

# **The Content Continuum: Extending the Hayes & Wheelwright Process-Product Diagonal to Facilitate Improvement of Services**

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## **ABSTRACT**

The explanatory power of the Hayes & Wheelwright Process-Product Matrix, as well as the diagonal embedded within it, fails under counterexamples of mass customization. When the diagonal is extended into the realm of service products using Schmenner's Service Process Matrix, an expanded framework emerges. That framework, herein coined The Content Continuum, appears to be highly explanatory and finds good fit with many existing service classification schemes.

## **INTRODUCTION**

A number of Original Levi's retail outlets offer made-to-order women's bluejeans on a mass customization basis. Customer measurements are entered at the POS terminal and directed to a numerically controlled cutting device at the company's Tennessee plant. Levi's customization strategy effected a 300% increase in sales and a simultaneous reduction in inventory at introduction (1994a). Toward further improvement, the company has co-developed a point-of-sale "body scanner" expected to decrease response time and improve the quality of the process (1994b). The application is not unique; Tom Peters notes a similar process for the tailoring of suits at Saks Fifth Avenue (Peters, 1987). Anderson windows, Motorola pagers, and Hallmark Create-A-Card vending machines provide examples of mass customization from other industries. Even McDonald's, the bellwether of Levitt's industrialized service (1972, 1976), now carries hundreds of menu items targeted by region, rotates specialty items seasonally or monthly, and offers its once standardized burgers on an assemble-to-order basis.

In some ways, such mass customization (Pine II, 1993) implies a shift towards craft shop production, including higher product heterogeneity and increased levels of customer involvement, specification, and delivery convenience. However, it also expects increased volumes, economies of scale, capitalization, and commodity-like behaviors, as found in flow production of goods. These contradictions in the trend to mass customization represent directly opposing shifts along the main diagonal of the Hayes and Wheelwright Process-Product Matrix (1979a, 1979b) to depict the relationship between a product's growth and volume and its process technology. The Process-Product Matrix, a generally accepted operations management framework, is robust with implications for strategy, operations, and marketing. Here, however, it falters under the higher service content of the mass customized product. Increased volumes, economies of scale, capitalization, and commodity-like behaviors do, however, represent an outward shift along the diagonal within the Service Process Matrix, developed by Schmenner (1986, 1993, 1995) for equivalent analysis of service products and processes.

Industry is rich with examples of trends to increase the service content of goods, a trend that suggests the need for a framework which places the Process-Product Matrix within the context of products viewed as bundles of goods and services. This paper first reviews a relevant sampling of dominant service perspectives that suggest such a framework. Next, a framework that merges these perspectives with the Hayes & Wheelwright Process-Product Matrix is figured and discussed. Next, the automobile and dining industries are used as illustrative examples of the functionality of the framework. Some anticipated questions are then proactively addressed. Finally, a comparison is made with a number of other service classification schemes to demonstrate an acceptable degree of harmony.

## **RECENT SERVICE PERSPECTIVES**

Hill's economic analysis of goods and services (1977) provides a foundation for synthesis. Both goods and services are transaction-based; the transfer of ownership identifies a good, and the change in the condition of an object identifies a service. Hill's perspective allows for the bundling of goods and services within a single product transaction; a position supported by numerous researchers (Bell, 1981; Fitzsimmons & Sullivan, 1982; Foxall, 1985; Kotler & Armstrong, 1980; Levitt, 1972; Rathmell, 1966; Sasser, Olsen, & Wyckoff, 1978; Shostack, 1977). Advocacy for bundling from a practitioner perspective is exemplified by Lexus management, re-defining its product, not as a manufactured good, but as a luxury service package. Hill also recognizes the potential utility of a good or

service, and delineates it from the underlying transaction; the interpretation of service as consumers transacting for utility finds modern support as well (Hsieh & Chu, 1992; Murdick, Render, & Russell, 1990). If both goods and services are viewed by consumers as creating utility, then a single product variously bundled with proportions of goods and services allows for the efficient and rational consumer to effect equivalent utility substitutions, e.g., grocery stores versus restaurants in the case of food products. Therefore, a specific product should be viewed on a continuum representing its relative proportion of goods and services, a conclusion reached by others (Rathmell, 1966; Sasser et al., 1978; Shostack, 1977).

