Asian Journal of Managerial Science
ISSN: 2249-6300 (P), Vol.12 No.1, 2023, pp.26-31

DOI: https://doi.org/10.51983/ajms-2023.12.1.3440

Analysis on Waiting Lines in the Context of Service Encounter: Waiting Lines

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(Received 31 December 2022; Revised 15 February 2023; Accepted 4 March 2023; Available online 10 March 2023)

***Abstract* - It is quite often that a customer comes in contact with a service provider. Often we call each this contact as moments of truth. It is quite true that each of these moments of truth need the qualification as a satisfying one for enhancing the customer prospects. At times it may be possible that these encounters which turn out to be not satisfying leaves a void between the customer and the service provider. To obviate widening of such a gap service provider undertakes the process of service recovery. Cycle of service would be satisfying when the moments of truth become acceptable. Unexpected failures in service encounter would be seen from the point of frequent bottle necks or the waiting lines. Waiting line is generally seen when more than one customer wait for a service. So, if we understand in economics it is a case of imbalance between demand and supply or we say demand for service and the capacity of the service provider to satisfy the customer within the acceptable time. Service provider can influence the acceptable time by various methods. Waiting line is definitely related to the arrival rate, so the point in consideration is variability. E-commerce has taken a step in support of reducing the waiting line in certain cases of services. In this paper analysis is being carried out to understand the impact of waiting lines in service encounter. The research design adopted is survey method.**

Keywords: **Service Encounter, Waiting Lines, Service Recovery, Moment of Truth, Culture**

I. INTRODUCTION

A customer evaluates the service and the service provider from the quality of service and the interaction with the contact person of the service provider. Dimensions of quality of service includes time and timeliness, completeness, courtesy and consistency. Hence time and timeliness is an important factor, which means that the customer is anxious to know as to how much time or how long the wait is for the service. So, the interaction with the contact person of the service provider and the effectiveness in delivering the service are important [22]. From the satisfied customer develops a word of mouth opinion which is translated into increased recognition of the service provider, productivity but in case of the converse there would be a negative publicity or unpopularity. Service value has a direct bearing on the service encounter, which means an evaluative judgement based on the service encounter [1].

A service encounter is an evaluative statement on the efficiency in terms of perceived control, autonomy and satisfaction. Unrealistic customer expectations and unexpected service failures may lead to poor service encounter. Satisfaction can be a personal and subjective evaluation of the customer. Service encounter will largely depend upon the technology adaptation of the service provider and interpersonal skills of the contact person [22]. The increased frequency with which the customer utilises the service would make the service provider more amenable to the requirements. It may go to the extent of a mutual understanding of each other's capacity to absorb. Hence there would not be any case of unrealistic customer expectations.

Waiting lines is important for the operations manager for a number of reasons. This is primarily because it affects certain aspect of manufacturing like process design, capacity planning and supply chain performance. As identified the concept of waiting line comes to play due the temporary imbalance between demand for service and capacity of the service provider [3]. The demand for service can be based on timelines, which can also cause imbalances.

Let us take for example a commercial bank. It performs variety of functions. These functions have characteristic variations which would be time dependent but having variable time brackets. Hence even within scheduled operations, there are cases where timelines cause a temporary imbalance resulting in waiting lines. In certain cases, even when the process time is constant there can be waiting lines as a result of variability. Sometimes out of the box concepts can introduce waiting lines. As a matter of fact, certain outlets introduced a concept of midnight sale. This drew large crowds and it was surprising to find that during the time of pandemic people were found jostling for space on the staircases.

In service encounter we come across a host of interpersonal activities, which include welcoming a customer, actively listening to the customer, engaging the customer and obtaining feedback from the customer. Analysis of service encounter brings in certain key aspects, which are breaking the ice, interacting, engaging and finalising. Understanding the various pragmatic strategies which can be used to engage in service encounter assumes important along with contextual, social and linguistic aberrations. Many people

stick to a particular service provider, which implies that there is a built in familiarity. This familiarity can be developed as a resource as and when the familiarity is taken a step ahead to personal level from transaction level. Followed by breaking the ice is the negotiation of service. During this part it may be prudent to consider a state of existence above the transactional level, especially if the service provider has been able to establish familiarity. At this point we may get involved in the concept of satisfaction mirror.

