THE ANTECEDENTS OF CLIENT SATISFACTION IN PRODUCT DESIGN CONSULTING

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ABSTRACT

Product design consulting has been promoted as an open innovation strategy but project outcomes vary widely and the causes of this variation are not well understood. Because client satisfaction is both a holistic, overarching measure of consulting project success and an under-studied one, this paper derives a model explaining it in terms of project performance and value, working relationship quality, and the client’s experience with design consulting and reason for outsourcing the project. The model is tested using quantitative survey data from 97 consulting projects, and explains 73% of the observed variation in client satisfaction. The results confirm predictions from customer satisfaction theory but challenge conventional wisdom about outsourced innovation. Although design consultancies have been widely portrayed as “creativity experts,” clients outsourcing to obtain an original perspective had lower satisfaction than those outsourcing for other reasons. The consultancies were much more effective at rapid innovation, developing familiar products far more quickly than bureaucratic organizations and inexperienced start-ups can.

INTRODUCTION

Product design consultancies have been heralded as knowledge brokers [1], design-inspired innovators [2], and even “superstars of innovation” [3] but in fact the outcomes of consulting projects vary widely and the causes of this variation are not well understood [4]. Past research has identified dozens of factors believed to influence project outcomes but has not confirmed them [5]. This paper seeks to explain the determinants of one particular outcome: a client’s satisfaction with a consulting project.

Client satisfaction is an important outcome to study for several reasons. First, it is a central outcome, relating traditional product development concerns such as design quality and development process performance to consulting-specific concerns such as project value and the quality of the consultant/client working relationship. Second, client satisfaction is a holistic outcome, highly correlated with most other measures of consulting success [6]. Third, client satisfaction is highly relevant to practitioners. Clients implicitly seek to maximize their own satisfaction, while consultants explicitly try to optimize it in parallel with their own interests. To do so they must be able to estimate client satisfaction accurately, yet consultants’ estimates are generally poor, explaining just 3% of the variation in actual satisfaction [7]. Improved models would help consultants to better estimate and manage client satisfaction. Lastly, the science of customer satisfaction benefits from the investigation, as it has focused little on business-to-business professional services to date.

The paper begins by reviewing several key concepts from the literature. A framework is then derived from customer satisfaction theory and tested using quantitative data from a survey of 97 design consulting projects. The results suggest that just a few variables can explain up to 73% of the observed variation in client satisfaction.

LITERATURE REVIEW

Traditional Product Development Literature

Scholars of traditional (i.e., non-outsourced) new product development have identified scores of project success measures [8], and developed explanatory models for many of them [9, 10]. Unfortunately the results are sometimes conflicting [9], and the sheer number of success factors and outcome measures that have been used is overwhelming. To simplify understanding, integrated frameworks have been developed that explain ultimate project outcomes such as commercial success in terms of intermediate outcomes such as development process performance (e.g., time-to-market, development cost) and product performance (e.g., design quality, unit cost) [11, 12].
Outsourced Product Development Literature

Compared to the traditional product development literature, the outsourced product development literature is much less mature. Although speculation abounds on the sources of success and causes of failure [13-19], only three academic studies have empirically assigned causes to the outcomes of specific projects. Roy and Potter, in their study of U.K. design consultants [20], found that “the problems most associated with project failure were inadequate briefing of the consultant and internal disagreements [within the client firm] about the aims or value of the projects.” Amaral and Parker found the most common reasons for failure in outsourced platform design projects to be misaligned objectives within the client firm or between the firm and its design service provider, unanticipated rivalries between multiple vendors, and poor version control [21]. Anderson, Davis-Blake, and Parker, in an ongoing study of interfirm coordination mechanisms [22], report complex and sometimes conflicting relationships between communication intensity and several project outcome measures. For example, co-locating employees was found to improve product quality but worsen development schedule performance.

