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QUALITY MANAGEMENT IN SERVICES: ANALYSIS AND MEASUREMENT

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by

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Abstract

The production and delivery of services differ in some significant ways from manufacturing. These differences result in different structures for pricing and production decisions and in contracting for services. Correspondingly, there are significant differences in the management of quality as well. In this paper, we develop a new framework for service quality, and propose a methodology for analysis and measurement of service quality. The framework and methodology have been tested on a large set of case studies. Information gathered from the case studies lead to a number of interesting observations and conclusions regarding service quality management.

Keywords: Service Quality, Quality Analysis, Quality Measurement, Quality Management

1.0 Introduction

Service production differs from manufacturing in several ways. In many operations texts, the key issues that are identified include the intangibility of service output, the difficulty of portability, and complexity in the definition and measurement of services (for example, see Chase and Aquilano, 1992, or Krajewski and Ritzman, 1993). To these we would also add the observation of Shugan (1993) that services often involve joint production between the buyer and the supplier. These characteristics create certain differences in the production and marketing of services. For example, the joint production aspect means that the productive system is often not buffered from the customer. The customer is often present and even participating in the production process, while simultaneously being a consumer. The resulting need for "customer contact" has been analyzed in the seminal work of Chase (1981) to categorize different types of service firms and sectors.

In this paper we examine the effect of some of the special characteristics of services, on quality management in services. We use the formal quality management model of Karmarkar and Pitbladdo (1992) as a point of departure. That model maps quality terminology and concepts into market models that are consistent with traditional approaches in marketing and economics. However, the model is primarily aimed at quality in manufacturing. In order to develop a corresponding approach for the case of service management, we use the service transaction and competition model of Karmarkar and Pitbladdo (1993), and also consider several special aspects of service production and delivery that are addressed in the operations management literature.

We first present a survey of the characteristic features of service operations, service market and contracts, and service quality. Next we develop frameworks for analysis and measurement of service quality. Finally, these frameworks are illustrated and the results from several case studies of quality management in service firms are summarized

Characteristics of Services

There is a growing body of literature on operations management in service firms. Special

characteristics of service operations are discussed in textbooks such as Sasser, Olsen and Wyckoff (1978), Fitzsimmons and Sullivan (1982), Murdick, Render and Russell (1990), Heskett, Sasser and Hart (1990), Lovelock (1992b), Chase and Aquilano (1992), and in casebooks including Sasser, Hart, and Heskett (1991), Zemke and Schaaf (1989).

Managing quality in service businesses, although similar in spirit to that in manufacturing, is somewhat different and is relatively more challenging due to certain inherent characteristics of service operations. These include the *intangibility of service outcome in some cases*, and the *presence and participation of customers in the creation of many services*. Intangibility of outputs results in difficulties in matching demand and supply since such output can't be inventoried. This is, however, not meant to suggest that lack of inventory is a characteristic of services. In fact, as exemplified by a restaurant, managing inventory of supplies (termed as tangible goods by Sasser, Olsen and Wycoff (1978)) can be very critical to the success of a service enterprise.

The *diversity* of services makes it difficult to come up with generalizations that are helpful for managers of service businesses. Lovelock (1983) proposes five schemes for classifying services that offer insight for marketing and operations managers in different service businesses. Additional suggestions for managing service business are given by Lovelock (1992a), Schmenner (1986), Albrecht and Zemke (1985), and Quinn (1992).

Chase (1981) proposed a theory of the *customer contact* approach to services which holds that the services that entail high degree of customer contact have inherently smaller potential for efficiency due to the variability and uncertainty that customers introduce in the creation of service. Apte and Mason (1993) propose that customer contact be conceptualized in two ways: first, in terms of propinquity, or a physical presence, involving a face-to-face contact between the customer and service provider, and second, in terms of a symbolic contact where the main purpose of customer contact is to exchange the information necessary in service creation and consumption. It should be noted that a service activity, in general, requires a combination of

both types of customer contact. With the progress of information technology, the symbolic portion of the contact is being increasingly automated using information technology. In many cases, information technology is also being used for redefining, or reengineering, services.

Closely related to the concept of customer contact is the service characteristics of *joint production*. Not only do customers have a presence during the service creation process, but they may have significant tasks to perform as well. Examples range from self service at gasoline stations and salad bars to the shared responsibility for communication in diagnostic services and tailored financial services (including tax preparation). In some cases, the customer's participation in joint production is rather passive. But in other cases, such as financial planning or education, the participation may be very active and very significant in determining the quality of service production. Indeed, education is a major service sector for which an active role of the customer is absolutely critical. In the prototypical manufacturing case, customers' roles start after production has been completed. To the extent this is not the case - for example, custom production of manufactured goods with customer provided blueprints - the manufacturing business takes on more of the character of a service.

Many service processes must deal with *inputs supplied by the customer.* Dry cleaning services and photo finishing services are examples where there can be virtually no customer contact, and where the operations take on a "back-room" character closely resembling manufacturing. It is the customer specific inputs which distinguish such businesses from manufacturers. Among the managerial implications are that the concepts of scrap and rework take on a different character, with far greater negative implications.

As mentioned earlier, many services have outputs that are *intangible* and are *hard to measure*. For example, in services such as medical examinations or tax planning, output is quite intangible. Output of sales transactions involving manufactured goods can be metered rather easily with respect to the quantities involved. However, the delivered "quantity" of business consulting or medical services is rather more difficult to measure. In such cases, it is difficult

for the buyer and the vendor to easily agree on exactly what output has been supplied. A serious confounding problem is that it is difficult to distinguish between the level of attributes of services and the quantity of services. For example, it may be hard to say whether medical advice is more correct, more thorough, more considerate of the patient, or simply more.

In textbook discussions of service operations, services are often described as being *complex*. A part of this complexity arises from the difficulties in measurement discussed above. A second part arises from the joint production or custom character of many services, which in turn has two effects: First, the presence of the customer means that the service process cannot be separated from service output. The obvious consequence is a much larger set of attributes for customer evaluation. Moreover, the customer brings to the process a set of expectations, capabilities, as well as material inputs that are specific to that customer. As a result, the "output" of the process as perceived by the customer may involve many customer specific attributes. Participation in the production process is in itself a complex issue with some internal costs but possibly some consumption value as well. All these threads may be very difficult to untangle. As an example, consider a class in a management course, with the students (possibly organized into groups) and instructors interacting in the course of a case discussion. It is near impossible in practice to measure the educational output received by any one student in an objective way either in terms of quantity or attribute levels.

Service Markets and Contracts

The special features of services lead to significant differences in the process of production, sale and consumption of services. These in turn have implications for market structure, pricing, and contracting for services. While the operational implications of service characteristics have received some attention, there have been very few attempts to capture the implications for markets. The large majority of papers dealing with service competition have addressed issues like queues and congestion, and their consequences for customer waiting time. Papers in this area include the work of De Vany (1976), and De Vany and Saving (1983).

While queuing is certainly an issue central to services - customers must access service systems because of the *lack of portability* of services - the difference relative to manufacturing is primarily one of degree. There are, on the other hand, several important characteristics of services which remain untreated in terms of market models. For example, there is little to be found on the subject of models with joint production. Similarly, the inability to measure and meter service output renders standard price-quantity mechanisms untenable. The result is that prices must be set on a case basis, by specific bilateral contracting based on inputs rather than outputs, or by repeated renegotiation and contracting. While these are not individually all new issues, there does not seem to be an integrated treatment of service markets from this viewpoint.