Beginning with Buffa (1976), researchers have often proposed service classification schemes with acute analogy to the manufacturing processes within the Hayes & Wheelwright Process-Product Matrix. Thomas (1978) categorized services along a one-dimensional continuum titled equipment-based versus people-based, further delineated as automated equipment, equipment monitored by unskilled labor, equipment operated by skilled operators, unskilled labor, skilled labor, and professional labor. Examples offered for automated equipment (e.g., car washes, vending machines) bear resemblance to line or continuous flow manufacturing; professional labor examples (e.g., lawyers, consultants, accountants) suggest job shop operations with closer customer involvement. Thomas also notes that services may move along this continuum as they evolve via capital/labor substitutions.

Bell (1981) jointly classifies goods and services within a 2 x 2 continuum based on levels of tangibility and customer involvement. The main diagonal moves from highly tangible, low involvement products, referred to as commodity-like "pure" goods, e.g., rolled steel, to highly intangible, high involvement products, titled customized service. The central point is described as a bundle of goods and services bearing a median level of product differentiation. Later work by Bell (1986) explores the strategic implications of repositioning a product along the diagonal via bundling. Bell's classification offers a "goods" diagonal that bears resemblance to the Process-Product diagonal, coupled to a equivalent diagonal for services, resulting in a continuum of bundled goods and services.

Maister (1982) considers professional service firms to be "the job shops of the service sector," requiring high customer interaction and customization. The professional staff is analogized as equipment, facilitating the use of manufacturing logic for resource and capacity planning.

Schmenner (1986) expands upon the work of Maister within a Service Process Matrix that dichotomizes the degree of such interaction and customization by the degree of labor intensity. Professional service firms are characterized by high degrees of interaction, customization, and labor intensity; service factories, by low degrees. Service shops have low labor content, but a high level of customization; mass services, the reverse. Schmenner characterizes this work as a clear services parallel to the Hayes & Wheelwright Process-Product Matrix for manufacturing, e.g., that increasing interaction and customization causes the service factory (Chase & Garvin, 1989) to give way to the service shop in similar manner as continuous flow gives way to job shop manufacturing. Schmenner also notes the attraction of services toward, and movement along, the main diagonal from 'professional service' to 'service factory,' and the related strategic implications of such positioning. Figure 1 positions the Process-Product Service Process diagonals side-by-side and also illustrates how such a positioning complements the accepted notion of the goods/services bundle.

**FIGURE 1 Goods and Service Process Types with Industry and Management Task Examples**

Diagonal within Process-Product Matrix (Hayes & Wheelwright, 1979a, 1979b)				Approximated Diagonal within Service Process Matrix (Schmenner, 1986)			
Continuous Flow	Assembly Line	Batch	Job Shop	Professional Service	Service Shop	Mass Service	Service Factory
Refineries	Autos	Tool & Die	Print Shops	Consultants	Hospitals	Schools	Resorts
Raising required capital	Development of standards, systematizing diverse elements		Fast reaction	Customer intervention	Binding labor to firm	Standardization of operations	Capital decisions
100% Goods ←				→ 100% Services			
← Percentage of Goods/Services Content →							

Chase (1985) proposes a service diagonal similar to that of Schmenner within a 'service system design matrix' to integrate marketing and operational strategy, which he credits as strongly influenced by the Hayes & Wheelwright Process-Product Matrix. Chase's diagonal is characterized as moving from services with high physical

contact and customization towards services with high operational efficiency and automation. Chase continually contributes to the classification of services, and his work is later explored in more depth.

The above review of service perspectives is not exhaustive; other dominant service typologies are addressed later in this paper. However, this select sampling identifies two perspectives with broad and continuous support, i.e., a product continuum containing bundled goods and services and a service classification scheme which mirrors the Hayes & Wheelwright Process-Product diagonal.

### FRAMEWORK FOR A CONTENT CONTINUUM

When the juxtaposition of the two diagonals reflected in Figure 1 is viewed as a single continuum, it also contains the spectrum of proportional goods and services content used for classification by both Sasser (1978) and Shostack (1977). Continuous flow commodity goods contain relatively little service; resorts, relatively little goods. At center, the traditional print shop product is primarily a good bundled with facilitating services; professional firms provide services bundled with facilitating goods, e.g., accountants and prepared tax returns.