Suggestions, offers, and conditional statements can draw the customers to a positive service encounter. The transformation of an employee's satisfaction to the customer is indicated in satisfaction mirror [4]. How does it happen? Primarily it is the organizational culture developed by a service provider to the employees to convert each of the service encounter into more meaningful by a transformational approach. A higher employee satisfaction has been able improve the customer satisfaction resulting into lower costs and better results for the customer and higher productivity and increased profit for the service provider. A good organizational culture will improve quality which is reflected in productivity. Such a state drives service value and profitability as well as growth [6].

II. LITERATURE REVIEW

John A. Czepiel; Michael R. Solomon; Carol F. Surprenant in their book entitled "The Service encounter: managing employee/customer interaction in service businesses", which deals with service encounter has discussed the conceptual understanding of face to face encounters. Consumer risk perceptions and perceived control in service encounter is deliberated. It also covers the impact of cross selling on the service encounter in retail banking. It also undertakes an empirical study on the consumer of household services in market place [12].

"Determinants of Successful Service Encounters", 2019, IGI Global Publisher of timely Knowledge deals with interactions between customers and service providers are apparent phenomena. The article introduces various theories and propositions of successful service encounters that aim to interpret the process through which service encounters may seem most appropriate and affect customers and employees [12].

Maria da Graça Batista, Miguel Pina e Cunha, Armenio Rego, (2012), in their book entitled "Structuring the Service Encounter: A Test of Alternatives", IGI Global Publisher of timely Knowledge performed two studies (experimental and correlational). There is an element of originality in this study since it empirically explores the application of minimal structures to the service encounter and the findings help practitioners to make more informed choices about the structures they adopt for the management of service encounters [15].

Oreilly, (2022), in the book entitled "Waiting Line Models: Operations management an integrated approach", 5th Edition discusses that any time there is more customer demand for a service than can be provided, a waiting line occurs. Customers can be either humans or inanimate objects. We would have objects in the nature of an item under repair or under process (WIP inventory) or spatial delay in transmission of electronic messages. It may even be delay in the process of transportation peripherals which consume quite a lot of time. There is a relation between the accepted waiting time and cost of service being provided. It is probable that when the intensity of service being provided is low it results in poor customer satisfaction. As we all know, high customer satisfaction translates into good business and improved productivity. The managers should weigh between level of service and cost [18].

Kenneth A Shaw, (2015), in the book entitled "Operations Methods: Waiting Line Applications", Second Edition, Business Expert Press, provides materials for assisting business professionals on using waiting line analysis and methods to improve both service and manufacturing business applications of queuing situations. Here the importance is provided to bringing out the caveats in applying waiting line theory and becoming aware of the assumptions used in developing that theory [13].

III. RESEARCH METHODOLOGY

Survey method has been adopted and hypothesis testing is used to identify the customer perception in service encounter and its relation to waiting lines. So here we have derived a hypothesis to identify the correlation between service encounter and waiting lines. For evaluation of any thought process on its efficacy and generality a scientific analysis is required. In this case also, to make the research appropriate and acceptable to various situations a scientific approach has been utilized. For initiating the study in to a scientific approach selecting a hypothesis encompassing all the desired characteristics and factors was found to be necessary [5].

Based on the focus of study the general statement of research selected has been, "Customer perception of Service encounter is influenced by the waiting lines". It is more often than not a prognostic assertion which can possibly be tested scientifically. The methodology used in formulation of this paper is largely qualitative and to a very miniscule portion quantitative. Since the object of this research is to arrive at a relation between

For the purpose of obtaining a realistic data, questionnaire was circulated amongst various age groups and occupation through internet and some cases based on the educational level through surveys [7]. A significant level of one has been taken, which is fairly accurate. After formulation of general statement, the next step is to frame specific question. For the research work the specific question formulated is as given below.

"*Is there a positive correlation between customer perception of service encounter and waiting lines?"*

Hypothesis:

Ho: Customer perception of service encounter is influenced by waiting lines.
Ha: Customer perception of service encounter is not influenced by waiting lines.

