Winning in Service Markets, Vol 7: Balancing Capacity and Demand in Service Operations

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Balancing Capacity and Demand in Service Operations

Jochen Wirtz

Winning in Service Markets is a highly practical book. I love the comprehensive coverage of services marketing and the rigor. Also, it is easy to read and full of interesting, best practice examples. I recommend this book to everyone working in a service organization.

Jan Swartz
President, Princess Cruises

Winning in Service Markets provides a set of useful frameworks and prescriptions rooted in both practice and research. As such, it represents a refreshing alternative to the prevailing literature available to managers who are looking for insights rooted in sound theory. A must read for any practicing manager in the service economy.

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Many services with limited capacity face wide swings in demand that can be caused by the change in seasons. The effective use of expensive productive capacity is one of the secrets of success in such businesses. By working with managers in operations and human resources, service marketers need to develop strategies to bring demand and capacity into balance, in ways that create benefits for customers as well as to improve profitability for the business. *Balancing Capacity and Demand in Service Operations* is the seventh book in the Winning in Service Markets series by services marketing expert Jochen Wirtz to cover the key aspects of services marketing and management based on sound academic evidence and knowledge.

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Winning in Service Markets Series: Vol. 7

Balancing Capacity and Demand in Service Operations

Jochen Wirtz

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Dedication

To my past and future EMBA and Executive Program participants.

I have been teaching EMBA and Executive Programs for over 20 years. This Winning in Service Markets Series is dedicated to you, the participants from these programs. You brought so much knowledge and experience to the classroom, and this series synthesizes this learning for future EMBA candidates and managers who want to know how to bring their service organizations to the next level.

Preface

The main objective of this series is to cover the key aspects of services marketing and management, and that is based on sound academic research. Therefore, I used the globally leading text book I co-authored with Professor Christopher Lovelock (Title: *Services Marketing: People, Technology, Strategy*, 8th edition) as a base for this series, and adapted and rewrote it for managers. This is a unique approach.

This series aims to aims to bridge the all-too-frequent gap between cutting edge academic research and theory, and management practice. That is, it provides a strongly managerial perspective, yet is rooted in solid academic research, complemented by memorable frameworks.

In particular, creating and marketing value in today's increasingly service and knowledge-intensive economy requires an understanding of the powerful design and packaging of intangible benefits and products, high-quality service operations and customer information management processes, a pool of motivated and competent front-line employees, building and maintaining a loyal and profitable customer base, and the development and implementation of a coherent service strategy to transform these assets into improved business performance. This series aims to provide the knowledge required to deliver these.

Winning in Service Markets comprises of the following volume:

Vol 1: Understanding Service Consumers
Vol 2: Positioning Services in Competitive Markets
Vol 3: Developing Service Products and Brands
Vol 4: Pricing Services and Revenue Management
Vol 5: Service Marketing Communications
Vol 6: Designing Customer Service Processes
Vol 7: Balancing Capacity and Demand in Service Operations
Vol 8: Crafting the Service Environment
Vol 9: Managing People for Service Advantage
Vol 10: Managing Customer Relationships and Building Loyalty
Vol 11: Designing Complaint Handling and Service Recovery Strategies
Vol 12: Service Quality and Productivity Management
Vol 13: Building A World-Class Service Organization

Contents

Introduction

Many services with limited capacity face wide swings in demand that can be caused by the change in seasons. The effective use of expensive productive capacity is one of the secrets of success in such businesses. By working with managers in operations and human resources, service marketers need to develop strategies to bring demand and capacity into balance, in ways that create benefits for customers as well as to improve profitability for the business. *Balancing Capacity and Demand of Service Operations* is the seventh book in the Winning in Service Markets series by services marketing expert Jochen Wirtz to cover the key aspects of services marketing and management based on sound academic evidence and knowledge.

VOLUME 7

Balancing Capacity and Demand of Service Operations

Balancing the supply and demand sides of a service industry is not easy, and whether a manager does it well or not makes all the difference.

W. Earl Sasser
Professor at Harvard Business School

They also serve who only stand and wait.

John Milton
English poet, 1608–1674

FLUCTUATIONS IN DEMAND THREATEN PROFITABILITY

Many services with limited capacity face wide swings in demand that can be caused by the change in seasons. This is a problem as service capacity usually cannot be kept aside for sale at a later date. The effective use of expensive productive capacity is one of the secrets of success in such businesses. The goal should be to utilize staff, labor, equipment

and facilities as productively as possible. By working with managers in operations and human resources, service marketers may be able to develop strategies to bring demand and capacity into balance, in ways that create benefits for customers as well as to improve profitability for the business.

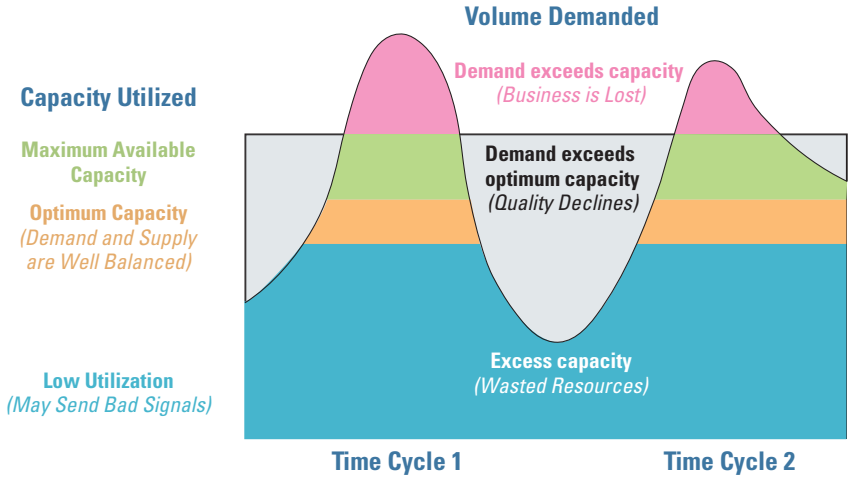
From Excess Demand to Excess Capacity

For fixed capacity firms, the problem is a familiar one. "It's either feast or famine for us!" sighs the manager. "In peak periods, we're disappointing prospective customers by turning them away. And in low periods when our facilities are idle, our employees are standing around looking bored, and we're losing money." In other words, demand and supply are not in balance.

At any given moment, a fixed-capacity service may face one of the four following conditions (Figure 1):

- *Excess demand.* The level of demand exceeds the maximum available capacity, resulting in some customers being denied service and loss of business.
- *Demand exceeds optimum capacity.* No one is turned away, but conditions are crowded and customers are likely to perceive a deterioration in service quality and may feel dissatisfied.

Figure 1: Implications of variations in demand relative to capacity.



- *Demand and supply are well balanced* at the level of optimum capacity. Staff and facilities are busy without being overworked, and customers receive good service without delays.
- *Excess capacity.* Demand is below optimum capacity and productive resources are under-utilized, resulting in low productivity. Low usage also poses a risk that customers may find the experience disappointing or have doubts about the viability of the service.

Sometimes optimum and maximum capacities are one and the same. At a live theater performance or sports event, a full-house looks grand and is exciting for the performers or players and audience. It creates a more satisfying experience for all. With most other services however, a customer might feel that they will get better service if the facility is not operating at full capacity. For instance, the quality of restaurant service often deteriorates when every table is occupied, because the staff is rushed and there is a greater likelihood of errors or delays. When traveling alone in an aircraft with high density seating, a passenger tends to feel more comfortable if the seat next to them is empty. When repair and maintenance shops are fully scheduled, delays may result if there is no slack in the system to allow for unexpected problems in completing particular jobs.

Building Blocks of Managing Capacity and Demand

There are two basic approaches to the problem of fluctuating demand. One is to adjust the level of capacity to meet variations in demand. This approach requires an understanding of what constitutes productive capacity and how it may be increased or decreased on an incremental basis. The second approach is to manage the level of demand. This requires a good understanding of demand patterns and drivers on a segment-by-segment basis, so that firms can use marketing strategies to smoothen out variations in demand. Most service firms use a mix of both approaches.[1]

Figure 2 shows the four building blocks that provide an integrative approach to balancing capacity and demand. The remainder of this volume is organized along these four building blocks.

