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# The “Coping” Capacity Management Strategy in Services and the Influence on Quality Performance

The “Coping”  
Capacity

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## Introduction

The literature on quality management in services has been expanding rapidly (Berry *et al.*, 1990; Collier, 1987; Grönroos 1984). However, these articles more often than not deal with questions relating to the definition of quality and the identification of measuring systems for quality management. While the authors recognize the influence on quality of the perceptions of management and service providers, they do not address in detail issues relating to the overall management of resources for the successful delivery of services, in particular, capacity management and the effect on service quality. It is argued in this article that the aspect of the delivery of services which has received insufficient recognition is the management of capacity, although referred to by Collier (1987), Rhyme (1988) and Chase and Bowen (1991).

Operations managers in a service organization will either succeed or fail in the process of balancing quality of service and resource management, expressed in terms of resource productivity, depending on their skill in managing capacity to match demand. This article examines more closely the factors in the management of capacity in services which influence quality and productivity performance. It is considered that even though service managers may be concerned about capacity management they tend more to manage capacity by “feel” rather than intent or design to a greater extent than their manufacturing counterparts. This is in contrast to aspects of influencing demand through marketing activities.

There is an interaction between capacity management, quality management, and resource productivity or efficiency management which is at the heart of the planning and control process for operations management in services. A number of authors have identified some of the issues confronting operations managers in managing supply and demand in services which affect their ability to maintain quality standards while achieving productivity targets (Chase and Bowen, 1991; Heskett *et al.*, 1990; Lovelock, 1984; Rhyme, 1988). The issues are threefold:

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- (1) The limited ability of the organization to alter capacity in terms of both the extent of the change and response time to make the change while having to deal with rapid fluctuations in demand.
- (2) The need to deliver consistent levels of customer service.
- (3) The varying degrees of uncertainty in demand.

Capacity management in service operations is a testing activity for operations managers because the nature of the service delivery process and the involvement of the customers in the process restricts the options open for controlling the process of matching supply with demand across the whole service delivery system. The four general options for operational control are altering the capacity, holding inventory in anticipation of demand, requiring customers to wait for the service, or influencing demand in other ways. In service delivery there is not the possibility of producing the complete service package in advance of demand and holding it as an inventory. This real time element of service production makes the matching of supply and demand very important, particularly in capacity-constrained services, such as airlines, hotels, and professional services, when the profitability of the operation is closely linked to the use of the current capacity and the prices charged.

Capacity management is the ability to balance demand from customers and the capability of the service delivery system to satisfy the demand. This places an emphasis on understanding first, the nature of demand by forecasting (Lovell, 1984) and second, the options for managing capacity to meet the expected demand. Sasser (1976) suggested two basic strategies for managing capacity in services, namely, the *level* strategy and the *chase* strategy. The former is applicable where capacity is limited and hence the focus is on influencing demand to be in line with capacity, and the latter chase strategy being possible when supply can be changed to keep in line with demand. Consequently operations managers must understand the composition of their capacity, the degree to which it can be changed, and the speed of reaction (Slack, 1983), and the costs involved (Heskett, *et al.*, 1990).

### **A Model for Capacity Management**

Capacity management relates the potential output from the resources available to actual output. The output achieved by any service delivery process depends on three main factors (see Figure 1):

- The *service load* represented by the variety of the services being delivered, the resource absorption per service, the variation in the demand pattern and the way in which demand is managed for example by price changes or appointments.
- The way the *capacity task is managed* using techniques of forecasting, prioritizing, scheduling, managing bottle-necks, and altering capacity. In addition, as is argued in this article, the need for coping strategies.