Karmarkar and Pitbladdo (1993) present some key features regarding service contracting that are relevant to the development of a service quality model. First and foremost, service operations are always post-contractual (with the possible exception of New York City automotive window washing). Fixed price contracts centered on output specifications can fail on two accounts. First is the difficulty of conceiving or verifying meaningful output specifications, and second is the variability of customer inputs and joint production which makes fixed price contracts risky for the firm even when the output specifications can be well defined. Alternatively, contracts based on process specifications, such as time and materials, can turn out to be unsuitable since these can be risky for customers. These dual risks for firms and for customers can be addressed via stage-wise or contingent contracting, where the process is broken into stages, and the price for a given stage is made dependent on the outputs of previous stages. For example, there may be a fixed fee for a diagnosis, and a fixed fee for treatment which, however, depends on the outcome of the diagnosis. The uncertainty in customer inputs is resolved by the diagnosis before it materializes in terms of treatment cost.

Service Quality

Many corporations believe that customer satisfaction and high service quality leads to greater long-term profitability. This belief is confirmed by the massive database on profit impact of

market share (PIMS), which contains performance data on thousands of companies. PIMS shows that high quality of service is strongly correlated with both high profitability and market share (Buzzell and Gale, 1987).

There exists a substantial body of literature that deals primarily with quality management in manufacturing as opposed to services. Fort example, see Deming (1985), Crosby (1979), and Garvin (1988). The topic of service quality, however, is receiving increasing attention during the last decade. Papers by Sasser, Olsen and Wyckoff (1978) and Gronroos (1982), are some of the earlier ones that explicitly dealt with service quality. The main conclusions of these papers are:

- Customers find it more difficult to evaluate the quality of service as compared to the quality of goods.
- Customer evaluation of service quality involves comparison of a customer's expectations with actual service performance.
- Service quality evaluation are based on the outcome of a service as well as the process of service delivery.

More recent literature on service quality includes comprehensive collections of readings such as Bowen, Chase and Cummings (1990), Brown, Gummesson, Edvardsson and Gustavsson (1991) and Lovelock (1992b). Chase and Bowen (1991) discuss service quality issues in terms of three elements of service delivery system: technology, systems and people. In discussing the measurement and management of service quality, Collier (1990) examines the issues of definitions, standards and measurement, monitoring and control of service quality. As Collier observes, measurement and management of service quality is a difficult task requiring a multi-disciplinary approach involving fields such as marketing, operations, human resource management, economics, and business strategy.

Importance of customer viewpoints and customer satisfaction is indicated by the Baldrige

Award criteria developed by the National Institute for Science and Technology (1993). Indeed, customer satisfaction is an important category receiving 300 points out of a total of 1000 points. Adopting a customer's viewpoint, service quality is conceptualized by Parasuraman, Berry, and Zeithaml (1985, 1991) as the difference between the service quality expectations of a customer and the quality of service delivery performance as perceived by a customer. A detailed discussion of their service quality model and the associated survey instrument, SERVQUAL, can be found in Zeithaml, Parasuraman and Berry (1990).

2.0 Proposed Service Quality Model

Customer Preferences, Customer Expectations, and Service Delivery

It is incontroversial to assert that quality management, and hence quality measurement, should focus ultimately on customers. Of the many important aspects of customers in the context of service delivery, we highlight customer *preferences* and customer *expectations*. It is important to distinguish between the two. A customer might prefer first class service, but contract for second class service for reasons of thrift. In this case, the customer would of course expect second class service. Of fundamental importance when analyzing service quality are the connections between preferences, expectations, and service delivery performance. Indeed, many important measures of service quality are influenced by these connections.

One such measure is overall customer satisfaction. It is enhanced by delivered service comparing favorably with service expectations. Market measures, such as market share and price premiums relative to competitors, are responsive to the connection between customer preferences and customer expectations in the short run and delivered service and customer preferences in the long run.

Specifications - The Hub of Quality Measurement

Specifications are concrete, verifiable descriptions of the nature of a product or service. These are of two general types: *process specifications*, characterizing the activities undertaken in the transformation process, and product or *output specifications*, characterizing what is to be accomplished by said transformation process. In manufacturing, only output specifications are of *external* relevance, that is directly relevant at the market interface, whereas process specifications are only of *internal* relevance. In contrast, one of the defining characteristics of services is that the process itself is of direct relevance to the customer, whereby process specifications take their place along with output specifications as having external relevance at the market interface. Moreover, to the extent that the output of a service is intangible, output specifications play a diminished role, thereby giving an enhanced role to process specifications.

The quality concepts and measures we have mentioned in the previous section generally avoid reference to output or process specifications. More refined quality concepts and a methodology for analyzing quality management and measurement problems are certainly needed. Moreover, we believe that specifications are a critical and central element that links to other important elements of quality management in a very meaningful and useful way. In proposing service quality model and analysis methodology in the next subsection, we break total service quality into six components, consisting of linkages between service specifications, customer preferences, customer expectations, and delivered service. We start with those that link service specifications with the others.

Six Components of Total Quality

The first decomposition of quality consists of distinguishing between performance and conformance. *Conformance quality* refers to the compliance of delivered service with established service specifications. It would seem that conformance to specifications is an absolutely vital component of total quality. This is true, unless the service specifications themselves are irrelevant to customers' preferences. To capture this latter consideration, *performance quality* refers to the degree that the specifications themselves, if perfectly executed,

satisfy customer preferences. Performance quality itself is usefully decomposed into two types of quality: class and design quality. *Class* refers to differentiation in terms of market segment. Examples include first class, business class, and coach airline service, and package delivery differentiated in terms of elapsed time: overnight, second day, etc. *Design quality* refers to the degree with which perfectly executed specifications satisfy customer preferences, within the confines of a given class of service. For example, in the overnight parcel delivery class, design quality encompasses parameters such as the standard time to complete tracking requests by customers. A high class service may nonetheless have some design flaws (poor design quality). Moreover, a well designed service may suffer from poor execution (poor conformance quality). A low class, economical service, on the other hand, may be well conceived (high design quality) and flawlessly executed (high conformance quality). Since the demarcation between class and design quality is not always sharp (the market may evolve to segment on design parameters), we shall distinguish between the two aspects of performance quality only when necessary.

Performance and conformance quality refer to how specifications relate to preferences and delivered service, respectively. Our approach involving differentiation between customer preferences and expectations, which distinguishes our work from the earlier research into service quality, suggests examining the relationship between specifications and expectations as well. We define *communication quality* to be the accuracy with which the service specifications are conveyed to the customer. In a market setting, customers need to understand the nature of the service in order to make an intelligent choice of whether to consume the service, or which of several service options to choose. Furthermore, once a service selection is made, customers make plans around the perceived service specifications. For example, suppose the recuperation time from a medical procedure is specified at two weeks, but the patient has the mistaken impression that it is one week and makes business commitments for that second week. The disruption from forced cancellations can far exceed those from a planned absence. Also, when customers perform an active role in the service creation process (joint production), process specifications must be clearly and accurately communicated to them. In this last aspect, communication quality is supportive of, rather than distinct from, conformance quality.

Insert Figure 1

Figure 1 presents a picture of the components of total service quality. Each component of total quality consists of a relationship between two of the four entities which serve as guideposts for quality analysis: customer preferences, customer expectations, delivered service, and the central element of service specifications. The components of quality which involve service specifications - performance quality, conformance quality, and communication quality - have already been described. We have also indicated on the periphery in Figure 1, the components of quality which do not involve the specifications. *Actual quality*, the extent to which delivered service satisfies customer preferences, can be decomposed into performance quality and conformance quality. It is distinct from total quality to the extent that communication quality is important. *Anticipated quality*, the extent to which the customer expectations match customer preferences, can be decomposed into performance quality and communication quality. Finally, *residual quality*, the extent to which delivered service conforms to customer expectations, can be decomposed into communication quality and conformance quality.

