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**Service in Manufacturing: Some Strategic  
and Theoretical Implications**

**CEO Publication  
G 87-16 (107)**

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Appreciation is expressed to Phillip Birnbaum, Joanne Martin and Gerald Salancik for comments on earlier drafts of this paper.

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Abstract

Approaches to enhancing the competitiveness of domestic manufacturing operations are re-conceptualized as ways of restructuring production operations to include attributes of service operations. Competitive advantage can be achieved via a strategy that differentiates the firm on the basis of service attributes. The organizational resources necessary for implementing this strategy are indicated by the emerging literature on service operations. Finally, implications of the meaning of service in manufacturing are discussed relative to conceptualizations of organizational effectiveness, core technology, and the role of the customer in organizational behavior.



The organization, effectiveness and competitiveness of U.S. manufacturing operations has recently captured the attention of researchers and practitioners. (Buffa, 1984; Cohen & Zysman, 1987; Skinner, 1986). Much of the attention has centered on the "factory of the future," a label subsuming such new approaches as flexible manufacturing systems (FMS) and computerized support systems such as CAD, CAM, CAE (computer-aided design, manufacturing, and engineering). Additionally, there has been an emphasis on staying close to the customer (Peters & Waterman, 1982; Peters & Austin, 1985), and assuming a customer orientation in manufacturing (Landvater, 1985). An overarching goal of these approaches to production is to restore balance in the trade-off between efficiency versus flexibility and quality, given that U.S. manufacturers have tended to emphasize the former while compromising on the latter (Jelinek & Goldhar, 1983). These new approaches can also be viewed as means through which manufacturing organizations can perform effectively against both internal effectiveness measures (machine utilization, inventory turnover) and external effectiveness measures (customization, reliability, and reduced consumer complaints) (Meredith, 1987).

The purpose of this article is to suggest that these approaches to restoring the competitiveness of domestic manufacturing can be usefully conceptualized as restructuring production operations along the lines of service operations. That is, given certain characteristics of services and service operations, as described by those studying the service sector (e.g., Chase & Tansik, 1983; Czepiel, Solomon & Surprenant, 1985; Lovelock, 1984; Mills, 1986), it appears that they describe the factory of the future as well.

In what follows, we first define services then extend service characteristics to manufacturing, describing their implications for corporate strategy and organizational theory. With respect to corporate strategy, a focus on service is shown to offer an overall corporate mission or management philosophy to guide and integrate the different tactics manufacturing firms implement to regain competitiveness. More specifically, we show that in industries in which shared manufacturing technology (old or new) reduces or eliminates manufacturing technology as a source of competitive advantage, then superior performance on service attributes can become a source of differentiation and, thus, competitive advantage. We propose the general nature of a "service in manufacturing" strategy and, drawing on the service literature, the organizational arrangements and resources necessary for implementation. With respect to organizational theory, we suggest that the concept of "service in manufacturing" requires rethinking significant issues in the organizational sciences literature, particularly the desirability of buffering the core technology and the role of the customer in organizational effectiveness.

#### The Definition and Meaning of Service

The difference between products and services is not clear-cut, but the following difference between them is cited most frequently: services are experiences that are rendered; products are objects that are possessed (Berry, 1980). Manufacturing activity focuses on the production of tangible goods from raw materials; services effect a change in the products possessed by consumers or a change in the consumers themselves (Riddle, 1986).

Although researchers have presented differing conceptualizations of the attributes of service (see Lovelock, 1984; Parasuraman, Zeithaml, & Berry, 1986 for reviews), there is consensus on: (1) the intangible nature of service output, and (2) the central role of customer contact in the service process. Intangibility and customer contact are described next as a basis for beginning to think about the implications of the meaning of service for manufacturing.

### Service is Intangible

Service, because it is an act or an experience rather than a physical possession, offers the consumer less concrete, physical evidence for its evaluation than do products. More specifically, Zeithaml (1981), drawing on earlier work by Nelson (1970) and Darby & Karni (1973), proposed that goods and services vary in their search, experience, and credence qualities. Search qualities include tangible attributes such as color and hardness that consumers of products can evaluate prior to making a purchase. Experience qualities include wearability and useability of the product or service that can be assessed only after purchase or during consumption. Credence qualities are highly intangible attributes such as the credibility or trustworthiness of the provider of the good or service. Credence attributes are very difficult to evaluate, and customers engage in extended post-purchase evaluation.

