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Dimensions of Service Quality in the Virtual World: Implications for Extranets

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ABSTRACT

The Internet has taken globalisation of the marketplace from hyperbole to present day reality. In this marketplace, information technology can be used to create and sustain competitive advantage. One such technology is the Extranet. Extranets are increasingly being used to add value in the virtual world through business-to-business information sharing and transaction handling. Yet there is limited research into perceptions of service quality when using Extranets. This paper relates the literature on service quality to the developing literature on Extranets. Five dimension of service quality from the physical world (Parasuraman, Zeithaml, and Berry, 1985) are applied to the virtual world of extranets. It is concluded that dimensions of quality in human-to-human interations may also apply to human-to-computer interactions, but that the factors which contribute to them may differ.

MOTIVATION FOR THE STUDY

In competitive environments organisations must take every opportunity to strengthen relationships with existing customers. Information technologies are increasingly being used for this purpose. As Abrahamson and Telford (1998) observe:

> Organisations which harness the powerful new benefits of information [technology] to establish intangibles, such as service quality, should enjoy an enhanced and sustainable competitive advantage. - cited in Lloyd & Boyle (1998) p. 93

One information technology which is increasingly being used to improve customer service is the Extranet. Extranets are "permeable yet secure commerce enabled networks, which electronically link distributed organisations over the Internet in a private forum" (OneSoft, 1998). They are IP networks which allow a company to run web applications for customers, suppliers and trusted partners. They differ from e-commerce retailing in that they are open only to selected partners and tend to involve greater information sharing on the part of the host firm. Extranets first caught on in vertical industries and have been used to automate the supply chain (see Benjamin & Wigand, 1995). Strong use is expected in the near future from the finance and health industries (Shein & Neil, 1998). In New Zealand we see strong moves into Extranets by Government and quasi-government agencies supplying information to producers and exporters. An early adopter was the Ministry of Agriculture and Fisheries (MAF) whose Extranet supplied complex and changing regulatory information to primary producers.

Currently, there is little reported research dealing with the success of Extranet systems. This paper addresses this deficiency by reviewing the service quality literature and relating that literature to Extranet systems.

SERVICE QUALITY

Leading service providers see quality as a strategic tool. By delivering superior quality these companies receive benefits including increased growth through improved customer retention and acquisition (Ferguson & Zawacki, 1993; Buzzell & Gale, 1987). But service quality has proved an elusive and indistinct construct which is difficult to delimit and to measure (Parasuraman, Zeithaml, & Berry, 1985; Schwartz, 1992). Four characteristics of services contribute to this difficulty: service intangibility, customer-producer inseparability, performance heterogeneity, and service non-storability (Gronroos, 1990; Zeithaml, Parasuraman, & Berry, 1990). These are briefly described next.

Service intangibility: Services are performances or experiences rather than objects. This makes it difficult for consumers to assess service products prior to delivery, particularly at the pure services end of the goods-services continuum. Intangibility also creates difficulties in objectively defining service characteristics. In the virtual world of information, intangibility dominates interactions. We can expect that the difficulties occasioned by intangibility in the physical world will apply and be magnified in the virtual world.

Customer-producer inseparability: Many services involve synchronic production and consumption with the consequent involvement of the customer in the production process. In these cases the customer can evaluate not only the service output but also the process and environment in which it is produced. This is usual where services are performed on or with persons, for example, hair styling or loan applications. It is less common where services are performed on goods, for example, repair services. In the virtual world, there is a distancing between customer and producer, with service or information being provided by a computer "behind the scene." Under these circumstances we may expect inseparability to diminish or even disappear from service interactions in the virtual world.

Performance heterogeneity: In the physical world, the potential exists for high variation in service quality over locations, producers, customers, and time. Performance heterogeneity results from the high degree of people involvement in service delivery and the high level of discretionary effort often found in service performance (Zeithaml et al., 1985). In the virtual world, service provision is frequently centralized and computerized or automated. Consequently, we may find greater consistency in service delivery such that performance heterogeneity diminishes in the virtual world.

Service non-storability: At the services end of the goods-services continuum, services are performances or experiences which cannot generally be stored. The only store for pure services in the physical world is the customer queue; an unacceptable solution for quality-focused organizations. Non-storability makes production capacity planning a critical activity in the physical world (Fitzsimmons, 1990). In the virtual world, transactions are handled by computers rather than people, and many services involve manipulation of digital information or distribution of digital assets. With increased speed of processing and reusability of digital assets, we may find that non-storability is less problematic in the virtual world.

In the physical world, the four characteristics of services have implications for quality, notably: (1) service quality is more difficult to evaluate than product quality, and (2) evaluations may be made not only on output but also on the delivery process. These do not necessarily hold true in the virtual world. Intangibility is often cited as the critical goods-services distinction from which other characteristics arise (Bateson, 1979; Zeithaml et al., 1985). Yet in the virtual world where intangibility is likely to be higher, problems arising from inseparability, heterogeneity, and non-storability may actually decrease. Clearly there are differences in service provision and quality between the physical and virtual worlds.