Here the term "residual" is not meant to have a negative connotation. Indeed, residual quality forms the last, and hence lasting, impression of the customer's service experience. It is likely to be closely correlated to measures of overall customer satisfaction. In fact, framework by Parasuraman, Berry and Zeithaml refers explicitly to this "residual" quality as a surrogate measure of service quality.

Inflating customer expectations, say via deceptive advertising, may in the short term increase anticipated quality and raise sales or prices, but in the long run can hurt through lack of repeat business or poor reputation (notwithstanding the philosophy of P. T. Barnum). This latter consideration may prompt some firms to consider a deliberate policy of trying to lower customer expectations, in order that customers leave pleasantly surprised. Such a policy should be approached with caution. First, any improvement in residual quality affected by such a

strategy comes necessarily at the expense of anticipated quality. This can discourage potential customers from becoming actual customers, resulting in the loss of legitimate profit as well as a disservice to the marginal customers who are misled into inferior service alternatives or no service at all.

Second, there is the issue of customers planning their actions around their service expectations. To see this, suppose we changed our medical procedure example so that the specifications call for a one week recovery period, on average, and the patients are led to expect a two week recovery time. Yes, the patients might at first blush be pleasantly surprised for being discharged earlier than expected, but they may come to realize they could have spent the second week better if they were accurately informed and able to make plans accordingly. Another example is the phenomenon of airline schedule padding. In the early to mid 1980's, US airlines competed domestically in part on scheduled departure and arrival times, as published to customers. Reflecting a focus on anticipated quality, scheduled time between departures and arrivals (as published to travel agents and customers) tended to be artificially short, based on best-case scenarios. This gap in communication quality set the stage for poor residual quality. As airline congestion became a bigger problem, the pendulum swung, with the help of published comparative on-time statistics, to the point where scheduled elapsed times became artificially long. This happened at the same time when airlines quit the practice of routinely waiting past the departure time to receive straggling passengers. Thus flights began to arrive well before their published arrival times. The pleasure of arriving before expected time could well turn into disillusionment as the customer sees through the ruse, while waiting outside the baggage claim area for a ride whose timing is based on the published schedule.

It is difficult to make a general case for anything but faithful representation of the service specifications, in a language and manner most conducive to customer understanding. We shall take this as our standard for communication quality, not only in reference to what the customer expects of the service provider, but also in the context of communication of process specifications in the case of joint production with the customer.

There are several forces which tend to modify a firm's ability to directly control the expectation of its customers. They usually involve customer experience of one kind or another. First is the past experience by customers. Service experience which is above or below expectations will inevitably influence customer's expectations for the future occurrences of the same service, or other services offered by the same firm. In a high frequency service, it would be most remarkable to continually surprise customers with service that is better (or worse) than expected. Second is the word-of-mouth information regarding other customers' experiences with the firm. Third is the customer experience, direct or indirect, of the market segment or industry in general, and of specific competitors in particular. In this vein, intelligence activities such as benchmarking not only can provide the basis for improved service design and delivery, but also give greater insight on existing customer expectations, providing groundwork for improved communication quality. Finally, there are formal third party reports, from public or private consumer agencies as well as individual reviewers, such as restaurant and entertainment critics.

For managerial purposes, it is important to concentrate on the components of quality which are the spokes of Figure 1; for these are the components which are most closely associated with business functions. As indicated on figure 1, conformance quality is primarily associated with operations, communications quality with marketing (particularly sales and advertising), and performance quality with service design (including market research). This alignment of distinct business functions to different dimension of server quality is not meant to suggest that coordination between these functions is unimportant. What we are suggesting is that cross-functional coordination be centered around the specifications. For example, the concept of design for manufacturing is an explicit recognition that design has an impact on conformance quality. This is no less true in the provision of services. Setting service specifications which can be reasonably executed can improve actual quality via improved conformance, as well as reduce cost in operations. Furthermore, setting realistic specifications simplifies the task of marketing. If conformance quality is assured, then communication quality, and hence residual quality, can be assured by faithful representation of the service specifications. But if

conformance quality is cast into doubt, the process of assisting customers to form accurate expectations must go beyond communication of the specifications, and into the anticipation of delivered service, requiring constant and distracting interaction with operations function in order to assure residual quality.

Of the three basic components of quality, both conformance and communication refer to variance, or "gaps", between specifications and delivered service in the former case, and between specifications and customer expectations in the latter. In each case, the goal is that of fidelity in aligning the different entities with one another. Performance quality has a character which is quite different. Yes, there is a degree of matching, or alignment, in ascertaining which attributes are relatively more important to a customer, or a customer segment, and reflecting such considerations in the service specifications. This is the design quality aspect of performance quality. But there is also the question of how far to go in satisfying customers' open-ended preference for more and more of a valued attributes, i.e. moving the service into a higher class. Here we expect to see clear tradeoffs between quality and cost. While it may make sense to talk about conformance quality or communication quality being "free" (Crosby, 1979), such a statement is untenable when referring to performance quality as defined here. In the Karmarkar and Pitbladdo (1992) model of manufacturing quality, this distinction is formalized, with the class aspect of performance quality represented by a mean value in product attribute space, and conformance quality its associated variance, or the lack thereof.

Stage-wise Decomposition of Services

As we mentioned in the previous section, specifications can be related to process or output. We also made the distinction between external specifications, which arise at the market interface, and internal specifications, which do not. With this distinction in mind, we noted that services are characterized as having external process specifications. External specifications are precisely those which define a contract, whether explicitly or implicitly. They are the most concrete conveyance of what the service will provide. Adequate conformance and

communication quality, relative to external specifications, give a customer no cause to claim a breach of contract, for the service is delivered as planned and as announced. Following Karmarkar and Pitbladdo (1993), we shall use contracts for manufactured goods as a point of departure.

The presence of a tangible, portable output which can be quantified by both vendor and buyer allows, perhaps forces, considerable simplification in the market forming process of manufactured goods. Contracts for manufactured goods are centered around a clearly defined junction between production and use, at which point responsibility is transferred from producer to customer. While the value of a product to a customer may actually depend on the customer-specific uses to which the product is put, such information is not needed at the market interface, where customers can reveal their preferences through price-quantity negotiations. Similarly, specifications of the production process have no relevance at the market interface apart from their impact on the specifications of the product.

For services, the transaction between customer and provider must be represented in a greater detail. Figure 2 shows the sequence of steps involved in a service transaction as seen by a customer. At the end of each step is the state that is reached, observed by either the buyer or the vendor of the service. Karmarkar and Pitbladdo discuss why 1) contract terms for the next stage are typically contingent on the states reached in the previous stages, and 2) switching to competing providers is an option at the end of each stage. We hasten to note that not all services necessarily involve all these steps.

Insert Figure 2

The first step is *access* to the service; this may involve bringing a customer to the service system, or the reverse. The second stage is *diagnosis*. For our purposes, diagnosis is defined as the mapping of customer requirements of a service into a technical or process specification. For example, a customer at a car repair facility may describe certain problems that he or she

has experienced based on which repair needs can be assessed. The process of diagnosis identifies the underlying technical problem, perhaps as a syndrome (collection of symptoms) or perhaps in terms of the underlying mechanism. The medical analogy is obvious. Similarly a client of a financial planning service may describe problems in terms of college payments and retirement. The planner may convert the statement to needed cash flows, risk attitudes and state preferences. Diagnosis is likely to be an interactive or joint process. In some cases, the diagnosis step is performed by the customer alone.

The third stage, *process planning,* is the generation of alternative service processes or treatments, to meet the output requirements defined by the diagnosis. This may be a joint production process. In some cases, the alternatives available are already stated and fixed. A menu at a restaurant is an example. In others, processes or alternatives can be highly specialized to the customer's needs. It is conceptually useful to note that diagnosis, coupled with process planning, is the dynamic equivalent of Quality Function Deployment (QFD) (Hauser and Clausing, 1988). In manufacturing, QFD consists of mapping generic customer needs into clearly defined product specifications. Diagnosis and process plan generation consists of mapping specific customer needs and desires into clearly defined process specifications, particular to the customer.