All products and services are comprised of a mixture of these three qualities. Both can be high in experience qualities, but services tend to be high in credence qualities and products tend to be high in search qualities. The intangible, experiential nature of services is the basis of Shostack's (1977) observation that quality "is defined by the



customer: the reality of a service lies in the eye of the beholder" (pg. 42, emphasis added).

Parasuraman et al. (1985) identify ten facets of service quality (see Table 1) from the customer's perspective: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding the customer, and then, tangibles such as physical facilities, equipment, appearance of personnel delivering the service, and the physical good that may accompany the service. Table 1 provides definitions and behavioral anchors of these facets of service quality. These multiple facets of service indicate the meaning of search, experience, and credence qualities for the consumer of service output.

#### Service Involves Customer Contact

There are frequent face-to-face interactions between employees and customers in service delivery, given the absence of middlemen between the production of a service and its consumption. (Fuchs, 1968; Mills & Marguiles, 1980). Customer contact makes it less possible or desirable to decouple functions such as production, marketing, and human resource management in service production and delivery. Service employees often act as "mini factories" unto themselves, simultaneously producing, marketing, and distributing the service (Sasser, 1976). Other consequences of customer contact in service production include: services can be customized at the point of sale (Lovelock, 1984), and services cannot be inventoried as readily as goods (Thomas, 1978).

Another dimension of customer contact is that customers frequently participate in creating the service they receive. Many service operations depend upon the customer to provide the information that is

the raw material to be transformed to service output (as for a physician or lawyer), as well as making use of the clients' efforts in the transformation process (as for depositing a check at the bank) (Mills & Moberg, 1982). In other words, the customer acts as both a consumer and producer in service operations. The service customer has been labelled a "partial employee" of the firm (Bowen, 1986; Mills, Chase, & Marguiles, 1983) consistent with earlier works by Barnard (1948) and Parsons (1956) that argued for the inclusion of the customer into the social system boundaries of organizations.

#### The Attributes of Service in the New Manufacturing Environment

The relevance of viewing efforts to restructure manufacturing operations in the context of these service attributes can be seen in the contrast between old style manufacturing technology and the emerging CAD/CAM environment offered by Jelinek and Goldhar (1983) in Table 2. The attributes of the new manufacturing environment, as contrasted with the old, closely resemble how the attributes of service (intangibility and customer contact), contrast with products. Flexibility, variety, and quality, as defined by the customer, are indicators of organizational effectiveness (Meredith, 1987); there is increasing attention paid to the benefits perceived by the customer (Chase & Erikson, 1987).

In the new manufacturing environment, products are more tailored to individual customer preferences. Indeed customers may participate in product design. The opportunity to work shoulder-to-shoulder with the customer, perhaps less accessible to competitors based overseas, may be a more significant competitive factor than even a premium product and lower costs (Meredith, 1987). There is less delay between production

and consumption in the new environment because tailor-made production runs occur after consumers have already defined their demands. Closer integration of marketing and design appear essential; old notions of the division of work are breaking down (Jelinek & Goldhar, 1983). Overall, marketing, engineering, and production are more closely integrated and the ability to customize, rather than simply lowering costs via standardized products, may be the basis of competitive advantage (Jelinek & Goldhar, 1983).

In sum, the characteristics of the new manufacturing environment parallel the attributes of service. Consequently, the services literature that describes the organizational implications of intangibility and customer contact can indicate the organizational arrangements and resources necessary for manufacturing firms to gain competitive advantage through a focus on service.

#### The Attributes of Service as a Source of Competitive Advantage in Manufacturing

The extension of service attributes to manufacturing can serve two strategic objectives: (1) A focus on service quality can offer an overarching goal that integrates other facets of the corporate mission; and (2) Service can replace relative cost and technological sophistication as a source of competitive advantage.