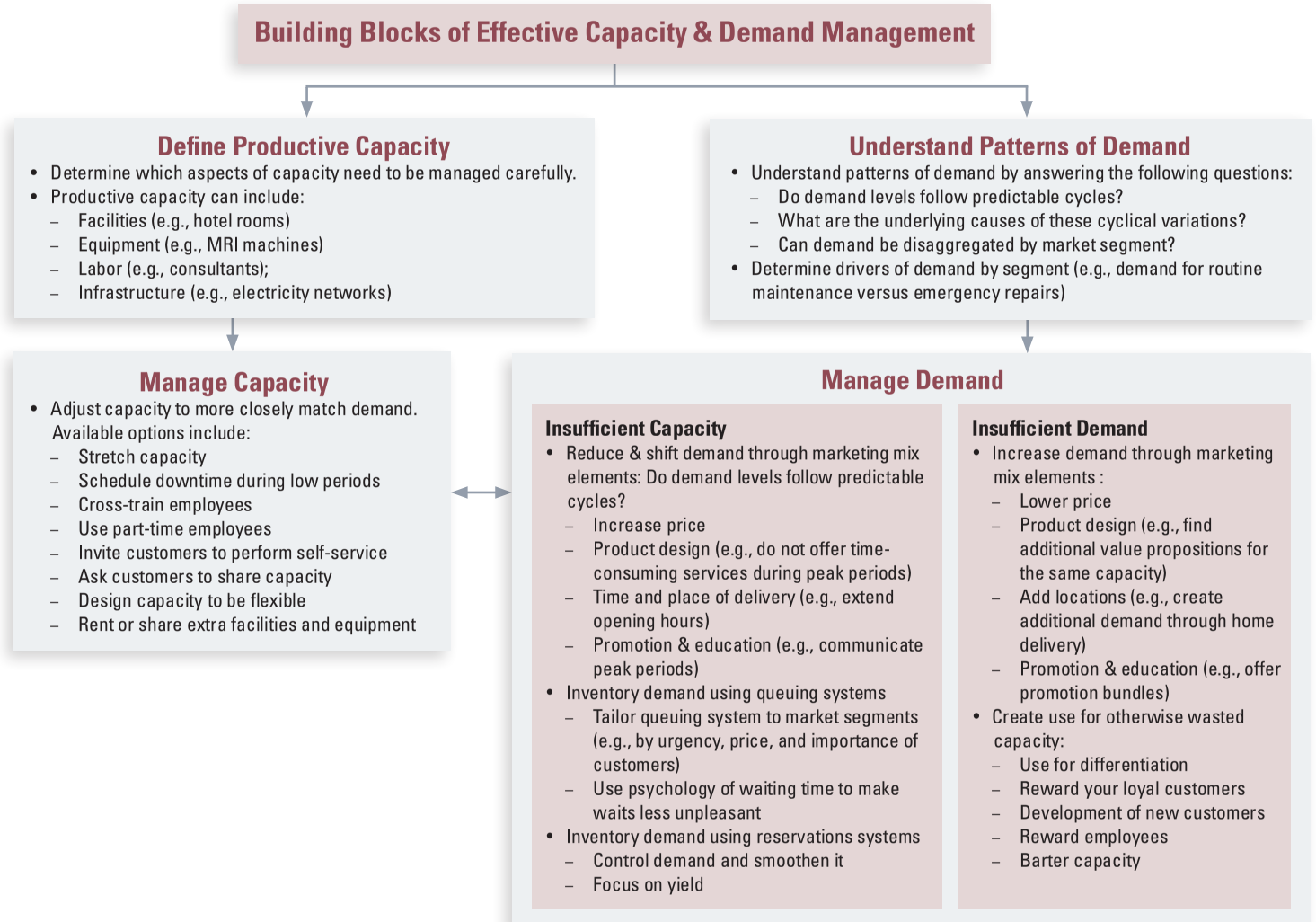


Figure 2: Building blocks of effective capacity and demand management.

DEFINING PRODUCTIVE SERVICE CAPACITY

When referring to managing capacity, we implicitly mean productive capacity. This term refers to the resources or assets that a firm can use to create goods and services that are typically key cost components and therefore need to be managed carefully. In a service context, productive capacity can take several forms, including facilities, equipment, labor, and infrastructure.

1. *Facilities* critical to capacity management can relate to those designed to "hold" customers and those that hold goods. The former is used for people-processing services or mental-stimulus processing services. Examples include medical clinics, hotels, passenger aircrafts, and college classrooms. The primary capacity constraint is likely to be in terms of furnishings such as beds, rooms or seats. In some cases, local laws may limit the number of people allowed inside a facility for health or safety reasons. The latter relates to facilities designed for storing or processing goods that either belong to customers or are being offered to them for sale. Examples include pipelines, warehouses, parking lots, and railroad freight wagons.
2. *Equipment* used to process people, possessions, or information may encompass a large range of items and can be very situation-specific — diagnostic equipment, airport security detectors, toll gates, bank ATMs, and 'seats' in a call center are among many items whose absence in sufficient numbers for a given level of demand can bring service to a crawl, or even a complete stop.
3. *Labor* is a key element of productive capacity in all high-contact services and many low-contact ones. If staffing levels are not sufficient, customers might be kept waiting or service will become rushed. Professional services are especially dependent on highly skilled staff to create high value-added, information-based output. Abraham Lincoln captured it well when he remarked that "A lawyer's time and expertise are his stocks in trade".
4. *Infrastructure* capacity can also be critical**.** Many organizations are dependent on access to sufficient capacity in the public or private infrastructure to be able to deliver quality service to

their customers. Capacity problems of this nature may include congested airways that lead to air traffic restrictions on flights, traffic jams on major highways, and power failures (or "brown outs" caused by reduced voltage).

Financial success in capacity-constrained businesses is, in large measure, a function of the management's ability to use productive capacity — labor, equipment, facilities, and infrastructure — as efficiently and as profitably as possible. In practice, however, it is difficult to achieve this all the time. Not only do demand levels vary, often randomly, but the time and effort required to process each person or thing may vary widely at any point in the process. In general, processing times for people are more varied than for objects or things, reflecting the varying levels of preparedness ("I lost my credit card"), argumentative versus cooperative personalities ("If you will not give me a table with a view, I will have to ask for your supervisor"), and so forth. Furthermore, service tasks are not necessarily homogeneous. In both professional services and repair jobs, diagnosis and treatment times vary according to the nature of the customers' problems.

MANAGING CAPACITY

Although service firms may encounter capacity limitations due to varying demand, there are a number of ways in which capacity can be adjusted to reduce the problem. Capacity can be stretched or shrunk, and the overall capacity can be adjusted to match demand.

Stretching Capacity Levels

Some capacity is elastic in its ability to absorb extra demand. Here, the actual level of capacity remains unchanged, and more people are being served with the same level of capacity. For example, normal capacity for a subway car may offer 40 seats and allow standing room for another 60 passengers with enough handrail and floor space for all. At rush hour however, up to 200 people could squeeze into a subway car, although under sardine-like conditions (Figure 3). Similarly, the capacity of service personnel can be stretched, and staff may be able to work at high levels of efficiency for short periods of time. However, staff would quickly tire and

Figure 3: Rush hour crowd stretches the capacity of train services.

begin to provide poor service if they had to work that fast for a prolonged period of time.

Another way to stretch capacity is to utilize the facilities for longer periods. For example, some banks extend their opening hours during weekdays and even open on weekends. Universities may offer evening classes, and weekend and summer programs.

Lastly, the average amount of time customers (or their possessions) spend in process may be reduced. Sometimes, this is achieved by minimizing slack time. For example, a restaurant can buzz tables, seat arriving diners, present menus fast, and the bill can be presented promptly to a group of diners relaxing at the table after a meal.[2] In other instances, it may be achieved by cutting back the level of service — by offering a simpler menu at busy times of the day.

