had installed large-scale building service systems from a multi-national Fortune 100 firm. The results indicate that the drivers of customer satisfaction and relationship quality changed significantly, in both order and magnitude, during the course of a project depending on whether projects were delivered on-time or late. The changes in these drivers have important implications for project managers in keeping clients satisfied during the course of the project, and also in maintaining on-going relationships with the client in the future.

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1. Introduction

The approach to evaluating project success has evolved substantially over the past thirty years (Davis, 2014; Ika, 2009). The early focus was predominantly on the “iron triangle” of cost, time, and scope/quality (Pinto and Prescott, 1988; Pinto and Slevin, 1988; Shenhar and Dvir, 2007). Now, there is clear recognition that project success must also be evaluated from the perspective of various stakeholders (Atkinson, 1999; Gemunden, 2015; Turner and Zolin, 2012). Perhaps the most important of these stakeholders is the customer. As a result, some experts have suggested that customer satisfaction is a critical dimension of project success (Davis, 2014; Dvir et al., 2003; Ireland, 1992; Serrador and Turner, 2015).

The iron triangle is still important, but the triple constraints are considered as measures of project efficiency, such as setting priorities during the course of the project (Ebbesen and Hope, 2013). Recent literature distinguishes between project efficiency and overall project success (Cooke-Davies, 2002; Serrador and Turner, 2015; Shenhar and Dvir, 2007). Project efficiency includes the things that must be done to complete a project (Muller and Jugdev, 2012; Serrador and Turner, 2015). On the other hand, project success is more focused on business-oriented results, sustainability and customer satisfaction (Ebbesen and Hope, 2013; Shenhar and Dvir, 2007). It is further argued that project efficiency (on-time; on budget; on scope) should only be measured as one of a package of five drivers of overall project success (project efficiency; team satisfaction; impact on the customer; business success; preparing for the future) thus providing a more holistic look at project success (Mir and Pinnington, 2014; Shenhar and Dvir, 2007).
The goal of this paper is to examine the linkage between project management success factors and two dimensions of project success: on-time completion of projects and customer satisfaction. Specifically, we examined customer perceptions of a supplier’s project performance across three phases of the project lifecycle: planning, execution, and delivery. We compared these perceptions for projects completed on-time versus those that were completed late. Serrador and Turner (2015, p. 39) called for researchers to investigate “if there are any moderators or contingency factors in the relationship between efficiency and success”. We respond to this call by introducing a mediator, relationship quality that has been relatively neglected in the project management literature. Based on network and social exchange theory in marketing channels, relationship quality has emerged as a critical aspect of business to business (B2B) exchange (Palmatier et al., 2007). For example, customer relationship management (CRM) has been identified as the fourth most used tool in marketing (Ahearne et al., 2012).

Some authors contend that a project ends with project delivery (Ika, 2009). We believe that this contention is both correct and incorrect. While a specific project may end, the relationship between the supplier and customer organizations usually does not end. In our study, the respondents had a median of 15 years of experience dealing with the supplier on a personal level. The specific projects would have lasted about a year. The implication is that in many B2B situations, a specific project is simply one part of a more enduring, long-term relationship. In our study in the heating, ventilation, and air conditioning (HVAC) industry, the supplier installed new systems, did major retrofits, and provided on-going maintenance and service of the systems. Because of the nature of these complex, long-term supplier–customer interactions, we expected relationship quality would play an important role by influencing the project success criteria of customer satisfaction.

Against this background, our study focused on feedback from customers who recently completed large system installation projects. We measured the drivers of both the customer satisfaction with the project, and the relationship quality, during the course of the project. We also contrasted these drivers between projects that were completed on-time, versus those that were late. The study makes several important contributions in advancing our theoretical understanding of project success from the viewpoint of the customer. First, we measured the customer’s perceptions of a supplier’s project management performance across the phases of the project lifecycle. We then empirically examined the relative impact of project management performance in the various phases of the project on customer satisfaction and relationship quality. To our knowledge there are few studies that have explored these relationships in a large project management context (Turner and Zolin, 2012). We should note that we use the term “project performance” broadly to include a team-based view that included a project manager and various actors from the supplier organization. The composition of this team was fluid over time, as the different project phases created a need for different knowledge and skill sets from different people.

Second, our study included one of the traditional metrics of project success, on-time performance, as a moderating variable. We examined how the project performance drivers of customer satisfaction and relationship quality for the project varied between projects that were delivered on-time and those that were late. The project management literature emphasizes the importance of on-time delivery (Atkinson, 1999; Chan and Chan, 2004), and we expected it would play a significant role in our study. Certainly, on-time completion of projects has long been identified as an important project performance metric (Atkinson, 1999; Cooke-Davies and Arzymanow, 2003; Lim and Mohamed, 1999; Loo, 2002; Shenhar et al., 2001). If a project is completed late, the delay can cause a variety of financial and operational problems for clients, resulting in the conclusion that the project was not successful (Heydari and Sikari, 2012; Pinker et al., 2014; Verner et al., 2014; Wateridge, 1998). Because of the importance of on-time completion historically, we developed a split sample approach to compare projects finished on-time versus those that were completed late.

Third, we included the variable of relationship quality as both an antecedent of customer satisfaction, and also as a mediator between project management performance and customer satisfaction. There is a wealth of literature that highlights the importance of relationship quality and customer satisfaction in B2B situations (Molinari et al., 2008; Rauyruren and Miller, 2007). To date, however, the application of relationship quality and customer satisfaction has not been common in the project management literature (Chakrabarty et al., 2007).

A fourth contribution of this research is to demonstrate how project management theory can benefit from the theoretical foundations of relationship marketing. Ahlemann et al. (2013) have noted that the vast majority of the project management literature consists of descriptive or prescriptive discussion of tools, techniques, and problem solving. They found that very few project management articles were theoretically based and suggested that project management research could benefit by building on theoretical foundations in related disciplines. We demonstrate how project management can be examined by using the inter-organization exchange theories and channel governance theories from relationship marketing. Specifically, the value exchange in project management falls within the domain of marketing channels as exchange between channel members, a supplier and customer in the project management context. These four contributions to the literature enable a more holistic look at project management success and project success in large-scale B2B projects, beyond the traditional trifecta of time, cost, and quality.

