

**A MATRIX FOR LINKING SERVICE
CONTENTS WITH DELIVERY CHANNELS**

Luis M^a Huete

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Abstract

This paper presents a matrix to match the design of the front-office portion of a service unit with service content and customer characteristics. Contact between manufacturing organizations and their clients can also be approached using the matrix. The matrix relies upon Chase's customer contact model and the general form and structure of Hayes and Wheelwright's "product-process" matrix for manufacturing. An important statement of this paper concerns the normative evolutionary life cycle for the front-office portion of a service firm. The proposed matrix was used to guide research designed to gather data on service encounter strategies of American retail banking units.

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Service operations are, in the opinion of various operations management scholars, one of the areas of operations management of greatest current interest. Such interest is due not only to the growing importance of services and the service component of industrial organizations, but also the growing dissatisfaction felt by service consumers as reported in business periodicals (Koepp, 1987; Labich, 1987). This may reflect the fact that service operations management, as a subfield of operations management, is still an emerging field, in which further exploration is needed in order to provide usable knowledge for making theory-based modifications in service systems.

The objective of this paper is to contribute to the expressed need for useful guidelines in this area. A matrix is presented that serves as a framework for analyzing the delivery system design as service contents and delivery channels evolve.

Service Encounters

The delivery system of a service firm encompasses the set of delivery channels (e.g., teller, automatic teller machines, etc.) *through which* service contents are delivered to customers. In this paper, the "service content" is what is delivered to a customer (e.g., cash advances, financial planning, etc.), while a delivery channel is the sociotechnical system *through which* a service content is delivered to a customer. Either one is useless by itself, but together, a service content and a delivery channel create a "service encounter." A service encounter is to a service firm and its customers what a "product" is to a manufacturing firm.¹

Although clients are vital to the completion and distribution of service contents, they are nevertheless problematic because their behavior cannot be predicted with any degree of regularity. Traditional service encounters are characterized by customer participation, and this increases the complexity of interactions between marketing and operations. Both characteristics of the service encounter are rich in theoretical as well as practical implications, as will be shown later.

¹ There is one important difference, however. In the case of a service firm, a single "product" usually involves a multiplicity of delivery channels over a period of time. For example, the "product" financial planning may involve not only face-to-face channels but also phone contacts, mailings, etc.

Earlier evaluation of operations management research (Buffa, 1980; Chase, 1980; Miller and Graham, 1981) pointed out the dominance of technocratic and micro approaches in the type of problems confronted by operations management researchers. Similarly, the situation in service operations management is reported (Miller and Graham, 1981; Sullivan, 1982; Mabert, 1982) as suffering from too narrow a focus. These authors urge service operations researchers to take a broader view in their research efforts, to establish linkages with other fields, and to pay more attention to the front-office portion of the service delivery. In other words, the area where customer interaction takes place and where managers need to integrate many functions such as marketing,² operations and personnel.

The proposed matrix constitutes the conceptual basis for a research project³ which explicitly addresses each of the aforementioned concerns by studying the changes taking place in the customer contact portion of retail banking units and by making extensive use of marketing and personnel variables to understand the behavior of operations variables.

The Industrialization of Service Encounters

In the opinion of Miller and Graham (1981), the study of the generic field of service operations probably dates from the work of a marketing scholar, Theodore Levitt. Levitt argued (1972, 1976) that service operations managers ought to stop thinking of service as servitude and start taking a manufacturing approach to service by substituting "technology and systems for people." The ability to "industrialize" service operations, in the opinion of Levitt, will result in a wealth of productivity, comparable to that which was achieved during the industrial revolution of the early 1800's.

The distinction between back-room and front-office, first made by Chase (1978), is of great interest to service operations managers. The first stage of service industrialization occurred in the back-room. Only recently have managers begun to place a comparable emphasis on improvement of front-office productivity through the increased use of automated equipment and the transfer of part of the service completion activities from front-office employees to consumers and to back-room operations.

The literature in service operations ordinarily views the existence of customer contact in service operations as one far-reaching difference between service and manufacturing operations (Thompson, 1962; Sasser et al., 1978; Fitzsimmons and Sullivan, 1982). One of the few theory-building attempts for designing service systems is the "customer contact approach" (Chase, 1978, 1981). This approach to service operations argues that the potential efficiency of a service system is a function of the extent of customer contact during the delivery of the service content. Chase proposed that those services involving extensive customer contact were inherently less efficient than those in which customer contact was minimal, so that tasks should be screened to determine whether they can be provided by low-contact delivery channels.

² This need to balance the requirements of operations and marketing is found in many service management decisions such as process and job design, location, capacity, scheduling, quality, automation, productivity improvement plans, etc.

³ Retail Banking Delivery Systems Collaborative Research Project between Boston University and Bank Administration Institute.

Consequently, delivery systems characterized by high customer contact are inherently limited in their labor efficiency. The reason is that the customer can generally influence the service encounter, even in the most standardized service contents, and hence, can cause inefficiencies in the operation of the system. Chase's approach is one of the best known attempts at applying operations management ideas to the service sector, especially in mass-consumer settings.

Both Levitt and Chase provide a variety of examples to illustrate their positions and specify several heuristic rules for service system design and operation. The main point of the authors is that firms utilizing low customer contact in the delivery of their services are capable of operating much more efficiently, over a significant period of time, than those firms that employ high customer contact approaches.

Chase, Northcraft, and Wolf (1984) refer to several criteria that justified the use of high levels of contact: 1) when the customer contact and delivery channel are absolutely inseparable; 2) when marketing benefits are afforded by contact with the customer, or 3) when contact with the customer is avoidable in principle but necessary in practice. These researchers argue that tasks not meeting any of these criteria should be considered candidates for low-contact delivery channels.