While these findings are interesting, the three studies used outcome measures that are either vague [21], or not essential in how consultants and clients define success [20, 22]. Client satisfaction is a more relevant success measure [6, 23], and has the additional benefits of being holistic, easy to measure, and easy to understand. Surprisingly, the present study is the first to examine its origins. To do so, it is useful to review the substantial literature on customer satisfaction.

Customer Satisfaction Literature

Scholars of customer satisfaction have examined the relationships between key concepts such as customer expectations, product performance, and satisfaction but have reached only partial consensus. The widely-used disconfirmation paradigm posits that satisfaction results when the customer’s perception of product (or service) performance meets or exceeds his expectations [24]. The pure formulation is somewhat flawed: it predicts that a customer who expects poor performance and receives it will be satisfied. Two adjustments are commonly made to improve the model. One is to replace or supplement expectations (predictions of what will happen) with other comparison standards [25], such as experience-based norms (what could happen, in the best-case) [26] or ideals (what should happen, based on fairness of exchange) [27]. The second adjustment is to add direct links from expectations to satisfaction [28], perceived performance to satisfaction [29], and/or expectations to perceived performance [30], as shown in Figure 1. Debate over these details has raged for thirty years, and it seems that no one model fits all situations [29]. The relative strengths of the various effects depend on the type of product or service and the customer’s experience with it [30].

For example, all three effects might be active in a frequently consumed but inconsistently delivered service such as restaurant table service. Customers have well-formed expectations and can evaluate performance accurately, creating the potential for disconfirmation. In more complex services such as automobile repair or medical care, performance is harder for the non-expert customer to evaluate (flat tires and extreme pain notwithstanding), so satisfaction derives heavily from expectations, which might be formed directly from experience or indirectly via advertising or word-of-mouth. Disconfirmation models perform well for many consumer products and services but break down when the customer does not have well-formed expectations [31].

An alternative paradigm, value-percept disparity theory, eliminates the expectations and disconfirmation constructs and posits that customer satisfaction results directly from the perceived value of the product or service to the customer [32]. Johnson, Nader, and Fornell demonstrated that a value-percept model explained customer satisfaction with bank loans much better than a disconfirmation model [31]. They argued that because bank loans are complex, intangible, heterogeneous, and infrequently consumed, the customer could not form meaningful expectations.

One widely known satisfaction model, the American Customer Satisfaction Index (ACSI) [33], combines elements of the disconfirmation and value-percept disparity theories. As shown in Figure 2, satisfaction is influenced by perceived value, perceived performance, and customer expectations. Disconfirmation is not modeled explicitly; rather, measures of

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1 Using the standard terminology, confirmation occurs when performance exactly meets expectations. Disconfirmation results from a difference between performance and expectations. Performance exceeding expectations generates positive disconfirmation, while performance falling short of expectations produces negative disconfirmation. Hence disconfirmation is positively associated with customer satisfaction.

2 The developers of the ACSI use the term perceived quality in place of perceived performance, but it represents the same concept. Performance is used throughout this paper for internal consistency.
the fulfillment of expectations and ideals are combined with a measure of overall satisfaction to form the satisfaction index. The ACSI is used to measure customer satisfaction across a broad range of product and service industries.

CONCEPTUAL FRAMEWORK & PROPOSITIONS

Concepts and relationships identified from customer satisfaction theory were combined with understanding gained from in-depth interviews with three dozen experienced design consultants and clients to model the antecedents of client satisfaction in product design consulting. The proposed conceptual framework is shown in Figure 3. Satisfaction is influenced by perceived value, perceived performance, client expectations, and the quality of the consultant/client working relationship. Perceived value and working relationship quality are specified by a single variable each, while perceived performance and client expectations consist of two and three variables, respectively. In addition to the substantive variables, the sample type (sampling details are provided in the Methods section) is included as a methodological control. Specific hypotheses are now derived in turn.

Johnson et al. have suggested that perceived value (i.e., performance relative to cost) is the primary determinant of customer satisfaction in complex services [31]. Given that design consulting is a complex service, it is hypothesized that:

**Hypothesis 1 (H1):** Client satisfaction with product design consulting is positively associated with the client’s perception of the consulting project’s value to his company.