In the first case, service quality becomes the strategic objective, and new manufacturing technologies are only a means by which the objective is implemented--along with product warranties, additional field operations, etc. Indeed, benefits attributed to the new technologies are often the result of changes in management philosophies and practices--and these benefits are obtainable with simpler, less expensive technologies that are directed at accomplishing a specific

mission (Meredith, 1987). Furthermore, new technologies, when managed with the same manufacturing models or mentality as the older technology they replaced, have not competed successfully with the Japanese (Jaikumar, 1986). In explaining the failures, Jaikumar observes:

Management treated the Flexible Manufacturing System as if it were just another set of machines for high volume, standardized production--which is precisely what it is not. Captive to old-fashioned Taylorism and its principles of scientific management, these executives separated the establishment of procedures from their execution, replaced skilled blue-collar machinists with trained operators, and emphasized machine up time and productivity. In short, they structured narrow-purpose production on expensive FMS technology designed for high-powered flexible use. . . . Certainly, Frederick W. Taylor's work still applies--but not to this environment (1986: p. 71).

Jaikumar maintains that the Japanese establish competitive advantage on the basis of not just technology, but a superior corporate mission or vision. Relatedly, manufacturing innovations are most successful when, from the context of Daft's (1978) dual core model, innovation occurs in both the technical core and the administrative core (Ettlie, 1986). The technical core produces the output for consumers; the administrative core deals largely in symbols (Daft, 1978). In sum, the first strategic objective served by service in manufacturing is a new vision or management philosophy where superior service is the objective and manufacturing technology is one of many methods by which the objective can be achieved.

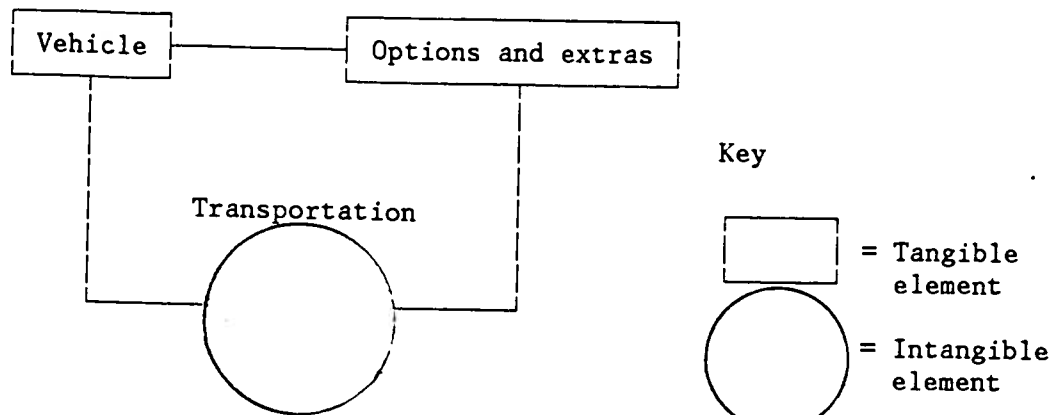
The second, related, strategic objective of a focus on service in manufacturing is replacement of cost leadership or scope (Porter, 1978) by superior service quality as the key to competitive advantage. This is especially important in industries where manufacturing technology is common across firms and where these technologies make possible low-volume production of customized output, all at low cost, by all

firms in the industry. In this vein, it has been argued that as the technological infrastructure of an industry becomes more highly developed, non-technological aspects of strategy become more critical in overall organizational effectiveness (Birnbaum, Weiss, Stears & Ottensmeyer, 1984). Firms, then, may differentiate themselves via a strategy in which they excel on service quality. This may also be the basis of competitive advantage for firms or industries in which new manufacturing technologies are not developed or are prohibitively costly to adopt.

In sum, both of these strategic consequences of a focus on service quality in manufacturing move competitive advantage out of the technology arena, exclusively, to competition on those attributes that define the meaning of service. The form these attributes can assume in manufacturing is next discussed more fully, drawing on how these attributes have been developed in the service literature.