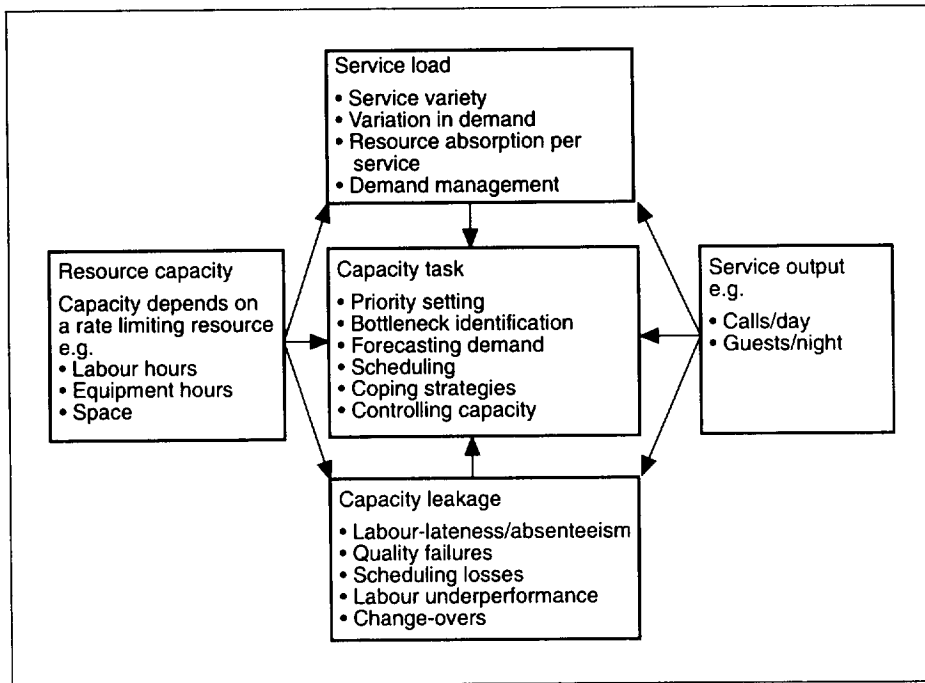


Figure 1.  
Capacity Management

- The extent of *capacity leakage* because key resources are not available, quality failures, scheduling losses, and loss at change-overs associated with achieving flexibility.

### “Chase” and “Level” Are Not Enough – A “Coping” Strategy

It is generally recognized that service organizations tend towards either chase or level capacity rather than exhibiting sole characteristics as identified by Sasser (1976). Level strategies are applicable when demand is more visible before the time of use and the service organizations can effectively tell customers to wait when demand cannot be satisfied, i.e. the service is *valued* by the customers and they are willing to wait. In more sophisticated systems, such as airlines and hotels, there is a focus on the use of yield management techniques to get the best return from limited and costly resources.

Chase strategies apply more when customers will not wait long for the service and there is an immediate need at least to get the process started and taken to a reasonable stage so that customers feel satisfied. The use of telephone response centres often fulfil this role for complex services such as customer service support for after sales service. There are in many instances mixed operating systems where both approaches are used. For instance, for a garage the reception may employ a chase approach whereas the workshop itself is nearer to a level strategy.

However, it is inevitable that all service organizations will at times run out of capacity to satisfy demand within the time frame expected by customers. This

is the area which most service managers would recognize as *coping*. In these circumstances there are two possible courses of action:

- (1) To allow service quality standards to fall in an uncontrolled way.
- (2) To try to control the fall in service standards, thereby protecting the service standards for the core service.

The alternative scenario is when capacity is in excess of demand leading to lower efficiency and in some cases lower quality. In these circumstances the coping is concerned with minimizing these effects, perhaps by accepting the situation as a period of rest and recovery for service staff or engaging them on other activities. This article considers the effect of coping on service quality in more detail.

It might be expected that service operations managers would be aware of when they are entering the coping zone and of the resulting change in customer perception of service quality. However, anecdotal evidence suggests that this is not the case. As a result, a number of propositions are derived which have been tested against research findings.

*P1:* Many service operations managers are not aware in any precise way when they are entering the coping zone Although they may be aware when it happens.

*P2:* Most service operations managers do not measure the degradation of service quality as perceived by customers during coping.