In a later article, Chase (1985) added a further refinement to the argument that customer contact inhibits efficiency. Chase argues that having the customer in direct contact with the service system should be viewed as a sales opportunity, since the more time the customer is in the system, the greater the potential for add-on sales. The trade-off that arises, then, is between the higher efficiency associated with reduced customer contact and the higher sales opportunity associated with increased customer contact. To fully exploit the trade-off perspective, Chase presents a matrix in which service delivery channels are plotted according to production efficiency and sales opportunity effectiveness.

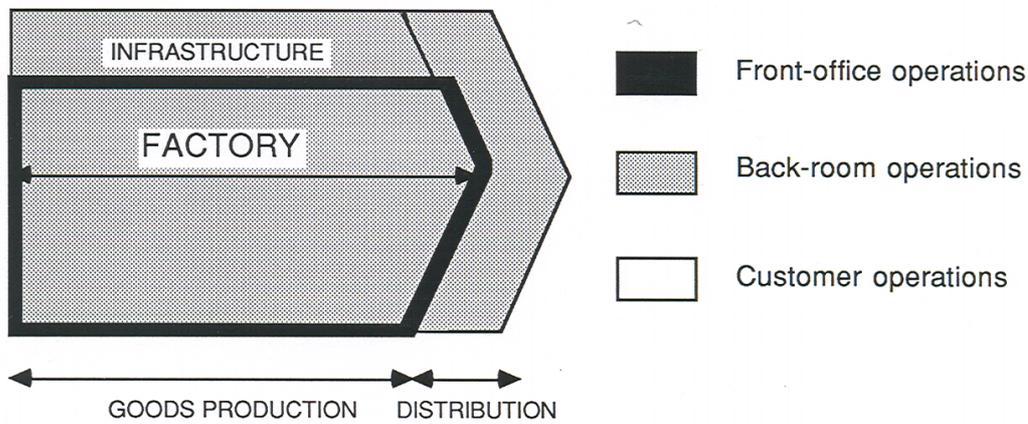
Figure 1 compares the type of activities involved in the product creation and distribution process in a manufacturing and a service environment. As can be seen, manufacturing activities are typically backroom operations. The service creation and distribution process, on the contrary, normally implies back-room employee activities, front-office employee activities and customer activities. The proportion of each of these categories of activities varies from service to service and from firm to firm. The activities of a firm's front-office employees are usually the more difficult to plan and control and have, therefore, a greater potential for inefficiency.

That is why many service providers have implemented productivity policies geared toward reducing the total number of activities necessary for the completion of a service and toward changing the service's mix by reducing the proportion of front-office activities in relation to either back-room operations or customer activities. This paper will understand that phenomena as a characterization of service industrialization.

Figure 1

Product vs service typology of production and distribution activities

Typology of a product creation and distribution process



Typology of a service creation and distribution process

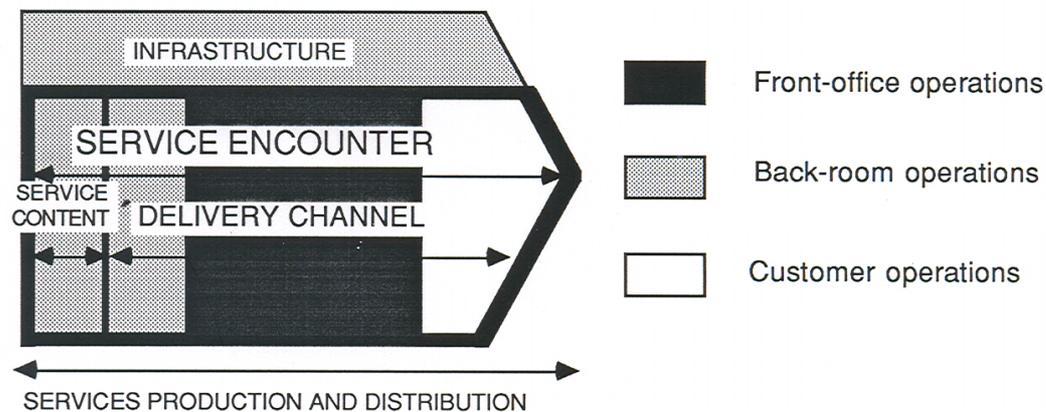


Figure 2 illustrates, with the banking service content loan application as an example, the concept of the service industrialization. This figure shows the changing mix of activities needed for the production and distribution of a typical banking service. Depending on the delivery channel used, the types of activities vary significantly. New service delivery channels bring the opportunity to operate with a mix of activities in which front-office operations are reduced in favor of more efficient operations like back-room and customer operations.

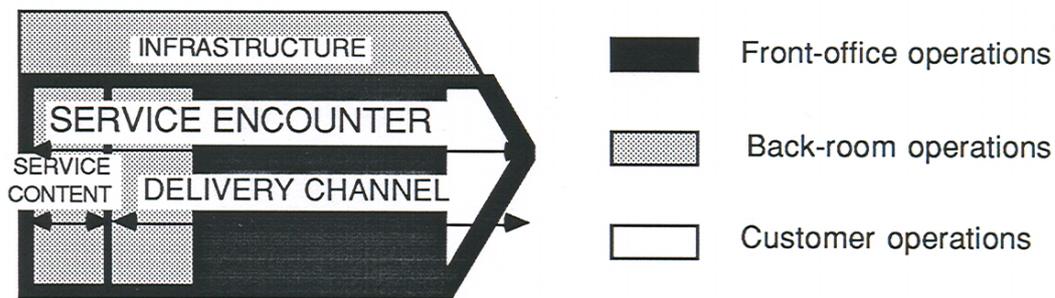
The reorganization of service activities is resulting in many service companies becoming quite equipment-intensive. Norman (1984) distinguishes five ways that equipment can benefit a service delivery system: First, it can substitute for manpower with a view to reducing cost or increasing efficiency. Second, it can make it easier to control and standardize quality of service.

