

Construction Product/Service and Customer Satisfaction

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Abstract: Construction has typically been viewed as a production process, with the product being the completed facility. In addition to providing this product, contractors also provide service. Construction is examined in terms of the service product, service delivery, and service environment. The concept of service encounters is examined in the context of perceived quality and customer satisfaction. Determinants of service quality are analyzed in terms of how they influence perceived quality. The relationship between the criteria used by customers in choosing suppliers and the factors driving satisfaction are examined, and results of two studies of factors involved in contractor selection and satisfaction are reviewed. These factors are the contractor-customer relationship, the contractor's project management skills, the contractor's safety performance, whether the contractor has a prepared/skilled workforce, and the cost of the work.

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Introduction

When a contractor submits a bid to complete a construction project, what is that contractor proposing to provide? The contractor's bid is based upon the pricing of items identified during a detailed quantity takeoff conducted after an analysis of the plans and specifications prepared by the designer. Overhead and profit are added to this amount to determine the bid price. Does this mean that what the contractor provides to the client is the physical manifestation of the design or the construction product? The answer to this question is "Yes, but..." In addition to the construction product, the contractor also provides a set of construction services that range from meeting periodically with the owner's representative to customer satisfaction. This relationship is important because construction purchasers do not base their selection decision solely on the construction product to be provided.

Construction—Product or Service

The process of constructing a project produces neither a pure product nor a pure service but may be considered a hybrid process consisting of both product and service components. Graphically, the process can be depicted as shown in Fig. 1 (Rust and Oliver 1994). This concept is at the core of the construction process and is the reason the client initiates the process. When most people think of construction, they think of what is actually built or the physical structure or product. The physical product is what is detailed in the plans and specifications provided by the designer. In construction, this would consist of a series of systems that are

constructed; for example, foundation, structure, electrical, mechanical, roofing, and so on. It is what is in place after the work has been completed and the contractor and his or her forces have left the site.

There is no natural demand for the construction product; the demand for the construction product is derived from the demand for the intended use of the facility. For example, there is no natural demand for a manufacturing facility; the demand for the facility derives from the demand for the product that is to be manufactured in that facility. The demand for cars generates a demand for auto parts and assembly plants. To meet this demand, the auto company contracts for the design and construction of the parts and assembly facilities. The client's primary concerns are when the facility will be available and what it will cost. These two factors significantly influence the economic viability of the project. Completion of the project in accordance with the plans and specifications within budget and on time will satisfy the client's needs and allow the contractor to make a profit. However, it will not guarantee the contractor future work with that client.

In providing the physical product, the contractor provides a service that consists of three elements: service product, service environment, and service delivery. The service product is the service as it is designed to be delivered, which often includes specific features. It also involves service specifications and targets. Features can be such things as schedule, progress reports, quality assurance, warranties, and so on. For example, union electrical contractors in Illinois and Missouri are providing a five year warranty on parts and labor on residential electrical work to attract additional work. The service product includes what the customer receives in addition to the physical product. The key managerial decision in designing the service product is the identification of the relevant features or specifications to offer. For the electrical warranty mentioned above, this would include issues such as the length of the warranty period, how the contractor's warranty would complement that provided by the electrical equipment manufacturer, how warranty costs will be covered and so on.

The service environment includes numerous dimensions that can be classified into two main themes, that of the internal environment (the service provider) and that of the external environment. The internal environment is the organizational culture and the overriding philosophy brought to service provision by man-

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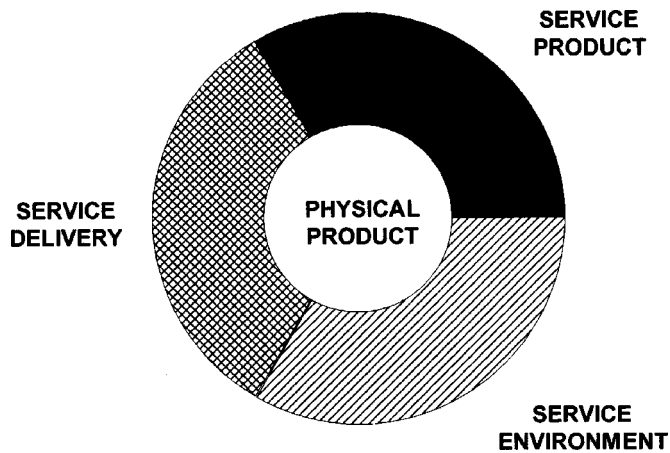