#### Intangibility as a Strategic Factor in Manufacturing.

The importance of intangibility in manufacturing is suggested by Levitt's (1981, p. 94) observation: "Everybody sells intangibles in the marketplace, no matter what is produced in the factory" (emphasis added). Since tangibility is a continuum, rather than a dichotomy separating services from goods, the output of both sectors can be viewed as a mix of intangibles and tangibles. Consider the automobile:



(Adapted from G. Lynn Shostack, "Breaking Free from Product Marketing," Journal of Marketing, April 1977, p. 75)

Domestic automakers have tended to emphasize the tangible product characteristics of the physical vehicle, i.e., search qualities, over the intangible, i.e., experience and credence qualities, of transportation. Intangible facets of transportation such as reliability and safety, i.e., experience and credence qualities, have been emphasized less by domestic manufacturers than by foreign competitors like Volvo and Toyota.

The importance of these intangible experience and credence qualities to the product customer is described by Levitt:

From a buyer's viewpoint, the product is a promise, a cluster of value expectations of which its nontangible qualities are as integral as its tangible parts . . . (1981: p. 98) [customers] are asked to buy what are essentially promises--promises of satisfaction. Even tangible, testable, feelable, smellable products are, before they're bought, largely just promises (1981, p. 96, emphasis added).

Manufacturing firms can compete on this intangible dimension by framing a strategy and set of distinctive competencies in the context of the facets of service quality described by Parasuraman et al. (1985). This entails first, identifying those facets of service quality that are to be the basis of the firm's definition of service and source of differentiation. That is, above and beyond competing on the tangible

evidence of the physical product itself, does the firm choose to seek competitive advantage based on factors such as responsiveness and access? New technology, warranties, service support, and so forth, represent alternative ways of enacting the chosen definition. And, secondly, establishing standards and measures for those facets which have been identified. This involves establishing behavioral anchors and service levels for each competitive dimension. For example, responsiveness may be defined as returning customer hot-line phone calls. The quality-service level may be set as 24-hour turnaround time. Adoption of standards and measures for service are ways by which the manufacturing sector enacts a focus on consumer experience, and enacts a focus on service quality. In this way firms compete not only on search qualities (the conventional focus of manufacturers) but also on experience and credence qualities as well.

Firms that have not historically included attributes such as accessibility and responsiveness as strategic priorities may require cultural, more than technical, innovations to effect a service strategy. Whereas "old" manufacturing values focus on efficiency, economies of scale, and beliefs that variety and flexibility are costly, service-oriented values center on innovation, customization and beliefs that flexibility and variety create profits. This potential clash between different norms and values can be viewed as a clash between a dominant culture and a counter-culture (Martin & Siehl, 1983). The management challenge is to ". . . maintain the uneasy symbiotic relationship that exists between a dominant culture and a counter-culture" (Martin & Siehl, 1983, p. 63). In effect, this is a means of diffusing resistance to change by managing the balance between

efficiency and flexibility, rather than the total substitution of one value set for the other. A counter-culture with a focus on service values can be the internal source of a new ideology that can be introduced into other organizational subcultures (Trice, 1985). In addition, the subculture of the top managers of the firm needs to emphasize the importance of service as a central value. The commitment of management to service must be reflected in the context of the company's other goals and priorities; it must be institutionalized as part of the organization's dominant culture (Shetty & Ross, 1985).

#### Customer-Contact as a Strategic Factor in Manufacturing

Whereas customer-contact in service firms is inherent in their technologies, manufacturing firms must develop techniques to involve customers. Bridging strategies (Pfeffer & Salancik, 1987; Scott, 1981), which are effective at linking the organization with other parts of the environment (suppliers, competitors, and so forth), may be equally effective if employed with customers. These strategies are a means of increasing mutual control over activities involving interdependent organizations. For example, the concept of participation through the incorporation of representatives of external groups into the decision-making or advisory structure of an organization, can be extended to include customers. Most of the research on this kind of intergroup participation or cooperation has focused on boards of directors (e.g., Pfeffer, 1972) but it is possible to conceive of involving customers through participation in order to gain their input and support.

Another bridging strategy is a joint venture in which two or more firms create a new organization to pursue a common purpose (e.g.,



Pfeffer & Nowak, 1976; Pfeffer & Salancik, 1978). A group of existing customers and the organization could engage in a joint venture whose purpose is the creation of a new product or service. IBM is perhaps the prototypical example of a firm that works in partnership with customers in new product development, distribution, and research in order to meet the objective of improved productivity at an affordable cost.