This single 'Content Continuum' also represents the main diagonal within Bell's goods and services classification scheme, reflecting pure goods at left, goods and services bundles at center, and customized services at right, within which products are strategically repositioned via bundling and unbundling. The concept of a purely customized service is not highly dissimilar from that of the service factory or mass customization; each suggests a total product with the lowest goods content and the highest level of individualized needs determination and variety. Consider Disney World as archetype of such service, operating as a highly capitalized and standardized continuous flow process, yet delivering a fully individualized product through customer decision making, e.g., environment, routings, and activities, and through personalizing experiences, e.g., roving players, guides, and special events, containing high customer contact and interactive depth. As capital expenditures increment environments, etc., a larger base of customer needs can be fulfilled, and greater flow is captured, not through economies of scale via increasingly homogenous goods, but through "economies of scope" (Pine II, 1993) via increasingly heterogeneous service.

Figure 2 formally presents The Content Continuum framework, which draws upon the arrangement figured above. Various positions along The Content Continuum reflect varying goods/services proportional content. The figure also presents a number of product and production environment attributes that also vary according to position along the Continuum. The Content Continuum embraces the strategic implications of previous research, as positioning within The Content Continuum is effectively positioning within the framework of either the Process-Product Matrix or the Service Process Matrix.

### ANTICIPATED QUESTIONS

Certain questions—regarding the Content Continuum's agreement with existing theory, the relative positioning of products, and some intuitive notions regarding service—are proactively anticipated and discussed. To support better understanding of that discussion, Figure 3 presents two illustrations, each depicting a basic industry with various types of products positioned along the Continuum.

Such positioning may not be entirely intuitive. Consider Lexus positioned beyond service, relative to Rolls-Royce. It might be argued there is higher service content in the Rolls-Royce product, versus the Lexus product. However, the value of the goods received is much higher also, and the continuum attributes position to proportional content; the Lexus product, we suggest, at one-sixth the price, offers more than one-sixth the service. Both the volumes and the service and goods production techniques also place Rolls-Royce under the shop / batch environment; Lexus, under line. Other characteristics given for the service shop position such as higher labor intensity, lower price sensitivity, lower commodity behavior, and greater capacity management issues are also clearly associated with Rolls-Royce relative to Lexus. While Lexus contains elements of mass customization, the current Rolls-Royce process and capacity limit the total product heterogeneity it can produce.

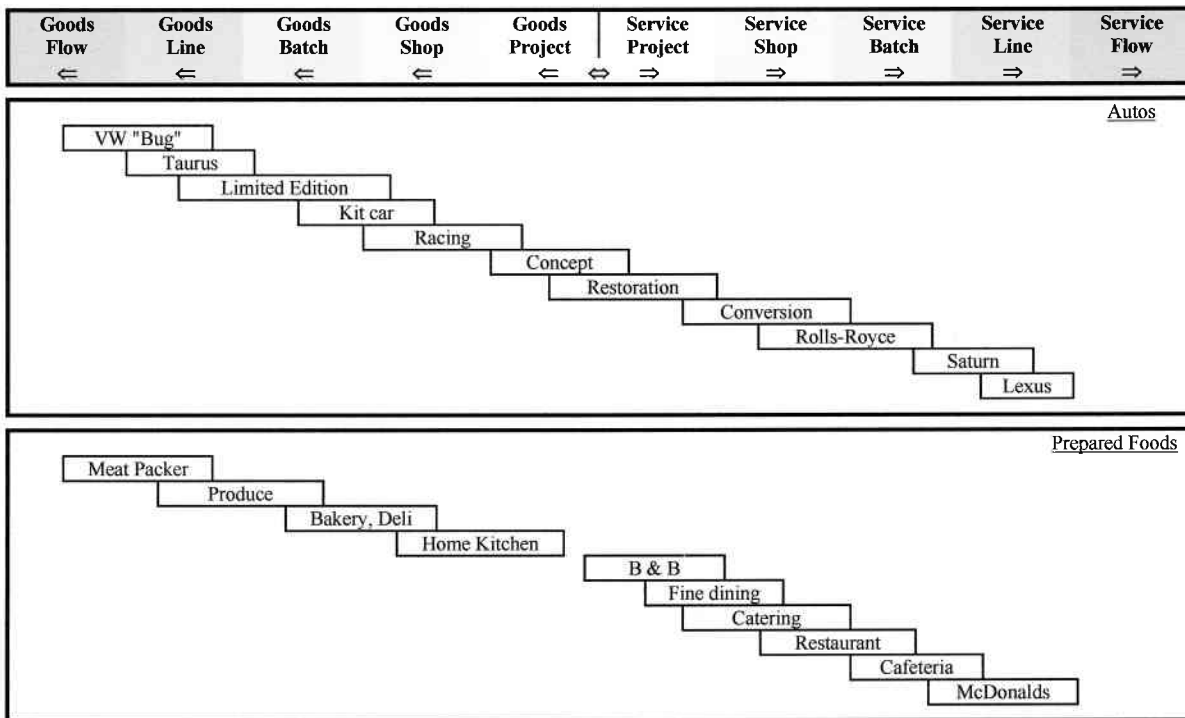
A continuum that embodies two discrete product life cycles is not as inhibiting as might first appear. Consider a small print shop start-up near the center of The Content Continuum for which management seeks mature product growth towards continuous flow volumes. Such increase in product volumes may be enticed either through emphasis on goods, e.g., quantity price points and designated color discount days, or through emphasis on services, e.g., electronic order pick-up and on-site delivery.