Fornell et al. have argued that perceived performance has a direct effect on client satisfaction, in addition to its indirect effect through perceived value. Including both performance and value in the model allows an investigator to determine which has the stronger effect for a particular product or service, and improves comparability of customer satisfaction across diverse industries [33]. In the present model, perceived performance is operationalized using two variables: the client’s assessments of how well the consulting project requirements were met (Requirements Performance), and how much rework the client had to perform on the consultant’s final deliverable (Rework). These correspond to two components of performance utilized in the ACSI: the meeting of requirements indicates successful customization of the consultant’s service to meet the client’s needs, while the amount of rework reflects the reliability of the consultant’s service [33]. Arguably, service reliability might also comprise project schedule and budget performance, but these were not included in the model because they typically show little variation [4] and do not figure prominently in clients’ mental models of success [6]. Although rework is expected to be closely related to requirements performance, it is hypothesized to have an independent effect on client satisfaction for two reasons. First, the visibility of requirements performance and rework differ between client personnel. Project sponsors and managers are more familiar with the contractual requirements but less so with the nitty-gritty details of the deliverables and the rework required to them. Project engineers are painfully aware of rework but may be less familiar with the project contract. Both variables are included to allow prediction of satisfaction across diverse client roles. A second reason to hypothesize independent effects has to do with the timing of the satisfaction measurement. Measurements taken shortly after the project may be influenced more by requirements performance, as the extent of rework required may not yet be fully appreciated. Later satisfaction measurements might be more heavily influenced by rework due to recency effects. In sum, it is hypothesized that:

**H2:** Client satisfaction is positively associated with requirements performance, independent of the effect of perceived value.

**H3:** Client satisfaction is negatively associated with the amount of rework required, independent of perceived value and requirements performance.

Client expectations are not modeled explicitly, for both conceptual and methodological reasons. First, design consulting clients are a mix of highly experienced and novice individuals. The former may have well-formed expectations, while the latter will not [31]. Including both in a single construct would distort the true effect of well-formed expectations. Second, accurate assessment of expectations requires pre-purchase measurement of them [34]. Given the nature of the research design, it was not possible to do so. Post-purchase measurements of expectations in complex services have been shown to be artifacts of perceived performance [31]. Analysis of ACSI data suggests that the link between post-purchase estimates of expectations and satisfaction is weak and can be removed [35]. For these reasons, the expectations construct is replaced by three factors that influence expectations but are conceptually more precise and easier to measure. The first is the client firm’s reason for hiring the consultant [5]. A client that is outsourcing simply to gain additional design capacity will have strong ideals
Senior employees will likely have more realistic expectations of how the project should be performed. Specifically, it should be done the same way the client would have done it. A capable client that hires a consultant to get an original perspective expects a design, and perhaps even a development process, that is markedly different from what it would have done. These are both well-formed ideals that may be disconfirmed upon receipt of the consultant’s design. In contrast, a client that hires a consultant to access specialized knowledge is inexperienced in the activity being performed and will have less well-formed ideals. These differences in ideals should generate differences in satisfaction with the various reasons for outsourcing. In the capacity case, the best the consultant can do is meet the client’s ideal; it is unlikely that he will exceed the client’s own performance (unless the client is actually outsourcing for speed rather than capacity). As a result, client satisfaction is expected to range from fair to poor. In the originality case, the consultant might delight the client with a creative design or disappoint with an unoriginal or impractical design. Simply meeting the ideal seems less likely. In the knowledge case, satisfaction will derive less from disconfirmation and more from perceived performance (if the client has sufficient knowledge to assess performance) and/or the quality of the working relationship. A wide and continuous range of satisfaction is expected. The following two hypotheses are proposed:

**H4:** Clients outsourcing to access specialized knowledge will be more satisfied than those outsourcing for additional capacity or an original perspective.