Adjusting Capacity to Match Demand

Unlike stretching capacity, adjusting capacity involves tailoring the overall level of capacity to match variations in demand — a strategy also known as *chasing demand*. There are several actions that managers can take to adjust capacity as needed.[3] These actions range from the easiest to implement to the more difficult:

- *Schedule downtime during periods of low demand.* To ensure 100% capacity during peak periods, maintenance, repair, and renovations should be conducted when demand is expected to be low. Employees should make use of these periods by taking leaves, etc.
- *Cross-train employees.* Even when the service delivery system operates at full capacity, some physical elements — and their attendant employees — may be under-utilized. If employees can be cross-trained to perform a variety of tasks, they can be shifted to bottleneck points whenever needed, thereby increasing total capacity. In supermarkets, for instance, the manager may call on stockers to operate cash registers when crowded. Likewise, during slow periods, the cashiers may be asked to help stock shelves.
- *Use part-time employees.* Many organizations hire extra workers during their peak periods, e.g., postal workers and retail store associates hired during festival seasons, extra staff hired in tax preparation service firms at the end of the financial year, and additional hotel employees hired during holiday periods and for major conventions.
- *Invite customers to perform self-service.* If the number of employees is limited, capacity can be increased by involving customers in the co-production of certain tasks. One way to do this is by adding self-service technologies such as electronic kiosks at the airport for airline ticketing and check-in, or automated check-out stations at supermarkets.
- *Ask customers to share.* Capacity can be stretched by asking customers to share a unit of capacity normally meant for one individual. For instance, at busy airports and train stations, where the supply of taxis is sometimes insufficient to meet demand, travelers going in the same direction may be given the option of sharing a ride at a reduced rate.
- *Create flexible capacity.*[4] Sometimes, the problem is not the overall capacity but in the mix available to serve the needs of different market segments. One solution lies in designing physical facilities to be flexible. For example, tables in a restaurant can be all two-seaters. When necessary, two tables can be combined to seat four, or three tables combined to seat six. An airline may have too few seats in the

economy class even though there are empty seats in the business class cabin on any given flight. Facing tough competition from Airbus, Boeing received what it described in jest as "outrageous demands" from potential customers when it was designing its 777 airliner. The airlines wanted an aircraft where galleys as well as the lavatories with their plumbing could be relocated almost anywhere in the cabin within a matter of hours. Boeing gulped at the demands but managed to come up with solutions. Airlines can now rearrange the passenger cabin of the "Triple Seven" within hours and reconfigure it with varying number of seats allocated to the different classes.

- *Rent or share extra facilities and equipment.* To reduce spending on fixed assets, a service business may be able to rent extra space or machines during peak times. Two firms with complementary demand patterns may enter into formal sharing agreements. For example, some universities rent out student accommodation to visitors during the peak holiday season when their own students are on summer breaks and the first-year students have not moved into the campus yet.

UNDERSTAND PATTERNS OF DEMAND

In order to effectively manage demand for a particular service, managers need to understand that demand often differs by market segment.

Random fluctuations are usually caused by factors beyond management's control. However, analysis will sometimes reveal that a predictable demand cycle for one segment is concealed within a broader, seemingly random pattern. This fact illustrates the importance of breaking down demand on a segment-by-segment basis. For instance, a repair and maintenance shop that services industrial electrical equipment may already know that a certain proportion of its work consists of regularly scheduled contracts to perform preventive maintenance. The balance may come from "walk-ins" and emergency repairs. Although it might seem hard to predict or control the timing and volume of such work, further analysis might show that walk-in business is more prevalent on some days of the week than others, and that emergency repairs are frequently requested, following damage sustained during thunderstorms, which

Table 1: Questions about Demand Patterns and their Underlying Causes.

1. **Do demand levels follow a predictable cycle?**
   If so, is the duration of the demand cycle:
   - One day (varies by hour)
   - One week (varies by day)
   - One month (varies by day or by week)
   - One year (varies by month or by season or reflects annual public holidays)
   - Another period

2. **What are the underlying causes of these cyclical variations?**
   - Employment schedules
   - Billing and tax payment/refund cycles
   - Wage and salary payment dates
   - School hours and vacation
   - Seasonal changes in climate
   - Occurrence of public or religious holidays
   - Natural cycles, such as coastal tides

3. **Do demand levels seem to change randomly?**
   If so, could the underlying causes be:
   - Day-to-day changes in the weather
   - Health events whose occurrence cannot be pinpointed exactly
   - Accidents, fires, and certain criminal activities
   - Natural disasters (e.g., earthquakes, storms, mudslides, and volcanic eruptions)

4. **Can demand for a particular service over time be disaggregated by market segment to reflect such components as follows?**
   - Use patterns by a particular type of customer or for a particular purpose
   - Variations in the net profitability of each completed transaction

tend to be seasonal in nature and can often be forecast a day or two in advance. Understanding demand patterns allows the firm to schedule less preventive maintenance work on the days with high anticipated demand of typically more profitable emergency repairs.

To understand the patterns of demand by segment, research should begin by getting some answers to a series of important questions about the patterns of demand and their underlying causes (Table 1).

Most cycles influencing demand for a particular service vary in length from one day to 12 months. In many instances, multiple cycles operate simultaneously. For example, demand levels for public transport may vary according to the time of the day (highest during commute hours), day of week (less traveling to work on the weekends but more leisure travel), and season of year (more traveling by tourists in the

Figure 4: In summer, many tourists flock to Cologne, Germany to take in its rich heritage.

summer, as seen in Figure 4). The demand for service during the peak period on a Monday in summer is likely to be very different from the demand during the peak period on a Saturday in winter, reflecting day-of-week and seasonal variations jointly.

No strategy for smoothening the demand is likely to succeed unless it is based on an understanding of why customers from a specific market segment choose to use the service when they do. For example, it is difficult for hotels to convince business travelers to remain on Saturday nights since few executives do business over the weekend. Instead, hotel managers may do better to promote weekend use of their facilities for conferences or leisure travel. Attempts to get commuters to shift their travel to off-peak periods will probably fail, since such travel is determined by people's employment hours. Instead, efforts should be directed at employers to persuade them to adopt flexi-time or staggered working hours.

Keeping good records of each transaction helps enormously when it comes to analyzing demand patterns based on past experiences. Best practice queuing systems supported by sophisticated software can automatically track customer consumption patterns by the type of

customer, service requested, and date and time of day. Where relevant, it is also useful to record weather conditions and other special factors such as a strike, an accident, a big convention in town, a price change, or the launch of a competing service that might have influenced demand.

MANAGING DEMAND

Once the demand patterns of the different market segments are understood, we can proceed to manage demand. There are five basic approaches:

- Take no action and leave demand to find its own levels.
- Reduce demand during peak periods.
- Increase demand during low periods.
- Inventory demand using a queuing system.
- Inventory demand using a reservations system.

The first approach, *take no action*, has the virtue of simplicity but little else. Eventually customers learn from experience or word-of-mouth when they can expect to stand in line to use a service and when it will be available without delay. The trouble is that they may also learn to find out about a competitor who is more responsive, and low off-peak utilization cannot be improved unless action is taken. The other four proactive approaches are therefore far superior and profitable strategies.

Table 2 links these five approaches to the two problematic situations of excess demand and excess capacity. Many service businesses face both situations at different points in the cycle of demand, and should consider use of the interventionist strategies described. Next, how marketing mix elements can help to shape demand levels will be discussed, as well as how to inventory demand first through waiting lines and queuing systems, and second through reservation systems.

Marketing Mix Elements Can be Used to Shape Demand Patterns

Several marketing mix variables can be used to stimulate demand during periods of excess capacity, and decrease or shift around demand during periods of insufficient capacity. Price is often the first variable to be proposed for bringing demand and supply into balance. However, changes

Table 2: Alternate demand management strategies for different capacity situations.

Capacity Situation		
Approaches in Managing Demand	**Insufficient Capacity (Excess Demand)**	**Insufficient Demand (Excess Capacity)**
Take no action	• Results in unorganized queuing (may irritate customers and discourage future use).	• Capacity is wasted (customers may have a disappointing experience for services such as theater).
Manage demand through marketing mix elements	Reduce demand in peak periods: • Higher prices will increase profits. • Change product elements (e.g., do not offer time-consuming services during peak times). • Modify time and place of delivery (e.g., extend opening hours). • Communication can encourage use in other time slots. (Can this effort be focused on less profitable and less desirable segments?) • Note that demand from highly profitable segments should still be stimulated, and priority to capacity should be given to those segments. Demand reduction and shifting should primarily be focused on lower yield segments.	Increase demand in low periods: • Lower prices selectively (try to avoid cannibalizing existing business; ensure that all relevant costs are covered). • Change product elements (find alternative value propositions for service during low seasons). • Use communications and variation in products and distribution (but recognize extra costs, if any, and make sure that appropriate trade-offs are made between profitability and use levels).
Inventory demand using a queuing system	• Match appropriate queue configuration to service process. • Consider priority system for most desirable segments and make other customer shift to off-peak period. • Consider separate queues based on urgency, duration and premium pricing of service. • Shorten customer's perceptions of waiting time and make their waits more comfortable.	• Not applicable, but the queuing system can still collect data on number and type of transactions and customers served. The same applied to reservations systems below.
Inventory demand using a reservations system	• Focus on yield and reserve capacity for less price sensitive customers. • Consider a priority system for important segments. • Make other customers shift to off-peak periods.	• Clarify that capacity is available and let customers make reservations at their preferred time slots.

in product, distribution strategy, and communication efforts can also be used to reshape demand patterns. Although each element is discussed separately, effective demand management efforts often require changes in several elements concurrently.