These tactics for establishing customer contact move manufacturing firms from an "impersonal market" to a "relational market," as these mechanisms have been described in a transaction cost analysis of service organization-customer exchange (Bowen & Jones, 1986). This analysis prescribed the governance mechanism that established the most efficient boundary between the organization and the customer in response to the input uncertainties posed by customer participation. Impersonal markets are prescribed for exchanges characterized by low performance ambiguity (standardized service output and a facilitating good that provides search qualities as evidence) and low goal congruence (parties that put self-interest ahead of shared returns). In this case, an impersonal market is prescribed that bases exchange on price, anonymous buyers and sellers, and a clear boundary between organization and customer.

Alternatively, relational markets are prescribed when performance ambiguity is low, but goal congruence is high. When goal congruence is present, the organization and customer realize that the potential gains from acting cooperatively will exceed the gains from acting opportunistically. It then becomes possible to utilize the resources of customers as partial employees, blurring the boundary between organization and customer, provided relational ties and rules are used to govern the exchange in addition to price. Joint gains also result

because the organization is able to include customer preferences as inputs into the production process. Customization of output is then a possibility.

The competitive advantages of relational markets can be described as follows:

The advantage to the organization of relational exchange is that customers will increasingly limit their business to a given organization, and/or organizational agent, when the exchange relationship becomes an object of value. In relational markets, both the organization and customer concede some control and autonomy in return for assurance of equitable exchange and reduction of risk over the longer term (Bowen & Jones, 1986: p. 436; emphasis added).

The informational requirements of a relational market may require personal contact between the organization and its customers. Research on service firms indicates that a firm's dependency on information obtained in face-to-face encounters with customers increases as task complexity increases (Mills & Turk, 1986). This same conclusion would seem to hold for the role of customer contact in relational product markets when customized, rather than standardized, products are exchanged. More broadly, customization, in contrast to standardization, increases the likelihood that novel, difficult-to-analyze problems will occur in production. These kinds of problems will require a high richness of information transfer to be resolved. Face-to-face discussions provide the most rich information for transfer, telephone conversations are moderate to high, and formal correspondence is low in information richness (Daft, 1981; Daft & Macintosh, 1981). Thus, personal contact between the manufacturing organization (e.g., personnel in engineering or manufacturing) and customers, rather than reliance upon market surveys or third parties, can be a source of differentiation and competitive advantage in the new manufacturing environment.

### Competencies and Control Mechanisms for Customer-Contact Personnel.

The literature on service operations emphasizes that employees in high customer-contact roles require not only technical skills, but also interpersonal skills to be effective. That is, the research literature indicates that the behavior of employees in customer-contact roles is associated with customer perceptions of quality and, further, that customers may equate the quality of service with the employee who provides it (Schneider & Bowen, 1985; Shostack, 1977). It follows that as increasing numbers of manufacturing employees assume boundary-spanning responsibilities such as external representation and information gatekeeping (Adams, 1976; Aldrich & Herker, 1977), these employees will require service-related competencies. Of course, these competencies will be in addition to production-related competencies required for production roles. An emphasis on service, then, requires that greater attention be paid to the individual attributes necessary for fulfilling what Organ (1971) calls the social-psychological role dimension of boundary positions. Following our earlier logic, these attributes and competencies of a manufacturing firm's customer contact personnel can be sources of competitive advantage.

The recruitment and selection of personnel with interpersonal competencies is limited by the human resource management literature's focus on paper and pencil measures of cognitive ability (Schneider & Schmitt, 1986). This is legitimate, because for most, if not all, jobs these measures are valid as predictors of traditional performance criteria (Hunter & Hunter, 1984). Expanding the criteria of performance to include service, however, may require implementation of more behaviorally-based selection procedures. As in management selection,

simulations of the job may be required and these simulations may produce improvements in validity beyond those attainable with paper and pencil tests (Thornton & Byham, 1982). That is, job simulations can include the interpersonal facets of the job and selection decisions can take these data into account in making hiring decisions.