Our paper is organized as follows. First, we explore the role and importance of customer satisfaction and relationship marketing theory to better understand project success. We then present a conceptual framework exploring linkages between different project management phases and relationship quality and customer satisfaction, depending on whether a project was finished on-time or not. Third, we report the results of an empirical study involving 588 customers from a multi-national Fortune 100 firm, who had recently installed
large-scale building services. Finally, we present our results and discuss implications for researchers and practitioners.

2. Literature review

2.1. Customer satisfaction and project management

Becoming more customer-centered has been recognized as an important component of corporate strategy for many years. A worldwide Conference Board study of Chief Executive Officers (CEOs) of multinational corporations found that improving customer satisfaction and loyalty were among the top challenges facing their organizations (Briscoe, 2002). The reason for this is primarily financial, as firms that achieve high levels of customer satisfaction generally out-perform their competitors on a number of financial metrics. Research has found that higher satisfaction leads to increased cash flow, revenue growth, profitability, market share, and stock price (Anderson et al., 2004; Gruca and Rego, 2005; Homburg et al., 2005; Morgan and Rego, 2006; Williams and Naumann, 2011).

Customer satisfaction has emerged as a dominant driver of customer loyalty in B2B markets (Bolton, 1988; Caprarò et al., 2003). The concepts of relationship quality, product quality, service quality, and customer value are considered the major drivers of satisfaction in B2B exchange (Anderson and Mittal, 2000; Cooil et al., 2007; Lam et al., 2004). Despite the importance of customer satisfaction to business performance in general, there have been relatively few studies in the project management literature that have empirically assessed the drivers of satisfaction, and their inter-relationships with project success (Yang and Peng, 2008).

Customer or client satisfaction may be the most studied topic in the business literature because it is a universal concept that can be applied to virtually all types of products and services (Zeithaml et al., 2006). Accordingly, a large body of research has examined the antecedents of customer satisfaction in a wide variety of contexts. Of particular relevance to project management are the studies that have addressed on-going business-to-business (B2B) relationships. Homburg and Garbe (1999) noted that B2B supplier–customer relationships typically have structural quality (quality of the core product and/or service), process quality (project management performance in our study), and outcome quality (the completed system) that emerge as drivers of customer satisfaction. They felt that process quality is often the key driver of satisfaction among business customers. These findings from the B2B marketing literature align well with the project management literature.

Ireland (1992) identified nine different customer groups, with different expectations, that project managers needed to respond to. He also suggested that customer satisfaction must be included as project success criteria. While there is a long history of the role of customer satisfaction as project success criteria, relatively few studies examine the relationship between project management success factors, or project efficiency, and customer satisfaction (Serrador and Turner, 2015). In other words, customer satisfaction is widely acknowledged to be an important high level project outcome, but little research has examined exactly how projects should be managed to achieve it. In fact, it was suggested by Ika (2009) that project success includes a “virtuous square” where customer satisfaction is added to the iron triangle criteria thus reinforcing the importance of our customer perspective of project management.

2.2. Relationship quality and project management

There is a large body of literature in marketing that has identified the importance of the quality of relationships between suppliers and customers in B2B situations (Fruchter and Simon, 2005; Gronroos, 2011; Gronroos and Helle, 2012; Harker and Egan, 2006; Lusch and Vargo, 2011; Vargo and Lusch, 2004, 2008). The service dominant logic (SDL) paradigm suggests that close collaborative relationships between suppliers and customers are necessary for the co-creation of value in B2B exchanges (Lusch and Vargo, 2011; Vargo and Lusch, 2004, 2008). The quality of the supplier–customer relationship has recently been addressed in the project management literature (Aholá et al., 2008; Zou et al., 2014), highlighting its importance to our study.

Shenhar (2008) noted that most modern projects are complex and uncertain, requiring adaptation and change as the project progresses. Svejvig and Andersen (2015) also noted that projects are often dynamic systems that require agile relationships between the supplier and customer. Davis (2014) and Muller and Jugdev (2012) suggested that these relationships were reciprocal where the customer could influence project success. Serrador and Turner (2015) stated that effective agile project management is based on high levels of interaction, collaboration, responsiveness, and joint problem solving. Davis (2014) empirically found that cooperation, collaboration, consultation, and communication all loaded together as a success factor. The implication of this body of research is that many researchers now recognize that dimensions of inter-firm relationships are important within the context of project management. However, there is little research that has explicitly examined the influence of relationship quality on project success criteria.

In this paper we contend that client relationship quality is important for development of relational norms for dynamic problem solving, communication, and trust building throughout a project. By definition, project management is a process of inter-organizational value creation and exchange within a marketing channel. Channel governance theory contends that exchanges are guided predominantly by two governance mechanisms that are intended to reduce uncertainty and risk, leading to more efficient exchanges (Heide, 1994; Heide and John, 1992). These two governance mechanisms are contracts and relational norms. Contractual governance can exist along a continuum from rigid, strict contracts to flexible, adaptive contracts that allow for change and evolution (Mooi and Ghosh, 2010; Wathe and Heide, 2004; Yang et al., 2012). In a project management context, the contract would address time, cost, and quality issues, but would also include incentives, monitoring procedures, and means of enforcement to align expectations in the exchange relationship between the supplier and customer.
Since projects are complex, unique exchanges, specifying all aspects of a project in detail in the project contract is difficult (Shenhare, 2008). Söderlund (2010) noted that project management needs to explicitly address changes throughout a project. Some have addressed the need for change as an aspect of “agile project management” (Hornstein, 2015; Serrador and Pinto, 2015; Sheffield and Lemétayer, 2013). This agility and adaptation reinforces the need for a high quality client relationship throughout a project.

As contractual governance becomes more adaptive and flexible, relational governance norms become more important (Dwyer et al., 1987). Relational norms are “soft,” or “behavioral”, contracts that guide inter-organizational exchange (Brown et al., 1991). Of the ten relational norms proposed by MacNeil (1980), subsequent research has identified role integrity, solidarity, and reciprocity to be the most important (Blois and Ivens, 2007). Related to these norms are the behaviors of trust, communication, shared expectations, and goal congruity (Heide and John, 1992). Wuyts and Geyskens (2005) found that these behaviors were directly influenced by a firm’s corporate culture. We propose that such relational norms and behaviors are developed more strongly when there is a higher quality client relationship.