Use Price and Non-monetary Costs to Manage Demand. One of the most direct ways to balance supply and demand is through the use of pricing. The lure of lower prices may encourage at least some people to change the timing of their behavior, whether for shopping, travel, or sending in equipment for repair. Non-monetary costs may have a similar effect too. For instance, customers who dislike spending time waiting in crowded and unpleasant conditions will try to come during less busy periods.

For the monetary price of a service to be effective as a demand management tool, managers must have some sense of the shape and slope of a product demand curve. They must understand how the demanded quantity of the service responds to the increases or decreases in the price per unit at a particular point in time. It is important to determine whether the demand curve for a specific service varies sharply from one time period to another. For instance, will the same person be willing to pay more for a weekend stay in a hotel on Cape Cod in summer than in winter when the weather can be freezing cold? The answer is probably yes. If so, very different pricing schemes may be needed to fill capacity in each time period.

Complicating matters further, there are typically separate demand curves for different segments within each time period (e.g., business travelers are usually less price sensitive than tourists, as discussed in Volume 4 on service pricing).

One of the most difficult tasks facing service marketers is to determine the nature of all these different demand curves. Historical data (often from revenue management systems), research, trial and error, and analysis of parallel situations in other locations or in comparable services, are all ways of understanding the situation. Many service businesses explicitly recognize the existence of different demand curves by designing distinct products with physical and non-physical design elements (or rate fences) for their key segments, each priced at levels appropriate to the demand curve of a particular segment. In essence, each segment receives a variation of the basic product, with value being added to the core service

through supplementary services to appeal to higher paying segments. For instance, in computer and printing service firms, product enhancement takes the form of faster turnaround time and more specialized services. In each case, the objective is to maximize the revenues received from each segment.

However, when capacity is limited, the goal in a profit-seeking business should be to ensure that as much capacity as possible is utilized by the most profitable segments available at any given time. For instance, airlines hold a certain number of seats for business passengers paying full fare, and place restrictive conditions on excursion fares for tourists (using non-physical rate fences such as requiring advance purchase and a Saturday night stay) in order to prevent business travelers from taking advantage of cheap fares designed to attract tourists who can help fill the aircraft. Pricing strategies of this nature are known as revenue management and are discussed in Volume 4.

Change Product Elements. Sometimes, pricing alone will be ineffective in managing demand. The opening vignette is a good case in point — in the absence of skiing opportunities, no skiers would buy lift tickets on a midsummer's day at any price. It is the same for a variety of other seasonal businesses. Thus, educational institutions offer weekend and summer programs for adults and senior citizens, small pleasure boats offer cruises in the summer and a dockside venue for private functions in winter months. These firms recognize that no amount of price discounting is likely to develop business when it is out of season, and that a new service product targeted at different segments is instead needed to encourage demand.

There can even be variations in the product offering during the course of a 24-hour period. Some restaurants provide a good example of this, marking the passage of the hours with the changing of menus and levels of service, variations in lighting and decor, opening and closing of the bar, and the presence or absence of entertainment. The goal is to appeal to different needs within the same group of customers, to reach out to different customer segments, or do both, according to the time of day. Product elements can also be changed to increase capacity during peak periods — for example, the lunch menu is designed to contain only dishes that can be prepared quickly during the busy lunch period.

Modify Place and Time of Delivery. Rather than seeking to modify the

demand for a service that continues to be offered at the same time in the same place, firms can also respond to market needs by modifying the time and place of delivery. The following basic options are available:

- *Vary the times when the service is available.* This strategy reflects changing customer preference by day of week, by season, and so forth. Theaters and cinema complexes often offer matinees on weekends when people have more leisure time throughout the day. During the summer, cafes and restaurants may stay open later as people are generally inclined to enjoy the longer balmier evenings outdoors. Shops may extend their opening hours in the weeks leading up to Christmas or during school holidays.
- *Offer the service to customers at a new location.* One approach is to operate mobile units that take the service to customers, rather than requiring them to visit fixed-site service locations. Mobile car wash services, in-office tailoring services, home-delivered meals and catering services, and vans equipped with primary care medical facilities are examples of this. A cleaning and repair firm that wishes to generate business during low demand periods might offer free pickup and delivery of movable items that need servicing.

Promotion and Education. Even if other variables of the marketing mix remain unchanged, communication efforts alone may be able to help facilitate smooth demand. Signage, advertising, publicity, and sales messages can be used to educate customers about peak periods and encourage them to make use of the service at off-peak times when there will be fewer delays.[5] Examples include the US Postal Service requests to "Mail Early for Christmas", public transport messages urging non-commuters — such as shoppers or tourists — to avoid the cramped conditions of commuting hours during peak periods, and communications from sales representatives for industrial maintenance firms advising customers of periods when preventive maintenance work can be done quickly. In addition, management can ask service personnel (or intermediaries such as travel agents) to encourage customers with flexible schedules to consider off-peak travel periods.

Changes in pricing, product characteristics, and distribution must be communicated clearly. If a firm wants to obtain a particular response to the variations in the marketing mix elements, it must fully inform

customers about their options. Short-term promotions that combine both pricing and communication elements as well as other incentives may provide customers with attractive incentives to shift the timing of service usage.

Not all demand is desirable. In fact, some requests for service are inappropriate and make it difficult for the organization to respond to the legitimate needs of its target customers. For example, many calls to emergency numbers such as 911 are not cases that the fire department, the police, or ambulance services should be dispatched to. Such calls make it difficult for the organization to respond to the actual emergency cases. *Service Insights 1* shows how a marketing campaign was used to reduce undesirable demand and free up the capacity. Discouraging undesirable demand through marketing campaigns or screening procedures will not eliminate random fluctuations in the remaining demand. However, it may help to keep peak demand levels within the service capacity of the organization.

SERVICE INSIGHTS 1

Discouraging Demand for Non-emergency Calls

Have you ever wondered what it is like to be a dispatcher for an emergency telephone service such as 911? People differ widely in what they consider to be an emergency.

Imagine yourself in the huge communications room at Police Headquarters in New York. A gray-haired sergeant is talking patiently by phone to a woman who has dialed 911 because her cat has run up a tree and she was afraid it will get stuck there. "Ma'am, have you ever seen a cat skeleton in a tree?" the sergeant asks her. "All those cats get down somehow, don't they?" After the woman has hung up, the sergeant turns to a visitor and shrugs. "These kinds of calls keep pouring in," he says. "What can you do?"

The trouble is, when people call the emergency number with complaints about noisy parties next door, pleas to rescue cats, or requests to turn off leaking fire hydrants, they may be slowing the response times to cases that actually involve fires, heart attacks, or violent crimes.

At one point, the situation in New York City became so bad that officials were forced to develop a marketing campaign to discourage the public from making inappropriate requests for emergency assistance through the 911 number. What seemed like an emergency to the caller — a beloved cat stuck up a tree, a noisy party preventing a tired person from getting much needed sleep — was not a life (or property) threatening situation that the city's emergency services were poised to resolve. A communications campaign using a variety of media, was developed to urge the public not to call 911 unless they were reporting a *dangerous* emergency. For help in resolving other matters, they were asked to call their local police station or other city agencies. The ad shown below appeared on New York buses and subways.

INVENTORY DEMAND THROUGH WAITING LINES AND QUEUING SYSTEMS

As seen in the previous section, there are a variety of tactics for balancing demand and supply. But what is a manager supposed to do when the possibilities for shaping demand and adjusting capacity have been exhausted, and yet supply and demand are still out of balance? Not taking any action and leaving customers to sort things out on their own is no recipe for customer satisfaction. Rather than allowing matters to degenerate, customer-oriented firms must try to develop strategies to ensure order, predictability, and fairness. Therefore, for services which regularly face demand that exceeds capacity, managers often need to take steps to inventory demand.

Demands can be inventoried in two ways: (1) by asking customers to wait in line, usually on a first-come, first-served basis, or by offering customers more advanced queuing systems (e.g., systems that take into account urgency, price, or importance of the customer), and (2) by offering customers the opportunity of reserving or booking service capacity in advance. We will discuss the wait-line and queuing systems in this section, and reservation systems in the next.