The fourth stage is the *execution* of the service process itself. Once again, this may or may not involve joint production. Finally we add a fifth stage, *continuation*, which represents the continuing consumption or consequences of service outputs (the provider's role in this stage can be characterized as long term service support). The reason for this is that the outputs or consequences of many services (e.g. health care, financial planning, consulting) cannot be completely evaluated immediately. It is instructive to note here that, in the manufacturing case, the counterpart of this fifth stage constitutes the entirety of the customer involvement with the product. The service provider may continue to have a role in this stage in the form of direct interaction and consultation, or a set of instructions along the lines of a "user's manual." Surgery provides a clear example, involving a schedule of required and proscribed activities,

along with follow-up checkups and telephone consultations.

3.0 Methodology for Analysis and Measurement of Service Quality

Clearly, quality measurement is a complex task. The most difficult aspect from the service provider's perspective will be the determination of variables that are most important to the customer. A complicating factor in services is that the appropriate set of variables may vary with the customer. The determination of the right set of variables can often be folded into the diagnostic process. One implication of this is that a quality measurement scheme may have a static and a dynamic part. The former part addresses generic variables common to all customers whereas the latter part measures variables specific to a given customer or customer class. Measurement schemes must include process variables in addition to outcome state variables. In addition, in order to estimate conformance quality, specifications must be clear for both sets. Finally, customer expectations have to be measured either before, during or after service delivery. A measurement problem peculiar to service delivery is that observation or measurement is often visible to the customer and may affect the quality of service. Furthermore, in the case of joint service production, some process measurements could involve the customer very directly.

Classification Template

Fundamental to our methodology of analysis and measurement of service quality is a classification scheme, whereby we observe service characteristics, customer preferences and expectation, and quality measurements, and place each observation into its relevant category. The classification template essentially follows from the proposed service quality model introduced earlier. The dimensions for categorization of the quality measurement section are:

1. *Service Stages:* Access, Diagnosis, Planning, Execution, and Continuation
2. *Quality Components:* Performance, Conformance, and Communication quality

3. *Specification Types:* Output specification, Provider's process specifications, and Customer's process specification

The division of process specifications into provider's process specifications and customer's process specification is an explicit recognition of the importance of a customer's role in some stages of the process, which we have referred to as joint production. As a result of this tripartite categorization, we have 5x3x3 = 45 cells in all. In practice, several of them may be left unfilled, as they may not pertain to the particular service under consideration. It is easy to see how this template can be valuable in performing a comprehensive analysis and measurement of service quality.

The large number of potential cells is another indication that service quality management, in general, is a complex task, mostly because customers are part of the process. Yet this complexity provides an opportunity to directly engage and observe customers (except in the continuation stage, when this may no longer be possible). This allows employees to observe and gain feed back information about the quality of customers' experience. Federal Express, a company that excels in an arena where service quality is paramount, has incorporated this notion explicitly into its process specifications (Lovelock, 1990).

Whenever we encounter an important stage in a service process, we should expect to see external output specifications if the output is tangible, external process specifications for the provider if the output is intangible and/or if there is customer contact, and external process specifications for the customer if there is joint production. If the stage is critical, we should expect to see all three of performance, conformance, and communication addressed in each of the above contingencies.

We have applied this quality analysis and measurement scheme to thirteen real examples of service operations. Two of these cases are presented later in detail. At this point, please note that each cell - being associated with either performance, conformance, or communication

quality, must address a *link* between specifications and customer preferences, service delivery, or customer expectations, respectively. This is quite straightforward in the case of conformance quality: measurements simply indicate to what extent specifications have been met in the service delivery. Communication quality is more challenging. One can monitor whether or not information is transmitted to customers with fidelity to specifications. It is more relevant, but also more difficult, to focus on the receiving end. This might take the form of querying customers regarding their expectations. This would be compared with the specifications themselves. Thus some of the measurements do not directly address a linkage, but provide the basis for linkage.

This last observation is magnified when we turn to performance quality. Analysis, in addition to direct measurement, is needed to determine whether specifications are in good alignment with open ended customer preferences. Such analyses would take a form resembling tools of Quality Function Deployment, such as "House of Quality" (Hauser and Clausing, 1988). Thus it is beyond the scope of a single measure to directly address the linkage *per se*; rather, direct measurement will take the form of measuring some aspect of customer preferences, as well as restating specifications in a form more amenable to comparison with customer preference. Since performance quality is associated with service design, such measurements will be taken much less frequently than those associated with conformance and communication.

Service Quality Audit Procedure

Starting with the tripartite service quality classification scheme proposed in the previous section, we ask question(s) regarding the attainment of service quality for each combination of service stage, primary component of quality, and specification type. For example, for the access stage, communication quality, and customers' process specification, we ask: Are customers given adequate directions to perform their role in accessing the service? The questions are designed to be directly useful in asking how the service addresses key issues in quality management. One way, of course, to address an issue is to monitor through measurements. In this sense, an ideal

service quality measurement system would be able to address all of the questions raised in Table 1. Thus Table 1 also serves as a standard procedure for a service measurement system.

Insert Table 1

An important thing to note about the questions asked in Table 1 is the dominant focus on the customer. Indeed, the word "customer" is explicitly mentioned in 36 out of the 45 cells. Thus a framework which technically takes inanimate specifications as the key organizing element, nonetheless, does not lose track of the customer.

Empirical Study

To validate the proposed service quality model and audit procedure, we examined in detail thirteen service operations:

General Hospital	Fast Food Restaurant: Drive Thru Window
Automobile Insurance Claims	Parcel Delivery System
Automobile Repair Facility	Pool Cleaning Service
Merchant Banking Services	Newspaper Delivery System
Children's Hospital	Telecommunications - carrier
Controller's Office	Telecommunications - retail
Steak Restaurant	

The selection criteria for these cases were aimed at providing a broad array of private sector services (although our framework would apply equally well to government services as well), with a pragmatic concern for accessibility to the authors, as well as a bias towards services that seemed to be successful. These cases show a variety of connectedness between the service operation and a parent firm. Some, such as the pool cleaning service, consist of an entire firm. Others, such as the fast food service, are a franchise unit of a service system. The

controller's office stands apart as being an internal service bureau. This aspect buffers the controller's office from the customers of the parent firm. On the other hand, it introduces a new set of customers: internal customers. The concept of internal customers is made more vivid as more firms reorganize internal service bureaus into profit centers, requiring them to market their services to line management within the firm (in competition with outside service vendors), and in some cases allowing them to market their services outside the firm.

To illustrate proposed methodology, we present results of two cases in some detail: "General Hospital" and "Fast Food Service - Drive thru Window". In the interest of brevity, we shall discuss the analysis and measurement of service quality for only the "Fast Food Restaurant: Drive Thru Window" case, while the "general Hospital" case will be presented only in the form of tables. Next we shall present observations of general managerial interest which resulted from the study of the remaining cases.

Service System Description

Table 2 presents essential information on the service under consideration to provide proper perspective to the subsequent analysis and measurement of service quality. A broad definition of service vision is provided first. For the present case, it is defined as fast food service utilizing limited menu offered to drive-thru customers. A brief description of the service delivery system is presented next. For each stage, Table 2 presents key parties responsible for service, a breakdown of important tangible and intangible elements, as well as information required and outputs expected. It is expected that prior to applying the proposed quality analysis and measurement methodology, a detailed study of service operations, including flow charting, input-output analysis, and so forth, be completed. This is critically important, since, it is this level of understanding of the detail that is essential in measuring and improving service quality.