### **Resource Utilization and Service Quality**

The concept of resource utilization and service quality is understood in the context of queuing theory (Maister, 1985) where it is recognized that to maintain a consistency in waiting time and queue lengths average utilization of resources may be relatively low. There is also the recognition in those services where the role of the customers (Hart *et al.*, 1990) is to create the experience, for example in a theatre, theme park or restaurant, the level of utilization of the resources can affect the perception of service quality. Heskett (1986) reporting work in the context of a restaurant, showed that perception of service quality increased with utilization up to a maximum of 75 per cent and fell away from that point. It is easy to see that the build to the maximum is associated with the general ambience of the restaurant giving a "buzz" to the atmosphere which enhances the experience for customers and also helps to motivate serving staff. The subsequent fall in perceived quality is due in part to a move into the coping zone.

This additional aspect of coping indicates that services operations managers need to have an understanding of the level of utilization of resources above or below which service quality will be affected unless some other actions are taken.

*P3a:* Service operations managers do not generally understand the link between resource utilization and service quality for their operations.

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*P3b:* Where they do understand the link they do not act in ways to maximize perceived service quality.

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*P3c:* At times most organizations will have to manage in the coping zone because of variability in demand.

### **Coping and Service Recovery**

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The concept of a coping strategy for managing service resources has a particular link to service recovery (Hart *et al.*, 1990) and unconditional service guarantees (Hart, 1988; Hart *et al.*, 1992). There is growing evidence, from both these areas of literature, that service organizations which are already good at delivering a consistent level of customer service are seeking to improve and differentiate themselves from their competitors by being able to respond quickly and effectively when things go wrong. Hence, the overall level of customer satisfaction is not diminished and if there are unconditional guarantees these can be delivered without “giving away the store”. To achieve these results requires a greater understanding of what is required to satisfy customers and to control the operation.

*P4:* Service organizations which are good at service recovery are better at managing in the coping zone.

### **Is There any Evidence for the Truth of the Propositions?**

There is no evidence for the four propositions which would establish them as proved or disproved hypotheses. However, some recent research carried out by way of a postal survey to managers in service organizations across the services sector who were subscribers to a quality journal suggest the propositions may have some validity, Armistead and Clark (1992a, b). The sample selected might have been expected to display a high level of motivation to improve their quality performance and to be largely committed to Total Quality Management. About 170 responses were used in the analysis from a total sample of 3,000.

#### *Proposition 1: Many Service Operations Managers Are Not Aware in Any Precise Way when They Are Entering the Coping Zone*

Service managers were asked questions about “early warning signals” which warn them that they are running out of capacity. Most of the respondents talked about some fall in service standards and in particular, aspects of timing, of customers complaining and staff showing signs of stress. These might be interpreted as showing some awareness at the level “Gosh we’re busy” or “We’re rushed off our feet” rather than “We need to be careful now and make sure we control what is happening”.

Some responses talked about measuring what is happening, against a plan, which suggests a data-gathering exercise which might be used to improve forecasting in the future. However, an action which may be important in reducing the coping zone in the future is not likely to help in the immediacy of the moment.

Overall the responses lend weight to the proposition being true for many service organizations. Perhaps this reflects that to be good at coping you must already be good at managing capacity so that the process is more controlled and the coping zone is reduced. As one airline reported, "We used to regard firefighting as part of our culture without recognizing what this did for customer service and cost".

*Proposition 2: Most Service Operations Managers Do Not Measure the Degradation of Service Quality as Perceived by Customers during Coping*

Responses to a question asking what suffers in service quality when services run out-of capacity and whether this was measured revealed some alarming results. The features of service quality which were perceived to suffer most in these circumstances were responsiveness, reliability, assurance and empathy (summarizing them in the terms used by Berry *et al.* (1990), and were the ones which were considered to be of most importance to customers. However, despite the importance of the effect on customer satisfaction there was very little indication that this degradation of service quality was measured at the time, either by internal measurement or by talking to customers. Most of the measurement was collected, analysed, and perhaps acted on after the event, by way of internal audits or customer surveys or complaints received. Whether the customer surveys fixed the time of the experience in all cases was not investigated. There were also instances of managers admitting that no measurements were made.