The importance of client relationship quality, through norms and behaviors, has also received attention in the project management literature. Cserháti and Szabó (2014) found that relationship success factors included communication, cooperation, and project leadership. Mir and Pinnington (2014) found that inter-organizational teamwork was an important project success factor. Similarly, Zou et al. (2014) found that active client relationship management leads to better project performance as the relationship changed across project phases. The same authors found that customer satisfaction was a key measure of project success. In support of high quality client relationship management during projects, Suprapto et al. (2014) found that relational-based contracting was particularly important in project partnering and project alliances.

In summary, we propose that relationship-marketing theory can help explain project success through effective client relationship management and channel governance through relational norms. Under the traditional means-end philosophy of relationship marketing, better quality client relationship processes should lead to more satisfied clients, which in turn should lead to a longer-term outcome of repeat business in the future (Bolton and Drew, 1991; Zeithaml, 1988).

2.3. Project management performance and project phases

The delivery of complex systems requires that the customer needs and supplier’s business processes are well integrated, and that knowledge flows fluently between the customers and suppliers (Gann and Salter, 2000). We expected that the dynamics of the service interface between the project management team and the customer team would influence customer attitudes towards the overall relationship quality and subsequent satisfaction levels (Homburg and Rudio, 2001; Jackson and Cooper, 1988; Mukherjee et al., 2009; Patterson and Spreng, 1997; Schellhase et al., 2000). The project manager acts as a key bridge between the customer and the supplier, and manages the service interaction of the relationship between the two parties. However, the supplier’s project team has numerous points of interaction with the customer.

The project management team’s service performance is therefore a significant influence on the customer’s attitudes towards the project success, and is likely to influence both customer satisfaction and relationship quality. The nature of project management team’s service performance is often complicated due to the different phases of a project. In the literature, there is general acceptance that projects have distinct lifecycle and sequential phases, with some disagreement about the actual number of phases (Kwak and Ilbs, 2000; Munns and Bjeirmi, 1996). A project team does not typically have a static composition as different skills may be needed at different phases.

The traditional measures of time, cost, and quality are seen to be more important in the early stages of the project, while project success factors such as overall customer benefit and customer satisfaction are more important at later stages (Lim and Mohamed, 1999; Lipovetsky et al., 1997). We incorporated the different stages of the project lifecycle in our research design, as the influence of the project management team is likely to vary at different phases of completion. The Project Management Institute typically identifies four stages of project management PMI (2008). However, there is a good deal of diversity in the number of phases used by different researchers. Some have used six phases (Kwak and Ilbs, 2000), some have used five phases (Hodgson, 2002), some have used four phases (Ahuja et al., 1994), and some have used three phases (Haverila et al., 2013). For simplicity, we used three phases used by Haverila et al. (2013) and Chou and Zolkiewski (2010), which were project planning, execution, and delivery.

A project begins with the initial supplier and customer contact and extends through to the delivery and warranty phases. The first phase typically involves the initiation and planning for the project. From a project management perspective, this involves a high degree of interaction between the customer and project teams as the financial parameters, scope of work, project timeline, and customer needs and expectations are clarified (Kwak and Ilbs, 2000; Pellegrinelli, 1997). These initial interactions provide the supplier the opportunity to leverage their knowledge to bring innovation and enhanced value creation to the project (Kollitveit and Gronhaug, 2004). The culmination of the initial phase is typically a formal proposal and project contract that formalizes the project details.

After the project planning has been completed, the second phase begins with the execution of the project. For the project manager, the majority of the cost and scope issues occur during the execution and installation phase (Ahola et al., 2008). The effective management of the project and the development of supplier–customer relationships are critical performance dimensions in this phase (Pellegrinelli, 1997). Particularly important in this phase is establishing open communication and trust between the supplier team and customer team (Pinto and Slevin, 1987).
Following execution and installation, the next project phase typically involves the commissioning, start-up, and delivery of the system. Research has emphasized that preparing for commissioning is important to the customer so that operational performance is enhanced (Dvir, 2005). This ensures that the technical functionality of the system meets the customer’s expectations. This is also when a system is “debugged” before it is released to the customer for use. The supplier usually provides the customer with final documentation, schematics, and design specifications. This usually requires that the customer “sign off” that the project is completed correctly. Many projects also have a warranty phase that extends for some period of time after the project is completed.

Based on the three phases, we expected the customer perceptions of the supplier’s performance across the planning, execution, and delivery phases to be different for projects completed late compared to projects completed on-time. Specifically, we expected customers to have more negative views of project performance if their project was completed late. We also expected the respective customer relationship attitudes and path coefficients to change significantly throughout the process depending on whether the project was completed or not. In effect the nature of the client–supplier relationship would be affected by the strength of the moderating variable of on-time completion.

### 3. Conceptual framework and propositions

#### 3.1. Proposed model and expected relationships

By integrating the discussion and theoretical concepts discussed to this point, we propose a conceptual model of the expected relationships between the key variables (see Fig. 1). To summarize, we expected the three different project management phases to be positively associated with both client relationship quality and client satisfaction. Additionally, we expected relationship quality to be positively associated with client satisfaction. We also expected the magnitude and relative order of the path coefficients in our structural models to be significantly different for projects completed late compared to projects completed on-time. Although not tested as formal propositions, we also examined relationships between the three project management performance constructs since we expected planning to be positively associated with execution and execution to be positively associated with delivery.

#### 3.2. Expected impacts on client relationship quality

Project-based suppliers often deliver complex systems and integrated solutions to serve their customers’ project needs (Ahola et al., 2008; Brady et al., 2005; Davies et al., 2007). It is widely recognized that many B2B supplier–customer relationships involve a blend of product and service components (Eggert et al., 2014; Hutchinson et al., 2011; Tuli et al., 2007; Ulaga and Eggert, 2006). Suppliers interact constantly with customers throughout a project installation and customize their integrated product and service solution, in order to fit to customers’ exact needs (Rajamma et al., 2011; Tuli et al., 2007). This combination of services has been sometimes described as “hybrid services” to reflect the integration of product and services into a customer solution (Ulaga and Reinartz, 2011).