Insert Table 2

Also included in Table 2 are subjective evaluations of several measures which can be used to categorize service types, such as levels of customization, customer participation, room for judgment, and labor intensity. Previous research (Lovelock, 1983 and Schmenner, 1986) suggests several generalized conclusions concerning management of different "categories" of services. Hence, a service categorization will be particularly useful in drawing simple, action-oriented conclusions.

Quality Measurement using Service Quality & Productivity Template

In measuring service quality, the quality audit questions of Table 1 are to be applied to each process and output specification listed within Table 3. For example, consider the cell corresponding to process execution stage, conformance quality, and the output specification pertaining to the low number mis-packs (in practice we will have a specific number, say three, as the maximum number of mis-packs allowed per day). The question to be asked is simple - is the standard with respect to the low number of mis-packs being consistently met? Gathering answers to questions similar to this is in essence the service quality measurement scheme that we propose. Systematically answering all the questions and collecting the answers within Table 3 completes the discussion of the methodology for service quality analysis and measurement that we propose. Completed Table 3 provides a comprehensive picture of the quality of service being delivered to the customer. Management can use these measures to take the necessary actions in continuously monitoring and improving the service quality. These actions could take many forms - providing the necessary training to the employees, investing in information technology, making a change in the specification itself, and so forth.

Insert Table 3

Measurement of quality and productivity are intrinsically intertwined in services since service productivity can only be measured subject to meeting a specified level of quality (McLaughlin and Coffey, 1990). For manufactured products, defining and measuring quality

is relatively easy. But for services, defining and measuring quality is a complex process indeed. As we discuss later, and as argued by Senge (1990), the difficulty in measuring service quality leads managers to place a greater emphasis on measuring more tangible, productivity-related performance measures such as number of customers served. Responding to this measurement, employees ensure, sometimes to the detriment of service quality, that the count of customers served remains satisfactory. To determine if productivity measures are adversely impacting the delivering of quality service, it is essential that productivity measures used by the company be also identified along with the quality measures being used. Consequently, productivity measures being used are also identified an Table 3.

Managing Service Quality

As a result of analysis and measurement of service quality in thirteen cases, several generalizable observations concerning service quality management were made:

1) Because service quality is intangible, there is a strong tendency to manage a service business by measuring and focusing on productivity elements, such as number of customers served, which are typically more tangible and are more easily measured. This causes productivity numbers to "look good without being good." Service Quality invariably suffers, which can prove to be very expensive in the long term. This problem is particularly chronic in labor intensive industries where in periods of high workloads, the problem of under-capacity is tackled by service employees by lowering the average amount of time they spend serving customers.

   For example, consider the claims handling service in insurance industry. Productivity measures which focus on output, such as caseload or claims closing rates, are what a claims operations manager typically uses to control the performance of claims operations. In a period of high incoming claims volume, claims representatives (or reps for short) have a tendency to spend less amount of time investigating each claim so as to maintain

an acceptable level of caseload and closing rate to receive a good performance rating (Apte, Cavaliere, Hegde, 1992). The quality of claims handling suffers resulting into increase in the size of loss payments - a very expensive error for the insurance company. The right approach here is to establish rigorous procedure for claims handling, training claims representatives, inducing claims representatives to follow these procedures by performing technical audits and by measuring the amount of time spent adjusting claims, and above all, responding to the increased workload by hiring adequate number of reps so that claims handling quality is maintained.

2) At times, a company defines a variety of measures that on the surface seem to indicate high overall quality of service. In actuality, the company should ideally use other measures that are more intrinsically linked to customer desires. An example: hospitals have traditionally measured the quality of medical care (e.g., mortality and morbidity) as the primary determinants of service quality. However, recent research indicates that a patient's satisfaction with hospital facilities as a "high class hotel service" is extremely important in the hospital being evaluated as a high quality medical facility.

3) The quality of the process in the first few stages of the service process, such as access, diagnosis and process plan generation, have a large influence on the service quality that customers perceive in the short term. Consider, for example, the financial statement creation service performed by a controller's office in a large organization: the courtesy, accessibility and response time afforded by the personnel in the controller's office have a large impact on the way users perceive the accuracy of the final financial statements.

However, the quality and consistency of outcomes matter in the long term evaluation of the service quality. An example of this is a pool cleaning service. Even if the service personnel are well-groomed and polite, ultimately it is the cleanliness of the pool that determines whether a customer is satisfied.

4) In many cases, service organizations provide customers a service package consisting of a core service along with several supplemental (or secondary) services. We encountered an excellent illustration of this in the truck stop service. Truck fueling operation, which contributes about two-thirds of the total revenue, is at the core of a truck stop service. The supplemental services at a truck stop include minor truck repairs, grocery and accessory sales, restaurant/snack bar, toilet and shower facilities, TV/game room, chapel services, and business services as sophisticated as access to computerized trucking market systems. Managing excellence in delivering the core service is certainly critical for long term survival, but profitability is determined mostly by the success of the supplemental services. Needless to say, poor quality in one service component can more than offset high levels of quality in others. In managing the package, it is important to measure and manage quality in each of the important supplemental services as well as in the core service.

5) The delivery of a core or supplemental service often contains several sub-processes, executed in either serial or parallel fashion. The proposed framework for measurement and management of service quality should be applied to each of the sub-processes. For example, parcel delivery service depends on the sub-processes of management of package movement and management of package location information. The proposed framework should be applied to each sub-process and these sub-processes should be ultimately managed in an integrative manner.

6) For a service that entails multiple encounters, or in some cases that involves a "membership" relation, managing service operations under a failure mode is equally if not more important than operating under a normal mode. Long distance telephone service is a good example of this. The service is normally invisible to customers except when it fails. In such a case, taking care of customer's problems in a timely and courteous manner is of paramount importance.

7) When the provision of a service depends on a high degree of customization, the diagnosis and process plan generation phases are critical. Consider the automotive repair shop: The correct diagnosis and the presentation of various options and their costs to customers are crucial to overall service quality as evaluated by customers.

8) In a high contact service, the process largely determines the customer's perception of service quality while in a low contact service the outcome is the prime determinant of service quality. A restaurant is an example of a high contact business where the ambiance and the service provided by the waiters are the key components of the overall service quality. In a low contact service like telecommunications, the outcome of a successful, noise free connection is what is important while the process remains mostly invisible to the customer. The process, of course, becomes critically important when the service failure occurs.

9) Competitive pressures were observed to be a principle driving force behind the level of sophistication of quality management. The level of competition also goes hand in hand with the maturity and market saturation of the industry. Among the services studied, the fast food drive through window, truck stop, and parcel delivery services were those with the highest level of maturity, market saturation and level of competition. These services had highly sophisticated quality measurement scheme. The merchant electronic banking service we studied has been very successful financially, and is growing very rapidly while hardly encountering any competition. Interestingly, this company had the most haphazard and casual approach to quality management, with hardly any quality measurements system in place. The general hospital and telecommunications services are somewhat in the middle. Competitive pressure is building up, and so is management's attention to implementing quality measurement and improvement.

10) Often, items that need to be measured are not measured, and vice versa. The telecommunications services we studied collected mountains of data; yet they seem to

perform little or no analysis. The data was simply collated into reports, most of which, we were led to believe, got tossed aside unread by the management. The insurance claims service, as explained earlier, provides other type of an example where wrong items are being measured and used in performance evaluation of reps, leading to lower service quality.

4.0 Conclusions

We have examined how the nature of services and markets for services differ from manufacturing operations. One the most important characteristic of service operations is the joint production whereby customers participate in creating services. This and other characteristics formed the basis for the service quality model we introduced, and the methodology for analysis and measurement of service quality that we proposed. The distinguishing feature of our model from those proposed by others is the explicit distinction we make between customer preferences and their expectations.