Fig. 1. Physical product and service elements

agement. Evidence of the internal environment is provided by the attitudes and actions of the employees of the contractor, both craft and management. The importance attached to the customer and his or her place in the values of the contractor are major determinants of the internal service environment. The external environment is characterized by the availability of sufficient numbers of the appropriate tools and equipment in good operating conditions, a clean, well-organized on-site facility, and material that is available as needed.

The service delivery can be likened to the performance of roles in theoretical scripts. Consumers are thought to possess expected sequences of events and provider role expectations within most service encounters. For example, the customer visits the job site and during the visit asks a question of a craftsman on the job. The customer has the expectation that the craftsman, in his or her role, will respond in a courteous, informative manner. If the craftsman fails to do so, the customer's role expectations are violated and the customer will not be satisfied.

Service Encounters—Satisfaction and Quality

The contractor and his or her personnel interact with the customer through service encounters, which may be defined as that period of time during which the customer and service firm interact in person, over the telephone, or through other media. A service encounter is a discrete event occurring over a definable period of time. It has been termed by marketing professionals as the moment of truth. In today's parlance, it is the time to see whether the contractor and his or her personnel actually "walk the walk" or simply "talk the talk". The customer's contact with the craftsman described above is an example of a service encounter. Similarly, a

customer's interaction with a contractor's project manager to discuss a potential change order is a service encounter.

Each service encounter provides an opportunity for the contractor to reinforce its commitment to customer satisfaction or quality. The customer's evaluation of each encounter will clearly not be perfectly related to the customer's overall satisfaction with the contractor or perceptions of the contractor's quality. However, over time it is likely that multiple positive (negative) encounters will lead to an overall high (low) level of satisfaction. Thus, customer satisfaction must be considered at both the micro and macro levels. Service encounter satisfaction is the customer's satisfaction or dissatisfaction with a specific service encounter. This reflects the customer's feelings about the specific encounter and results from the customer's evaluations of the events and behaviors that occur during the encounter. Overall service satisfaction is the customer's overall satisfaction or dissatisfaction with the organization based on all encounters and experiences with that particular organization. It reflects satisfaction or dissatisfaction with a number of types of encounters (encounters with personnel, quotations, negotiations, delivery, and post-contract award services) within the same firm. Customers will distinguish their satisfaction with a particular encounter from their overall satisfaction with the firm's services.

In addition to satisfaction, an issue of major concern to the customer is service quality, which may be defined as the customer's overall impression of the relative inferiority or superiority of the organization and its services. Most customers want superior service quality, but at the same time they want the lowest price. The combination of service quality and the price paid for that quality is the value received by the customer.

Satisfaction can be viewed in terms of a process of "expectancy disconfirmation," in which satisfaction is based largely on meeting or exceeding expectations. The development of expectations will be discussed later in detail.

The relationship between satisfaction and quality is shown in Fig. 2 (Bitner and Hubbert 1994). From the figure, it can be seen that a customer has a service encounter with the service provider in which a particular level of quality is provided. Based upon the customer's expectations and whether the encounter confirms or disconfirms those expectations, the customer is satisfied or dissatisfied with the encounter. Based on multiple service encounters as well as other factors and the customer's satisfaction with each, the customer experiences an overall level of satisfaction or dissatisfaction with the service.