Another promising direction is found in work by Hogan, Hogan, and Busch (1984) who have developed a personality-based measure of service orientation. They define service orientation as the disposition to be helpful, thoughtful, considerate, and cooperative--an aspect of nontechnical performance that is important in a variety of jobs. However, given there is a difference between service-oriented (a personality trait or affinity) and service-skilled (an ability), even service-oriented personnel in manufacturing may require skill-based training. The content of this training can be framed by the facets of service upon which the firm is trying to differentiate itself and the behavioral anchors for these facets as presented in Table 1.

Lastly, it is proposed that the control mechanisms appropriate for employees filling customer-contact service roles need to be primarily unobtrusive rather than formal and obtrusive. The service literature has emphasized the point that conventional control mechanisms such as rules and procedures, behavior control, and formalized goal-setting may be less applicable to service tasks for the following reasons: (1) it is difficult to specify means-ends relationships governing the production and delivery of service (Mills, 1986); (2) customer involvement creates high input uncertainty and the need to control customer behavior (Argote, 1982); and (3) it is difficult to specify a priori how customer-contact employees are to behave in the unpredictable range of

circumstances that may arise during service provision (Katz & Kahn, 1978; Mills et al., 1983).

The costs of monitoring highly uncertain and interdependent work by conventional authority systems (i.e., formal rules and structures), is prohibitive and an alternative system can be based on common internalized goals (Ouchi, 1980), or on organizational members internalizing the decision premises that direct their behaviors (Perrow, 1979). Thus, employees encountering idiosyncratic customer demands in product design, sales, or after-sales service may be more appropriately controlled through shared values rather than rules and procedures for, in (human) service organizations, ideologies and values are the definers of goals (Katz & Kahn, 1978).

Managing the Customer. When customers are involved in co-designing or co-producing their output, the possession of a motivated, knowledgeable well-trained customer can be a source of competitive advantage. Organizations in which customers perform such roles need to develop techniques to facilitate the role-making process for them (Mills & Morris, 1986). Role making is a process by which participants who are functionally interdependent: (1) work through how each other will behave in certain situations by reciprocal reinforcement, and (2) agree on the nature of their relationship within the context of the formal organization (Graen & Cashman, 1975). Although there are clearly differences between customers and "regular employees," some role-making techniques that are used with employees might also be extended to customers, including: basing "selection" decisions about customers on reliable and valid information, and providing customers a "realistic job

preview" (Wanous, 1973) of the nature of their role (Mills & Morris, 1986).

The overarching issue with respect to managing customers is to conceptualize customers as partial employees. One can then draw on models of employee behavior for insight into customer management. For example, employee performance has been viewed as a function of an individual's motivation, role clarity, and ability (cf. Vroom, 1964) and it has been suggested that the determinants of customer performance be viewed similarly (Bowen, 1986). That is, customers can be expected to perform effectively in their roles as "partial employees" to the extent that they perceive valued rewards obtained through their efforts (motivation), they understand the nature of the task they are expected to perform (role clarity), and they have the necessary task-relevant competencies (ability). For example, in manufacturing, if customers are involved in the product-design stage, the firm needs to: (1) demonstrate that customers obtain higher quality or lower cost from exerting this effort (motivation), (2) clarify the terms and conditions defining customer level of inclusion in the design process (role clarity), and (3) select or train customers in the product knowledge competencies necessary to participate effectively in product design (ability).

Service in Manufacturing:  
Implications for Organizational Theory

To this point we have presented a description of manufacturing operations through a service focus that emphasizes intangibles and customer contact. These emphasizes suggest a need to also reconceptualize or expand the conceptualization of key topics in organizational theory. These topics include organizational

effectiveness, buffering the core technology, and the role of the customer in organizational theory.

### Organizational Effectiveness

The new manufacturing environment, and a focus on service, alter conventional thought on organizational effectiveness along two dimensions. First, formerly competing values and objectives such as high quality and high efficiency can now be simultaneously pursued. Chase and Erikson (1987), for example, note that as recently as the mid-70s, Skinner (1974) correctly stated that for manufacturing firms to simultaneously strive for high quality, low price, and variety was an unworkable strategy. However, the new computer-driven technologies allow firms to simultaneously perform well against all these effectiveness criteria. This reality suggests that the hypothetically incompatible values of stability and flexibility, as in the competing values model of organizational effectiveness (Quinn & Rohrbaugh, 1983), may in fact be compatible. These technologies also render more feasible pursuing Porter's (1978) three generic strategy types--cost leadership, differentiation, and scope--simultaneously, as opposed to having to pursue one to the exclusion of others.