In the B2B service literature, there is general consensus that the nature of supplier–customer interaction is complex, heterogeneous, and diverse (Mukherjee et al., 2009; Palmatier et al., 2007). In large-scale projects, like those in our study, there are multiple points of contact in the supplier–client relationship, and there is often a network of participants (Ganesan et al., 2009). As noted earlier, during the installation of any large B2B HVAC system, which is often highly customized, there must be a detailed understanding of the client’s needs through relational exchange, and these are balanced against the supplier’s capabilities and constraints (Palmatier et al., 2007; Rajamma et al., 2011). We thus expected all the different project management phases to impact directly on client relationship quality but differ significantly if the project was completed late. Our proposed propositions were as follows:

**Proposition 1.** The path coefficient between project management performance at the planning stage and client relationship quality will be significantly different between projects completed on-time and those completed late.

**Proposition 2.** The path coefficient between project management performance at the execution stage and client relationship quality will be significantly different between projects completed on-time and those completed late.

**Proposition 3.** The path coefficient between project management performance at the delivery stage and client relationship quality will be significantly different between projects completed on-time and those completed late.

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Fig. 1. Conceptual model of expected relationships. Note: Solid arrows signify direct paths which constitute formal propositions. Dotted arrows signify relationships between the three project management performance constructs.
3.3. Expected impacts on client satisfaction

As noted earlier, project success is often measured by the project meeting time, cost, and quality considerations. This “iron triangle” of success factors is an important measure of success for a project (Atkinson, 1999; Chou and Zolakiewski, 2010). However, it is contended that project success should also include the project’s impact on the customer satisfaction and client relationship quality, as additional metrics. While the project compliance to time, cost, and quality is important, other dimensions of success like customer satisfaction and relationship quality should be evaluated after the project completion (Toor and Ogunlana, 2010).

Recent research has also investigated several different contributing factors for project success including social responsibility (Yang et al., 2010), change management (Levasseur, 2010), and the importance of completion before a competitor becomes aware of the project (Pinker et al., 2014). The immediate measure of customer satisfaction and relationship quality rapidly after project completion has not received the attention that traditional project management success factors in the literature (Toor and Ogunlana, 2010). Given the importance of customer satisfaction to the development of ongoing long-term business relationships (Rauyruen and Miller, 2007), we argue that the satisfaction of customers should be included in assessing the success of a project.

A large body of recent research also found that various dimensions of relationship quality were important for effective B2B value creation and customer satisfaction (Gronroos, 2011; Gummesson, 2010; Gummesson and Polese, 2009; Ramaswamy, 2011; Terho et al., 2012; Toytari et al., 2011). We thus expected all the different project management phases to impact directly on client satisfaction but differ significantly if the project was completed late. We also expected client relationship quality to be an important driver of satisfaction, and a partial mediator of the different project management phases on satisfaction. Our next set of propositions was as follows:

Proposition 4. The path coefficient between project management performance at planning stage and client satisfaction will be significantly different between projects completed on-time and those completed late.

Proposition 5. The path coefficient between project management performance at execution stage and client satisfaction will be significantly different between projects completed on-time and those completed late.

Proposition 6. The path coefficient between project management performance at delivery stage and client satisfaction will be significantly different between projects completed on-time and those completed late.

Proposition 7. The path coefficient between client relationship quality and customer satisfaction will be significantly different between projects completed on-time and those completed late.

4. Methodology

4.1. The firm

The specific projects in this study were from the building service industry, involving the installation of heating, ventilation, control, and security (HVAC) systems in large facilities. We collected customer data from a large multinational corporation that manufactures and installs these large-scale systems for clients in over 100 countries around the world. Since it has a threshold revenue level for projects, all of the projects had a significant dollar cost. Most of the clients were other large organizations. The projects typically had duration of two months to over a year. The projects also required close coordination with other contractors and system providers such as architectural, structural, electrical, and information technology contractors. All of the data for this study came from the United States and Canada.

4.2. The sample

The firm in this study completed thousands of system installation projects each year. The client firms were typically very large organization. About half of the sample was comprised of multinational corporations. The remaining portion of the sample consisted of government, healthcare, and educational organizations. There were no small projects as the firm had a dollar value minimum. From a single year of data, we randomly extracted a sample of 484 surveys from clients who had their projects completed on-time. We also extracted a sample of 104 surveys from clients in the same year of data that had their projects completed late, for a total sample size of 588. The individual client respondents were typically facilities managers or engineers in the client firm who held senior management positions, and who had significant influence in vendor selection and on-going project supervision. The questionnaire introduction directed the respondent to answer questions based on their recently completed installation project. Specifically, they were asked about their perceptions of project management performance (planning, execution and delivery), relationship quality, and satisfaction specific to this project.

All client organizations had a long history with the supplier with an average relationship duration of 18 years (67.4% having a relationship duration of 11 years or longer). All customer organizations were also large, with a median number of employees of 500 at the project location. We used the number of employees at a location as a surrogate for project size. Individual respondents had an average of fifteen years of experience dealing with the supplier.

Each project had a formal performance contract associated with it. At the end of the project, the customer, usually the key contact individual, signed off on the project as complete. The customer and project information was then transferred to a market research firm for telephone surveying. Surveying was typically completed in the second or third week after the project completion. The intent of surveying soon after completion was to ensure that the supplier’s project performance was still fresh.
in the customer’s mind. The cooperation rate for the surveying (people contacted vs. completed surveys) was usually in the 60–65% range. This high response rate was due to the fact that the client had agreed to complete a satisfaction survey at project completion in the project contract. This high response rate also meant that non-response bias was not likely to be a problem.

4.3. Questionnaire development and measures

The questionnaire was developed through a multi-stage process. First, individual telephone depth interviews were conducted with several groups of 20 customers each. The goal of the interviews was to identify the key drivers of project management satisfaction, from the customer’s viewpoint. The results of the depth interviews were aligned with the firm’s internal processes. Then a questionnaire was developed by a marketing research firm, by using a combination of scales from academic literature and other recognized business research metrics. The draft questionnaire was then circulated to an executive steering committee overseeing the project business unit. After several iterations, the questionnaire was pre-tested, revised, and finalized.