For example, the customer has interacted with the contractor's foreman during a meeting to discuss progress on the project and has dealt with the contractor regarding submittals for a progress payment. In addition, the customer has observed the extremely organized, clean job site maintained by the contractor. In all three cases, the customer's expectations were met and, as a result, the customer experiences overall satisfaction with the contractor. The

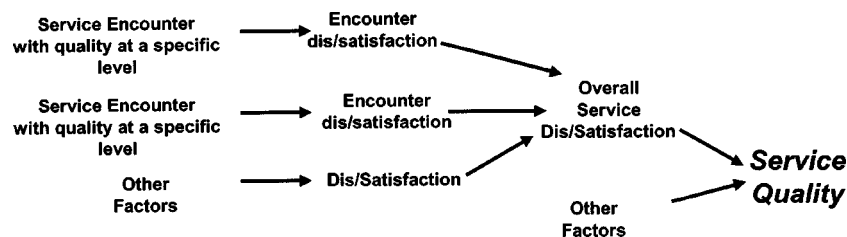


Fig. 2. Satisfaction and service quality

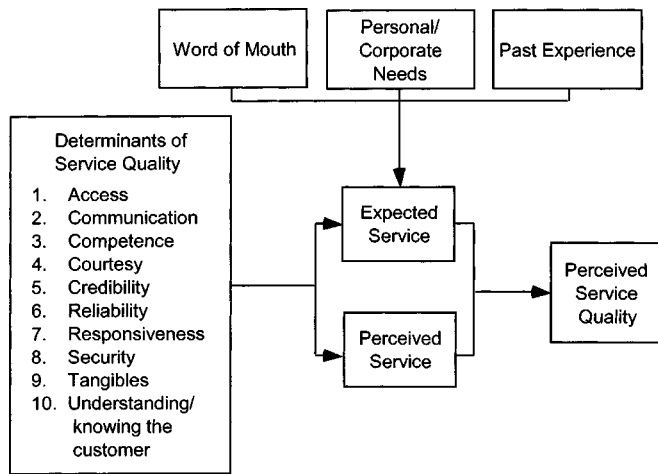


Fig. 3. Determinants of perceived quality

overall service satisfaction along with other factors determines the customer's perception of service quality. For our example, the customer perceives that the quality of the physical product is outstanding and exceeds his or her expectations. Together, the outstanding quality of the physical product and the overall service

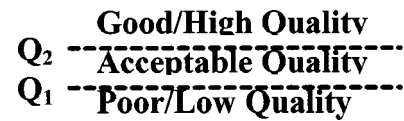


Fig. 4. Quality zones

satisfaction cause the customer to perceive that the contractor provides superior service quality.

Perceived Service Quality

Fig. 3 (Parasuraman et al. 1985) focuses on the factors influencing the customer's perception of service quality. Perceived service quality is a function of the relationship between expected service—the expectations the customer has for the service to be provided—and the perceived service—the customer's perceptions of the actual service that has been provided. The relationship between expected service and perceived service may be expressed as follows (Fig. 3):

Perceived service—expected service=perceived service quality

Perceived service quality may be viewed in terms of three zones, which may be illustrated in the following manner (Fig. 4):

$$\text{If expected service—perceived service} \begin{cases} < Q_1 \Rightarrow \text{perceived service quality} = \text{poor/low} \\ > Q_1 \text{ but } < Q_2 \Rightarrow \text{perceived service quality is acceptable} \\ > Q_2 \Rightarrow \text{perceived service quality} = \text{good high} \end{cases}$$

The zone between Q_1 and Q_2 is the zone in which the level of perceived service quality is acceptable. It has also been referred to as the zone of indifference, in that what was received is what was expected, no more and no less. The customer is neither excited nor disappointed.

In the world of total quality management (TQM), the zone of indifference is where most firms are located. There are a few firms whose performance falls below Q_1 , and there are a few firms whose performance puts them above Q_2 . A firm with a TQM philosophy will have as its objective that the customer perceive the firm's performance above Q_2 , that is, at a level that will delight the customer. At this level, the firm's performance is perceived to significantly exceed the expected performance. When this happens, the customer is extremely satisfied and delighted.

Expectations

An expectation is a belief or anticipation of what will happen as a result of an action. A customer makes a decision to select a particular contractor to provide construction services. In making that selection decision, the customer formulates expectations as to what will happen as a result of that decision. The customer's expectations of service are a function of three factors: word of mouth about the contractor or similar contractors, the customer's past or direct experience with the contractor or similar contractors, and the customer's personal and corporate needs.