Waiting Is a Universal Phenomenon

Waiting is something that occurs everywhere. Waiting lines — known to operations researchers (and the British) as "queues" — occur whenever the number of arrivals at a facility exceeds the capacity of the system to process them. In a very real sense, queues are basically a symptom of unresolved capacity management problems. Analysis and modeling of queues is a well-established branch of operations management. Queuing theory has been traced back to 1917, when a Danish telephone engineer was charged with determining how large the switching unit in a telephone system had to be to keep the number of busy signals within reason.[6]

Nobody likes to wait or to be kept waiting. It is boring, time-wasting, and sometimes physically uncomfortable, especially if there is nowhere to sit or if you are outdoors. Almost every organization faces the problem of waiting lines somewhere in its operation. People are kept waiting on the phone, listening to recorded messages such as "your call is important to us", they line up with their supermarket carts to check out their grocery purchases, and they wait for their bills after a restaurant meal. They sit in their cars waiting to enter drive-in car washes and to pay at toll booths. Some physical queues are geographically dispersed. Travelers wait at many different locations for the taxis they have ordered by phone to arrive and pick them up.

A survey in the US revealed that the waiting lines most dreaded by Americans are those in doctors' offices (cited by 27%) and in government departments that issue motor vehicle registrations and drivers' licenses (26%), followed by grocery stores (18%) and airports (14%).[7] Situations that make it even worse at retail check-outs include slow or inefficient cashiers, a shopper who changes her mind about an item that has already been rung up, or one who leaves the line to run back for an item. It does not take long before people start to lose their cool; one-third of Americans say they get frustrated after waiting in line for 10 minutes or less, although women report more patience than men and are more likely to chat with others to pass the time while waiting.

Physical and inanimate objects wait for processing too. Customers' emails sit in customer service staff's inboxes, appliances wait to be repaired, and checks wait to be cleared at a bank. In each instance, a customer may be waiting for the outcome of that work — an answer to an email, an appliance that is working again, and a check credited to a customer's balance.

Managing Waiting Lines

The problem of reducing customer waiting time often requires a multi-pronged approach, as seen by the approach taken by Disney, described in *Service Insights 2*. Increasing capacity by simply adding more space or staff is not always the best solution in situations where customer satisfaction must be balanced against cost considerations. Like Disney, managers should consider a variety of ways, including:

1. Rethinking the design of the queuing system (i.e., queue configuration and virtual waits).
2. Tailoring the queuing system to different market segments (e.g., by urgency, price, or importance of the customer).
3. Managing customers' behavior and their perceptions of the wait (i.e., use the psychology of waiting to make waits less unpleasant).
4. Installing a reservations system (e.g., use reservations, booking or appointments to distribute demand).
4. Redesigning processes to shorten the time of each transaction (e.g., by installing self-service machines).

Points 1 to 4 are discussed in the next few sections of this volume. Point 5 is discussed in Volume 6 on customer service process redesign.

SERVICE INSIGHTS 2

Disney Turns Queue Management into a Science

Have you ever been in a queue at Disneyland? Very often, we may not realize how long we have been waiting as they are many sights to see while queuing. We may be watching a video, playing with interactive technology and touch screens stationed along the way, looking at other customers enjoying themselves, or reading the various posters on the wall, and enjoying comfort in the form of fans and shade that help us cool off. As our waits are occupied and comfortable, we may not realize that a long time has passed. Disney's theme park line management is an extension of their entertainment philosophy!

At Disney World's 'Dumbo the Flying Elephant' ride, children and their parents can play in an interactive room resembling a circus tent. While playing, these children are also waiting for a buzzer to signal their turn to go onto the outdoor line for the ride. These children playing in the tent do not have the perception of waiting in line, but that is exactly what they are doing!

Disney has taken the management of waiting lines to another level. At Walt Disney World, there is a Disney Operational Command Center, where the technicians are monitoring the queues to make sure that they are not too long and people are moving along. To them, patience is not a virtue in the theme park business. Inside the Command Center, they have computer programs, video cameras, digital maps of the park, and other tools to help them spot where there might be queues that are too long. Once there is a wait problem, they will send a staff to fix the problem immediately. The problem may be dealt with in several ways. For example, they could send a Disney character to entertain the waiting customers. Alternatively, they could deploy more capacity. For example, if there is a long queue for the boat ride, then they will deploy more boats so that the queue moves faster. Disney World is divided into different lands. If there is less crowd in one land compared to another, they may re-route a mini-parade towards that area, so that the crowds will follow and the crowd distribution becomes more even. They have also added video games to waiting areas.

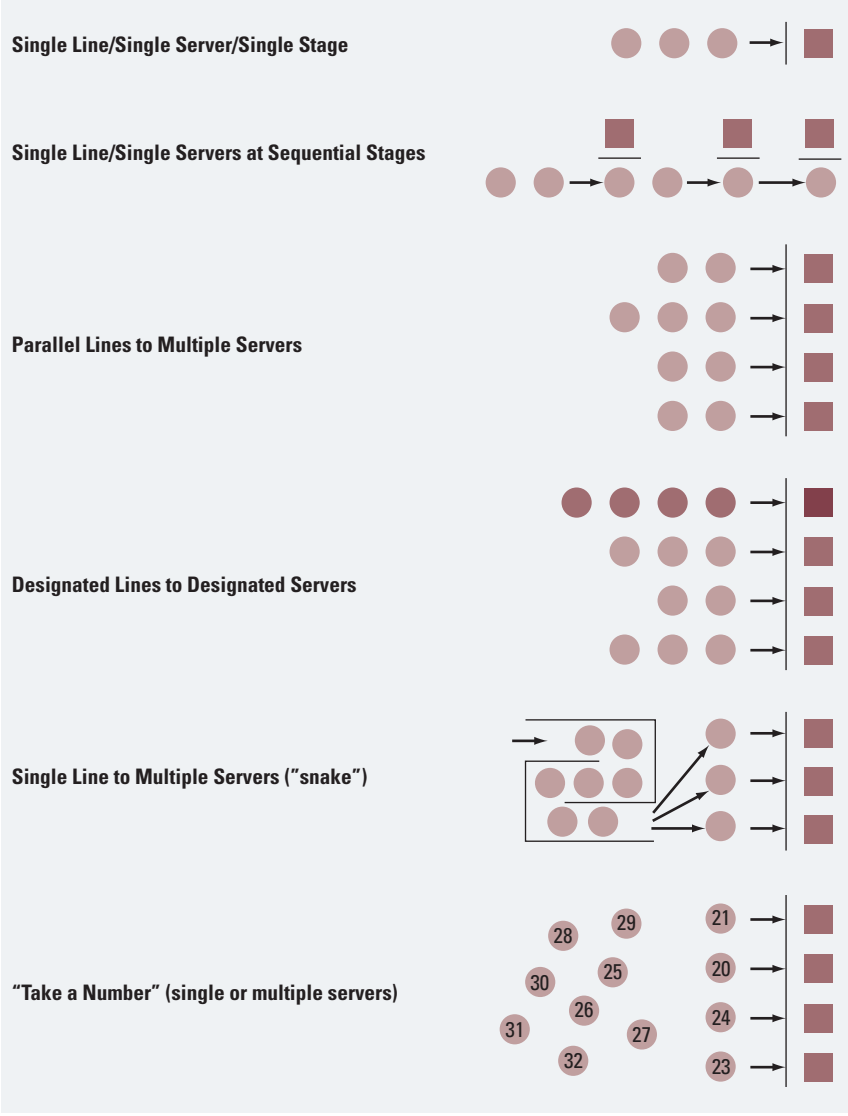
With the Command Center in place, they have managed to increase the average number of rides a visitor to Magic Kingdom normally takes, from nine rides to 10 rides. Disney will continue to experiment with different types of technology to help them manage customer waiting time. They are experimenting with smartphone technology and the Walt Disney World® app to see how it can be used to help manage waiting lines. Disney does all this in the hopes that customers will not be frustrated by the waits, and thus return more often.

Sources: Brooks Barnes, "Disney Tackles Major Theme Park Problem: Lines," *The New York Times*, December 27, 2010, http://www.nytimes.com/2010/12/28/business/media/28disney.html; Eamon McNiff, Sarah Lang, and Kimberly Launier, "Disney Theme Parks Reimagining the Wait in Line", *ABC News*, April 23, 2014; and https://itunes.apple.com/en/app/my-disney-experience-walt/id547436543?mt=8 ; all accessed on 6 April, 2016.

Different Queue Configurations

There are different types of queues, and the challenge for managers is to select the most appropriate type. Figure 5 shows diagrams of several types you may have experienced yourself.