FIGURE 2 The Content Continuum

Goods Flow	Goods Line	Goods Batch	Goods Shop	Goods Project	Service Project	Service Shop	Service Batch	Service Line	Service Flow
←	←	←	←	← ↔ ⇒	⇒	⇒	⇒	⇒	⇒
Low				Higher					Highest
				Service as Percentage of Product Bundle					
				Product Customization					
				Customer Affinity					
				Product Heterogeneity					
				Customer Participation in Design & Production					
				Customer as Object of Production					
				Economies of Scope					
High				Lower					Lowest
				Goods as Percentage of Product Bundle					
				Consumer Price Sensitivity					
				Cost of Product Customization or Variety					
				Economies of Scale					
Low				High					Low
				Labor Intensity					
High				Low					High
				Use of Capital Equipment and Technology					
				Production Volume, Lot Sizing					
				Operational Standardization and Efficiency; Process Stability					
				Commodity-like Product Attributes					

The use of manufacturing technology has history facilitated the movement of producers toward goods flow; the mass customization examples noted above exemplify a similar movement of service producers toward service flow; this increasing employment of technology is reflected as incremental shading in the figuring of The Content Continuum. The natural repositioning of service towards flow via technology is anticipated by both Maister and Lovelock (1982), Rathmell (1966) and others (Chase, 1981; Chase & Garvin, 1989; Sprague, 1990), with Sprague explicitly noting this repositioning as beyond the 'band' of the Process-Product Matrix.

FIGURE 3 The Content Continuum with Two Product Examples



The question arises as to how a product can have more "serviceness" than a professional such as a lawyer or consultant primarily providing expert judgment. Intuition suggests the high intangible content of such products implies high service content. However, the concept of intangibility is not as precise as one might first think. Is a motion picture intangible? If received via television, some would argue so; when purchased as a video tape, it can certainly be dropped on one's foot. Such natural ambiguity may account for Bowen's (1990) difficulty in finding empirical significance of intangibility as a characteristic of service. Tangibility is considered here to be an attribute that, without a proper treatment that is beyond the scope of this paper, may misguide, and it is therefore avoided.

The incorporation of pure public services, e.g., police and welfare, in service classification schemes is a historically problematic issue. Hill (1977) notes their consumption differs fundamentally, i.e., it is continuous, relatively unobservable, covert, irrespective of the individual consumer's consent, membership, or awareness. He further notes such services generally defeat consumption-based charging. Lovelock also sets pure public services apart from other service relationships (Lovelock, 1983). Within the presented Content Continuum framework, pure public services can be viewed as near service flow products of uneconomical process, occupying a typically void position off the continuum that is artificially maintained via taxes. For comparison, consider the attributes, processes, and efficiencies involved in for-profit electronic home protection services versus those involved in police street patrols and 911 dial-ups. The perspective is analogous to Schmenner's example of non-profit hospitals in the void corner of the Service Process Matrix repositioned onto the diagonal by operating for profit (Schmenner, 1986).