If a firm has a need for construction services and has little knowledge of the contractors that are available to do such work, the individual in the firm responsible for procuring such services may talk with similar individuals in other firms to gather information on firms that could provide the services. The information obtained may be about specific firms or groups of firms such as union or nonunion contractors. For example, it may be determined that XYZ contractor provides outstanding quality work at a good price but that it is very difficult to get XYZ to complete work in a timely manner, or that union contractors have a well-trained workforce but are continually embroiled in jurisdictional disputes with other construction unions. It is important to recognize that word-of-mouth information is based upon someone else's experience and is therefore subject to some distortion. Even so, word-of-mouth information provides a basis for the establishment of expectations.

On the other hand, past experience is firsthand, that is, a result of direct interaction with the contractor or group of contractors. For example, the plant engineer of Smith Manufacturing has used Jones Construction to perform construction work in the plant. The plant engineer therefore has direct knowledge of the work performed and the services provided by Jones Construction. If Smith's plant engineer has had direct experience with several union contractors, but not Jones, which is a union contractor, the plant engineer may attribute the performance characteristics of the union contractors to Jones in the belief that because Jones is a

union contractor, he or she will perform just as do other union contractors. Thus, the plant engineer's expectations for Jones would be similar to those for the other union contractors who have worked for Smith.

Finally, an individual formulating expectations for contractor performance will consider his or her personal needs and philosophy along with those of his or her organization. For example, the individual and organization may have a very strong philosophy about courtesy and how one individual treats another or about how much communication is desired in a particular relationship. The individual and organizational beliefs will influence the formulation of expectations of service to be provided to the organization.

Fig. 3 identifies 10 factors as determinants of service quality. The customer develops an expectation for each of these factors using the three sources of information described above. Thus, the customer develops an expectation, for example, of the access that the customer will have to the contractor based upon word of mouth, past experience, and personal or corporate needs. As a result, the customer will have one or more expectations for each of the 10 determinants of the service to be provided by the contractor.

Expectations play an extremely important role in the evaluation of performance. The concept of performance alone is meaningless. Without some standard or point of reference, no meaning can be attached to that performance. If you are told that a golfer shoots a round of 80, you might think that this golfer had a good round, particularly if you are told that par for the course was 72. However, if you are told that the golfer actually played a par 3 course where par for 18 holes was 54, your evaluation would be much different. Similarly, if a contractor completed a small job in two weeks, the evaluation of the performance would be very different if the expectation for the job's duration was one week or three weeks. Expectations form the standard for the evaluation of performance.

As the customer experiences the service provided by the contractor, he or she develops perceptions of the service that is actually provided, that is, the perceived service. The perception of service quality results from a comparison of the expected service to the perceived service. The more the perceived service exceeds the expected service, the greater the perception of service quality.

From the perspective of the service provider, he or she is able to control the factors that are the determinants of service quality. These determinants are examined below.

Determinants of Service Quality

Access involves approachability and ease of contact. This factor deals with the customer's perception of the willingness of the contractor's personnel to meet with the customer and how easy it is to actually contact the appropriate contractor personnel. It deals with such things as the contractor's personnel's availability to meet with the customer and how quickly and easily the customer can contact the appropriate contractor personnel. When the customer has a problem or a question, he or she wants it resolved quickly. If it takes the customer several days to reach the appropriate person in the contractor's organization, the customer will not be pleased. This is not to say that the customer must be able to reach the person instantaneously, but simply within a reasonable time.

Access can be viewed as bidirectional. It is good business sense for the contractor and his or her personnel to maintain con-

tact with the customer. Phone calls and visits to the customer provide ready access. Contact between the customer and contractor should not be initiated solely by the customer.

Communication means keeping customers informed in language they can understand and listening to them. It may mean that the company has to adjust its language for different consumers—increasing the level of sophistication with a well-educated customer and speaking simply and plainly with a novice. It involves explaining the service itself; explaining how much the service will cost; explaining the trade-offs between service and cost; and assuring the customer that a problem will be handled.