Figure 5: Alternative queue configurations



- In *single line sequential stages,* customers proceed through several serving operations, as in a cafeteria. Bottlenecks may occur at any stage where the process takes longer to execute than at previous stages. Many cafeterias have lines at the cash register because the cashier takes longer to calculate how much you owe and to return the change, than the servers take to slap food on your plate.
- *Parallel lines to multiple servers* offer more than one serving station, allowing customers to select one of several lines in which to wait. Banks and ticket windows are common examples. Fast food restaurants usually have several serving lines in operation at busy times of day, with each offering the full menu. A parallel system can have either a single stage or multiple stages. The disadvantage of this design is that lines may not move at equal speed. How many times have you chosen what looked like the shortest line only to watch in frustration as the lines on either side of you moved at twice the speed of yours, because someone in your line has a complicated transaction?
- A *single line to multiple servers*, commonly known as a "Snake". This type of waiting line solves the problem of the parallel lines to multiple servers moving at different speeds. This method is commonly used at post offices and airport check-ins.
- *Designated lines* involve assigning different lines to specific categories of customers. Examples include express lines for five items or less and regular lines at supermarket check-outs, and different check-in stations for first class, business class, and economy class airline passengers.
- *Taking a number* saves customers the need to stand in a queue. This procedure allows them to sit down and relax, or to guess how long the wait will be and do something else in the meantime — although at the risk of losing their place if earlier customers are served faster than expected. Users of this method include large travel agents, government offices, and outpatient clinics in hospitals.
- Restaurants often have *wait lists* where people put their names down and wait until their name is announced. There are four common ways of wait listing: (1) party-size seating, where the number of people is matched to the size of the table; (2) VIP seating, which

involves giving special rights to favored customers; (3) call-ahead seating, which allows people to phone before arriving on-site to hold a place on the wait list; and (4) large-party reservations. If customers are familiar with wait listing techniques, they are likely to view them to be fair. If not, VIP seating is viewed as especially unfair by guests who do not enjoy the priority treatment.[8]

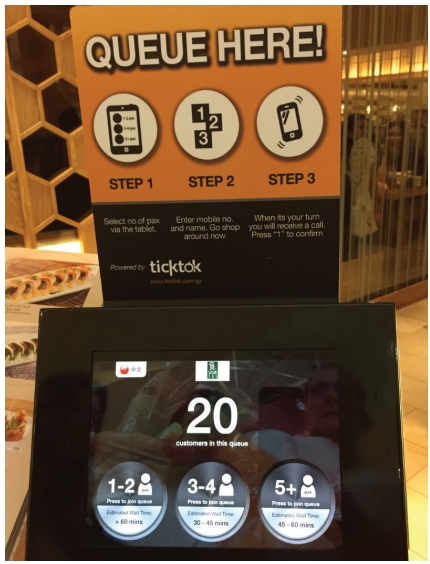
Queues can also be a combination of different approaches. For instance, a cafeteria with a single serving line might offer two cash register stations at the final stage. Similarly, patients at a small medical clinic might visit a single receptionist for registration, proceed sequentially through multiple channels for testing, diagnosis, and treatment, and conclude by returning to a single line for payment at the receptionist's desk.

Research suggests that selecting the most suitable type of queue is important to customer satisfaction. Anat Rafaeli and her colleagues found that the way queues in a waiting area are laid out can produce feelings of injustice and unfairness in customers. Customers who waited in parallel lines to multiple servers reported significantly higher agitation and dissatisfaction with the fairness of the service delivery process than customers who waited in a single line ("snake") to access multiple servers. This result was despite the fact that both groups of customers waited the same amount of time and were involved in completely fair service processes.[9] The issue of perceived fairness arises as waiting customers are often very conscious of their own progress towards getting served. Perhaps you have watched resentfully as other diners who arrived at a busy restaurant later than you were given priority and leapfrogged the line. It does not seem fair, especially when you are hungry!

Virtual Waits

One of the problems associated with waiting in line is the waste of time this involves for customers. The "virtual queue" strategy is a creative way of taking the physical waiting out of the wait altogether. Instead, customers register their place in line on a terminal, which estimates the time at which they will reach the front of the virtual line and should return to claim their place.[10] Sushi Tei, a restaurant chain, implemented a self-service touch screen terminal where guests can simply select the party size, which allows the restaurant to match table sizes, enter their cell phone number

Figure 6 An innovating queuing system allows customers to enter a virtual queue for a table.



and then go shopping (Figure 6). Diners will receive a text message confirming their booking, and the message contains a link where they can view in real time how many parties are still ahead of them in the queue. They will be called by an automated system five minutes before their table is available, and diners can confirm their booking (by pressing '1'), ask for an additional 15 minutes until they will reach back to the restaurant (by pressing '2'), or they can cancel their booking if they have made alternative plans (by pressing '3'). The restaurant has a long queue on weekend evenings, but this system helps them keep customers loyal and extends the time it operates at full capacity on busy days.

Service Insights 3 describes the virtual queuing systems used in two very different industries; a theme park and a call center.

The concept of virtual queues has many potential applications. Cruise ships, all-inclusive resorts, and restaurants can use this strategy if customers are willing to provide their cell phone numbers or remain within buzzing range of a firm-operated pager system.

SERVICE INSIGHTS 3
Waiting in a Virtual Queue

Disney is well-known for its efforts to give its theme park visitors information on how long they may have to wait to ride a particular attraction, and for entertaining guests while they are waiting in line. However, the company found that the long waits at its most popular attractions were still a major source of dissatisfaction and thus created an innovative solution.

The virtual-queue concept was first tested at Disney World. At the most popular attractions, guests were able to register their place in line with a computer and were then free to use the wait time visiting other places in the park. Surveys showed that guests who used the new system spent more money, saw more attractions, and had significantly higher satisfaction. After further refinement, the system, now named Fastpass, was introduced at the five most popular attractions at Disney World, and was subsequently extended to all Disney parks worldwide. It is now used by more than 50 million guests a year.

Fastpass is easy to use. When guests approach a Fastpass attraction, they are given two clear choices — obtain a Fastpass ticket there and return at a designated time, or wait in a standby line. Signs indicate how long the wait is in each instance. The wait time for each line tends to be self-regulating, because a large difference between the two will lead to increasing numbers of people choosing the shorter line. In practice, the virtual wait tends to be slightly longer than the physical one. To use the Fastpass option, guests insert their park admission ticket into a special turnstile and receive a Fastpass ticket stating a return time. Guests have some flexibility because the system allows them a 60-minute window beyond the printed return time.

Just like the Fastpass system, call centers also use virtual queues. There are different types of virtual queuing systems for call centers. The first-in, first-out queuing system is very common. When callers call in, they will hear a message that informs them of the estimated wait time for the call to be taken by an agent. The caller can (1) wait in the queue and get connected to an agent when his turn arrives, or (2) choose to receive a call back. When the caller chooses the latter option, he has to enter his telephone number and tell his name. He then hangs up the phone and his virtual place in the queue is kept. When he is nearly at the head of the queue, the system calls the customer back and puts him at the head of the queue where an agent will attend to him next. In both situations, the customer is unlikely to complain. In the first situation, it is the customer's choice to wait in the queue, and he

can still do something else as he already knows the estimated wait time. In the second situation, the person does not have to wait for very long on the phone after the call back, before reaching an agent. The call center also benefits as fewer frustrated customers will take up the valuable time of the agents by complaining about how long they had to wait. In addition, firms also reduce aborted or missed calls from customers.

Source: Duncan Dickson, Robert C. Ford, and Bruce Laval, "Managing Real and Virtual Waits in Hospitality and Service Organizations," *Cornell Hotel and Restaurant Administration Quarterly* 46, February 2005, 52–68; "Virtual Queue," Wikipedia, www.en.wikipeidao.org/wiki/virtual_queuing; and A FASTPASS Guide for Disneyland and California Adventure, http://dlrprepschool.com/a-fastpass-guide-for-disneyland-and-california-adventure ; accessed on 25 March, 2016.