The questionnaire had sections that asked the customer about overall satisfaction (2 items), relationship quality (3 items), project planning performance (4 items), project execution performance (6 items), and project delivery performance (6 items). There was a single dichotomous yes/no question regarding on-time completion that was used to partition the data. Customer satisfaction was a linear composite of two items to improve reliability and validity. One question was “overall satisfaction” and the other was “met expectations”. This combination has commonly been used in other academic research (Barry et al., 2008; Tokman et al., 2007; Zeithaml, 1988; Zolkiewski et al., 2007). Measures of relationship quality and the three project performance constructs were adapted from Haverila et al. (2013).

All constructs and their respective items are shown in Appendix A. Questions had a five-point response scale. The reason for this is that the data was gathered through the use of telephone interviews, and five point scales are concise and clear to respondents. The overall satisfaction scale had response choices of “very satisfied–satisfied–neither...–dissatisfied–very dissatisfied”. Most of the project management performance questions used an “excellent–very good–good–fair–poor” scale. These scales are among the most commonly used in academic research (Gruca and Rego, 2005).

In designing the questionnaire, items comprising the dependent and independent variables were separated and items within each set were intermixed in an effort to reduce single-source method bias (Podsakoff et al., 2003). Common method bias was assessed using a CFA approach to Harman’s (1967) one factor test (McFarlin and Sweeney, 1992). According to this test, if a single factor emerges from the exploratory factor analysis or one factor accounts for more than fifty per cent of the variance in the items, methods bias is present (Mattila and Enz, 2002). All of the items were entered into a common factor analysis with OBLIM rotation. The results revealed that no single factor accounted for more than fifty per cent of the variance. Therefore method bias, per se, cannot explain our study results.

4.4. Analytical techniques

Prior to testing the propositions, we examined the mean scores to identify differences in the model constructs between projects completed on-time and those that were not. We then used structural equation modeling (SEM) Partial Least Squares (PLS Graph version 3.00) (Chin, 1998), to test our propositions and examine differences between the two groups: completed on time group or not completed on time group. Although a combination of regression analysis and factor analysis could have been used, they share a common limitation in that each technique can examine only a single relationship at a time. Our conceptual model (Fig. 1) involved the examination of a series of dependence relationships simultaneously. For example, higher project planning performance creates higher levels of relationship quality and then relationship quality creates higher levels of client satisfaction. Relationship quality was therefore both a dependent and an independent variable in the same theory.

Partial Least Squares (PLS), a powerful multivariate analysis technique with roots in path analysis (Wold, 1982), is ideal for testing structural models involving multiple constructs with multiple latent variables. PLS was considered to be an appropriate technique for a number of reasons. First, unlike covariance structural analysis, such as LISREL, which seeks to explain relationships, the objective of PLS is to explain variance in the endogenous variables in a model that has managerial relevance (such as relationship quality and client satisfaction). PLS is particularly well suited to operationalizing satisfaction models in an applied setting (Edvardsson et al., 2000) and exploratory research settings (Hair et al., 2013). The goal of our current study was to identify key project management performance constructs as drivers of client relationship quality and client satisfaction. Second, PLS can deal with small sample sizes (as is the case with the “project not completed on time” sample) because the iterative algorithm behind PLS estimates parameters in only small subsets of a model during any given iteration (Whittaker et al., 2007). PLS can produce reliable results despite sample size inequity (Whittaker et al., 2007). Third, PLS can be used for both confirmatory and exploratory applications, since, unlike covariance-based approaches, it does not try to go beyond the data (Wold, 1982). Consequently, PLS made it easier to explore the differences between projects that were completed on time and those that were not by comparing their path coefficients (Chin, 2009).

The test of the measurement model for both groups included the estimation of internal consistency, plus convergent and discriminant validity (Hair et al., 2006). In order to evaluate the structural model, the $R^2$ values for the endogenous constructs and the size, $t$ statistics, and significance level of the structural path coefficients were computed using the bootstrap re-sampling procedure. Bootstrapping with 1000
bootstrap samples and sample sizes that are equal to the original sample sizes is fundamental for the significance of path coefficients (Efron and Tibshirani, 1993).

The differences between the two groups were analyzed using path coefficients’ comparison. Testing differences in path coefficients across groups requires that the latent variables are created in the same way for all groups (Carte and Russell, 2003). We addressed the measurement model invariance and variability between the two groups (difference in sample size) by using the bootstrapping technique in PLS. We then compared the path coefficients between the two groups by using a parametric procedure from (Chin, 2009), as originally described by (Keil et al., 2000). This procedure is shown below and shows a $t$-distribution with $m + n - 2$ degrees of freedom (see Fig. 2 below).

### 5. Results

#### 5.1. Preliminary analysis

Prior to assessing differences between the two groups, we conducted some preliminary tests of the data and the a priori measurement model. Firstly, we assessed whether the same measurement model held for each sample by analyzing the measurement model invariance between the project ‘completed on time’ sample and the ‘project not completed on time’ sample. Using the bootstrapping technique and the Fisher’s $z$ transformation, item loadings (as shown in Table 1) did not differ significantly across both samples. All individual item loadings were close to or above 0.70 (Chin, 1998) and highly significant using the bootstrap results of PLS. Two items with loadings between 0.60 and 0.70 measuring the project delivery performance in the ‘project not completed on-time’ group were retained because they were theoretically grounded and there were other measures in the block for comparison purposes (Hair et al., 2013).

Table 1 shows that the factor pattern is similar across the two groups. That is, the five-factor model fits the data well for both groups. Tenenhaus et al. (2005) report a goodness-of-fit (GoF) measure for PLS based on taking the square root of $R^2$ value of the endogenous constructs. The GoF measures were 0.64 for the ‘project completed on-time’ group and 0.63 for the ‘project not completed on-time’ group. Moreover, values for blockwise average communalities greater than 0.6 are reasonable (ours is 0.72 for the ‘project completed on-time’ group and 0.68 for the ‘project not completed on-time’ group). These results indicate very good fit suggesting that the model has good explanatory power in both groups. The Stone–Geisser test of predictive relevance was also performed to further assess model fit in PLS analysis (Geisser, 1975; Stone, 1974). Both customer satisfaction and relationship quality had positive redundancy $Q$-square values suggesting that the proposed research model had good predictive ability.