These results suggest that the proposition as stated is not strictly true. Managers do measure but not often at a time when there is the possibility of corrective action being taken. The effect is to have *lagging* rather than *leading* measures.

*Proposition 3a: Service Operations Managers Do Not Generally Understand the Link between Resource Utilization and Service Quality for Their Operations*

*Proposition 3b: Where They Do Understand the Link They Do Not Act in Ways to Maximize Perceived Service Quality*

*Proposition 3c: Most organizations Will Have to Manage at Times in the Coping Zone because of Variability in Demand*

Respondents were asked to say whether there was an upper or lower utilization level where service quality was affected for the worse. The responses to the question were often couched in terms which reported an average utilization of resources achieved – a resource productivity measure rather than a quality measure. Some follow-up telephone interviews with a smaller number of respondents suggested a lack of understanding of the link between utilization and quality. Where the link was understood there was a lack of good data to fix the utilization figures relative to service quality dimensions. It also seemed clear that most did at some time see themselves as being in the coping zone.

The propositions 3a, 3b, and 3c seem generally true for many service organizations in that while the link between utilization and resource productivity is recognized as a measure, the same is not true for the way in which resource utilization and service quality is measured and managed. It does raise the question, “How, without the knowledge of the link between resource utilization and customer satisfaction, can a service operation expect to raise its general level of utilization of resources without affecting customer satisfaction if no measurements are being collected, analyzed and used by the operations managers?”

*Proposition 4: Service Organizations Which Are Good at Service Recovery Are Better at Managing in the Coping Zone*

The survey work described so far did not allow this proposition to be tested. However, anecdotal and empirical evidence would suggest some truth to the proposition. Centre Parcs, an activity holiday resort, minimizes the need to cope through design of flexible facilities and the availability of a range of alternative activities which can be offered when capacity is being reached in a particularly popular activity. Los Locos, a Mexican style restaurant and nightclub, relies on the skills of staff to interact with customers to make the service experience different from less busy times. American Express Authorization Departments forecast and monitor demand and maintain high flexibility in the speed with which extra staff can be brought into action.

*Proposition 5: Service Organizations Which Are Good Copers Are Good at Designing Flexibility into Their Operations*

This proposition would seem to follow from an examination of the other four. An understanding of flexibility and capability to build it into the delivery system and to manage it operationally should reduce the coping zone.

It would seem that service organizations which fall into the category of good copers already carry out many of the basics of good capacity management with regard to service quality and resource productivity, namely:

- Improving their forecasting capabilities.
- Setting clear quality targets.
- Setting clear resource productivity targets.
- Understanding the bottle-necks in service delivery and manage them.
- Understanding the need for flexibility and build it into the service delivery.
- Understanding the critical failure points in service delivery (Armistead and Clark, 1992c).
- Understanding the critical and sensitive hygiene dimensions of service quality (Armistead and Clark, 1992c).

### A Coping Action Strategy

The present situation for managing coping does not seem to be encouraging on the basis of an empirical examination of the propositions relating to capacity management and the achievement of service quality and resource productivity targets. If service organizations are to improve their service delivery to compete on the service recovery and unconditional service guarantees, an extension of the simple capacity strategies proposed by Sasser (1976) are inadequate guidance for service operations managers.

Armistead (1990) has proposed the importance of an understanding of the *service operations task* as an instrument for translating service strategy into a service delivery system which is capable of achieving the goals of the strategy. Integral to the task are statements of:

- (1) The customer service dimensions which are:
  - critical dimensions leading to competitive advantage; and
  - sensitive hygiene dimensions which if absent lead to loss of customer satisfaction.
- (2) Service demand which describes the nature and variation of demand and shifts in the mix of services.
- (3) Resource productivity targets.
- (4) Constraints on resources or the actions managers can take.

Empirical evidence from working with service organizations suggests that service managers do not necessarily have the information on these four important factors organized in a way which brings them together in a cohesive manner. The result is that they cope by custom and practice rather than by design.