Queuing Systems Can Be Tailored to Market Segments

Although the basic rule in most queuing systems is 'first come, first served', not all queuing systems are organized in that way. Market segmentation is sometimes used to design queuing strategies that set different priorities for different types of customers. Allocation to separate queuing areas may be based on any of the following:

- *Urgency of the job.* At many hospital emergency units, a nurse is assigned to greet incoming patients, and decide which patients require priority medical treatment and which patients can be safely asked to register, sit down and wait for their turn.
- *Duration of service transaction.* Banks, supermarkets, and other retail services often have "express lanes" for shorter, less complicated tasks.
- *Payment of a premium price.* Airlines usually offer separate check-in lines for first-, business- and economy-class passengers, with a higher ratio of personnel to passengers in the first- and business-class lines, resulting in reduced waits for those who paid more for their tickets. At some airports, premium passengers may also enjoy faster lanes for the security check.
- *Importance of the customer.* Members of frequent-flyer clubs frequently get priority wait-listing. For example, the next available seat is given to a platinum card holder of the airline's loyalty program, and these members can also jump the queue with priority access to

call centers, and even when travelling economy class, members of frequent-flyer clubs can use the shorter business class check-in lines.

CUSTOMER PERCEPTIONS OF WAITING TIME

People do not like wasting their time on unproductive activities any more than they like wasting money. Customer dissatisfaction with delays in receiving service often can stimulate strong emotions, even anger.[11] In fact, it has been found that if customers are dissatisfied with the wait, they must be more satisfied with the service to have the same level of loyalty as customers who were satisfied with the wait.[12]

The Psychology of Waiting Time

Research shows people often think they waited longer for a service than they actually did. For instance, studies of public transportation use have shown that travelers perceive the time spent waiting for a bus or train as passing 1.5 to 7 times more slowly than the time actually spent traveling in the vehicle.[13]

Savvy service marketers recognize that customers experience waiting time in different ways, depending on the circumstances. Why are some willing to wait for 50% of their time at an amusement park, but complain when they have to wait for 20 minutes for a taxi? David Maister and other researchers have the following suggestions on how to use the psychology of waiting to make waits less stressful and unpleasant[14]:

- *Unoccupied time feels longer than occupied time.* The noted philosopher William James observed, "Boredom results from being attentive to the passage of time itself". When you are sitting around with nothing to do, time seems to crawl. The challenge for service organizations is to give customers something to do or to distract them while waiting. For example, BMW car owners can wait in comfort in BMW service centers where waiting areas are furnished with designer furniture, large-screen TVs, Wi-Fi, magazines, and freshly brewed cappuccinos. Many customers even bring their own entertainment in the form of a smart phone or tablet.

Some restaurants manage the waiting problem by inviting dinner guests to have a drink in the bar until their table is ready (that approach makes money for the house as well as keeps the customer occupied). In similar fashion, guests waiting in line for a show at a casino may find themselves queuing in a corridor lined with slot-machines.

- *Solo waits feel longer than group waits.* It is nice to wait with people you know, and talking to them is one way of helping to pass the time while waiting. However, not everyone is comfortable talking to a stranger.
- *Physically uncomfortable waits feel longer than comfortable waits.* "My feet are killing me!" is one of the most often heard comments when people are forced to stand in line for a long time. Whether they are seated or standing, waiting seems more burdensome if the temperature is too hot or too cold, if it is drafty or windy, or if there is no protection from rain or snow.
- *Pre- and post-process waits feel longer than in-process waits.* Waiting to buy a ticket to enter a theme park is different from waiting to ride on a roller coaster once you're in the park.
- *Unfair waits are longer than equitable waits.* Perceptions about what is fair or unfair sometimes vary from one culture or country to another. In the United States, Canada, or Britain, people may expect everybody to wait their turn in line and are likely to get irritated if they see others jumping ahead or being given priority for no apparent reason. When people perceive the wait as fair, it reduces the negative effect of waiting.
- *Unfamiliar waits seem longer than familiar ones.* Frequent users of a service know what to expect and are less likely to worry while waiting. New or occasional users, in contrast, are often nervous, wondering not only about the probable length of the wait but also about what happens next.
- *Uncertain waits are longer than known, finite waits.* Although any wait can be frustrating, we tend to mentally prepare ourselves to a wait of a known length. It is the unknown that keeps us on edge. Imagine waiting for a delayed flight and not being told how long the delay will be. You do not know whether you have the time to get up and walk

about in the terminal, whether to stay at the gate in case the flight is called any minute, and whether you will make your connecting flight on the other end.

- *Unexplained waits are longer than explained waits.* Have you ever been in a subway or an elevator that has stopped for no apparent reason, without any announcements telling you why? In addition to uncertainty about the length of the wait, there is added worry about what is going to happen. Has there been an accident on the line? Will you be stuck there for hours?
- *Anxiety makes waits seem longer.* Can you remember waiting for someone to show up at the arranged meeting time or rendezvous, and worrying about whether you had gotten the time or location correct? While waiting in unfamiliar locations, especially outdoors and at night, people often worry about their personal safety.
- *The more valuable or important the service, the longer people will wait.* People will queue up overnight under uncomfortable conditions to get good seats to a major concert or sports event expected to sell out fast.

INVENTORY DEMAND THROUGH RESERVATIONS SYSTEMS

As an alternative, or in addition, to waiting lines, reservations systems can be used to inventory demand. Ask someone what services come to mind when you talk about reservations and they will most likely cite airlines, hotels, restaurants, car rentals, and theaters. Use synonyms like "bookings" or "appointments" and they may add haircuts, visits to professionals such as doctors and consultants, vacation rentals, and service calls to fix anything from a broken refrigerator to a temperamental laptop. There are many benefits in having a reservations system:

- Customer dissatisfaction due to excessive waits can be avoided. One aim of reservations is to guarantee that service will be available when customers want it. Customers who hold reservations should be able to count on avoiding a queue, because they have been guaranteed service at a specific time.
- Reservations allow demand to be controlled and smoothed out in a more manageable way. A well-organized reservations system

allows the organization to deflect demand for service from a first-choice time to earlier or later times, from one class of service to another ("upgrades" and "downgrades"), and even from first-choice locations to alternative ones, and thereby overall contributing to higher capacity utilization.

- Reservations systems enable the implementation of revenue management and serve to pre-sell a service to different customer segments (see Volume 4 on revenue management). For example, requiring reservations for normal repair and maintenance allows management to make sure that some capacity will be kept free for handling emergency jobs. Since these are unpredictable, higher prices can be charged, which bring higher margins with them.
- Data from reservation systems also help organizations to prepare operational and financial projections for future periods. Systems vary from a simple appointments book using handwritten entries for a doctor's office to a central, computerized data bank for an airline's global operations.

The challenge in designing reservation systems is to make them fast and user-friendly for both staff and customers. Many firms now allow customers to make their own reservations on a self-service basis via their websites and smartphones. Whether they are talking to a reservations agent or making their own bookings, customers want quick answers about whether a service is available at a preferred time and at what price. They also appreciate it if the system can provide further information about the type of service they are reserving. For instance, can a hotel assign a specific room on request, or at least assign a room with a view of the lake rather than one with a view of the parking lot? Some businesses now even charge a fee for making a reservation (see *Service Insights 4*).

Of course, problems arise when customers fail to show up or when service firms overbook. Marketing strategies for dealing with these operational problems include requiring a deposit, canceling non-paid reservations after a certain time, and providing compensation to victims of overbooking are discussed in Volume 4 on revenue management.

SERVICE INSIGHTS 4

Pay to Get That Hard-To-Get Table Reservation!

Today's Epicure is an exclusive online company that helps customers get table reservations at the most popular dining spots in New York, such as Carbone, Lafayette or The NoMad, where only people who are 'somebody' or have the right connections can secure a table. Even then, it can take several months of patient planning. The company is able to get a table on a specific day, and on short notice. Currently, the company focuses on areas where it is difficult to get reservations, namely New York City, Philadelphia, and the Hamptons. Individuals pay a membership fee of $1,000 to join and $125 per month for access to the service.

Pascal Riffaud, the entrepreneur behind this idea, was president of Personal Concierge International, a leading company providing exclusive concierge services in the United States. During his work experience as president of Personal Concierge, Riffaud built a large network of contacts with exclusive restaurants, allowing him to obtain those hard-to-get reservations.

His clients were delighted with his service and kept flooding him with requests for reservations. However, similar to earlier start-ups, there have been protests from restaurant owners who felt these types of services were upsetting their reservation systems and also selling their tables for a price. Even though these services cancel unsold reservations, restaurant owners feel these could have been sold to other customers who really wanted a table. As more start-ups offer similar service (see www.Table8.com and www.resy.com in Los Angeles), restaurants may have to rethink the way they handle reservations!