### HARMONY WITH OTHER CLASSIFICATION SCHEMES

From the authors' perspective, a high degree of concordance exists between The Content Continuum and the existing body of service classification knowledge; Figure 4 equates the Continuum with a number of such schemes. Some liberty is taken with some typologies through techniques such as mirroring (Larsson and Bowen, 1989) or extending by degree, e.g., Lovelock's (1984) service act, in order to encapsulate both goods and services.

Though the equity of these schemes is presented here in the most general fashion, the dominance of Chase's work within the literature and its relationship to The Content Continuum merits further discussion. Chase (1978, 1981) crystallizes the customer-oriented nature of services as customer contact, i.e., the extent of physical presence of the customer in the service system. Chase's Customer Contact Model (CCM) (Chase & Tansik, 1983), a one dimensional continuum of low to high contact services, also reflects the manufacturing paradigm. Low contact services, termed quasi-manufacturing, stand to benefit from economies of scale and from continuous flow manufacturing processes. High contact 'pure' services contain high operational uncertainties, avoid attempts at batching, and operate on shorter-term forecasts. Services with degrees of such characteristics, termed mixed services, are centered on the continuum. CCM, therefore, further serves to strengthen the case for the equivalent service diagonal.

Chase's CCM is a dominant framework within the literature, but certain researchers have raised objections. Counterexamples such as insurance organizations and stock exchanges are offered (Snyder, Cox, & Jesse Jr., 1982) as low physical contact, near-pure services. Several researchers (Larsson & Bowen, 1989; Mersha, 1990; Schmenner, 1986) suggest differentiation between active and passive contact to obtain a better measure of customer involvement; Mersha added a second dimension of active versus passive contact, creating a 2 x 2 matrix which attempts to address the deficiency. More recently, Chase recognized the difficulty inherent in the operationalizations of the customer contact construct and attempted to address it (Kellogg & Chase, 1995). Accordingly, this framework adopts the construct of 'customer affinity,' intended to broadly embrace the notion of the customer's physical contact, non-physical contact, presence, involvement or interaction. Several years after development of the CCM, Chase published his envisionment of a transformation of current flexible factories through higher focus on customer service and closeness; lowering of labor content; anticipation, understanding, and fulfillment of the comprehensive range of customer requirements; and commitment to product variety (Chase & Garvin, 1989). Even more recently, Chase recognized and modeled the strong relationship between customer contact and quality of service (Soteriou & Chase, 1998). The posture of these later works are clearly concordant with The Content Continuum.

### CONCLUSIONS

The Content Continuum framework, derived from the authors' earlier and continuing research effort (Polito, 1996), does offer decision-makers strategic insight beyond existing frameworks; a return to the aforementioned custom-cut bluejeans exemplifies. The Continuum's underlying Hayes & Wheelwright and

Schmenner frameworks suggest seeking to reposition toward either of the two the flow process environments, found at either end of the Continuum. The point-of-sale body scanner implementation, driven by the pursuit for greater service efficiency and customer affinity, is indeed such a repositioning. The Continuum predicts the resulting increase in customer design participation as a byproduct. The Continuum suggests possibilities for further repositioning. The Continuum's suggestion to continue to increase customer affinity might inspire the notion of locating fully automated body scanners as shopping mall, laundromat or supermarket kiosks; the strategy of moving such self-marketing devices into such untraditional venues may seem counterintuitive, however it differs little from the strategy that once moved women's hosiery from department store counters to supermarket aisles ... a placement we now view as quite rational. The Continuum's suggestion to increase economies of scope might inspire a device