Third, equipment can make possible a level of service (e.g., around-the-clock operation) that would be impractical or too expensive if people were employed to do the same jobs. Fourth, information system technology and equipment can link the service company and the client more closely. Fifth, certain kinds of equipment can foster the desired human behavior both in clients and employees. Norman's claim is that although industrialization has great potential for making services more cost-effective and for increasing their quality, it also creates the need for delicate modifications in the total service system.

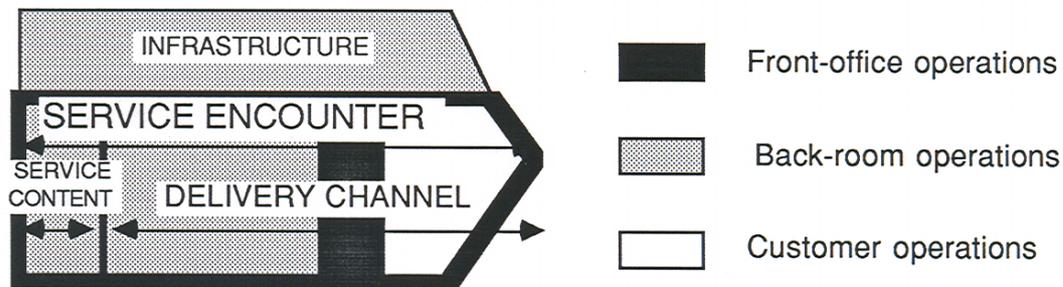
Figure 2

The industrialization of loan applications

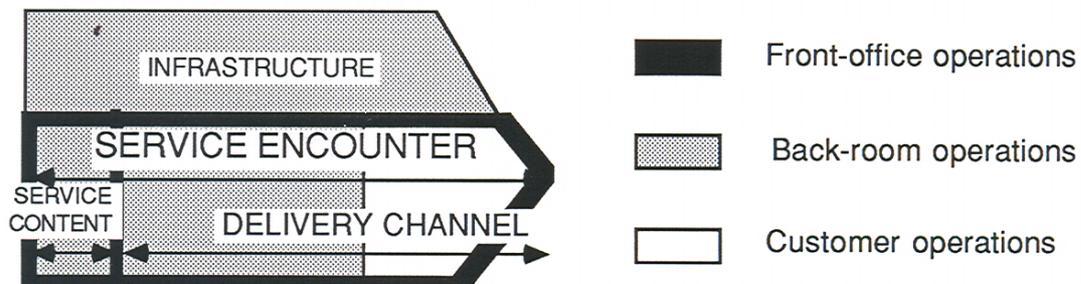
**From the typical service creation and distribution process...
(e.g. loan application through platform officer)**



**...to more efficient service creation and distribution processes:
(e.g. loan application through person voice telephone)**



(e.g. loan application through remote technology-based self service)



The Matrix

Based on Chase's theoretical contributions and the general form and structure of Hayes and Wheelwright's "product-process" matrix (1979a, 1984), a "service content-delivery channel" matrix for service settings was developed. The matrix is designed to illustrate the relationships between delivery channel and service content characteristics (see Figure 3).

A service business unit, a product line, or the elements of a single service can be characterized as occupying a particular region in this matrix, as determined by its service content characteristics and its delivery channels.