Sources: "Would you pay $1,000 for a dinner reservation? Meet the scalper selling table spots at New York's hottest restaurants", by Daily Mail Reporter, www.dailymail.co.uk/femail/article-2384867/Meet-Pascal-Riffaud-Today-s-Epicures-scalper-selling-table-spots-New-Yorks-hottest-restaurants.html#ixzz3VOp1ZIDb, https://www.todaysepicure.com, http://resy.com, all accessed on 25 March, 2016.

Reservations Strategies Should Focus on Yield

Increasingly, service firms are looking at their "yield" — the average revenue received per unit of capacity. Yield analysis forces managers to recognize the opportunity cost of selling capacity for a given date to a customer from one market segment when another might subsequently yield a higher rate. Think about the following problems facing sales managers for different types of service organizations with capacity limitations:

- Should a hotel accept an advance booking from a tour group of 200 room nights at $140 each, when some of these same room nights might possibly be sold later at short notice to business travelers at the full posted rate of $300?
- Should a railroad with 30 empty freight cars accept an immediate request for a shipment worth $1,400 per car or hold the cars for a few more days in the hopes of getting a priority shipment that would be twice as valuable?
- Should a print shop process all jobs on a first-come, first-served basis, with a guaranteed delivery time for each job, or should it charge a premium rate for "rush" work, and tell customers with "standard" jobs to expect some variability in completion dates?

Decisions on such problems deserve to be handled with a little more sophistication than just resorting to "the bird in the hand is worth two in the bush" formula. Good information based on detailed record-keeping of past usage supported by current market intelligence is the key to allocating the inventory of capacity among different segments. The decision to accept or reject business should be based on realistic estimates of the probabilities of obtaining higher rated business and on the awareness of the need to maintain established (and desirable) customer relationships. The more sophisticated approach of revenue management systems for allocating capacity to different "rate buckets" and setting prices are discussed in Volume 4.

CREATE ALTERNATIVE USE FOR OTHERWISE WASTED CAPACITY

Even after professional management of capacity and demand, most service firms will still experience periods of excess capacity. However, not all unsold productive capacity has to be wasted, as alternative "demand" can be created by innovative firms. Many firms take a strategic approach to the disposition of anticipated surplus capacity, allocating it in advance to build relationships with customers, suppliers, employees, and intermediaries.[15] Possible uses for otherwise wasted capacity include:

- *Use capacity for service differentiation.* When capacity utilization is low, service employees can go all the way to truly 'wow' their customers. A firm that wants to build customer loyalty and market share should use a slack in operations to focus on outstanding customer service. This can include extra attention paid to the customer, allocation of preferred seating, and the likes.
- *Reward your best customers and build loyalty.* This can be done through special promotions as part of a loyalty program, while ensuring that existing revenues are not cannibalized.
- *Customer and channel development.* Provide free or heavily discounted trials for prospective customers and for intermediaries who sell to end customers.
- *Reward employees.* In certain industries such as restaurants, beach resorts, or cruise lines, capacity can be used to reward employees and their families to build loyalty. This can improve employee satisfaction and provide employees an understanding of the service as experienced from the customer's perspective and thereby raising performance.
- *Barter free capacity.* Service firms often can save costs and increase capacity utilization by bartering capacity with their own suppliers. Among the most widely bartered services are advertising space or airtime, airline seats, and hotel rooms.

CONCLUSION

As many capacity-constrained service organizations have heavy fixed costs, even modest improvements in capacity utilization tend to have a significant effect on the bottom line. This volume has shown how managers can manage productive capacity and demand, and improve customers' waiting and queuing experiences. Managing capacity and demand for a service at a particular place and time closely links back to what is covered in earlier Volumes, including decisions on product elements and tiering of service seen in Volume 3, revenue management as discussed in Volume 4, promotion and education as discussed in Volume 5, and designing and balancing the capacity of service processes as discussed in Volume 6.

SUMMARY

1. The Problems of Demand-Supply Imbalance

At any one time, a firm with limited capacity can face different demand–supply situations:

- Excess demand.
- Demand that exceeds ideal capacity.
- Well-balanced demand and supply.
- Excess capacity.

When demand and supply are not in balance, firms will have idle capacity during low periods, but have to turn away customers during peak periods. This situation impedes the efficient use of productive assets and erodes profitability. Firms, therefore, need to try and balance demand and supply through adjusting capacity and/or demand.

2. Effective Capacity and Demand Management

The building blocks for effective capacity and demand management include:

- Define productive capacity.
- Use capacity management tools.
- Understand demand patterns and drivers by customer segment.
- Use demand management tools.

3. Productive Capacity in Services

When we refer to managing capacity, we implicitly mean productive capacity. There are several different forms of productive capacity in services:

- Physical facilities for processing customers
- Physical facilities for processing goods
- Physical equipment for processing people, possessions, or information
- Labor
- Infrastructure

4. Capacity Management

Capacity can be managed in a number of ways, including stretching capacity and adjusting capacity.

Stretching capacity means that some capacity is elastic and more people can be served with the same capacity through crowding (e.g., in a subway car), extending operating hours, or speeding up customer processing times.

Adjusting capacity involves to more closely match demand by:

- Scheduling downtime during low periods
- Cross-training employees
- Using part-time employees
- Inviting customers to perform self-service
- Asking customers to share capacity
- Designing capacity to be flexible
- Renting or sharing extra facilities and equipment

5. Managing Demand Effectively

To manage demand effectively, firms need to understand demand patterns and drivers by market segment. Different segments often exhibit different demand patterns (e.g., routine maintenance versus emergency repairs). Once firms have an understanding of the demand patterns of their market segments, they can use marketing strategies to reshape those patterns.

6. Managing Demand

- Take no action, and leave demand to find its own levels.
- Reduce demand during peak periods.
- Increase demand during low periods.
- Inventory demand through waiting lines and queuing systems.
- Inventory demand through reservation systems.

7. Smoothing Out Fluctuations in Demand

The following marketing mix elements can be used to help smooth out fluctuations in demand:

- Use price and nonmonetary customer costs to manage demand
- Change product elements to attract different segments at different times
- Modify the place and time of delivery (e.g., through extended opening hours)
- Promotion and education (e.g., "mail early for Christmas")

8. Waiting Lines and Queuing Systems

Waiting line and queuing systems help firms inventory demand over short periods of time. There are different types of queues with their respective advantages and applications. Queuing systems include single line with sequential stages, parallel lines to multiple servers, single line to multiple servers, designated lines, taking a number, and wait list.

Not all queuing systems are organized on a 'first come, first served' basis. Rather, good systems often segment waiting customers by:

- Urgency of the job (e.g., hospital emergency units).
- Duration of the service transaction (e.g., express lanes).
- Premium service based on a premium price (e.g., first-class check-in counters).
- Importance of the customer (e.g., frequent travelers get priority wait listing).

9. The Psychology of Waiting

Customers do not like wasting their time waiting. Firms need to understand the psychology of waiting and take active steps to make waiting less frustrating. Ten possible steps to do so were discussed, including keeping customers occupied or entertained while waiting, informing customers how long the wait is likely to be, providing them with an explanation of why they have to wait, and avoiding perceptions of unfair waits.

10. Effective Reservations Systems

Effective reservations systems inventory demand over a longer period of time and offer several benefits.

- They help to reduce or even avoid customers waiting in queues and thereby avoid dissatisfaction due to excessive waits.

- They allow the firm to control demand and smooth it out.
- They enable the use of revenue management to focus on increasing yield by reserving scarce capacity for higher-paying segments, rather than selling off capacity on a 'first come, first served' basis.

11. Managing the Use of Surplus Capacity

Even after professional management of capacity and demand, most service firms will still experience periods of excess capacity. Firms can take a strategic approach to the use of surplus capacity, including:

- Use capacity for service differentiation. When capacity utilization is low, service employees can go all the way to truly "wow" their customers.
- Reward your best customers and build loyalty (e.g., through special promotions as part of a loyalty program).
- Customer and channel development (e.g., provide free or heavily discounted trials).
- Reward employees (e.g., excess capacity in restaurants, beach resorts, or cruise lines can used to reward loyal employees and their families).
- Barter free capacity (e.g., service firms can consider bartering excess capacity for advertising space, airline seats, and hotel rooms).

ENDNOTES

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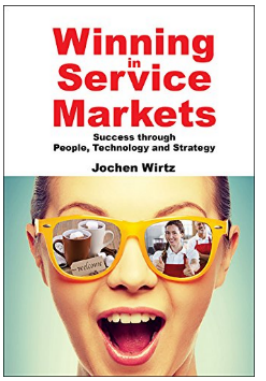

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