We would go for a correlation test using Pearson's correlation coefficient (r) based on the values we obtain from the responses received. Here we take customer perception as 'x' and duration in waiting line as 'y'. It is possible to estimate the correlation coefficient using the formula.

Equation 1:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}$$

IV. ANALYSIS OF THE STUDY

Waiting line is a relative term having an independent variable customers and a dependant variable time. The scope of service may also be a factor and the capacity of the service provider as well as the efficiency of the point of contact. Generally speaking, it is an imbalance which has a bearing on the least tolerance of the customer. Scope of the service means how complicated the service is or how many levels or process the service moves to satisfy the customer requirement. Even though waiting lines are generally associated with living beings and services, we can relate this feature to manufacturing as well as inanimate objects. In effect a waiting line would have a population, delay in process causing a waiting line formation whose length is relative, a service provider whose facility has an influence on the waiting line and also the precedence established for providing the service [12]. Customer population can be finite or infinite, a factor which is based on the rate at which population generates new customers. They can also be considered as patient or impatient. The impatient customer balks on finding waiting lines which would be a cause of concern for the service provider resulting in loss of opportunity. The service system can be single line or multiple lines, single phase or multiple phases and single channel or multiple channels. The use of a particular type of service system depends upon factors such as; community, environment, technology and purchasing power. Unlike the cases of preemptive discipline, we all go by the common priority rule while identifying service facility with the customer. Source of variation as far as waiting line is concerned depends upon the flow of customers and variation in service times [8].

Variability of customer arrival can be better organized using Poisson distribution where as service time can be described by exponential distribution. Probability that 'x' number of customers will arrive in a particular time period (y) can be calculated by $Pn = \frac{(\lambda y)^x}{x!} e^{-}\lambda y$; where λ is average number of customer arrivals per time period. Average utilization of the system (ρ) whether it is single –server model or multiple server model is directly proportional to the mean arrival rate (λ) and inversely proportional to the (μ) mean service rate $\rho = \frac{\lambda}{\mu}$ and average time spent in the system would be $\omega = \frac{1}{(\mu-\lambda)}$ [9].

In analyzing waiting line one of the tools used is Little's law. This law relates three variables; number of customers in a waiting line (L), arrival rate and waiting time of the customers; $L = \lambda\omega$ or$Lq = \lambda\omega q$. The scope of this law is to provide flexibility to operations manager, wherein if the time spend at a facility is excessive or more than acceptable parameters by either adding capacity or improving work methods the time spend serving the customers can be reduced. It is not only in services that we see the utilization of the law but also in manufacturing. Let us say if we know the average time a product spends in manufacturing process and arrival rate the average work in process (WIP) can be estimated. So, in the case of services and manufacturing the operations manager can measure the effects of process improvements. In the case of finite population, a single-server model is better [10].

Data analysis. The responses of the 76 participants are tabulated and analyzed. The mean value for all the questions is around 6 which imply that the respondents were generally aware on the work being undertaken and with a mean value of 6.8 for the Question No1 it is inferred that generally the respondents tend to shop that too on line shopping. For questions with * reverse score has been taken into consideration. It is most certain from the responses for question 2 that waiting line is a recurring or constantly occurring phenomenon.

As we are utilizing the correlation for identifying a possible relationship between the effect of waiting lines and service encounter, let us identify the waiting line as the independent variable (x) and satisfaction in the service encounter as dependent variable (y). From the tabulated responses we take a mean of the values obtained for Questions 2,4,5,8 to arrive at the value of x and mean of the responses to questions 6, 7, 10, 11, 12 for obtaining the value of y. Hence;

Equation 2:

$$x = \sum(471 + 476 + 457 + 472)/4 = 469$$

Equation 3:

$$y = (466 + 472 + 501 + 476 + 478)/5 = 479$$

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}$$

Feeding the value of x and y from equation 2 and 3 in equation 1 gives

r = [76(223063)-224651] // [76(217753)-219961)] [76(229249)-229441)] = 0.316

This implies that in general waiting lines has a positive correlation with service encounter and that implies that irrespective of the location the unpleasantness of service encounter increases with the waiting lines.