Models of Service Quality

Klaus (1985) identifies two commonly accepted conceptualizations of service quality: product models arising from the product-attribute approach to quality and process models arising from the customer-satisfaction approach to quality.

Product Models view services as special kinds of goods. This view is common in management (Deming, 1986; Lawton, 1991). The focus of these models is on service definition, resource use, and production technology. Quality is viewed as the sum of performance on identified attributes. It is achieved by compliance with standards.

Process Models view services as an interaction between the service provider and the customer. This view is common in marketing (Bitner, Booms, & Tetreault, 1990; Heskett, 1990). The focus of these models is on

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the subjective perceptions of consumers which, in turn, depend upon individual personalities and situational and temporal factors. Quality is viewed as customer satisfaction. Process models recognize the dynamic, situational, and subjective nature of service quality but they do present problems, not the least of which is the difficulty in measuring subjective evaluations.

A well-accepted model which considers both product and process is the GAP model of Zeithaml et al. (1990). In this model, service quality is defined as the degree and direction of the discrepancy between expectations and perceptions of a delivered service (gap 5). To reduce this gap the provider must close four other gaps. Management must have an accurate perception of customer expectations (gap 1), these expectations must be correctly translated into service quality specifications (gap 2), and employees must produce services which meet these specifications (gap 3). In addition, the firm must deliver everything that is promised in advertising, personal selling, and other communications (gap 4).

Kettinger and Lee (1995) propose a modified version of the GAP model for the information services function in which gaps 2 and 4 are removed and the remaining gaps renumbered and renamed to reflect the non-involvement of "management". The revised model alerts information service providers when:

1. providers incorrectly interpret customers expectations of information services,
   GAP 1 IS Service Concept Gap
2. providers fail to deliver to specifications derived from customer expectations,
   GAP 2 Service Delivery Gap, and
3. customer's perceptions of delivered information services do not meet expectations,
   GAP 3 IS Service Quality Satisfaction.

In addition to considering product and process, the GAP model successfully combines external and internal foci. The external customer evaluates the service quality discrepancy and an internal analysis and action is used to narrow this gap.

Dimensions of Service Quality

To measure service quality at gap 5, Parasuraman et al. (1985) first identified the dimensions of service provision which contributed to customer evaluations of quality. These were identified through extensive focus groups and refined through statistical analysis of a pilot survey instrument. The resultant five dimensions were:

Reliability: The ability to perform a promised service dependably and accurately

Responsiveness: A willingness to help customer and to provide support services

Assurance: The knowledge and courtesy of employees and their ability to inspire trust and confidence

Empathy: The caring, individualised attention a firm provides its customers

Tangibles: The physical facilities, equipment, and appearance of personnel

In the *human-to-human* environment investigated by Parasuraman et al. (1985) reliability was the foremost dimension used by customer in evaluating service quality, with responsiveness the next most important. Tangibles had the least influence. We can expect the relative importance of these dimensions to change in the virtual or *human-to-computer* environment. In the next section we discuss some possible relationships between Extranets and service quality.

EXTRANETS AND SERVICE QUALITY

There is little literature, either practitioner or academic, that deals specifically with quality of Extranet systems. Yet a major driver of Extranet implementation is to develop and nurture the customer relationship (OneSoft, 1998). Extranets can foster existing relationships by enabling companies to establish and maintain one-to-one relationships at a very low cost. With Extranets, firms can offer customised experiences that are dynamically generated or modified based on a customer's privileges, preferences, or usage patterns. In an independent study, Lederer, Mirchandani, and Sims (1998) identified the top ten realised benefits of Extranets (Table 1). The list contains several items which might impact service quality. Items 5 (improve customer relations) and 7 (provide better products and services to customers) directly target service quality. Items 2-4 are also closely related to the dimensions of service quality. Thus one half of the top ten benefits companies seek from Extranet systems are related to service quality objectives.

A particular benefit of Extranets to providers is the unprecedented opportunity to capture data on customer preferences. Information entered by customers (e.g., on-line surveys) can be incorporated with information automatically captured by the system (e.g., pages visited, length of viewing, originating site) to provide a comprehensive user profile (OneSoft, 1998). User profiles can be used for focused marketing that will differentiate the firm from its competitors (Cash & Konsynski, 1985; Lederer et al., 1998; McFarlan, 1991).

Table 1: Top 10 Benefits Companies Seek from Extranet Systems

1. Enhance competitiveness or create strategic advantage
2. Enable easier access to information
3. Provide new products or service to customers
4. Increase the flexibility of information requests
5. Improve customer relations
6. Enhance the credibility and prestige of the organisation
7. Provide better products or services to customers
8. Increase the volume of information output
9. Align well with stated organisational goals
10. Enable the organisation to respond more quickly to change

Dimensions of service quality applied to the virtual world

To relate the dimensions of service quality to extranets we looked at some reported or claimed benefits and concerns of Extranets and fitted these to the service quality dimensions defined by Parasuraman et al (1985).