**H5:** Clients outsourcing for increased development speed will be more satisfied than those outsourcing for knowledge, capacity, or an original perspective.

The second expectations-related factor hypothesized to influence satisfaction is the client firm’s experience with design consulting. Clients with greater direct experience should form more realistic expectations than those who base their expectations on indirect knowledge. Because design consulting is a relatively small industry, a novice client will have difficulty obtaining word-of-mouth recommendations and must base his expectations on the consultant’s own marketing, which may overstate the likelihood of success [5]. As such, the inexperienced client’s expectations may be unrealistically high, leading to greater disconfirmation and lower satisfaction. Consultants believe client inexperience with design consulting to be a risk factor [5], and prior research on management consulting has found that client satisfaction is positively associated with the experience of individuals in the client firm with similar purchase situations [34]. As such, it is hypothesized that:

**H6:** Clients who usually outsource projects similar to the one being assessed will be more satisfied than those who do not.

The third expectations-related factor is the respondent’s role on the project. Senior employees will likely have more realistic expectations due to their greater experience and greater familiarity with the project contract. More importantly, they were likely more involved in the hiring decision and purposefully structured the project to meet their desires. They are true customers, whereas a less-involved junior employee is merely a consumer of their purchase. In addition, cognitive dissonance theory suggests that a project sponsor may overestimate project performance so as not to create conflict with her pre-purchase expectations [24]. The junior team member, not having been involved in the hiring decision, has no such dissonance and can rate performance more critically. For all these reasons, it is hypothesized that:

**H7:** Client satisfaction is positively associated with respondent seniority.

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Figure 3: PROPOSED MODEL OF THE ANTECEDENTS OF CLIENT SATISFACTION. THE CLIENT EXPECTATIONS CONSTRUCT CONSISTS OF THE THREE VARIABLES INSIDE THE OVAL, WHILE PERCEIVED PERFORMANCE CONSISTS OF THE TWO IN THE CIRCLE. THE ARROW FROM SAMPLE TYPE IS DASHED TO INDICATE THAT THIS IS A METHODOLOGICAL CONTROL RATHER THAN A SUBSTANTIVE EFFECT.
Finally, satisfaction is hypothesized to be positively influenced by the quality of the working relationship between the client and the consultant on the project. Prior models of complex knowledge-based services have not included relationship factors [31, 34], but they figure prominently in models of retail service quality [36] and comprise a distinct dimension in how practitioners define consulting success [6]. Consultants in particular believe that a client might be satisfied with a project having poor objective results if the relationship was good [23]. Given that relationship quality is evaluated subjectively, even emotionally, it would likely have an independent effect on satisfaction from perceived performance (an observed quantity) or perceived value (a calculated quantity). In addition, a good working relationship likely indicates frequent feedback between the two parties, increasing the likelihood that the client’s expectations were well-managed. For all these reasons, it is hypothesized that:

**H8:** Client satisfaction is positively associated with working relationship quality, independent of the other effects.

In addition to the eight substantive hypotheses described above, it is hypothesized that respondents in the patent sample will be significantly less satisfied than those in the benchmarking sample (see below) due to selection, non-response, and/or “charity” biases. Thus, sample type is included in the model to control for these effects.

**H9:** Benchmarking sample respondents will be more satisfied than patent sample respondents, independent of the other effects.

**METHODS**

The hypotheses were tested using data from a benchmarking study of design and innovation consultancies [4]. The study population consisted of all projects completed within the prior four years by U.S. consultancies specializing in consumer, medical, and industrial product development [37]. Two separate samples were used to maximize coverage of the population. For the first sample, nineteen consultancies were randomly selected from the population and invited to participate in a benchmarking study. Five agreed to take part. A study coordinator at each consultancy compiled a list of all projects completed within the prior two years, from which a total of 126 projects (~25%) were randomly drawn for study. The coordinators identified one to four client participants of each project to solicit feedback from. The coordinators then mailed the questionnaires to 184 client participants. 82 questionnaires, assessing a total of 62 projects, were returned directly to the investigators, yielding a response rate of 44.6%.