All reliability measures for both samples were above the recommended level of 0.70 (see Table 1), thus indicating adequate internal consistency (Fornell and Bookstein, 1982; Nunnally, 1978). The average variance extracted scores (AVE) were also above the minimum threshold of 0.5 (Fornell and

### Table 1

<table>
<thead>
<tr>
<th>Construct name and items</th>
<th>Project completed on time (N = 484)</th>
<th>Project not completed on time (N = 104)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loading</td>
<td>IC</td>
</tr>
<tr>
<td>Project planning performance</td>
<td>0.92</td>
<td>0.74</td>
</tr>
<tr>
<td>Advice and suggestions</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Attending meetings/site visits</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Knowledge and expertise</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Company’s specifications</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Project execution performance</td>
<td>0.95</td>
<td>0.76</td>
</tr>
<tr>
<td>Reliable project schedule</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Meeting milestones</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Communicating effectively</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Coordinating</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Project delivery performance</td>
<td>0.93</td>
<td>0.68</td>
</tr>
<tr>
<td>Checkout and demonstration</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>Start-up problems</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Warranty process</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>Resolving warranty issues</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Final documentation</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Building control problems</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Relationship quality</td>
<td>0.86</td>
<td>0.68</td>
</tr>
<tr>
<td>Quality of business relationship</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Resolution of issues</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>0.87</td>
<td>0.77</td>
</tr>
<tr>
<td>Satisfied in doing business</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Met expectations</td>
<td>0.87</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Loading: represents how much a factor explains a variable. Convergent validity is demonstrated when items load highly (loading >0.70) on their associated factors (Chin, 1998).

IC: internal consistency is a measure of how well the items measure the same construct in repeated tests. PLS uses an alternative measure to Cronbach’s alpha. Rather than weighting the items equally, this measure uses the item loadings obtained within the nomological network or model.

AVE: average variance extracted refers to how much variance captured by the latent variable is shared among other variables.

Fig. 2. Formula for path coefficient comparisons.
Larcker, 1981) and ranged from 0.68 to 0.81 in the ‘project completed on-time’ group and from 0.60 to 0.85 in the ‘project not completed on-time’ group. Table 2 shows that none of the inter-correlations of the constructs exceed the square root of the AVE of the constructs, thus demonstrating adequate discriminant validity.

We also assessed the data distribution for non-normality. The frequency distribution of the 21 items indicated no problems of floor or ceiling effects in the measurements. In addition, Kolmogorov–Smirnov and Shapiro–Wilk tests also showed that each indicator of the model constructs was normally distributed. All of these preliminary tests held no breaches of key assumptions, and we were thus confident of the data being high quality and accurate for our subsequent PLS analysis and proposition testing.

For descriptive purposes, we also included a comparison of means between the two different groups for all the main independent and dependent variables. By examining the structural means for the model constructs in both groups (see Table 3), we found statistically significant differences. In the ‘not completed on time’ group, respondents reported significantly lower levels of performance across all three project management lifecycle phases, lower levels of customer satisfaction, and lower levels of relationship quality.

### 5.2. PLS analysis and testing of propositions

Table 4 shows the results of the PLS analysis, including the path coefficients, as well as the bootstrapped t-values (based on 1000 bootstrapping runs) for the two groups. The explained variances and the t-values for group differences (t-value differences) using Chin’s (2009) procedure are also shown.

The results highlight the complex nature of the factors influencing the client relationship and satisfaction. The relative importance of the different antecedents in both groups can be seen in the standardized beta coefficients, and these indicated some similarities and differences. The t-value difference scores in Table 4 showed some significant differences in the path coefficients between the three project management phases and relationship quality in both groups. The factors influencing client relationship quality, collectively, explained 62% of the variance for the on-time group, but 59% of the variance for the not-completed-on-time group. A number of path coefficients changed significantly in weighting and relative order of influence depending on whether the project was completed on-time or not (see Fig. 3). All three project phases were significantly related to relationship quality for projects completed on-time. There were significant differences in the magnitude of the path coefficients for planning, execution, and delivery between the two groups. While the most influential factor was project execution in both groups, it became the only significant factor that influenced client relationship quality when the project was completed late, reinforcing its importance. As such, Propositions 1, 2 and 3 were supported in that there were significant differences between the two groups for the influence of project planning, project execution, and project delivery on client relationship quality.

For the factors influencing customer satisfaction, collectively, these independent variables explained 54% of the variance for the on-time group, but 57% of the variance for the not-completed-on-time group. There was one significant difference in the path coefficient of project delivery between the two groups. As such, Proposition 6 was accepted in that project delivery was not a significant influence on satisfaction when the project is on-time. However, it had a significant influence on satisfaction when the project is late. The other propositions were rejected (Propositions 4, 5, and 7), as there were no significant differences in the path coefficients between the two groups for the factors of project planning and project execution and their client satisfaction.

The most influential factor predicting satisfaction was relationship quality for the on-time group ($\beta = 0.38$) and also for the not-completed-on-time group ($\beta = 0.29$), but this difference was not statistically significant. In addition, project execution performance had both a direct effect on customer satisfaction and an indirect effect on satisfaction through relationship quality for both the on-time and late groups. Based on the Sobel test (Baron and Kenny, 1986; MacKinnon et al., 2007), the indirect effect of project execution performance on satisfaction ($\beta = 0.16$, $t = 2.02$) was significant. The indirect effect was also significant in the late group ($\beta = 0.19$, $t = 3.28$).

### Table 2

**Assessing discriminant validity.**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project planning performance</td>
<td>0.86 (0.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Project execution performance</td>
<td>0.82 (0.82)</td>
<td>0.87 (0.82)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Project delivery performance</td>
<td>0.76 (0.75)</td>
<td>0.81 (0.71)</td>
<td>0.82 (0.77)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Relationship quality</td>
<td>0.71 (0.66)</td>
<td>0.76 (0.76)</td>
<td>0.71 (0.63)</td>
<td>0.82 (0.82)</td>
<td></td>
</tr>
<tr>
<td>5. Customer satisfaction</td>
<td>0.60 (0.62)</td>
<td>0.69 (0.71)</td>
<td>0.61 (0.68)</td>
<td>0.69 (0.66)</td>
<td>0.88 (0.92)</td>
</tr>
</tbody>
</table>

Note: ‘Project not completed on-time’ group in parenthesis.