To make our analysis more concrete, let us specifically go to the aspect of influence of waiting lines on service encounter. [16] For this we take the value of responses given for question 4, 5,9,10.

So, r = [76(353052)-234394] // [76(217044)-218089] [76(253129)-253009] = 0.475

This result confirms our position that waiting lines has a positive correlation with service encounter and that implies that irrespective of the location the unpleasantness of service encounter increases with the waiting lines [11].

V. FINDINGS OF THE STUDY

Waiting lines are a matter which has an impact on the service encounter, spoken reputation, productivity and customer satisfaction. Generally, a customer who receives no satisfaction due to persisting waiting lines would not generally resort to complaining, rather he balks or reneges. As a result, the service provider would not have the realistic assessment of the impact of waiting lines. It may be over a period of time this aspect is realized from the point of low productivity. It would be rare to find a patient customer in this regard in case the service provider does not have human considerations [17].

There is a possibility of reducing this dissatisfaction by established procedures. How can it be undertaken, and the success rates are rather inconsistent. Why it is inconsistent is due to various factors. The mental makeup of the customer plays an important role, which is influenced by the servicescape, satisfaction mirror personality of the customer, preemptive discipline and decision areas for the management.

In interpersonal services both customers and employees are present for interaction such as restaurant, service station for vehicles, hospitals or even public transport. The needs and requirements of customers and employees should be facilitated by servicescape to enhance the social interaction. The external arrangement and internal ambience would increase the customer satisfaction even if the waiting lines exist. One can imagine the waiting line in, check in counter at the airport surrounded by stillness compared to one where a soft soothing music is played. Even though waiting line is prevailing in both the cases the customers may not be complaining in the case of latter. In the self-service type services employees are absent and customer has to perform all operations on his or her own like operating ATMs and vending machines. In remote services, the customers are served from a distance and only employees perform the actions in the servicescape such as telephone and utilities related services [19].

Another important aspect is satisfaction mirror. Attitude of service provider is also important to provide the excitement to the customer to be patient rather that balking or reneging. When service management brings in a strong and positive relationship between the satisfaction of customer and workforce it will improve the service environment. Under such a state of positive correlation the negative effect of waiting line on service encounter would be reduced to a great extent. There are various factors which influences satisfaction mirror but suffices to state that workforce satisfaction is transferable to customer satisfaction. It is relative that when clients have a perception of better service the productivity of the workforce is improved and so will the productivity of the firm [14].

Whether in manufacturing or services, priority rule is established for the management of waiting lines. We are aware of Johnson's priority rule for machines in manufacturing, and when it comes to services the priority rule establishes an accepted norm for which customer to be served next. It may be first come first serve (FCFS) or earliest promised due date (EPDD) or shortest processing time (SPT). Once the customers are clear about the priority rule chances of having impatient customers is reduced that much. It suffices to say that having an established rule by no way absolves the responsibility of occupying the customers time due to fluctuations in arrival rate. These can be managed by having better servicescape. Waiting room can have television, newspapers, and journals to occupy the time. Introducing token system is an effective way to obviate long standing queues. Apart from these rules we may go for a preemptive discipline in certain cases. It may be allocating a higher priority to a customer with the permission to interrupt another customer in the line. We often find such cases in hospitals or for that matter in case of elderly customers. Definitely these would be exceptions than rule, which means that in case such exceptions become too frequent a separate channel is ideal. In cases of complex priority disciplines computer simulation may bring out logically laid out waiting lines based on modeling of systems [20].

On the basis of questionnaire and the responses received an effort was made to identify whether there exists any correlation between waiting lines and dissatisfied customer. With a value of r=0.316 it is reasonable to conclude that there is a positive correlation *which implies that waiting lines tends to produce dissatisfied customers*. This dissatisfaction may be translated in to a poor spoken reputation of the service provider or in extreme cases an impatient customer may choose to balk or renege. Either way the service provider looses a customer which would

directly affect the productivity. Thereafter it was considered to analyze whether waiting lines would create impatient customers using correlation coefficient and it was found that the value of r was 0.475 which reflects that *there is a positive correlation, and we can safely conclude that waiting lines tends to create impatient customers*. Hence we accept the null hypothesis; hence our assumption that; Customer perception of service encounter is influenced by waiting lines is accepted.