However, even when a service operations task can describe what has to be achieved in terms of customer service dimensions, demand and resource productivity targets, these may apply to the service overall. Hence, the intricacies of understanding what is needed to ensure that service delivery is achieved consistently through a multi-stage operation may be missed. The same criticism can be levelled at the Sasser model (1976) which suggests looking at the whole of the service delivery. What is needed is a means of bringing together information which focuses on the critical aspects of service delivery at different stages and to consider the general capacity management issues and the specific coping issues at each stage. A combination of a model of *operational focus* (Larsson and Bowen, 1989) and of *resource activity mapping* (Armistead and Clark, 1993) offer an improved approach.

#### *C-F-B Operational Focus*

Larsson and Bowen (1989) suggested that different types of service present service operations managers with a different operational focus. Their model addresses aspects of uncertainty in demand, first in the mix of services



required, i.e. diversity of demand, and second, in the nature of demand related to customers' willingness to participate. This matrix is similar to that proposed by Maister and Lovelock (1982) for standardized and customized services producing added value mainly in either the front office or the back room. Figure 2 shows a combination of the Larsson and Bowen and the Maister and Lovelock models so that high diversity of demand is associated with customized services and high customer disposition to participate with high customer involvement and value added in the front office. Four situations arise for the C-F-B operational focus:

- (1) High customization plus added value in the front office[C-F] -B: In this case, the operational focus is around the interaction between the front line service providers and the customer, typical of professional services. The back room still has a role to play in providing support and can, of course, frustrate the efforts of the front line if it fails to deliver. However, the back room is not visible to the customer.
- (2) High customization plus added value in the back room C- [F-B]: In this case, typical of market research or repair operations, the focus for the operations is in making sure that the information which is gathered from the customer is relayed to the back room doers and queries and suggestions flow in the opposite direction. The front office must understand capacity and the current state of the back room in negotiating directly with the customer rather than acting as a mere go-between. Also, there is still the important aspect of the front line staff

	Added value back room	Added value front office
Customize	C-[F-B]  Front to back room driven	[C-F]-B  Client interaction driven
Standardized	C-F-[B] Operations driven	[C-F-B] Customer participation driven
	Low customer contact	High customer contact

Source: adapted from Sasser (1976)

**Figure 2.**  
Operational Focus for  
Service Delivery

managing the customer service encounter capably so there is no decrease in customer satisfaction through over-promising. The client contact in this case is often only at the beginning and the end of the process.

- (3) High standardization plus added value in the back room C-F- [B]: In this case, the operational focus is on the back room. Aspects of efficiency are likely to be more important (following Chase and Tansik, 1983). Many transport operations and traditional retailing banking fall into this category. The front office role is to make a standard service seem “warm” to the customer through customer-care techniques, in effect to train the customer to expect a standard service.
- (4) High standardization plus added value front office [C-F-B]: Here there is a departure from the Bowen and Larsson model. The situation is one of participation by the customer in a standard service. The participation may be in a self-service capacity or it may be to play a part in a service involving groups of customers. The focus is on the chain to ensure that front office and back room co-ordinate to ensure that the customer is able to do the job and play the appropriate role, and consequently to receive the full benefit as an individual.

#### *Capacity Strategies for the Different Operational Foci*

Each of the four different types of operational focus require their own capacity strategy as a general approach and for coping.

- (1) Client-driven interaction, [C-F] -B: The main capacity strategy is more likely to be *level* because of the professional status of front office staff. The assumption being that the service is highly valued by the customer. The approaches to coping include:
  - establishing customer expectations;
  - starting the first stage of the process;
  - keeping in touch with clients;
  - having associates/locums who can help out;
  - using back room staff to provide customer care, though the organization must be careful that this is not perceived as mollifying clients;
  - downgrade the service offering in a planned manner.
- (2) Front to back driven, C- [F-B]: The main capacity strategy is towards level because of constraints on staff with the necessary skills, or because specialized equipment is required. The approaches to coping include:
  - managing customer expectation in the front office;
  - front office knowing the status in the back room to be able to update and renegotiate with customers;
  - confuse ignorant customers with the back room complexity!