FIGURE 4 Various Service Classification Schemes Fitted to The Content Continuum

Goods Flow ⇐	Goods Line ⇐	Goods Batch ⇐	Goods Shop ⇐	Goods Project ⇐ ⇄	Service Project ⇄ ⇒	Service Shop ⇒	Service Batch ⇒	Service Line ⇒	Service Flow ⇒
Input Uncertainty (Larsson & Bowen, 1989)									
Standardized goods	Pooled goods	Customized goods	Reciprocal goods	Reciprocal goods	Reciprocal services	Customized services	Pooled services	Standardized services	
Distribution (Lovelock, 1983, 1984)									
At producer convenience			At mutual convenience				At customer convenience		
Service Act / Object of Service (Lovelock, 1983, 1984)									
Goods and physical possessions			Intangible assets			People's bodies (characteristics)			People's minds (perceptions)
Goods / Services Categories (Bell, 1981, 1986)									
Industrialized goods		Differentiated or customized goods		Goods / services bundles		Differentiated or customized services		Customized services	
Customer Contact vs. Economic Concentration (Stiff & Pollack, 1983)									
Low contact, high concentration goods			High contact, low concentration goods and / or services				Low contact, high concentration services		
Workflow Interface (Mills & Marguiles, 1980)									
Maintenance interactive goods		Task interactive goods		Personal interactive goods and / or services		Task interactive services		Maintenance interactive services	
Customer (Physical) Contact Model (Chase, 1978), Service Factory (Chase & Garvin, 1989)									
			Pure service		Mixed service		Quasimanufacturing	Service Factory	
Equipment vs. People (Thomas, 1978)									
Automated equipment		Equipment plus operators		Skilled labor and / or professionals		Equipment plus operators		Automated equipment	
Diagonal from Marketing Strategy Matrix (Ryans & Wittink, 1977)									
High customer switching, low differentiation goods			Low customer switching, high differentiation goods and / or services				High customer switching, low differentiation services		
Technology (Thompson, 1967)									
Long-linked		Mediating		Intensive		Mediating		Long-linked	

capable of complimentary products, (e.g., blouses, shoes, suits, neckties) or the marketing of product partnerships during the measurement process. The Continuum's suggestion to increase product heterogeneity might inspire the strategy of additional fabric choices. Even this brief examples effectively suggests that The Content Continuum can be robust enough to provide management with insight into the manufacturing, marketing, and strategic implications of its decisions regarding the improvement of its service processes and service product content.