One of the major concerns of customers is the uncertainty—for example, with the completion date—associated with any construction project. In general, construction customers are not experts in construction. At the same time, the customer is making a significant financial investment in the project that is being constructed. The contractor, through effective communication, can reduce the customer's uncertainty and thereby increase the customer's satisfaction with the contractor and the contractor's performance.

Competence means possession of the required skills and knowledge to perform the service and involves the knowledge and skill of the craft workers performing the construction work, the personnel supervising those craft workers, and the personnel that come into contact with the customer.

The customer for any construction project wants the project built in a cost-effective and safe manner, on schedule, and with appropriate quality. This requires the people performing the work to possess sufficient skills to meet these objectives. The acquisition of the necessary skills requires training and the opportunity to develop those skills. Without these skills, costs escalate, accidents occur, schedules slide, and poor-quality work is performed. The competence of the workforce can be demonstrated by the training programs completed.

In addition to the technical competence of the craft workers, contractor supervisory personnel must have the knowledge, skills, and abilities to manage the construction work and supervise craft personnel effectively. Absent those skills, craft-worker productivity deteriorates.

Construction work requires the effective interaction of the personnel performing the work. The effectiveness of this interaction is a function of the interpersonal skills of the individuals involved in that interaction. Thus, interpersonal skills are another in the set of competencies required of construction workers.

The last set of skills necessary to influence the customer's perception of service quality is those skills utilized in the interaction between the contractor's personnel and the customer. The contact personnel must be trained to interact with the customer, anticipate the customer's needs, answer the customer's questions, and so on. How the contractor's personnel interact with the customer significantly influences the customer's perceptions of the quality of the service.

Courtesy involves politeness, respect, consideration, and friendliness of contact personnel as well as other factors such as consideration for the consumer's property. The key to courtesy is good interpersonal skills and respect for the customer. Courtesy extends beyond person-to-person interaction. Consideration and respect for the customer's property are just as important. A worker sent to a lawyer's office to repair a defective light fixture who tracks mud and grease onto the carpet, generates dust that falls on the furniture and is not cleaned up, and leaves the insulation stripped off the wire on the floor will be perceived as ex-

tremely discourteous. This craft worker will make a significant contribution to the customer's dissatisfaction.

Credibility involves trustworthiness, believability, and honesty; it involves having the customer's best interest at heart. Contributing to credibility are company name, company reputation, personal characteristics of the contact personnel, and the degree of hard sell involved in interactions with the customer. Credibility involves doing what you say you are going to do. The Japanese culture has the concept of face. A Japanese worker who says that he will do something and fails to do it will "lose face," which constitutes a disgrace in that culture. Therefore, the Japanese worker will do everything possible to follow through on his commitment to avoid losing face and the disgrace that comes with it. In the United States today, the response to failing to meet a commitment is too often the statement to the customer that we are "sorry about that." In today's business world, the customer who hears "sorry about that" is not a satisfied customer.

A contractor who is awarded a job based on a bid and then attempts to increase the value of the contract and his or her profits through continuous claims for extras will suffer a loss of credibility. At the heart of credibility is believability: whether the customer can believe what he or she is told by the contractor.

Reliability involves consistency of performance and dependability. To be reliable, the contractor and his or her personnel perform the service right the first time, honor their promises, are accurate in billing, keep records correctly, and perform the service at the designated time. Reliability is closely related to credibility. A history of reliability results in credibility.

Responsiveness concerns the willingness or readiness of employees to provide service and involves timeliness of service, calling the customer back quickly, and giving prompt service. Customers have needs. The contractor's ability to respond to those needs in a timely manner and with an attitude of wanting to be of service has a significant influence on the customer's perceptions of the contractor and the quality of the contractor's service.

Service is freedom from danger, risk, or doubt; it involves physical safety, financial security, and confidentiality. The importance of security to a customer varies by project. Depending upon the size of a project relative to the size of the customer, the failure to complete a project on time, within budget, and with appropriate quality may negatively impact the financial security of the customer. Performing work within an operating facility creates risk for the customer. Risk is also created when a contractor undertakes work on an off-hours basis in a facility such as a store or a mall. As discussed above under communication, efforts to reduce the customer's uncertainty will have positive benefits for the contractor. Reducing the customer's uncertainty or doubt will improve the customer's feelings of security and hence the customer's perceptions of the service.