### Table 3

**Descriptive results.**

<table>
<thead>
<tr>
<th></th>
<th>On time</th>
<th>Not completed on time</th>
<th>t test significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>3.90</td>
<td>0.63</td>
<td>3.34</td>
</tr>
<tr>
<td>Relationship quality</td>
<td>4.08</td>
<td>0.69</td>
<td>3.53</td>
</tr>
<tr>
<td>Project planning performance</td>
<td>3.92</td>
<td>0.78</td>
<td>3.33</td>
</tr>
<tr>
<td>Project execution performance</td>
<td>3.70</td>
<td>0.83</td>
<td>2.84</td>
</tr>
<tr>
<td>Project delivery performance</td>
<td>3.77</td>
<td>0.82</td>
<td>2.94</td>
</tr>
</tbody>
</table>

Note: Scale 1–5.
The total effect of project execution performance on customer satisfaction in the on-time group was 0.34 (direct) + 0.16 (indirect, 0.41 × 0.38) = 0.50 total effect. In the late group, the total effect was 0.26 (direct) + 0.19 (indirect, 0.67 × 0.29) = 0.45 total effect. Following the guidelines of Iacobucci and Duhachek (2004) we calculated the VAF (variance Accounted For) value which represents the ratio of the indirect effect to the total effect. In the on-time group, a VAF value of 32% indicated that just under a third of the total effect of project execution performance on satisfaction was explained by its indirect effect through relationship quality. In the late group, the VAF value was 42.2%.

6. Discussion and implications

Acknowledging the paucity of research examining the role of customer satisfaction and relationship quality in project management, this study explored the impact that different dimensions of the supplier’s project performance had on customer satisfaction and relationship quality when projects were completed on-time or was completed late. Ahlemann et al. (2013) noted that, in general, the project management literature is lacking in theoretical development. They suggested that theoretical foundations be drawn from other related disciplines and applied to project management. We followed this suggestion by basing our study on channel governance theory in relationship marketing to examine relational issues in project management, since projects can be conceptualized as a type of exchange between channel members.

The first observation from our results is that several project management performance drivers have a significant influence on both relationship quality and customer satisfaction. In turn, relationship quality partially mediates the relationship between these drivers and customer satisfaction. The identification of these drivers confirms the existing theory of the importance of inter-personal relationships (process quality) in B2B contexts to achieve customer satisfaction (Cserháti and Szabó, 2014; Homburg and Garbe, 1999). Specifically in our project management context, these performance drivers play a significant role at different stages of the project, by directly influencing customer satisfaction in different ways. This need for flexibility at different stages of the project reinforces recent work calling for more agile project management to respond to customers’ needs more directly (Hornstein, 2015; Serrador and Pinto, 2015; Sheffield and Lemétayer, 2013).

In addition, relationship quality has been shown in our study to be an important driver of satisfaction which reinforces the work of other researchers in the project management domain (Davis, 2014; Muller and Jugdev, 2012). In short, these results confirm that project performance factors are major drivers of relationship quality and satisfaction in our project management context. As noted by Zou et al. (2014), active client management is important for project success, especially at different phases of the project. Our results confirm that
relationship management is a key driver of the project success criteria of customer satisfaction as proposed by other researchers (Suprapto et al., 2014).

On-time completion is a central element of the “iron triangle” of project success factors, along with cost and quality. Our results show that completing a project late had a pervasive effect on customer perceptions of the project management performance dimensions. Late completion of a project decreased the means scores for all aspects of the project, not just on project aspects related to time. In other words, being late leads to much more negative views of all aspects of the supplier’s performance. Late completion also changed the way that customers conceptualized the project performance. In general, the path coefficients between the independent variables (project phases) and the dependent variables (customer satisfaction and relationship quality) became weaker for projects completed late compared to the on-time model. This means that being late had an impact on the way a customer perceives performance levels, and also on how they evaluated what was important in a project. While this certainly demonstrated the importance of on-time completion of projects, it also illustrated that time, as a project success factor, may be a hygiene factor.

In a project management context, hygiene factors are performance dimensions that the customer simply expects to be part of the project. Performing well on hygiene factors may just meet basic customer expectations, but not lead to high satisfaction. In our study, late project completion lead to dissatisfaction, which is exactly what would be expected of a hygiene factor. Delighters are performance dimensions that go beyond what the customer expects. These are usually aspects of inter-personal interaction between a supplier and customer where the supplier “goes the extra mile” or “above and beyond” to create a “Wow!” factor (Zeithaml et al., 1988, 1996). It appears that the “iron triangle” of time, cost, and quality are primarily hygiene factors. Completing a project on-time and on-budget are likely to be basic expectations of customers as that is what the supplier said they would do. If the term quality denotes primarily product quality, it too would be a hygiene factor. If the term quality includes a service component, it could be a delimiter, as delighters are typically relational behaviors (Tuli et al., 2007; Ulaga and Reinartz, 2011).

In our study, aspects of the supplier–customer relationship would be where delighters are found. Consistent with this theory, relationship quality was the strongest predictor of a customer’s satisfaction, by far, particularly for projects completed on-time. For projects completed late, relationship quality was still strongly related to satisfaction, but the predictive power was lower. Our results, and those of other studies, suggest that the “iron triangle” needs to be expanded to include both customer satisfaction and relationship quality as dimensions of project success (Hornstein, 2015; Mir and Pinnington, 2014; Suprapto et al., 2014).