Second, research on service organizations emphasizes that assessments of organizational effectiveness should include customer assessments as an external measure of effectiveness (Friedlander & Pickle, 1968; Schneider & Bowen, 1985). Customer assessments are emphasized in the service literature for two reasons: (a) service businesses, because they deal in intangible processes, have tended to be more customer-benefit oriented than manufacturing firms (Chase & Erickson, 1987), and (b) much of the research on service operations has

been within the field of marketing, which tends to have a strong focus on the customer. The services literature's concern with the customer helps reverse the undesirable tendency of organizational theorists to view organizations from the top looking down (management's perspective) or from the inside looking around (employees' perspective), but rarely from the outside looking in (customers' perspective) (Danet, 1981).

#### Buffering the Core Technology

The service literature has focused considerable attention on how the organization sciences literature, dominated by an implicit focus on manufacturing operations, requires amendments in order to be applicable to service operations. In this context, Mills and Moberg (1982) offered the following two modifications to Thompson's (1967) classic notion of buffering the core technology before that concept can be applied to service firms. The first modification was that service firms had a limited ability to seal off their technical core entirely. They reasoned: ". . . because the client/customer must be brought into the workflow to engage in information transactions with service workers, the conversion process must employ an open-system logic rather than the closed-system logic allowed in manufacturing operations" (p. 427)

Their second modification concerned the effect of sealing off the core in service operations.

Thompson reasoned that sealing off the core would result in greater efficiencies in terms of both quality and quantity of production, outcomes desirable in most manufacturing settings. In services, however, the same outcome does not eventuate. Sealing off the core may allow a greater number of clients to be served, but the amount and quality of the services produced for each client decreases. Moving toward closed systems of logic in the conversion process implies restricting the reciprocal exchange of information between client/customer and service worker. Less customization is permitted . . . In general, then, in service operations sealing off the core may



create outcomes that are more equivocal in value than those in manufacturing (p. 473).

These modifications suggest a paradox arising from our discussion of the meaning of service in manufacturing. On the one hand, these required modifications of "manufacturing theory" for use in understanding service operations are also required for the concept of buffered cores to fit the "new" manufacturing environment. Manufacturing firms may reduce uncertainty and increase efficiency by increasing customer involvement and thereby, acquiring desired labor and information inputs from customers. However, on the other hand, service organizations have recently been described as being more effective if they minimize customer contact (Chase, 1978; Chase & Tansik, 1983). In the service sector, then, where customers often supply desired information and labor, some contemporary thinking offers techniques to decouple the customer and the deliverer through automation. The logic here is that decoupling, or buffering, allows the organization to strike a balance with the system's efficiency requirements (Chase & Northcraft, 1985). This paradox suggests the need to develop more refined contingency approaches to buffering the core technologies of both manufacturing and service firms.

#### The Role of the Customer in Organizational Theory

Although the customer fills a number of roles in service operations and service-oriented manufacturing, organizational theory has tended to ignore the role of the customer in organizational effectiveness (Bowen, 1986; Danet, 1981). The customer is treated in the literature as a relatively passive, fleeting party to organizational exchanges. When the customer receives more attention, it is typically negative: customers disrupt organizational routines (Danet, 1981), they compromise

the efficiency of operations (Chase, 1978, 1981; Chase & Tansik, 1983), and they act as a constituency with whom boundary spanning employees identify at the expense of the organization (Aldrich & Herker, 1977).