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- (3) Operations driven, C-F- [B]: The main capacity strategy could be either chase or level. The approaches to coping include:
- downgrade the service protecting sensitive hygiene dimensions of customer service;
  - rely on the front office relationships with the customer to minimize damage in periods of coping;
  - prioritize work.
- (4) Customer participation driven, [C-F-B]: The main capacity strategy is more towards chase. The approaches to coping include:
- focusing on customers in trouble;
  - action/escalation teams;
  - provide a basic no-frills service.

#### *Resource Activity Mapping*

Resource activity mapping (Armistead and Clark, 1993) allows a presentation of the resources used in the different stages for the complete delivery of a service. The technique allows examination of the build of perceived added value associated with critical customer service dimensions and where costs are absorbed. Hence, strengths and weaknesses of the process can be established and enhancements identified. The technique is particularly useful for identifying gaps in the linkage between different stages.

#### **Coping Action Mapping**

Coping action mapping brings together the approach of resource activity mapping to display end to end the activities which constitute the whole service delivery. The concept is to display the main capacity strategy and the developed coping approaches or issues with reference to the main stages in delivering the total service while taking account of the critical and sensitive hygiene customer service dimensions. The operational focus for each activity is also displayed. In practice, it has been found that most service delivery can be reduced to between five and seven main activities. The coping action mapping matrix developed from these factors is show in Figure 3.

The use of the matrix is to examine coping issues and approaches in relation to the customer service dimensions at each stage. The process is best illustrated by way of a case example.

#### *Case Example of the Use of Coping Action Mapping*

Intruder Alarms is a hypothetical company based on a real company which designs, installs and services burglar alarm and access control systems for major public buildings, industrial premises, retail outlets and large private houses. The company has less than 500 employees and a turnover of £30 million per annum. It has four regional general managers, each responsible for sales and

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	Activities in service delivery			
	Activity 1	Activity 2	Activity 3	Activity 4
Operational focus				
Main capacity strategy				
Customer service dimensions				
(1) Critical				
(2) Sensitive hygiene				
Approaches/ issues of coping				

**Figure 3.**  
Basic Coping Action  
Map

service in their territory. Each region in turn has three or four “depots” or district offices containing sales people, system installers, service engineers and administrative staff. Administration includes routine customer enquiries, service engineer control and local inventory management. There is a small headquarters staff including the managing director, sales director and chief accountant. Other central services include a major projects team, national account managers and a small group of electronic design specialists available as a resource to sales consultants to solve non-standard problems. There is a central monitoring station to which key systems are connected to give immediate warning that a system alarm has been activated. Of total inventory 30 per cent of materials both for installation and service is held in the local depots, the remainder being held in a central store. There are weekly stock deliveries to the depots.

The UK intruder alarm market is very fragmented. There are a number of national network suppliers. Intruder Alarms has a strong national brand name; ABC Alarms has more installed systems, but an inferior quality reputation; and XYZ Alarms has better geographical coverage but is higher priced. Intruder Alarms has about 8 per cent of the UK market in terms of numbers of installed systems, ABC holds 12 per cent and XYZ, 7 per cent. A further 10 per cent of the market is represented by three local companies specializing in large systems and the remainder is made up of many small local suppliers who deal with private customers and small retail premises.

Installing a system does not guarantee the service contract will continue. Because the systems contain standard parts smaller service providers are often able to offer low cost maintenance.

The market is growing at 5 per cent per annum as crime rates increase, and insurance is linked to the effectiveness of security systems.

The industry generally is not good at maintaining service standards. A general statistic is that 90 per cent of all alarm calls are false alarms. The reasons for these false alarms include poor installation and design, infrequent maintenance and incorrect operation by customers. Apart from the cost implications, a major issue is that the police may take a system "off response" if the calls are consistently false alarms with consequent problems of insurance and protection.