## REFERENCES

- Anonymous. (1994a, November 8). Computer allows Levi's to offer made-to-order jeans. *New York Times*, p. D10.
- Anonymous. (1994b, September 20). In the lab : Garment scanner could be perfect fit. *Wall Street Journal*, p. B1.
- Bell, M. (1981). A matrix approach to the classification of marketing of goods and services. In J. H. Donnelly & W. R. George (Eds.), *Marketing of services* (pp. 208-212). Chicago, Illinois: American Marketing Association.
- Bell, M. (1986). Some strategy implications of a matrix approach to the classification of marketing goods and services. *Journal of the Academy of Marketing Science*, 14(1), 13-20.
- Bowen, J. (1990). Development of a taxonomy of services to gain strategic marketing insights. *Journal of the Academy of Marketing Science*, 18(1), 43-49.
- Buffa, E. S. (1976). *Operations management : The management of productive systems*. Santa Barbara, California: Wiley.
- Chase, R. B. (1978). Where does the customer fit in a service operation? *Harvard Business Review*, 56(6), 137-142.
- Chase, R. B. (1981). The customer contact approach to services : Theoretical bases and practical extensions. *Operations Research*, 29(4), 698-706.
- Chase, R. B. (1985). *A matrix for linking marketing and production variables in service system design*. Paper presented at the 26th Annual Meeting of the American Institute for Decision Sciences, Las Vegas, Nevada.
- Chase, R. B., & Garvin, D. A. (1989). The service factory. *Harvard Business Review*, 67(4), 61-69.
- Chase, R. B., & Tansik, D. A. (1983). The customer contact model for organizational design. *Management Science*, 29(9), 1037-1050.
- Fitzsimmons, J. A., & Sullivan, R. S. (1982). *Service operations management*. New York, New York: McGraw-Hill.
- Foxall, G. R. (Ed.). (1985). *Marketing in the service industries*. London, England: Frank Cass.
- Hayes, R. B., & Wheelwright, S. C. (1979a). The dynamics of process-product life cycles. *Harvard Business Review*, 57(2), 127-136.
- Hayes, R. B., & Wheelwright, S. C. (1979b). Link manufacturing process and product life cycles. *Harvard Business Review*, 57(1), 133-140.
- Hill, T. P. (1977). On goods and services. *Review of Income and Wealth*, 23(4), 315-338.
- Hsieh, C.-H., & Chu, T.-Y. (1992). Classification of service businesses from a utility creation perspective. *Service Industries Journal*, 12(4), 545-557.
- Kellogg, D. L., & Chase, R. B. (1995). Constructing an empirically derived measure for customer contact. *Management Science*, 41(11), 1734-1749.
- Kotler, P., & Armstrong, G. (1980). *Principles of marketing*. Englewood Cliffs, New Jersey: Prentice Hall.
- Larsson, R., & Bowen, D. E. (1989). Organization and customer : Managing design and coordination of services. *Academy of Management Review*, 14(2), 213-233.
- Levitt, T. (1972). Production-line approach to service. *Harvard Business Review*, 50(5), 41-52.
- Levitt, T. (1976). The industrialization of service. *Harvard Business Review*, 54(5), 63-74.
- Lovelock, C. H. (1983). Classifying services to gain strategic marketing insights. *Journal of Marketing*, 47(3), 9-20.
- Lovelock, C. H. (1984). *Services marketing : Text, cases & readings*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Maister, D. H. (1982). Balancing the professional service firm. *Sloan Management Review*, 24(1), 15-29.
- Maister, D. H., & Lovelock, C. H. (1982). Managing facilitator services. *Sloan Management Review*, 23(4), 19-31.
- Mersha, T. (1990). Enhancing the customer contact model. *Journal of Operations Management*, 9(3), 391-405.
- Mills, P., & Margules, N. (1980). Towards a core typology of service organizations. *Academy of Management Review*, 5(2), 255-265.
- Murdick, R. G., Render, B., & Russell, R. S. (1990). *Service operations management*. Needham Heights, Massachusetts: Allyn and Bacon.
- Peters, T. J. (1987). *Thriving on chaos : handbook for a management revolution*. New York, New York: Alfred A. Knopf.
- Pine II, B. J. (1993). *Mass customization : the new frontier in business competition*. Boston, Massachusetts: Harvard Business School Press.
- Polito, T. (1996). *Extending the product process diagonal to service operations*. Paper presented at the 1996 Annual Meeting of the Northeast Decision Sciences Institute, St. Croix, United States Virgin Islands.
- Rathmell, J. M. (1966). What is meant by services. *Journal of Marketing*, 30(4), 32-36.
- Ryans, A. B., & Wittink, D. R. (1977). The marketing of services : Categorization with implications for strategy. In B. A. Greenberg & D. N. Bellenger (Eds.), *Contemporary marketing thought* (pp. 312-314). Chicago, Illinois: American Marketing Association.
- Sasser, W. E., Olsen, R. P., & Wyckoff, D. D. (1978). *Management of service operations : Text, cases, and readings*. Boston, Massachusetts: Allyn and Bacon.
- Schmenner, R. W. (1986). How can service businesses survive and prosper? *Sloan Management Review*, 27(3), 21-32.
- Schmenner, R. W. (1993). *Production/operations management : from the inside out* (5th ed.). New York, New York: Macmillan.
- Schmenner, R. W. (1995). *Service operations management*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Shostack, G. L. (1977). Breaking free from product marketing. *Journal of Marketing*, 41(2), 73-80.
- Snyder, C. A., Cox, J. F., & Jesse Jr., R. R. (1982). A dependent demand approach to service organization planning and control. 7(3), 455-466.
- Soteriou, A. C., & Chase, R. B. (1998). Linking the customer contact model to service quality. *Journal of Operations Management*, 16(4), 495-508.
- Sprague, L. G. (1990). Operations management : Productivity and quality performance. In E. G. C. Collins & M. A. Devanna (Eds.), *The portable MBA* (pp. 267-291). New York, New York: John Wiley & Sons.
- Stiff, R., & Pollack, J. (1983). Consumerism in the service sector : Selected issues and opportunities. In L. L. Berry & G. L. Shostak & G. D. Upah (Eds.), *Emerging perspectives on services marketing* (pp. 54-58). Chicago, Illinois: American Marketing Association.
- Thomas, D. R. E. (1978). Strategy is different in service businesses. *Harvard Business Review*, 56(4), 158-164.
- Thompson, J. D. (1967). *Organizations in action : Social science bases of administrative theory*. New York, New York: McGraw-Hill.