Tangibles include the physical evidence of the service and constitute the external environment of the service environment discussed above. These would be the physical facilities, appearance of the personnel, tools or equipment used to provide the service, and physical representations of the service; for example, the progress payment application. To quote a television commercial for a camera, image is everything, though it is more accurate to say that perception is everything. The customer's perception of the contractor's tools, equipment, and site organization is a significant influence on the customer's perception of the quality of the services provided by the contractor. What perception of the contractor will a customer have if the customer is forced to prevent the contractor's foreman from bringing a company truck onto the customer's facility because the truck is in an unsafe

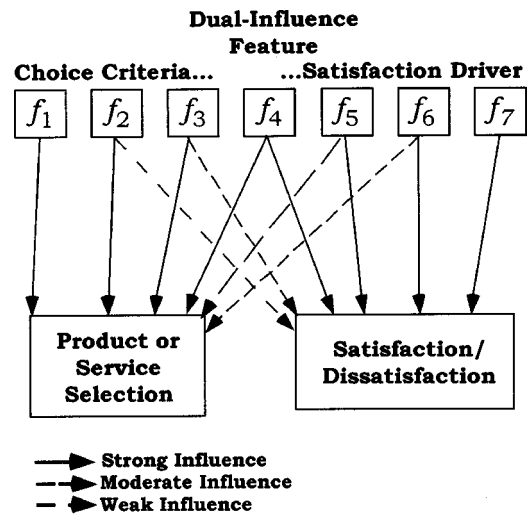


Fig. 5. Choice criteria and satisfaction drivers

condition? Similarly, what perception will the customer have if he perceives that the contractor has provided an inadequate number of tools, and those that are provided are in poor operating condition? What would be the customer's reaction if one of the contractor's employees shows up for work with both knees ripped out of his pants, a shirt that looks like it hasn't been washed in a month, and a bone in each ear?

Whether they are accurate or not, perceptions significantly influence people's decisions. It is extremely important to the contractor to know the image that he or she wants to portray to the customer and how to present the image. Maintaining the image requires the cooperation of all of the contractor's personnel.

Understanding and knowing the customer involves making the effort to understand the customer's needs by learning the customer's specific requirements, providing individualized attention, and recognizing the regular customer. To effectively satisfy a customer, all of the contractor's personnel must understand the customer's needs and requirements. In addition, the personnel must perform in a way that addresses those requirements. A customer who perceives that the contractor's personnel understand his or her requirements and are working to satisfy those requirements will perceive the contractor's efforts positively.

Selection of and Satisfaction with Contractors

An individual or firm needing construction services will employ a process of selection to identify the contracting firm with which they want to do business. In this process, the customer will utilize a set of criteria to aid in the identification. These criteria could include such factors as past experiences with the firm, perceived capability of the firm, price, and so on. At the conclusion of the contractor's work, the customer will experience satisfaction or dissatisfaction with the contractor. The satisfaction or dissatisfaction is based on a set of criteria that may be the same as or different from the criteria used in the selection decision. These criteria may include such factors as quality, number of claims filed, accidents, and so on, as shown in Fig. 5 (Rust and Oliver 1994).

It can be seen that a factor may influence the choice or selection decision, the satisfaction or dissatisfaction experienced as a consequence of the selection decision, or both. Factor f_1 is purely