The second sample was motivated by a desire to counter the potential biases introduced by involving the consultancies in the selection of respondents for the first sample. In the second sample, consulting clients were identified directly by the investigators from public traces left behind by their projects (specifically, U.S. patent applications). Pilot data suggested that nearly 45% of all consulting projects yield a patent application, and statistical analysis of the first sample showed that projects which generated a patent application did not differ significantly on any other dimension from projects that did not. Thus, patent applications can provide a reasonably representative sample of all consulting projects. To generate the second sample, five consultancies were randomly selected from the fourteen that declined to participate in the benchmarking study. For each consultancy, one or more employees were identified from public records and used as seeds for a search of U.S. patent records. Each hit provided the names of client inventors as well as additional consultants, who were used in subsequent searches. Proceeding through the patent network in this fashion produced a total of 230 projects having patent applications filed within the last four years. A total of 784 client inventors were identified, of whom the whereabouts of 310 could be confirmed from public records. From these, 252 were randomly selected and mailed the questionnaire, care of their present employer. 38 completed questionnaires and 18 non-deliverables were returned after one postcard reminder, yielding an effective return rate of 15.6%.

The survey instrument was developed based on three dozen in-depth interviews with experienced design consultants and clients and pre-tested on a pilot set of thirty projects from one consultancy. Measures for the various concepts were identified from the interviews as well as the literature. Wherever possible, standard survey items were used. Client satisfaction was measured using an index comprised of the three items that make up the ACSI [33]. Perceived value, requirements performance, rework required, outsourcing frequency, and working relationship quality were measured using ordinal scales. Respondent seniority was collected using three ordinal categories (Project Team Member, Project Manager, Project Sponsor). The client’s reason for outsourcing the project was determined by coding his answer to an open-ended question into one of five categories: Specialized Knowledge, Additional Capacity, Original Perspective, Development Speed, and Industrial Design Knowledge + Mechanical Engineering Capacity (the base case). A copy of the survey instrument is included in the author’s dissertation [7].

The responses from the patent sample were pooled with those from the benchmarking sample for analysis. Hypothesis testing was performed using ordinary least squares regression, with each respondent representing one observation. The unit of analysis was the individual rather than the project, because satisfaction is an individual-level construct and should be explained as such. The various reasons for outsourcing were treated as dummy variables. A few missing explanatory variables were imputed using the mean value for that variable. One severe outlier was removed from the regression model. Standardized regression coefficients and significance values were used to interpret the strength of effects rather than the raw coefficients because the measurement scales did not all have the same number of points (e.g., respondent seniority used a 5-point scale, whereas most other variables used 5-point scales).
RESULTS

Results of the regression analysis are shown in Table 1. The model explains 73% of the variation in client satisfaction. Rework, requirements performance, working relationship quality, and perceived value all had highly significant effects, confirming hypotheses 1, 2, 3, and 8. Only one of the three expectations-related factors had a significant additional effect. Client experience with consulting, measured by whether they usually outsourced projects similar to the one being assessed, was positively associated with satisfaction as hypothesized (H6). Neither the respondent’s seniority nor the sample type had a significant independent effect on satisfaction, which is surprising given the strong direct correlations observed between them. The likely reason is that respondent seniority and sample type influence both the explanatory and dependent variables similarly. That is, senior respondents were more satisfied, but they were also more likely to rate perceived value highly, working relationship quality highly, and so forth. To verify that the explanatory variables are in fact independent of each other, variance inflation factors were calculated for each. The highest value was 2.18, well below the typical cutoff of 10, indicating little multicollinearity [38].

The effects of outsourcing motivation were all in the hypothesized directions, but none were significant. Their effects were likely subsumed by more powerful factors such as rework and requirements performance. For example, clients outsourcing for originality or capacity rated rework higher than those outsourcing for knowledge (Kruskal-Wallis test, p = 0.039) and were also less satisfied (p = 0.097). Rework emerges as the stronger effect in the regression model.