The project planning phase was not related to customer satisfaction for both on-time and late project completion. There are two possible explanations for this. Project planning involves the development of a proposal and project contract that specifies project parameters. Accordingly, project planning may be a hygiene factor that once completed, the customer simply takes for granted. Second, the lack of a significant relationship may be a methodological artifact. By definition, project planning occurred at the beginning of a project. Since these were large HVAC systems installed in large facilities, the project duration could easily be over a year. Customers may not recall in detail the initial experience, instead paying more attention to the execution and delivery phases. Confounding this is the fact that project planning was significantly related to relationship quality for projects completed on-time. Project planning is the initial stage of interaction between the supplier’s project manager and project team and the customer organization. Completing a project on-time may reinforce these early interactions, while completing a project late erodes customer perceptions of project planning performance.

The project execution phase was significantly related to both customer satisfaction and relationship quality, whether the project was completed late or was on-time. While project execution was significantly related to customer satisfaction for on-time completion ($p < .0001$), the significance level dropped substantially ($p < .05$) with late completion. Project execution was strongly related to relationship quality for both on-time and late project completion. This is logical since this is where the most of the inter-personal interaction between the supplier and customer teams take place. While project planning is of short duration, the majority of the project’s life is spent in the execution phase. Other researchers have identified that relationship quality is a long-term orientation that leads to more collaboration and coordination (Ahola et al., 2008; Holmlund, 2008). This collaboration and coordination is a central aspect of project execution.

Project delivery performance was not related to customer satisfaction when a project was completed on-time, but was weakly related when a project was late. Completing a project late may sensitize a customer to the final activities in a project. As with other phases, project delivery was strongly related to relationship quality when a project was completed on-time. It may be that completing a project on-time creates a halo effect of positive perceptions of all aspects of project performance. However, when a project is completed late, there is no halo effect as project delivery is not related to relationship quality.

In summary, we have demonstrated that dimensions of project performance throughout the project lifecycle are more strongly related to relationship quality than to customer satisfaction when a project is completed on-time. We have also demonstrated that relationship quality mediates the relationship between project performance phases and customer satisfaction. However, when a project is completed late, many of the paths in the structural model change.

The results of this study have a number of important implications for project management practice. For the projects completed on time sample, our findings demonstrated the importance of project management performance across all three phases as drivers of relationship quality, with project execution performance being the most important driver. Project management execution was the only phase that has a direct impact on client satisfaction as well as an indirect impact through
relationship quality. Therefore it behoves project managers to ensure that all aspects of project planning, execution, and delivery are carefully considered, but greater importance should be placed on execution activities such as the creation and communication of reliable project schedules to clients and ensuring that communication policies and processes are followed so that the client is regularly and systematically updated.

In the ‘project completed late’ sample, project execution performance was the only important driver of both relationship quality and client satisfaction. Project completion performance was also a significant predictor of client satisfaction. Project managers, therefore, need to be sensitive to these changing client perspectives when the project is late and manage clients accordingly. Monitoring the performance of projects during the execution phase on a continuous basis becomes even more critical in fostering higher levels of relationship quality and client satisfaction when projects are late. In addition to project management execution activities, it is crucially important that project management teams ensure that the newly installed system is adequately demonstrated and start-up problems are correctly diagnosed and corrected. Project management delivery becomes an important driver of client satisfaction when projects are completed late.

7. Limitations and directions for future research

Given the cross-sectional nature of our study, we can only identify possible relationships between the variables, so causality in direction and influence of these relationships cannot be inferred. To reveal causal direction of these relationships would require a more quasi-experimental design or longitudinal study which should prove fruitful in better understanding the drivers of client satisfaction and relationship quality in a project management context. Our study also focused on one supplier firm and one individual respondent in the client firm responsible for the project. Future research should validate the research results with another sample and consider the use of multiple sources to address problems associated with common method variance. There is also a pervasive belief in social science research that PLS has special abilities that make it more appropriate than other techniques such as LISREL when analyzing small sample sizes. Goodhue et al. (2007), however, provide evidence that PLS does not have greater ability to detect a path relationship as statistically significant. The belief that PLS has more power than other techniques at small sample size requires further empirical investigation.

In project management, project success has typically been evaluated using the “iron triangle” of time, costs and quality. In future research, it would be interesting to examine the direct and moderating influence of these variables in models of project success that involve relationship quality and client satisfaction. Finally, we base our study on channel governance theory in marketing to examine relational issues in project management since projects are simply a type of exchange between channel members. Other related issues from channel governance theory such as inter-firm dependency, relational solidarity, reciprocity, and integrity may be particularly worthy of inclusion in future project management research.

Conflict of interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been so significant financial support for this work that could have influenced its outcome.

Appendix A. Constructs and measurement items

Project planning performance adapted from Haverila et al. (2013).

How would you rate X for providing advice and suggestions regarding the development and specifications for your project?

How would you rate X for attending meetings/site visit — doing everything necessary to understand the project requirements?

How would you rate X in demonstrating knowledge and expertise to show understanding of the customer’s business?

How would you rate X for delivering a proposal that meets the intent of your company’s specifications?

Project execution performance adapted from Haverila et al. (2013).

How would you rate X for creating and communicating a reliable project schedule?

How would you rate X for meeting milestones as specified by the project schedule?

How would you rate X for committing the appropriate resources to complete the project as scheduled?

How would you rate X personnel for communicating effectively throughout the execution of the project?

How would you rate X personnel for coordinating their work with other contractors (or the owner’s staff)?

How would you rate the quality of the installed systems?

Project delivery performance adapted from Haverila et al. (2013).

How would you rate X for conducting proper checkout and demonstration of the system?

How would you rate X for efficiently diagnosing and correcting start-up problems?

How would you rate X for informing you of the warranty process for this project?

How would you rate X for resolving warranty issues as defined by the warranty process?

How would you rate X for providing complete, final documentation — including ‘as built’ drawings, as per the project schedule?

How would you rate X for working with all parties to resolve building control problems including deficiency items?

Customer satisfaction adapted from Barry et al. (2008), Tokman et al. (2007), Zeithaml (1988) and Zolkiewski et al. (2007).
Thinking about your overall experience with X during the past 12 months, how satisfied are you in doing business with X? Considering X’s overall performance, would you say that X has met your expectations?

Relationship quality adapted from Haverila et al. (2013). Overall how do you rate the quality of the business relationship you have with X?

How would you rate X for following up with you to ensure resolution of issues you have brought to their attention?

How would you rate X’s performance in establishing fast, accurate two-way communication with its customers?

References


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