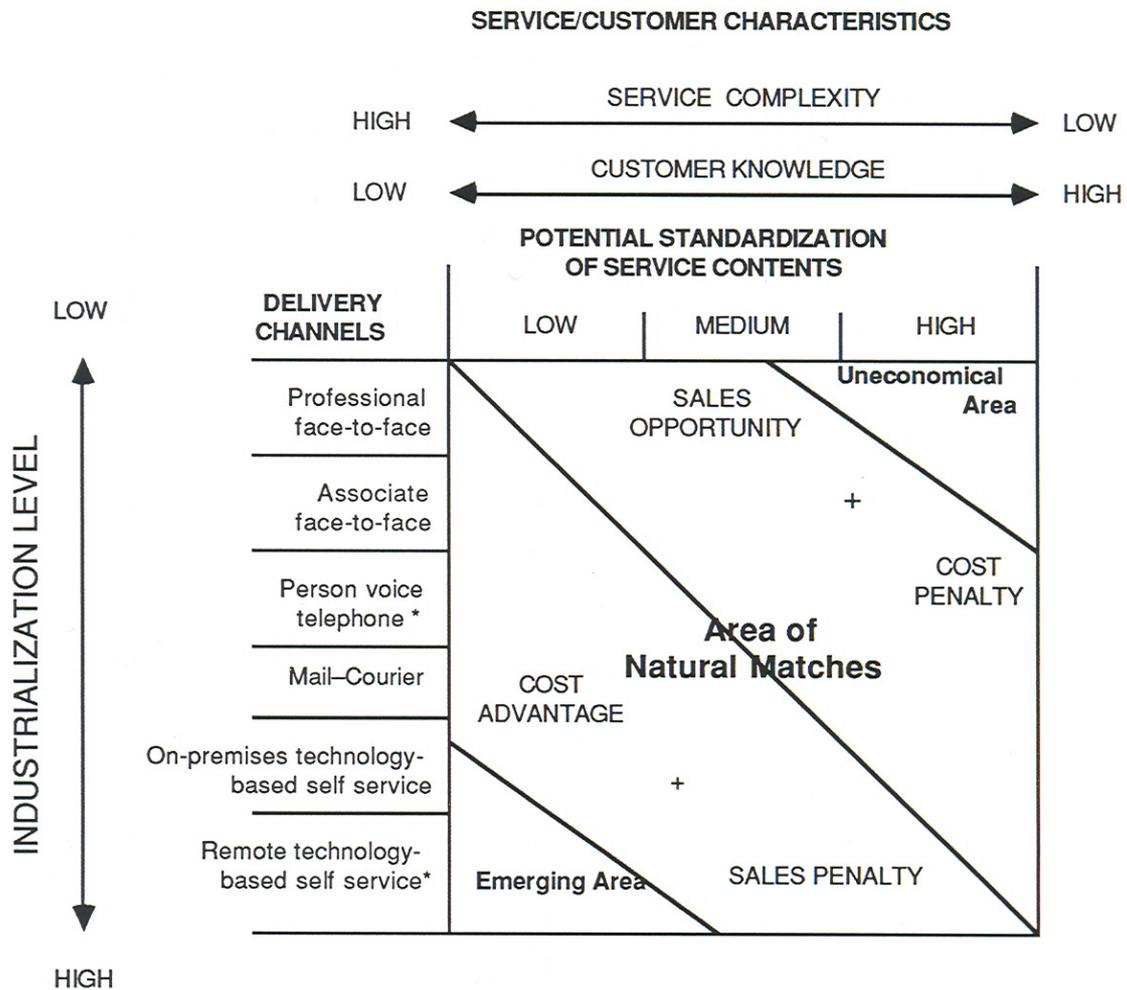
Description of the Matrix

Along the top of the matrix are listed two continuums of service complexity and customer knowledge. The matrix itself is divided into three levels of "potential standardization of service contents:"

- Low standardization potential; the category used to designate circumstances where customer knowledge about the service is low and the service complexity is high.
- Medium standardization potential; the category in which the customer knowledge and service complexity tend to be in a medium range, or are both high (a complex service but a knowledgeable customer) or both low (a simple service but an inexperienced customer).
- High standardization potential; the category where customer knowledge is high and the service complexity is low.

Figure 3

A matrix for linking service contents with delivery channels



* Only handles information and not physical "goods." May not be a viable option for certain services involving the transaction of physical goods.

Along the side of the matrix are service delivery channels placed relative to an industrialization level continuum. Note that the ordering of the channels implies that industrialization increases as the amount of employee contact in the provision of the service diminishes. Therefore, in the delivery channels located at the bottom of the matrix, technology is substituting for employee direct contact with customers, and decoupling of customers from the service production also takes place.

The reduction of employee activities necessary for the delivery of the service is made possible by substituting "technology and systems for people" (Levitt 1972, 1976), that is, by either eliminating front-office activities, or transferring them to the back-room or to the consumer.

The channels located at the bottom of the matrix are the ones where the industrialization of the service delivery system is higher. As a consequence, the notions of customer contact reduction, productivity or efficiency, and industrialization are taken as similar concepts in this paper.

The delivery channels in Figure 3 are "general types," based upon the delivery design variables proposed by Chase (1985), who mentioned six variables ordered according to increasing efficiency and decreasing sales opportunity. This paper also uses six options in the general matrix; however, the channels proposed differ somewhat from Chase's variables in their concept and in their ordering.⁴

These options seem to be a better instrument than Chase's variables for representing the fundamental delivery channel choices suggested by the dynamics of many service systems. One reason for this assumed superiority is that Chase omits any reference to remote technology-based self-service channels such as video and telephone-based online services. Another reason is that "mail" appears to be misplaced in Chase's matrix; "mail" as a delivery channel is viewed in this paper as involving more employee activities directly related to delivery⁵ than "on-premises technology" and therefore as less industrialized. For that reason "mail" is located in the matrix above "on-premises technology," whereas in Chase's matrix it is below.

A short description of each delivery channel included in Figure 3 follows:

Professional face-to-face refers to a delivery channel in which the provider is an employee, highly skilled and highly paid, whose role is to develop the specifications of complex service content through interactions with the customer. The limitations of this option include low labor efficiency, low accessibility, high cost, etc. On the other hand, this channel provides highly personalized service encounters. An example of this type of delivery channel in retail banking is "platform officer."

Associate face-to-face refers to a delivery channel category where the provider is an employee whose role is to provide a service content but who is not allowed much discretion in developing the specifications of the service content. This option allows higher productivity and the use of less skilled employees (Morgan, 1985). It is, at the same time, a channel potentially more rigid and less suited to customizing a service content than the previous channel, since less variation is allowed in the way the service encounter is performed. In retail banking this channel is represented by "teller."

The *person voice telephone* delivery channel is able to exchange only voice information, not physical goods or face-to-face communication; it therefore represents a decrease in flexibility. At the same time, it is potentially more efficient than the previous two channels, since a notable reduction in customer contact is achieved. In many cases this channel provides more customer convenience,⁶ since it allows for contacting the service organization from almost anywhere⁷. The service can be made available 24 hours a day.⁸ When the service content

⁴ Chase uses three variables related to face-to-face encounters, whereas in the proposed matrix only two are included. Also, the proposed matrix distinguishes between "on-premises technology-based self-service" and "remote technology-based self-service," where Chase's only includes "on-site technology." Finally, in this matrix "mail" is located above "on-premises technology" whereas the opposite happens in Chase's matrix.

⁵ In this case back-room activities.

⁶ It is remarkable to see the popularity of, for example, banking by telephone in areas like western New York. Goldome, the nation's largest mutual savings bank, is reported (Cohen, 1987) to have conducted by telephone almost 30 percent of the division's platform-type transactions during 1986.

⁷ This will give one limited access financial service location - a telephone -for every 1.5 people.

includes physical elements, this channel has to be used in conjunction with others. In retail banking this delivery channel is represented by "person voice telephone."

Mail/Courier is a delivery channel in which the completion of the service can be initiated by the customer in the absence of the service personnel and by the service personnel in the absence of the customer. Since the customer has no direct contact with an employee, this option can make the service highly efficient. Moreover, provision of the service can be buffered (decoupled) from consumption of the service. This channel allows most of the service content to be completed in the back-room of a service organization, where technology and systems are readily available to increase efficiency. This channel can handle the physical as well as the informational elements of a service content, and its use is almost unrestricted by space or distance considerations. At the same time, service completion delays can be considerable, and the use of third-party services (Post Office, Federal Express, UPS, etc.) is often unavoidable. Obviously, this option has restrictions: it cannot be used when the service content involves simultaneous provision and consumption (e.g., transportation between two cities, a haircut, etc.). In retail banking this channel is represented by "mail."