To verify that outsourcing motivation has an effect on its own, a second regression model was created that omitted rework, requirements performance, working relationship quality, and perceived value (Table 2). This model finds support for hypotheses 5, 6, and 7. On average, clients outsourcing for increased development speed had satisfaction scores 16.6 ACSI points higher than those outsourcing for knowledge, 18.4 points higher than those outsourcing for capacity, and 22.1 points higher than those outsourcing for an original perspective. Satisfaction was higher for knowledge than capacity and originality, but not significantly so (as evidenced by the overlap of the 95% confidence intervals for those terms), thus disconfirming hypothesis 4. As in the first model, sample type did not have a significant effect, disconfirming hypothesis 9.

DISCUSSION

The results suggest that client satisfaction in design consulting can be largely explained. Indeed, it can be explained more completely than traditional product development outcomes such as the project’s return-on-investment and the product’s success in the market [7]. Two factors may account for the difference. First, the science of customer satisfaction is more developed than that of product development, with more certain conceptual relationships and more refined measurement instruments. Second, customer satisfaction may be inherently more explainable. Product development outcomes are factual, and subject to many random influences. Satisfaction is a cognitive judgment that may account for these idiosyncrasies, attenuating their influence.

The results clearly indicate that rework, requirements performance, working relationship quality, and perceived value are the key drivers of client satisfaction. Each has a strong effect independent of the others, suggesting that practicing consultants must balance all four to deliver satisfaction. Satisfaction is likely to be mediocre for both “boutique” consultancies that deliver high performance but poor value, as well as “low-cost” consultancies that deliver value but not performance. It is particularly noteworthy that working relationship quality had an independent effect. While this will come as no surprise to practicing consultants, prior academic models of professional services have not included it, but may well benefit from doing so. It is unclear whether working relationship quality affects satisfaction by influencing client perceptions of performance or

<table>
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$R^2 = 0.73$, $R^2_{adj} = 0.70$  

*p < 0.05, **p < 0.01, ***p < 0.001

n = 119 client respondents (one outlier omitted)
by aligning client expectations to actual performance. Additional research, with explicit pre- and post-purchase measurements of expectations, might shed light on the mechanism.

For academics, these results suggest several interesting findings. Both perceived performance and perceived value had significant independent effects on satisfaction, suggesting that both should be included in model formulation, as done in the ACSI but not, for example, in [31]. In addition, variables that have not been previously studied, such as working relationship quality and the client’s reason for outsourcing, had significant effects.

These findings suggest that conventional wisdom about design consulting is mistaken. It is not a form of systems engineering, in which products are pre-specified, modularized, and divided up among multiple parties for independent development [39]. The data suggests that the best results occur when requirements are developed jointly by client and consultant and revised frequently throughout development. Though it was not included in the models, the degree to which the consultants felt their clients treated them as partners rather than vendors was positively associated with client satisfaction. While consultancies can and do provide additional development capacity, this is not their best value.

Nor, despite recent suggestions to the contrary, are design consultants most effective at radical innovation [3, 40], “creative generalism,” knowledge brokering [1], “design-inspired innovation” [2], or other forms of creativity-for-hire. Clients hiring a consultant for an original perspective were less satisfied than those outsourcing for other reasons. As one experienced client noted,

“You can’t, in my opinion, outsource [creative] innovation. If you’re the expert and you don’t know how to do it, just because some other guy has a pedigree, he ain’t going to be able to do it any better.”

Where design consultants do shine is in providing expertise, much like other professional services such as law, accounting, or medicine. As one client engineering director put it,

“The best use of outsourced design is when you are outsourcing to somebody who has real expertise or capability in something in which you are merely knowledgeable.”