Table 1. Importance of Factors in Dealing with Electrical Contractors

Factor	%
Follows codes	90
Stands behind work	87
Quality/competence	87
Honest/trustworthy	86
Right the first time	85
Safety procedures	78
On time	76
Works within budget	72
Top materials	67
Trained/specialized	65
Works with other trades	63
Quality control	61
Takes pride	61
Electricians available	61
Teamwork	60
Safety education	55
Schedule control	53
Flexible	52
Supervision	50
Saves money	48
Follow-up service	46
All size jobs	34
Lowest prices	19
Community commitment	17

a choice criterion, while factor f_7 is purely a satisfaction driver; that is, it forces the customer toward a state of satisfaction or dissatisfaction. Factors f_2 through f_6 are shown as dual-influence factors in that they influence both the selection decision and the satisfaction or dissatisfaction resulting from that decision. The strength of the influence of these factors varies and is shown in Fig. 5 as ranging from weak to strong. Factor f_2 , for example, has a strong influence on the selection but only a weak influence on satisfaction. Factor f_4 , though, is shown as having a strong influence on both the selection decision and satisfaction or dissatisfaction.

Factors Involved in Contractor Selection and Satisfaction

Given the dual-influence model depicted in Fig. 5, it is necessary to identify the specific factors used by the customers of contractors in making contractor selection decisions, those that are determinants or drivers of satisfaction or dissatisfaction, and those that act in a dual-influence capacity. Two studies were identified that examined factors important in dealing with electrical contractors. The first, conducted for the NECA/IBEW Market Research, Development and Public Relations Fund in St. Louis (Research 1990), involved a survey in which respondents were asked to rate the importance of each of a series of factors in dealing with electrical contractors. Four potential ratings were possible: not at all desirable, not very desirable, desirable but not critical, and absolutely critical. The factors and the percentage of the respondents rating the factor as absolutely critical are shown in Table 1. As seen in the table, the factors that are absolutely critical are not limited to factors associated with the physical product; many ser-

vice factors are included. Contractors who ignore the service factors risk poor customer satisfaction.

A second study, conducted by researchers at North Dakota State University (Cook et al. 1997), identified five dimensions of customer satisfaction for electrical contractors. The dimensions are listed below, with the specific questionnaire items from the study listed below each dimension.

Contractor/customer relationship: the electrical contractor's overall relationship with the customer. Customers view a contractor in terms of trust, respect, integrity, willingness to partner, responsiveness, and communication ability.

I feel [firm's name] communicates openly and honestly.

[Firm's name] conducts all work activities with a high level of integrity.

[Firm's name] clearly understands and is responsive to my needs.

Based on the manner in which [firm's name] performs all work requirements, I will work the [firm's name] in the future.

Project management: the electrical contractor's ability to plan, schedule, manage, and execute all aspects of a project from the conceptual design stage to project completion.

On-site project activities are effectively supervised and controlled.

Project milestones are completed on or ahead of schedule.

[Firm's name] effectively plans and prepares for all project activities.

[Firm's name] effectively responds to changes in project requirements and scope.

Safety: the electrical contractor understands and follows all safety regulations, maintains a safe work environment, and employs workers who practice safe work habits.

[Firm's name] employees understand and comply with all applicable state and federal safety regulations.

A safe, clean, and organized work environment is always maintained.

All work activities are conducted in a safe manner.

[Firm's name] employees observed all safety procedures.

Prepared/skilled workforce: the electrical contractor staffs a project with employees who are knowledgeable of the electrical code, are skilled in electrical construction techniques, take pride in quality work, and understand advanced electrical techniques.

[Firm's name] provides appropriately skilled and trained employees.

Project electricians demonstrate knowledge of advanced electrical technologies.

Electricians utilize appropriate electrical construction techniques.

[Firm's name] employees understand and follow current electrical codes.

Cost: the electrical contractor professionally manages all project cost activities, including initial project estimates, value engineering services, lower-cost alternatives, change-order pricing, and project billing activities.

Project costs are effectively managed and controlled.

Project cost estimates are accurate and in accordance with plans and specifications.

Change orders are priced fairly and in a timely fashion.

Project costs are accurately billed at appropriate stages of project completion.

General Satisfaction: in general, how satisfied the customer is with the performance of the electrical contractor.

I am very satisfied with the quality of work performed.

Overall, I am very satisfied with [firm's name]'s performance.