On-premises technology-based self-service refers to delivery channels located in service sites where the customer interfaces not with an employee but with a piece of equipment located on the service premises. This equipment can often handle information and a limited (but growing) array of physical objects, such as checks, bills, tickets, etc.⁹ This channel allows for the possibility of almost instantaneous transaction time, and negligible front-office employee activities. The provision of service contents can be made available with no employee intervention, 24 hours a day. This channel is typified by "ATMs"¹⁰ and other "on-premises self-service technology" in retail banking.

Remote technology-based self-service goes beyond the previous category in the space dimension. This delivery channel can make the provision of service content very efficient and convenient for the customer. It can be provided without employee contact, 24 hours a day, at a location as close as the nearest telephone or computer depending on whether the system is a telephone-based online service¹¹ or a video-based online service. In retail banking, examples are "computer voice telephone" and "home banking".¹²

The upper right-hand and lower left-hand corners of the matrix in Figure 3 are empty. Both regions represent a mismatch between delivery channels and the degree of service content

⁸ Citibank, the nation's largest commercial bank, relies heavily on this delivery option to handle inquiries regarding credit cards from its over 10 million credit card accounts. Citicorp's service centers handle 60,000 phone calls a day, with some 2,000 coming in between midnight and 6:00 A.M. More than 95 percent of the problems, such as billing errors and lost or stolen cards, are resolved during the customer's initial phone call. See "Citibank woos the consumer." *Fortune*, June 8, 1987.

⁹ Even jeans! Levi's jeans can be bought from a vending machine in Paris with a credit card. See "Clothes Machines." *Insight*, September 1, 1986.

¹⁰ Though ATMs are expensive to buy and run, the convenience that they offer the customer has made them extremely popular. In 1986 the 68,000 machines installed in the United States were used for 4.4 billion transactions. Approximately 157 million plastic cards to operate ATMs have been issued. *The New York Times*, September 9, 1987.

¹¹ Telephone-based services transmit computer-stored data to users as voice messages delivered by the computer, while receiving and responding to tones from the touch-tone telephone keypad.

¹² Introduced within the past years by about 35 American banks, they have so far met with limited acceptance. For the consumer this channel makes available for the first time banking transactions and information with complete privacy. On the other hand, the service encounters are more impersonal, offer no means to obtain cash or a physical proof of transactions, and require changing banking habits.

standardization: the upper right-hand corner is postulated to be uneconomical and the lower left-hand is technologically unfeasible. In the past, the upper right-hand corner was an area of rather normal service encounter activities, but nowadays, this (the use of an expensive delivery channel for a fairly simple service content to a highly knowledgeable customer) is uneconomical, although it can be justified if the sales opportunity that arises from the encounter is greater than the cost penalty. The lower left-hand corner represents the delivery of a service content that requires high customization using technology-based self service channels. Today, such delivery channels are simply too inflexible to accommodate the provision of a service content in which the customer requests can be varied and unpredictable.

However, advances in expert systems and artificial intelligence may make these service encounters feasible in the future; this would enable service encounters that are simultaneously convenient, massive and customized (Davis, 1987). New features in retail banking, such as financial planning, are good examples of the trend pushing the "natural frontier" downwards. A timely example of such a delivery channel is home banking, in which a highly customized service, such as financial planning, is available on a self-service basis. This is a match that was unfeasible until very recently, but is expected to become common in the future. For this reason the unfeasible area can also be named "emerging area."

Justification of the Matrix

Much of the work on the product-process interaction has been done by Hayes and Wheelwright (1979a, 1979b, 1984), extending the earlier work of Abernathy (1976, 1978), Abernathy and Townsend (1975) and Abernathy and Utterback (1975) regarding process technologies and product innovations.

The terminology which has been developed to describe production processes in manufacturing is not helpful in a service setting, except in the analysis of back-room operations. Even there, Hayes and Wheelwright's matrix is of limited use, since in back-room operations the need to match operations with market characteristics is minimal. Once back-room and front-office operations are decoupled, it is in front-office operations where the match between market and operations characteristics plays a critical role.

Neither the categories used in Hayes and Wheelwright's matrix to describe the production process (job shop, batch, line, and continuous flow) nor the ones used by the same authors to describe the product life cycle (one of a kind, multiple products-low volume, few major products-higher volume, commodity products) are applicable to service delivery system design. Similarly, although Chase's matrix provides a taxonomy of delivery system design variables plotted relative to one production variable (efficiency) and one marketing variable (sales opportunity) it, too, is limited.

The proposed matrix overcomes these limits. Contrary to Hayes and Wheelwright's it incorporates a terminology that is meaningful when describing service contents and service delivery system channel options. The matrix also differs from Chase's in important aspects; as said earlier, the channels proposed differ somewhat from Chase's in their concept and in their ordering. Also, the delivery channels and the industrialization dimension are put on the side of the matrix instead of on the diagonal. In addition, a set of two market characteristics (one for customer knowledge and one for service complexity) resulting in a given "potential standardization of service contents," replace Chase's marketing variable (sales opportunity). Finally, sales opportunity or sales penalty and cost advantage or cost penalty are seen as an

outcome of different matches between delivery channels and service/customer characteristics; that is, as a result of interactions between operations and marketing variables.

The Dynamics of Natural Matches between Delivery Channels and Market Characteristics

Like the manufacturing matrix of Hayes and Wheelwright, the proposed service content/delivery channel matrix suggests that there are diagonal "natural matches" in which a certain mix of service complexity and customer knowledge characteristics is paired with its "natural" delivery channel or channels. In addition, this chapter proposes a new hypothesis regarding the dynamics of this "natural match" and how it will change as a function of technology development.