In sharp contrast, the role of the customer is highly visible when service is introduced into manufacturing and organizational theory. In this paper we have conceptually developed an idea which, apparently, some manufacturing firms already practice: increased customer-contact can be conceived of as a means for reducing environmental uncertainty, not just a source of it. As relational markets or, as Meredith (1987) puts it, working "shoulder-to-shoulder" with the customer, become more commonplace, there is a need for research and theory-building relative to the consequences of encounters with customers. Except for some contributions regarding such issues as the role customer contact can play as a job enrichment strategy (Hackman, Janson, Purdy, & Oldham, 1975), this issue has received little attention in the management literature. This is changing through research and theory in the marketing of services (c.f., Czepiel, Solomon & Surprenant, 1985) that begin to identify the opportunities and constraints of customer contact. The work in marketing is quite provocative. For example: customers who participate in creating their own service may be less likely to complain (Lovelock, 1984); participating customers may contest management for control of the production process (Bateson, 1985); customer contact requires emotional labor of employees that they may find stressful (Hochschild, 1983); and whole organizations that become service driven become market leaders (Gronroos & Gummesson, 1986). Overall, there is a

need to deepen understanding of the phenomenon of customer contact in both the service and manufacturing sectors.

#### Conclusion

We have described how a focus on service quality can be a source of competitive advantage in manufacturing. A central theme of the paper was that the recent literature on services and service organizations can suggest the organizational arrangements necessary for manufacturing firms to resemble service operations. This theme is the converse of numerous works that describe how to restructure service firms to resemble manufacturing operations, exemplified by the "production line approach to service" (Levitt, 1972) and the "industrialization of service" (Levitt, 1976). Hopefully, our exploratory discussion of "service in manufacturing" further underscores the utility of extending organizational thinking from one business sector to another. It is this sort of cross-fertilization of ideas that is necessary for fully understanding organizations whose operations typically involve a mix of service and manufacturing.

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TABLE 1  
Determinants of Service Quality \*

<u>Determinants</u>	Definition	Examples
RELIABILITY	Consistency of performance and dependability	<ul style="list-style-type: none"> <li>• Accuracy of billing</li> <li>• Keeping records</li> <li>• Performing the service at the designated time.</li> </ul>
RESPONSIVENESS	The willingness or readiness of employees to provide service	<ul style="list-style-type: none"> <li>• Calling the customer back quickly</li> <li>• Giving prompt service.</li> </ul>
COMPETENCE	Possession of the required skills and knowledge to perform the service	<ul style="list-style-type: none"> <li>• Knowledge and skill of the contact personnel</li> <li>• Knowledge and skill of operational support personnel.</li> </ul>
ACCESS	Approachability and ease of contact	<ul style="list-style-type: none"> <li>• Waiting time to receive service is not extensive</li> <li>• Convenient hours of operation.</li> </ul>
COURTESY	Politeness, respect, consideration, and friendliness of contact personnel	<ul style="list-style-type: none"> <li>• Consideration for the customer's property</li> <li>• Clean and neat appearance of the contact personnel.</li> </ul>
COMMUNICATION	Keeping customers informed in language they can understand, and listening to them	<ul style="list-style-type: none"> <li>• Explaining the service itself</li> <li>• Assuring the customer that a problem will be handled.</li> </ul>
CREDIBILITY	Trustworthiness, believability, honesty	<p>Credibility is achieved by:</p> <ul style="list-style-type: none"> <li>• Company reputation</li> <li>• Personal characteristics of the contact personnel.</li> </ul>
SECURITY	The freedom from danger, risk, or doubt	<ul style="list-style-type: none"> <li>• Physical safety</li> <li>• Financial security.</li> </ul>
UNDERSTANDING/ KNOWING THE CUSTOMER	Making the effort to understand	<ul style="list-style-type: none"> <li>• Learning the customer's specific requirements</li> <li>• Providing individualized attention.</li> </ul>
<u>TANGIBLES</u>	The physical evidence	<ul style="list-style-type: none"> <li>• Physical facilities</li> <li>• Appearance of personnel</li> <li>• Tools or equipment used to provide the service</li> <li>• Physical representations of the service.</li> </ul>

INTANGIBLES

\* Adapted from Parasuraman et al. (1985)

Table 2

Some Comparisons Between  
"Old" versus "New" Manufacturing Technologies

<u>Descriptors of Old Manufacturing Technology</u>	<u>Descriptors of New Manufacturing Technology</u>
Standardization	Variety
Flexibility and variety are expensive	Flexibility and variety create profits
Smooth flows	Surge and turnaround ability
Standard product design	Many custom products
Low rate of responsiveness, high stability	Innovation and responsiveness
Inventory as a decoupler	Production tied to demand

Adapted from Jelinek and Goldhar (1983)