There is an industry trade association which lays down agreed minimum standards, but this is more cosmetic than rigorous.

The main activities in the total service delivery process are:

- (1) *Design* of the system initiated by sales persons in response to enquiries.
- (2) *Installation* of the equipment essentially by their own crews but sometimes using subcontractors.
- (3) *Commissioning* of the system and training of the customers. Training is important as many false alarms are caused by user errors. It is also the stage at which the system is passed from the installing teams to the service and support team.
- (4) *Monitoring* of the systems in use from a central monitoring station linked to the systems by telephone lines. If alarms are activated the monitoring station alerts the police, a designated key holder and a service engineer. An industry standard demands that all calls of this nature are attended by a service engineer to reset the system within four hours. Failure to meet this standard could lead to the police refusing to respond to calls.
- (5) *Service* of the equipment. The work may be to repair or upgrade a system or to carry out preventative maintenance. The work is carried out by service engineers based in district offices. Engineers may be transferred between districts to balance workloads.
- (6) *Support* of the customer in giving advice about the use of the system or upgrades or retraining of users as staff are replaced. Support is usually delivered from the district offices either by telephone or by visits from service engineers or sales people.

The most important critical dimensions of customer service for the main service provided by the company are:

- The reliability of the system.
- First time fix when things go wrong.
- User training.
- Documentation about the system and service contracts.
- The attitudes of front line staff.
- Price.

The sensitive hygiene dimensions of customer service are:

- The ease of installation of the systems.
- Meeting the four-hour response time.
- Routine maintenance.
- Access to staff.
- Customer records.

The main activities in the service delivery are shown in Table I. For each activity the C-F-B operational focus and the basic capacity management approach used, and the customer service dimensions which are most influenced by the activity are identified.

- (1) *Design*: The operational focus is C- [F-B] because the sales people do some of the design activity themselves and have to relate to back room engineering specialists and the producers of tenders. The capacity in this activity is basically “level” because of the skill level of the sales people. Additional capacity in the short term is available only through overtime.
- (2) *Installation*: The operational focus is C-F- [B] with little involvement of the customer or the front line staff. The emphasis is on the control of the installation team to fit the system according to the design specifications. The capacity strategy is “chase” with use being made of subcontractors and the ability to transfer resources about the network of branches when necessary.
- (3) *Commissioning*: The operational focus is now [C-F]-B with the emphasis on the training of the users and the hand-over between the sales team and the service team. The capacity strategy is “level” with the process being determined by the availability of the service engineer.
- (4) *Monitoring*: The operational focus is C-F- [B] and with a “level” capacity strategy due to the number of telecommunication lines into the central station.
- (5) *Service*: The operational focus is C-F- [B] with the concentration on the servicing of the security systems and ensuring consistency of work with first time fix. The capacity strategy is “chase” with engineers being scheduled against workloads and overtime and transfer of resources being used to accommodate peaks.
- (6) *Support*: The operational focus switches to [C-F]-B with the contact with the customer to answer queries and to give advice. A “level” capacity strategy is followed.

#### *The Coping Issues and Service Quality*

The issues which confront the service managers for each activity are to some extent determined by the bias of the basic capacity strategy, the nature of the activity itself, and the customer service dimensions. Importantly, it is necessary

	Design	Installation	Commissioning	Monitoring	Service	Support
Operational focus	C-[F-B]	C-F-[B]	[C-F]B	C-F-[B]	C-F-[B]	[C-F]B
Main capacity approach	Level	Chase	Chase	Level	Chase	Level
Critical customer service dimensions	Reliability Price Staff attitudes	Reliability	Customer training Staff attitudes	Reliability	Reliability First time fix	Documentation Customer training Staff Attitudes
- Sensitive hygiene factors	Installability	Installability	Customer records	Four-hour response Customer records	Routine maintenance Customer records	Customer records
Coping issues	Overpromising Customer waiting Prioritizing leads	Controlling subcontracts Transferring resources	Transferring resources	Contact "key" holders	Minimizing incidents Record accuracy Real time scheduling	Access to information and field staff Record accuracy

**Table I.**  
Coping Action  
Mapping

to have a feel for perceived service quality and costs in the coping zone when capacity runs out.