The match represented by the main diagonal in Figure 3 represents the portion of the service encounter's "natural" area (everything that is not in the two marked corners) in which the marketing and operations trade-off that arises in the different types of service encounters is best solved. The area above the diagonal (but not in the corner) represents feasible service encounters in which production efficiency is sacrificed; hopefully for the sake of a potential sales opportunity. Similarly, the area that is below the diagonal (but not in the corner) represents encounters in which a potential sales opportunity is sacrificed for production efficiency.

Since technology is transforming the efficiency and capabilities of delivery channels, while at the same time altering the service complexity and the knowledge of customers, dynamic "frontiers" are to be expected. That is, the "natural match" will be in a constant state of flux and the emerging and uneconomical corners will be subject to ongoing change.

The natural match of delivery channels and service contents represented as the main diagonal in Figure 3 corresponds to today's paradigm. This "natural match" was different in the past and it will certainly be different in the future. Figure 4 represents the natural match at three different times: t_{-1} , when the only option of customer interface was face-to-face, t_0 , depicting the suggested current situation, and t_{+1} , a hypothetical future situation in which it will be possible to provide even the most customized service content through a self-service technology-based delivery channel.

It should be noted that Figure 4 suggests that the line depicting the natural match of delivery channels and service contents follows a predictable evolution. Starting almost as a horizontal line, the line will move downwards towards an almost vertical band, representing a situation in which the "optimization" of trade-off will not involve any sacrifice in efficiency. In this situation, there would be almost complete feasibility in delivering different varieties of service content throughout the complete range of delivery channels. At the same time, as the emerging area (lower left-hand corner of the matrix) is reduced, the uneconomical area (upper right-hand corner of the matrix) should expand. This point addresses, for the customer-contact portion of an organization, the research question posed by Chase (1985): what is a normative evolutionary life cycle for a service firm?

It also addresses one of the limitations of the product-process matrix in manufacturing as given by Hayes and Wheelwright (1984). Recent development of flexible manufacturing systems and production practices have significantly increased production flexibility without sacrificing low cost. Hayes and Wheelwright see this phenomenon either as requiring the addition of a third

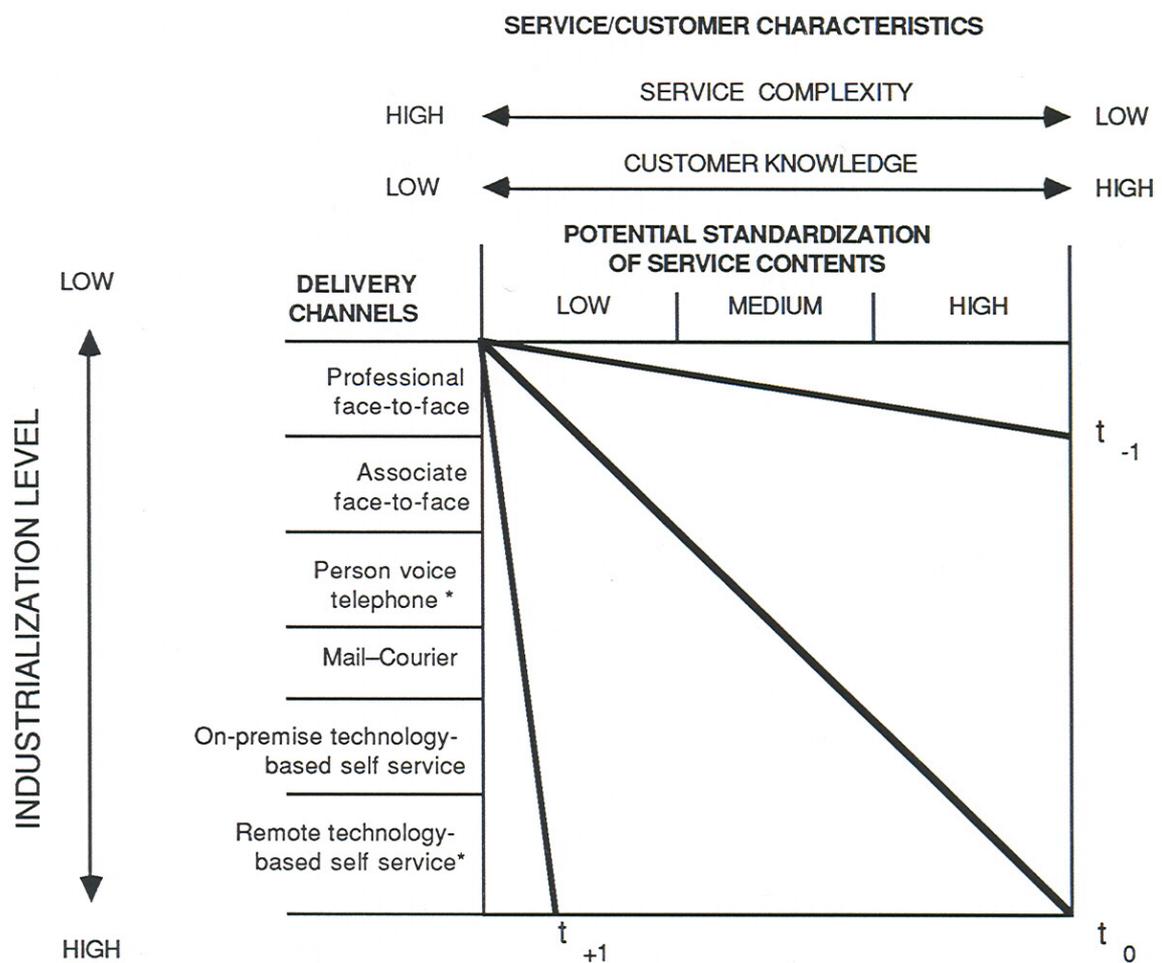
dimension or as occurring outside their matrix. In the proposed matrix for services, similar phenomena, such as the introduction of expert systems or artificial intelligence, are seen as existing inside the matrix, pushing down the "natural" match of delivery channels and market characteristics while reducing the emerging area.