Reliability: *The ability to perform a promised service dependably and accurately*

Using back-up systems can help ensure the availability of the Extranet and minimise downtown. Reduced downtime enhances a firm's image as a provider of dependable and accurate service. But reliability also implies accuracy. Information accuracy on Extranets can be enhanced through the use of up-date commands on critical information (Bort & Felix, 1997; OneSoft, 1998; Pfaffenberger, 1998) and regular, scheduled maintenance of other data and links.

Responsiveness: *A willingness to help customer and to provide support services*

Extranets use Internet technologies for data transfer. Bandwidth on the Internet is much smaller than that provided by VANs and LANs. If data transmission rates do not meet customer expectations they may judge the firm (rather than the system) to be unresponsive (Lederer et al., 1998; Senn, 1998; Sharp, 1998). A firm may also be judged unresponsive if it fails to respond quickly to email or online queries of users.

Assurance: K*nowledge, courtesy, and ability to inspire trust and confidence*

Several authors have questioned the security of Internet-based transactions (Lederer et al., 1998; Senn, 1998; Sharp, 1998), while others defend Extranet security levels (OneSoft, 1998; Kim, 1998). If security precautions do not measure up to expectations trust and confidence will be lost. Assurance may be important where transactions are involved, but may be less important where the objective of the Extranet is information provision rather than transaction handling.

Empathy:The caring, individualised attention a firm provides its customers

Extranets enable companies to give customers access to information previously available only to employees (Kim, 1998). Allowing access to privileged and trusted customers could convey a sense of caring, individualised attention. Intelligent use of user profiles, based on preferences and usage patterns, can add to the perception of individualised attention in this *human-to-computer* environment.

Tangibles: *The physical facilities, equipment, & appearance of personnel*

Visually pleasing page presentations and ease of navigation around a site could enhance a company's image and differentiate it from its competitors. Since Extranets operate in a virtual environment, site and page characteristics must construe any tangibles dimension in Extranet mediated service provision.

From our analysis it appears that Extranet mediated service could ex-

hibit all five dimensions of service quality identified in the physical world. But what is the relative strength of each dimension? Do other dimensions exist? In other research not fully reported here, we developed and piloted an instrument to measure the strength of each dimension.

Measuring Service Quality

We developed and piloted a modified version of SERVQUAL for the Extranet environment. SERVQUAL is a 22-item instrument developed by Parasuraman et al. (1985), based on the five dimensions of service quality identified by them. While the instrument has been critiqued, it remains the pre-eminent instrument within marketing practice and research for assessing service quality (Kettinger & Lee, 1994). Several industry-specific versions of SERVQUAL have been created, including two for information systems services provision (Kettinger and Lee, 1994; Pitt, Watson, & Kavan, 1995). Like these two instruments, our version involved only word changes to reflect the Extranet environment.

A large government agency was used to pilot the survey, with forms emailed to one information services manager and four customers nominated by this manager. Our convenience sample in a single industry sector is too small to make any generalisations, but we found interesting indications for future research among customer expectations. These are shown in Table 2. For all dimensions, every respondents recorded expectations above the mid-point of 4 on a 7-point Likert scale. As in the *human-to-human* environment, reliability ranked highest. Surprising results, however, were the second-highest ranking accorded to tangibles and the low ranking of assurance. The low ranking accorded to assurance may be attributed to the information-provision function of the particular extranet.

Table 2: Customer Expectations for a Government Information Agency

	Expectations	
	Range	***Mean***
Reliability	5.6-6.6	6.1
Responsiveness	5.3-6.0	5.5
Assurance	4.3-6.0	4.9
Empathy	4.6-6.0	5.2
Tangibles	5.0-6.0	5.6

The IS manager was also asked to rank her expectations on the five dimensions of service quality. Results are shown in Table 3.

Table 3: IS Manager's Expectations of Extranets in a Government Information Agency

	Expectations
Improve Reliability	5.0
Improve Responsiveness	6.0
Improve Assurance	6.0
Improve Empathy	6.0
Improve Tangibles	6.0

For four of the five dimensions (responsiveness, assurance, empathy, and tangibles) the IS Manager's expectations were greater than those of customers. For the fifth (reliability) her expectations were lower.

CONCLUSION

The late 1990s have seen a growth in the number of firms establishing Extranets to foster relationships with external customers. Extranets can impact the competitiveness of an organisation, but little has been reported on their impact on service quality. This study sought to address this by relating the service quality literature to Extranet systems. An examination of four key characteristics of services in the physical world revealed difference which may exist between services and service quality in the physical and virtual worlds. We also showed that the dimensions of service quality identified by Parasuraman et al. (1985), could hold true for Extranets. A small pilot study lent support to our theorising, but further research will be required to determine the extent to which dimensions of service quality in the physical world transfer to the virtual environment and whether SERVQUAL can be used to measure it.

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