Table 2. Potential Selection and/or Satisfaction Factors

Dimension	St. Louis study	North Dakota State University study
Contractor/customer relationship	Stands behind work	...communicates openly and honestly
	Honest/trustworthy	...conducts all work activities with a high level of integrity
	Teamwork	...clearly understands and is responsive to my needs
	Follow-up service	Based on the manner in which...performs all work requirements, I will work with...in the future
Project management	Right first time	On-site project activities are effectively supervised and controlled
	On time	Project milestones are completed on ahead of schedule
	Top materials	...effectively plans and prepares for all project activities
	Works with other trades	...effectively responds to changes in project requirements and scope
	Schedule control	
	Flexible	
	Supervision	
Safety	Safety procedures	...employees understand and comply with all applicable State and Federal safety regulations
	Safety education	A safe, clean, and organized work environment is always maintained
		All work activities are conducted in a safe manner ...employees observed all safety procedures
Prepared/skilled workforce	Follows codes	...provides appropriately skilled and trained employees
	Quality/competence	Project electricians demonstrate knowledge of advanced electrical technologies
	Trained/specialized	
	Quality control	Electricians utilize appropriate electrical construction techniques
	Takes pride	...employees understand and follow current electrical codes
	Electricians available	
Cost	Works within budget	Project costs are effectively managed and controlled
	Saves money	Project cost estimates are accurate and in accordance with plans and specifications
	Lowest prices	
		Change orders are priced fairly and in a timely manner Project costs are accurately billed at appropriate states of project completion
General satisfaction	—	I am very satisfied with the quality of work performed. Overall, I am satisfied with...performance.

Note: Two factors from St. Louis study did not fit with dimensions identified in North Dakota study: "all size jobs" and "community commitment"

As with the St. Louis study, customer satisfaction is highly influenced by service factors. Focus on the physical product is not enough for a contractor. The outcomes of the two studies can be combined to produce a listing of factors that constitute a set of potential selection and/or satisfaction criteria (Table 2).

Conclusion

It is important to recognize that customers' needs vary considerably. Two customers may have very different needs for their projects. A customer may have different needs for different projects; that same customer's project needs may vary over time. Cost may be the most important criterion for a customer on one project, while schedule may be the most important criterion on another. Thus it is not possible to establish "the" list of customer needs that is appropriate for every project. A contractor with knowledge gathered about each customer and their projects will have to identify the most important criteria for its customers on each project. Once those criteria are identified, the contractor can

formulate the customers' expectations that are important in any consideration of satisfaction.

As discussed earlier, satisfaction involves "expectancy disconfirmation," that is, the confirmation or disconfirmation of an expectation. The factors identified in Table 2 must be examined in terms of expectations to understand their potential role in customer satisfaction. One of the dimensions of customer satisfaction identified in the North Dakota State University study is Project Management. As shown in Table 2, each dimension has several elements, which may be translated into expectations for satisfaction purposes. For example, the North Dakota State study (Cook et al. 1997) identified an element of customer satisfaction as completing project milestones on or ahead of schedule, while 76% of the St. Louis study's respondents (Research 1990) stated that on-time performance was absolutely critical in dealing with electrical contractors. Thus, on-time performance is a factor that is likely to be of importance on any project, but it may be more important on some projects than on others. Expectation of on-time performance can be formulated in terms of the overall project or milestones. For example

Expectation of contractor XYZ: Project will be completed on or ahead of schedule

Expectation of contractor XYZ: Milestone A will be completed on or ahead of schedule

+

Milestone B will be completed on or ahead of schedule

Milestone N will be completed on or ahead of schedule where N = number of milestones considered

A factor may act in a dual-influence capacity in influencing the customer's selection decision as well as influencing the customer's satisfaction. For example, the contractor's skilled workforce may be a factor in the customer's decision to select the contractor to perform the work. At the same time, the contractor's skilled workforce creates expectations on the part of the customer. For example, because of the skilled workforce, the customer may have the expectation that there will be no rework on the project or no service calls to repair something after the customer has begun using the facility.

A contractor must have a detailed understanding of the customer's expectations and be able, through his or her personnel, to satisfy those expectations. An inability to bring about customer satisfaction will result in the contractor's exclusion from future bidding opportunities with that customer.

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