Applications of the Matrix

The matrix has both operational and strategic uses. Its operational uses are linked to the identification of requirements over the set of an operation's strategic variables (vertical integration, facilities, technology, capacity, workforce, quality, planning and control, and organization) usually mentioned in manufacturing literature (Buffa, 1984; Hayes and Wheelwright, 1984; Skinner, 1969, 1985). That is, it is anticipated that different locations of service units in different areas of the matrix will entail a diverse emphasis and a variety of policies within the spectrum of strategic variables.

Figure 4

The dynamics of "natural" matches



* Only handles information and not physical "goods." May not be a viable option for certain services involving the transaction of physical goods.

Some of the strategic uses of the matrix stem from its ability to help service managers in the following ways:

- a) To match the design of service delivery systems (delivery channels) with market characteristics or requirements (service complexity and customer knowledge).
- b) To view the likely implications (cost penalty above the diagonal, sales penalty below the diagonal) of intentional or unintentional mismatches between delivery channels and service contents.
- c) To assess the degree of dispersion of a business unit's service encounters, (e.g., the portfolio of a service unit's "service encounters" can be plotted along the two dimensions of the matrix).
- d) To identify the organization's distinctive area of competence (normally represented by the area of the matrix it occupies) as a filter for new service content introduction and/or diversification plans.
- e) To compare the business unit's location in the matrix with those of its competitors.
- f) To make more informed predictions about the changes likely to occur (e.g., service encounters becoming obsolete, service encounters becoming feasible) or the competitive opportunities likely to emerge in a particular industry (e.g., service content modifications, changes in service encounter focus, etc.).

Chase (1986) provides a useful list containing guidelines for looking for sales opportunities and methods for promoting production efficiency. This list can be used as an aid when making decisions which could lead to a change in delivery channels for a given service content.

The matrix also provides a crude tool for checking for consistency between operational decisions and competitive priorities. The literature contains several descriptive models (Sasser et al., 1978; Heskett, 1986) which postulate causal relationships between the service concept and the service delivery system. Establishing those relationships between the competitive priorities and the basic operational decisions allows service firms to consistently assess the trade-offs involved in formulating functional policies. In this way, operational decisions that are inconsistent with, or run counter to, the firms' choice of competitive mode can be avoided. Establishing the link between competitive priorities and operational decisions also allows firms to concentrate on those operational capabilities which will have the greatest effect on their competitive position.

Limitations of the Matrix

The basic purpose of the matrix is to provide a conceptual framework for understanding the match between service delivery system design and market characteristics in a wide range of service settings. Although the matrix appears to have a large number of applications and to be rather flexible, it does not serve equally well in all circumstances. There are several contextual settings in which some of the matrix's assumptions do not hold; knowing these limits is useful, since it allows one to make better use of the tool and encourages further research aimed at overcoming the shortcomings.

One such limitation is the nature of the service content provided. Although the matrix may suggest that the full range of delivery channels is open to provide all kinds of services, not all services can be provided through every channel. Services requiring the handling of physical goods (Sasser et al., 1978) are incompatible with delivery channels that only handle information such as telephone and remote technology-based self-service. Similarly, service contents involving simultaneous production and consumption cannot be provided by the channel "mail/courier." Nevertheless, even in firms where the core service content includes a facilitating good or requires simultaneous production and consumption, information channels can be used to provide peripheral services or information about the service. For example, some restaurants now list their menu on a videotext service, or accept reservations by telephone.

Another limitation issue is addressed by the question: what managerial implications results from having several delivery channels coexisting within the same service system? If one were to apply to service system the "focused factory" concept developed by Skinner (1974) for industrial systems, one would conclude that a variety of delivery channels within a single service system would unnecessarily complicate the management of the system. But Skinner's concept, however valid it may be for other kinds of systems, has less relevance for service systems. There are two reasons for this: firstly, services are more inclined than manufacturers to be unfocused, since one "product" of a service firm normally entails a variety of delivery channels. Secondly, delivery channels seem to complement one another better than manufacturing processes. The reason may be that different delivery channels place less radical demands on the total management system, and the delivery channels are often in existence to provide other service contents. These two factors provide a strong incentive to service firms to make available a wider variety of delivery channels than might be expected from the "focused factory" view point.

Diversity of customer needs and knowledge is another factor that limits the application of the "focused delivery system" concept. It is standard practice among service companies to direct customers with the same service content demands but with different levels of knowledge into different delivery channels.¹³ One promising direction for future research would be to determine which delivery channel combinations have been used by successful service companies.

The matrix also assumes that the more industrialized a delivery channel the higher the production efficiency, and therefore the greater the cost advantage. This assumption may only hold when the technologies of the channels being compared are in similar stages of their respective life cycles. Although assigning costs is a rather subjective exercise, new technology does not usually achieve its cost advantage potential until some while after its introduction.

It is also assumed that the less industrialized a delivery option the higher the sales opportunity potential. This assumption is based on the idea that all customers always place an equal value on the degree of customer contact. Of course this is not strictly true: different customers place different values on customer contact, and the same customer will desire it more in some contexts than in others. There are circumstances in which meeting with an employee for the provision of a service can be highly undesirable to the customer.

¹³ The branch offices of several banks are being re-designed to facilitate customers with different needs (especially with regard to knowledge transfer) being automatically channeled without any costly 'sorting mechanism' and without disturbing the smooth running of other channels which the customer doesn't happen to need just then.