We also introduced a methodology for analyzing and measuring service quality. As a part of this methodology we proposed three useful tools - a classification template for analyzing and organizing information, service quality audit questions, and service quality & productivity template. The first and the foremost benefit of this methodology is to provide a format for comparing what is important to a customer with what is currently being done regarding service quality, and for putting in place a process that can bring the two closer into balance. Specifically, the methodology will be useful to managers in at least three ways. First, to ensure that the specifications of service outcomes and processes reflect the preferences and expectations of customers. Second, to establish an audit process to systematically and consistently measure the quality of service being offered. Third, to provide a template for documenting and analyzing service quality measurement.

We have left many avenues open for future research. Among them is a careful

examination of the process of expectation formation, taking into account past customer experience with the firm and with competitors. Also, there is much to be done to understand the workings of service markets and competition within them, considering that most of the field of economics is centered upon the manufacturing paradigm.

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Figure 1
Components of Total Service Quality

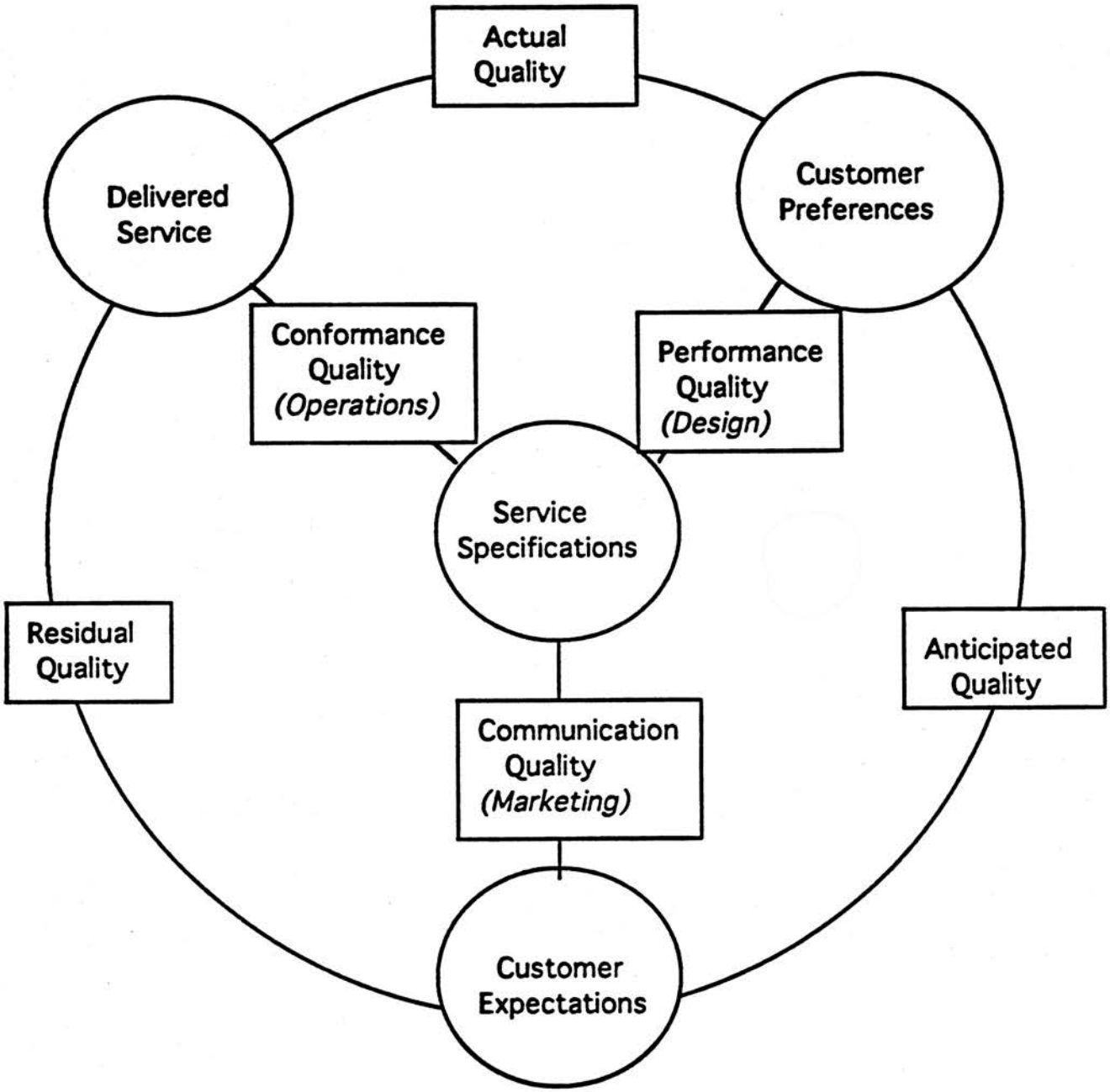

Figure 2
Service Process Stages and Outcomes

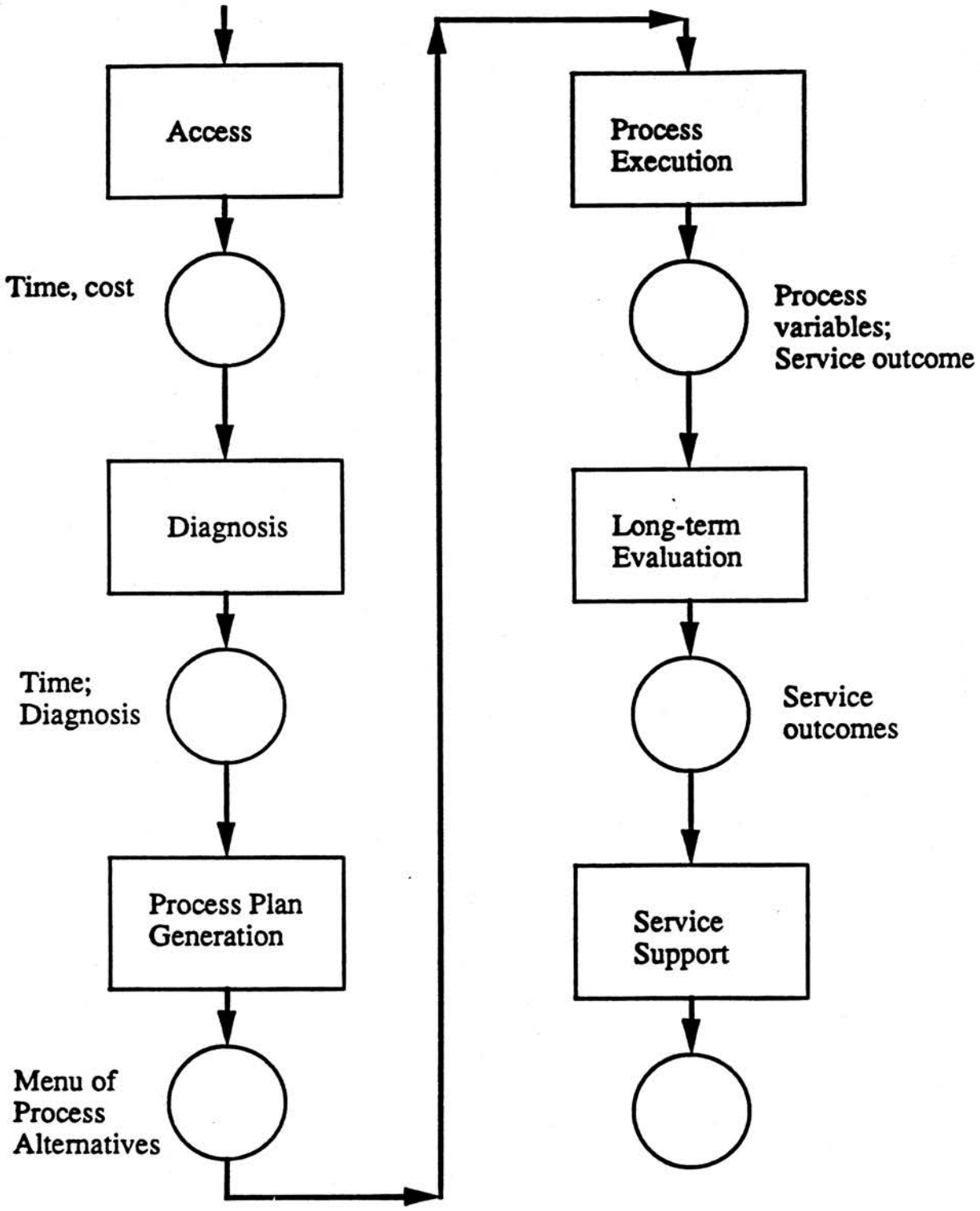

Table 1
Service Quality Audit Questions

Stage 1: Access	Performance Quality	Conformance Quality	Communication Quality
Output Specifications	To what extent will access allow customers to utilize the remaining stages of service?	How frequently do customers fail to access the service?	Do customers understand to what extent access allows or restricts service?
Provider's Process Specifications	Are service standards in terms of customer cost, waiting time, etc. acceptable to customers?	Are the service standards, in terms of customer cost and waiting, etc., met in practice?	Are customers aware of the service standards in terms of cost, waiting, etc.?
Customers' Process Specifications	Is too much (or too little) expected of customers to access the service?	Are customers able to follow access directions?	Are customers given adequate directions to perform their role in accessing the service?

Stage 2: Diagnosis	Performance Quality	Conformance Quality	Communication Quality
Output Specifications	How refined is the diagnosis? Is it designed to be amenable to process planning? Is the outcome portable?	What errors are there in diagnosis?	To what extent do customers understand diagnosis in terms of precision, utility for planning, and portability?
Provider's Process Specifications	How much time will diagnosis take? How much of this time will require the customer's presence? Is this acceptable to customers? Are customers to be treated with respect?	Are diagnostic procedures adhered to? Are standards for timeliness and respect for customers met in practice?	Do customers understand the standards of timeliness?
Customers' Process Specifications	How difficult is it for the customers to provide information for diagnosis?	Do customers answer questions accurately? Do they freely supply additional relevant information? Do they prepare adequately?	Are customers aware of what will be required of them in furnishing information to be used in diagnosis?

Table 1
Service Quality Audit Questions

Stage 3: Process Planning	Performance Quality	Conformance Quality	Communication Quality
Output Specifications	What level of detail are the process plans? Are they amenable to execution? Do they address the customers needs as diagnosed? Will the plan be portable?	With what frequency is the right match made between the diagnosis and the process plan?	To what extent are customers apprised of process planning in terms of detail, amenability to execution, relevance, and portability?
Provider's Process Specifications	How much time will planning take? How much will require the customer's presence? Is this acceptable to customers? Are customers to be treated with respect?	Are process planning procedures adhered to? Are standards for timeliness and respect for customers met in practice?	Do customers understand the standards of timeliness?