Taking the activities one at a time the coping issues are:

- (1) *Design*: The design process in itself helps to minimize the need for coping at later stages in service delivery by increasing the reliability of the system. Action which can be taken to minimize the occurrence of coping at the design stage include being careful about over promising what can be achieved in a period of time and persuading potential customers to wait; this requires good information on what is possible. Where there are conflicting demands from a number of customers a system for prioritizing customers is required. It is inevitable that at some times capacity will not be able to cope with demand and service levels will fall. In the short term extra resources cannot be added so it is important to control the fall in service. Rushed service should be avoided because of the importance of reliability in the customer service dimensions. Information systems like computer aided design operated by centralized-design specialists can be used to cut the time to design.
- (2) *Installation*: Resources can be increased to minimize coping if the transferring of resources can be anticipated and planned with sub-contractors controlled by supervisory resources. Better control of materials reduces the possibility of coping caused by stock shortages.
- (3) *Commissioning*: The issue here is concerned with transferring resources to be able to carry out customer training and hand-over. If this fails the service levels are likely to fall with poor customer training leading to errors in the use of the system and poor hand-over with the potential for an adverse effect on the reliability of the system.
- (4) *Monitoring*: Coping will occur if there are so many incidents that there are insufficient staff to communicate with the police and service engineers. Some system of prioritizing calls would minimize the effect or by spending more on remote diagnostics which would reduce call out to false alarms.
- (5) *Service*: Coping in service will be reduced if the basics of service can be carried out. Preventative maintenance, which can be scheduled accurately, reduces the incidence of failures. Execution of fault-free work when breakdown does occur and carried out at the first visit will also reduce the incidence of false alarms. When demand is running close to capacity and coping takes place, there will be a fall in the response time and the possibility of rushed service with mistakes being made. A vicious circle is set up of more coping leading to less time for preventative maintenance and, hence, more failures. The effects may be reduced by having comprehensive customer records of the system and of the key holders, by being able to schedule engineers' travel and work in real time, and being able to maintain contact with them. The issue is



concerned with how much can be spent to improve scheduling and customer records to control the fall in service with the present incidence of coping.

- (6) *Support:* Coping can be frequently induced as the capacity is essentially level. As the main feature of customer service which is likely to be affected is access to information and to field staff, the issue is to measure what is happening. When are customers being kept waiting? When are staff spending too little time with customers? When does the contact seem rushed for the customers? Are there errors in information or advice given to customers at these times?
- (7) *General issues:* Other actions to help to minimize coping include training of staff to increase their willingness to solve problems as they arise and engendering a right first time attitude in the service and support activities. The actions taken may involve a redesign of the service delivery system making increased use of technology to help in the design process, in remote diagnostics and remote resetting of alarms, in giving engineers access to information on specific systems, and for scheduling and controlling the movement of staff. All of which would help to increase the reliability of the systems and minimize failures thus reducing the coping zones.

### Conclusion

Research findings suggest that service managers are not good at managing capacity in relation to service quality. A coping capacity strategy is proposed as a way of augmenting the strategies of chase and level capacity management. The coping action map is an attempt to present a way of developing coping strategies which recognize changing operational focus, capacity strategies and customer service dimensions within a total service delivery. It is not prescriptive in the development of coping strategies at each stage but it does allow the main coping issues or approaches to be identified. If the aspect of coping is found to have a critical affect on service quality it indicates the need to develop a coping strategy. Such a strategy would involve:

- improving the basics of capacity management in forecasting and scheduling;
- measurement of service quality and utilization of critical resources;
- instituting a measuring system which will warn when the coping zone is being approached;
- deciding whether to reduce service quality levels and how this should be done; or
- deciding how to bring in additional resources.

Such an approach would help to overcome the shortfalls in understanding and managing capacity in relation to service quality.

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