Several effective paradigms were observed in the data. Most effective of all was speed – the ability to perform a task the client is capable of, far more quickly than the client could. The client can appreciate the quality of the work and the fact that his own firm could not have met the schedule. In the language of customer satisfaction, the consultant can readily exceed the client’s norms. A second particularly effective paradigm is that of the “time-shared” design group. Several client firms in the sample do not maintain internal design teams because they do not have enough design work to support them. Instead, they build long-lasting relationships with a consultancy who serves them and other key clients as necessary. The consultancy develops sufficient expertise in each client’s products, markets, and production capabilities, while maintaining enough variety to satisfy its own staff, and is effectively a time-shared resource between the various client firms. A third area in which the consultancies add value is the understanding of product users – everyday people. This is a specific expertise, indeed the root of the industrial design profession, yet one that is broadly applicable. Products as diverse as computer peripherals, housewares, and disposable food packaging are all used by the same types of people, and understanding of these users applies equally well to all the products.

CONCLUSIONS
This paper derived and tested a model of the antecedents of client satisfaction in product design consulting. The results demonstrate that client satisfaction can be largely explained by project performance, value, and working relationship quality. Clients are more likely to be satisfied if they usually outsource projects similar to the one being assessed. Of particular note, outsourcing for an original perspective produces lower client satisfaction than other outsourcing motivations.

These findings are supported by the model’s grounding in customer satisfaction theory. Customer satisfaction is an established field of inquiry with sophisticated conceptual models and well-tested measurement approaches. Furthermore, the
hypotheses and the survey questionnaire were refined based on understanding gained from in-depth interviews with experienced consultants and clients. As a result the variables used to were highly relevant to design consulting clients, which may explain why 7 of 9 hypotheses were confirmed. The use of two samples helped to reach both junior and senior client respondents, allowing examination of the effects of seniority on satisfaction.

The chief limitation of the study is that all the data were collected after the completion of the consulting projects, making it impossible to accurately measure client expectations. Other measures may suffer hindsight or recollection bias as well. Second, the model included as many as three observations (respondents) per project, which could lead to minor distortions as the individual responses are not truly independent of each other. Lastly, measures of requirements performance, value, and rework were made qualitatively rather than quantitatively. Hart, among others, has shown that qualitative assessments are generally valid and far easier for the academic researcher to access [41]. In addition, qualitative scales are used almost universally in customer satisfaction research [24].

The study makes valuable contributions to both the academic understanding of design consulting and its practice. For the scholar of customer satisfaction, the study provides relatively unique data on satisfaction in business-to-business professional services. The results confirm the predictions of value-percept disparity satisfaction models but suggest that working relationship quality may have an additional, independent effect. For scholars of product development, the study suggests that client satisfaction might be a useful tool with which to understand other types of outsourced product development. It also suggests need for a more careful evaluation of the strategies and tactics of design consultancies. These companies are often cited as expert innovators [3], yet little quantitative research has been conducted on them. The present results suggest that the consulting industry is indeed effective, but not for the reasons commonly assumed.

For the practicing consultant or client, the results simplify the daunting task of managing client satisfaction. Perceived performance (both rework and requirements performance) has the greatest influence on satisfaction, followed closely by relationship quality and then perceived value. Clients outsourcing for speedy development or specialized knowledge are likely to be more satisfied than those outsourcing for additional capacity or an original perspective.

The study suggests numerous avenues for further investigation. A larger study would allow the use of more sophisticated modeling techniques such as structural equations modeling to refine the specification of the conceptual framework. Pre-project measurements would enable direct inclusion of client expectations and disconfirmation constructs. These variables might help to explain the dramatic differences in satisfaction that were sometimes observed between multiple client respondents on the same project. The present client survey assessed only three individual-level variables: role on the project, involvement in project planning, and familiarity with the project contract. These explain part of the intra-project variation but some individuals still appear unusually dissatisfied. Inclusion of additional individual-level variables might help to define what makes them so. Finally, it should be noted that client satisfaction is just one of many success measures in common use by academics and practitioners [6]. Detailed models could be developed for each of the others to provide additional insights.

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