Customers' Process Specifications	How demanding is the customer's direct role in planning? Are there too many (or too few) constraints are put on customer choice?	Do customers cooperate in the planning process? Do they make decisions compatible with their own interest?	What information is given to the customer to enable intelligent process planning? How much advice is available for the customer to draw on?

Table 1
Service Quality Audit Questions

Stage 4: Process Execution	Performance Quality	Conformance Quality	Communication Quality
Output Specifications	To what extent can the execution stage accommodate a variety of process plans?	Does the executed service conform to what output specifications there are (if any)?	Do customers correctly perceive output specifications (if any)?
Provider's Process Specifications	How much time will execution take? How much of this time will require the customer's presence? Is this acceptable to customers? Are customers to be treated with respect?	Are process execution specifications adhered to? Are standards for timeliness and respect for customers met in practice?	Do customers know the standards of timeliness?
Customers' Process Specifications	Are the tasks assigned to customers burdensome and tedious, or pleasant and enlightening?	Do customers perform the tasks given them?	Do customers understand the nature of the tasks given to them? Are customers given enough guidance to enable them to perform the tasks?

Stage 5: Continuation	Performance Quality	Conformance Quality	Communication Quality
Output Specifications	For how long can the service be expected to have continuing value?	Do problems which were suppose to have been fixed recur? When they do, are remedies provided?	Do customers know for haw long the service should have continuing value?
Provider's Process Specifications	What is the extent of product support? Is it available for an appropriate period of time? Is there a policy of complete or partial remedy? How important is this to customers?	Are product support procedures adhered to? Is product support delivered in a timely manner?	Are customers aware of the extent of product support?
Customers' Process Specifications	How rigorous must the customer be in order to enjoy continuing value from the service?	Do customers follow directions and advice regarding continuation of the value of the service?	Are customers given clear directions to supplement continuing value of the service? Is there a "User's Manual" ?

Table 2: Service Description
General Hospital

	Access	Diagnosis	Process Planning	Process Execution	Continuation
Service Vision:	Providing high quality , comprehensive hospital care to patients while controlling costs.				
Service Delivery System:					
Process:	Admitting & registration	Testing & illness determination	Treatment plan	Delivery of planned health care	Follow-up checkups
Inputs:					
Key parties:					
External	Patient Referring physician Ins/PPO/HMO Government	Patient Referring physician	Patient Referring physician Ins/PPO/HMO Government	Patient Referring physician	Patient Referring physician
Internal	Clerk Registrar Operators Orderlies	Doctors Nurses Technicians Laboratory personnel	Doctors Nurses Technicians	Doctors Nurses Technicians Orderlies Laboratory personnel	Doctors Nurses Technicians Laboratory personnel
Facilitating Goods (Tangibles):					
	Admittance form Hospital building Parking lot MIS	Test materials Standard hospital materials MIS Diagnostic equipment	Reports Patient chart detailing treatment MIS	Reports Patient chart detailing treatment MIS Med technologies Beds	Reports Patient chart detailing treatment Medical records database
Intangibles:					
	Courtesy	Empathy Competence	Clarity Competence	Empathy Expertise	Clarity

Table 2: Service Description
General Hospital

	Access	Diagnosis	Process Planning	Process Execution	Continuation
Information:					
	Insurance information Medical problem Medical background History on charts	Nature of complaint Medical signs & symptoms Medical background Charts created with above Lab results Doctor's prognosis	References Treatment plan & prognosis	Charted plan & progress reports Bills Mortality Morbidity Perceived health & quality of life	Medical records Presciptions Patient education materials
Outputs:					
	Patient admitted Payment/s planned	Test results Diagnosis	Treatment plan	Patient illness treated Service time Government reporting	Improve pt. lifestyle Maintain pt. health Process improvement
Service Characteristics:					
Service Customization					
	Low	High	High	High	
Reponsibility for Customization					
		Doctor	Doctor	Doctor	
Level of Customer Participation					
	High	Medium	Low	High	
Service Personnel Judgement					
	Low	High	High	High	
Value Mostly Added By					
	Labor	Technology	Technology	Labor	