Conclusions

This paper developed a framework depicting relationships between service contents and delivery channels that can be used for analyzing customer-contact in service systems as they evolve.¹⁴ The matrix draws on an emerging body of literature in service operations management, and provides an understanding of the changes taking place in the service delivery systems. It also addresses the research problem, posed by Chase (1985), of finding a normative evolutionary life cycle for a service firm.

The matrix framework appears to be a suitable tool for depicting the changing match of delivery channels and service/customer characteristics. The "natural match" of delivery channels and service complexity/customer knowledge is represented on the matrix as a match which undergoes constant, progressive change as technology develops.

¹⁴ Contact between manufacturing organizations and their clients can also be approached using the matrix.

References

- Abernathy, W.J., (1976), "Production Process Structure and Technological Change," *Decision Sciences*, Vol. 7, No 4, pp. 607-619.
- Abernathy, W.J., (1978), "The Productivity Dilemma," Johns Hopkins Press.
- Abernathy, W.J. and P. Townsend, (1975), "Technology, Productivity and Process Changes," *Technological Forecasting and Social Change*, Vol. 7, No 4, pp. 379-385.
- Abernathy, W.J. and J. Utterbarck, (1975), "Dynamic Model of Process and Product Innovation," *Omega*, Vol. 3, No 6, pp. 639-648.
- Buffa, E.S., (1980), "Research in Operations Management," *Journal of Operations Management*, Vol. 1, No 1, pp. 1-7.
- Buffa, E.S., (1984), "Meeting the Competitive Challenge Homewood," *Dow Jones-Irwin*.
- Chase, R.B., (1978), "Where Does the Customer Fit in as Service Operation?," *Harvard Business Review*, Nov-Dec., pp. 137-142.
- Chase, R.B., (1980), "A Classification and Evaluation of Research in Operations Management," *Journal of Operations Management*, Vol. 1, No 1, pp. 7-14.
- Chase, R.B., (1981), "The Customer Contact Approach to Services: Theoretical Bases and Practical Expansions," *Operations Research*, Vol., 29, pp. 698-706.
- Chase, R.B., (1985), "A Matrix for Linking Marketing and Production Variables in Service System Design," Decision Science Institute Conference Proceedings Las Vegas.
- Chase, R.B., (1986), "Managing the Sales/Efficiency Trade-Off in Services," Graduate School of Business Administration, University of Southern California Working Paper, March.
- Chase, R.B., G.B. Northcraft, and G. Wolf, (1984), "Designing High-Contact Service Systems: Application to Branches of a Savings and Loan," *Decision Sciences*, Vol. 15, pp. 542-555.
- Cohen, B.R., (1987), "Taking the Customer out of the Branch," *The Bankers Magazine*, May-June, pp. 57-59.
- Fitzsimmons, J.A., (1985), "Consumer Participation and Productivity in Service Operations," *Interfaces*, Vol. 15, pp. 60-67.
- Fitzsimmons, J.A. and R.S. Sullivan, (1982), "Service Operations Management," New York: McGraw-Hill.
- Hayes, R.H., and S.C. Wheelwright, (1979), "Link Manufacturing Process and Product Life Cycles," *Harvard Business Review*, Jan-Feb., pp. 133-140.
- Hayes, R.H., and S.C. Wheelwright, (1979), "The Dynamics of Product-Process Life Cycles," *Harvard Business Review*, Mar-Apr., pp. 127-136.
- Hayes, R.H., and S.C. Wheelwright, (1984), "Restoring our Competitive Edge," New York: John Wiley & Sons.

- Hesketi, J.L., (1986), "Managing in the Service Economy Boston," Harvard Business School Press.
- Koepp, S. (1987), "Pul-eeze! Will Somebody Help Me?," *Time*, 2 February, pp. 48-55.
- Labich, K. (1987), "What the Sober Spenders Will Buy," *Fortune*, 2 February, pp. 35-38.
- Leviti, T. (1972), "The Production Line Approach to Service," *Harvard Business Review*, Sept-Oct., pp. 41-52.
- Leviti, T. (1976), "The Industrialization of Services," *Harvard Business Review*, Sept-Oct., pp. 63-74
- Mabert, V.A., (1982), "Service Operations Management: Research and Application," *Journal of Operations Management*, Vol. 2, pp. 203-209.
- Miller, J.G., and M.B.W. Graham, (1981), "Production/Operations Management: Agenda for the '80's," *Decision Sciences*, Vol. 12, pp. 547-571.
- Morgan, I., (1985), "Managing the Diagnostic Shift," Annual Conference of the Strategic Management Society, Barcelona, Spain.
- Norman R., (1985), "Service Management: Strategy and Leadership in Service Business Chichester," U.K.: John Wiley & Sons.
- Northcraft, G.B and R.B. Chase, (1985), "Managing Service Demand at the Point of Delivery," *Academy of Management Review*, Vol. 10, pp. 66-75.
- Sasser W.E., (1976), "Match Supply and Demand in Service Industries," *Harvard Business Review*, Nov-Dec., pp. 133-140.
- Sasser, W.E, R.P. Olsen, and D.D. Wyckoff, (1978), "Management of Service Operations: Text, Cases and Readings Boston," Allyn and Bacon.
- Sullivan, R.S., (1982), "The Service Sector: Challenges and Implications for Research in Operations Management," *Journal of Operations Management*, Vol. 2, pp. 211-214.
- Skinner, W., (1969), "Manufacturing: The Missing Link in Corporate Strategy," *Harvard Business Review*, May-June, pp. 113-121.
- Skinner, W., (1974), "The Focused Factory," *Harvard Business Review*, May-June, pp. 113-121.
- Skinner, W., (1985), "Manufacturing: The Formidable Competitive Weapon," Chapter 9 New York: John Wiley and Sons.
- Thompson, J.D., (1962), "Organizations and Output Transactions," *American Journal of Sociology*, Vol. 68, pp. 309-324.