As per Little law $L = \lambda\omega$ or$Lq = \lambda\omega q$. We would find that as λ (arrival rate) varies L increases causing discomfort. So, the challenge for operating manager would be make ω reasonably acceptable. Considering that efficiency of the contact personal to be same and the fact that Little law is not effective when customer population is finite, average utilization is calculated using the Po (probability of zero customers in the line). However, we may ponder to remove the confusion by arriving at a realistic λ by incorporating a factor δ value of which ranges from 0 to 1. For the peak arrival the value of δ can be taken as 1 and based on either statistical methods or judgmental methods value of δ can vary from 1 to 0 which in effect will give the realistic value of δ and thus λ. Hence we may modify the basic equation for L as, L= δ $\lambda\omega$ or $Lq = \delta\lambda\omega q$. *Therefore whether it is finite source or infinite source the operations manager would be able to realistically assess the waiting line and take remedial action to cater for impatient customers.*

VI. RECOMMENDATIONS

The bigger question is how the operations manager can improve the service system considering that waiting-line is a problem which needs to be realistically assessed. It is natural that waiting lines are one of the many factors which can change the expectation of service encounter. As the topic of discussion is on impact of waiting lines on service encounter and statistically we have been able to identify a positive correlation, the recommendations would be on the activities the operations manager can take to obviate or reduce the effect of waiting lines on service encounter. One thing which is certain is that there is a limit to increasing the efficiency of the system not only because of the cost factor but also due to phases involved. Length of the line and number of customers in the system indicates server efficiency and need to increase capacity but a long line may not necessarily reflect long waiting lines. In case the customer is spending unusually long time, it is an indication of need for change in priority discipline, server efficiency and capacity. There is a delicate balance between total time a customer spends in a system and service facility utilization because management's goal would be to minimize both [21]. Certain suggestions are given in subsequent paragraphs.

It is possible to level the arrival rates so that a near so even arrival rate is maintained. This can be done by attracting customers during the lean time using incentives. One of the recently tried out way was to have mid-night sale with discount, but then it was found that the waiting lines were too much to be classified as a crowd. Adopting a flexi system whereby service provider encourages workforce and design serving customers which can be multi-tasked. Possibly in this way an out of the ordinary waiting line can be attempted to be reduced to an acceptable time frame. Whenever tasks are complicated it takes more time which can create a bottleneck. When these tasks are identified these complicated tasks can be divided into manageable phases where each of the phases would remove the bottlenecks. Service rate can be improved by bringing in technology. For e.g., a passbook printing kiosk in the bank removed the waiting line at the service counter and the contact person could attend to more complicated tasks whereby waiting lines in both the areas were reduced. After identifying the waiting lines and then relating to the priority rule, opportunities may become obvious to the operations manager to bring changes to priority rule altogether or at individual servers. Multi-service windows or counter can reduce the waiting line. Process model layout can many a times reduce the waiting lines.

VII. CONCLUSION

In many cases the service mechanism is committed; hence it would be natural to find attendance delays. It would be certain that waiting lines cannot be eliminated completely, but suitable techniques can be used to reduce the waiting time of an object in the system. It is important for a service provider to realize that long waiting lines may result in loss of customers to an organization. Waiting time can be reduced by providing additional service facilities, but it may result in an increase in the idle time of the service mechanism and added cost to the service provider [21]. The topic of interactive service provider having a bother for each other in the context of service provider and customers during service encounter has attracted attention over the past few years in the marketing and management literature. Interactions exist among service encounter, service value, enduring satisfaction, and word-of-mouth (WOM) intention from the viewpoint of interactive marketing. During the service encounter process, service personnel and facilities may be precursors influencing consumers' satisfaction with the service and augmentation value. Providers also expect to gain the trust of a service recipient, which induces the beneficiary to recommend the service to other consumers for sustainable benefaction.

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