Table 3: Service Quality & Productivity Template
General Hospital

	Performance Quality	Conformance Quality	Communication Quality
Access			
Output Specs	Adequate emergency response time and in transit support of ambulance services. Arrival with sufficient info, records for diagnosis.	Incidence of late emergency arrivals. Related morbidity and mortality. Incidence of insufficient info, records.	Real time communication with ambulance services sufficient to set up for arrival.
Process Specs: Provider	Scheduling responsive to customer needs. Limited waiting time. Courteous reception. Clean, comfortable waiting area.	Incidence of waiting time beyond specifications. Customer complaints or inspection reports regarding discourteous reception, dingy facilities.	Customer understanding of expected transit time, waiting time.
Process Specs: Customer	Ease of contact, appointment scheduling, preliminary information provision.	Incidence of late customer arrivals, customers arriving with insufficient or inaccurate information.	Customer understanding of directions regarding transportation to facility, customer supplied information required.
Diagnosis			
Output Specs	Suitability of diagnostic precision for treatment planning.	Incidence of errors in diagnosis. Related mortality and morbidity. Accuracy of lab results.	Customer understanding of the nature of diagnostic output.
Process Specs: Provider	Limited waiting time. Patients treated with dignity, respect during diagnosis. Clean, comfortable diagnostic facilities.	Incidence of waiting time beyond specifications. Customer complaints or inspection reports regarding disrespectful treatment, dingy facilities.	Customer understanding of expected diagnostic procedures, waiting time.
Process Specs: Customer	Suitable environment for patient cooperation and information provision.	Patient cooperation. Incidence of insufficient or inaccurate information provided by customers.	Sufficient prompting of patients for relevant information.
Process Planning			
Output Specs	Joint choice of treatment plan to effectively address diagnosis, and provide appropriate balance between efficacy, side effects, and cost.	Incidence of clearly inappropriate choice of treatment.	
Process Specs: Provider	Suitable level of customer engagement. Limited waiting time. Cordiality. Clean, comfortable treatment planning facilities.	Incidence of waiting time beyond specifications. Customer complaints or inspection reports regarding ignorance of customer input, disrespectful treatment, dingy facilities.	Customer understanding of treatment plan decision process, including second opinion availability.

Table 3: Service Quality & Productivity Template
General Hospital

	Performance Quality	Conformance Quality	Communication Quality
Process Specs: Customer	Suitable breadth of customer choice in treatment. Respect for customer's decision making capability.	Patient cooperation and acceptance of responsibility.	Customer understanding of options and their health and financial implications.
Process Execution			
Output Specs	Full or partial return of patient to healthy state. Amelioration of adverse symptoms.	Mortality. Morbidity. Lack of patient improvement. Excess costs.	Customer understanding of expected results.
Process Specs: Provider	Attention to patient comfort. Limited waiting time. Patient treated with dignity during treatment and recovery. Clean, comfortable recovery facilities. Prompt response to patient needs during recovery.	Ignorance of patient comfort. Excessive waiting. Customer complaints or inspection reports regarding disrespectful treatment, dingy facilities, ignorance of patient or slow response during recovery.	Customer understanding of expected pain, waiting time, treatment time, recovery time.
Process Specs: Customer	Appropriate level of patient interaction in treatment.	Patient cooperation.	Patient understanding of role in treatment.
Continuation			
Output Specs	Continued or maintained return of patient to healthy state.	Mortality. Morbidity. Relapse. Lack of patient improvement.	Customer understanding of expected progress.
Process Specs: Provider	Appropriate frequency of follow up visits.	Lapses in patient follow-up.	Patient understanding of follow-up procedures.
Process Specs: Customer	Patient precaution and exercise plan appropriately designed.	Patient compliance with precautions and exercises.	Patient understanding of precautions and exercises.

Table 4: Service Description

Fast Food Restaurant - Drive Thru Window

	Access	Diagnosis	Process Planning	Process Execution	Continuation
Service Vision:					
	Fast food service utilizing limited menu offered to drive-up customers.				
Service Delivery System:					
Process:	Customer drives up	Determine Order Suggestive Selling	Update in-process inventory	Assemble, prepare, package, and deliver ordered food	Improve service time, food mix, strategic positioning
Inputs:					
Key parties:					
External	Drive-up customer	Customer	Customer		Manager
Internal	Order taker	Order taker Manager	Packer Kitchen Staff	Packer Kitchen Staff	District Office Restaurant staff
Facilitating Goods (Tangibles):					
	Headsets Two way speaker Menu board Timer	Headsets Two way speaker Timer	Headsets Storage Timer	Headsets Kitchen and storage equipment Timer	Food lab MIS
Intangibles:					
	Courtesy	Courtesy	Courtesy	Efficiency	
Information:					
	Menu Service time	Order placed Order rec'd by packer Service time Price given to customer	Kitchen staff verifies in process inventory Service time	Breading staff verifies product awaiting cooking Service time Order packed	Competitive info Long term database of service times
Outputs:					
	Start timer	Order relay Determine total price	Update of in-process inventory	Customer order filled Service time	Improved process Process control

Table 4: Service Description

Fast Food Restaurant - Drive Thru Window

Access	Diagnosis	Process Planning	Process Execution	Continuation
Service Characteristics:				
Service Customization				
Low	Low	Low	Low	
Reponsibility for Customization				
	Customer			
Level of Customer Participation				
High	High		Low	
Service Personnel Judgement				
Low	Low	Medium	Medium	
Value Mostly Added By				
Technology	Technology	Technology	Labor	

Table 5: Service Quality & Productivity Template
Fast Food Restaurant - Drive Thru Window

Stage	Performance Quality	Conformance Quality	Communication Quality
Access			
Output Specs	Low wait time Ease of driveway entry Ease of menu board access	Average wait time meeting standard	
Process Specs: Provider	Convenience of location Convenient window open hours Clean, attractive facility Courtesy and attentiveness	Facility maintenance and cleanliness as per standard Driveway layout Menuboard placement Reliable speaker system Immediate greeting by DTW attendant	Advertising Billboards/ Signage Menuboard Clarity
Process Specs: Customer		Driveup to menu board Understand Menu	Customer Understanding of direction on how to use menu board/ speaker
Diagnosis			
Output Specs	Low waiting time Ease of order placement Availability of ordered item/s Accurate order taking	Average wait time meeting standard Error rate in order taking below acceptable limit Percent of orders when ordered item is not available is below acceptable limit	Accurate understanding of customer order Price is understood by customer
Process Specs: Provider	Courteous and attentive ordertaking Help customers place order	DTW attendant training for attentive, energetic, courteous, and warm service Suggestive selling Quick and accurate pricing of orders	Reliable speaker system Repeat order for confirmation Inform customer of total price
Process Specs: Customer		Accurate order placement Confirm or change order as needed	Clearly communicate order
Process Planning			
Output Specs	No or low waiting time product availability	Average wait time meeting standard	Accuracy of internal order communication between DTW window and kitchen
Process Specs: Provider	Right products are available at right time, in right quantity with the right quality	Kitchen production plan and product schedule Product inventory management Providing production planning and scheduling training to kitchen staff	Reliable headphones and internal communication system

Table 5: Service Quality & Productivity Template
Fast Food Restaurant - Drive Thru Window

Stage	Performance Quality	Conformance Quality	Communication Quality
Process Execution			
Output *Specs*	Low wait time Quality food Order correctly filled	Average wait time meeting standard Food quality index meeting standard Mispacks below limit	
Process Specs: *Provider*		Quick order assembly Managing raw material and product inventory Kitchen staff following the standard cooking process Training DTW attendant and kitchen staff	Completing transaction with proper closing remarks
Process Specs: *Customer*	Making correct payment	Check order after receiving Make payment	
Continuation			
Output *Specs*	Repeat business High sales growth		
Process Specs: *Provider*	Increased transactions per labor hour	Performing routing and frequent operations and facility review Response to improvement suggestions of employees	Routine advertising and promotion

Productivity Measures

Percent of target market served by the restaurant as compared to competitors
Average service time in various steps (menu board, travel, window hang time)
Transactions per labor hour
Sales growth as compared to other sister franchises

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