



Modeling service experience design processes with customer expectation management

A system dynamics perspective

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Abstract

Purpose – The purpose of this paper is to propose a conceptual framework of customer expectation management and a reference model of service experience design which are regarded as the basic foundation to model the processes of service experience design for service operation strategies simulating and testing by employing a system dynamics approach.

Design/methodology/approach – System dynamics is the key approach which includes causal loop diagrams and stock and flow diagrams used to build the reference model of experience design. Simulations of the processes of service experience design have also been implemented by Vensim[®].

Findings – It is found that the proposed reference model involving customer expectation management can successfully capture the key elements of the service experience design within service operation strategies. The system dynamics approach can effectively enable a macro viewpoint of service experience design for service operation strategies and policies.

Practical implications – With the proposed reference model of service experience design and the system dynamics modeling approach, service providers cannot only comprehensively examine the processes of service experience design in detail but also accomplish the strategies testing and simulating. Hence, service providers can make correct decisions to achieve the business goals via the simulation results beforehand.

Originality/value – This paper contributes to analyze and combine the idea of customer expectation management with service experience design and give rise to a unique reference model of service experience design that is shown to be valuable to service operation strategies testing and simulating based on the system dynamics perspective.

Keywords Design, Customer behaviour, Expectation, Cybernetics, Customer service management

Paper type Research paper

Introduction

According to Heskett *et al.* (1994), the service industry has played an important role in the experience economy. In many developed countries, such as the USA or Japan, service jobs have already reached 40 percent of the total jobs. The gross output value of service industries has become the major economy source in these countries. On the other hand, with the rapid variation of the globalization service providers have to grasp the importance of the relevance between customer satisfaction and customer expectations. Parasuraman *et al.* (1991a) noted that understanding customer expectations will achieve business goals during service experience delivery. Although it is essential for service providers to realize what customers want, it is still difficult for them to realize customers' desirable needs. The gap between service providers and customers still exists in practice.



Hence, how to provide customers with good services to match their expectations is a critical issue for service providers.

Comprehending what customers really expect, what factors influence customer expectations and how service providers fulfill the variable needs are becoming important issues. Accordingly, there have been previous studies focusing on the issue and the factors of customer expectations that influenced customer expectations (Kurtz and Clow, 1993; Ojasalo, 2001; Zeithaml *et al.*, 1993; Parasuraman *et al.*, 1991a). However, customer expectations are multifaceted and capricious, and service providers should obtain a comprehensible approach about how to practice proper services in terms of diverse customer expectations. For example, service providers can develop a framework, as the development guidance on their operational strategies, to deliver exactly what they should serve in accord with the fluctuations of customer expectations. In other words, there is a strong need of explicit methods for providers to utilize the existing findings for establishing strategies of service operation that can facilitate their business in accelerating the degree of customer satisfaction.

Zeithaml *et al.* (1993) provided a concrete conceptual model of customer expectations. Theories explicating the nature of expectations, such as the zone of tolerance, elicited arguments about the factors affecting the size and the position of the zone (i.e. determinants of expectation). However, it has been still a tough task for service providers to deliver satisfactory services for matching various customer expectations. Consequently, service providers have to find ways to develop their operational strategies in order to satisfy their customers. Besides, customer needs are extremely dynamic in terms of their external factors (such as service functions, provider reputations, or service surroundings) and internal factors (e.g. customer expectations or emotions). Thus, good service experience design is indeed necessary to fulfill customer needs. To meet diverse customer needs, service experience design should take into account these customer external and internal factors. Accordingly, service experience design can be considered as a dynamic and comprehensive process. Most previous research mainly used empirical methods (such as a questionnaire survey or case studies, etc.) to analyze and investigate these issues; yet, to our knowledge, they were not sufficient enough to describe the dynamism of the experience design process within the situated contexts. Homer (1993) also mentioned that self-report surveys of respondents met biases in terms of incorrect reporting and memorizing.

The study sets out to explore the following three research questions and thereby set the stage for future service experience research:

- RQ1. How do service providers manage customer expectations to accommodate their business goals?
- RQ2. How do service providers efficiently integrate all kinds of factors in dynamic environments with service experience design?
- RQ3. How do service providers accurately implement appropriate strategies to satisfy their customers?

This study based on the knowledge of customer expectations previously developed attempts to propose a new framework that can aid in developing service tactics for service providers to deal with the dilemma. For the purpose of assisting in the tactics of business operations in correspondence with customer expectations, it is important to understand that customers engage themselves in the process of service experience delivery.

Customer participation in service encounters makes service tactics that are variously formed, so that, producers can develop a particular service episode while delivering the service. Service providers can gain the capability of providing appropriate services swinging with customer expectations and also reach the win-win value through manipulating customer expectations. Consequently, this study is to employ system dynamics to build a systematical service experience design model. In other words, this study is different from previous empirical research in terms of analyzing the causal process of experience design through the tools of systems dynamics (e.g. causal loop diagram (CLD) and stock and flow diagram (SFD)). Furthermore, using computer-based simulation to test the policy of service experience design within service operation strategies is an innovative way for service providers to select appropriate strategies and operations.

This study will proceed as follows: first, we will address theoretical foundations for supporting this research. Then, we will detail the research method. Next, we will propose the conceptual framework of customer expectation management and the reference model of service experience design. Following this, we will present the analysis of CLDs and SFDs in service experience design. Finally, we will provide conclusions and further research directions.

Theoretical foundations

This study mainly is built on the basis of the expectation theory (Parasuraman *et al.*, 1991a, b) and the concept of zone of tolerance (Zeithaml *et al.*, 1993) as follows.

Customer expectations

In the beginning of a service experience delivery process, customers are looking forward to service encounters with eager anticipation. In other words, what customers expect to acquire from service providers can define diverse customer expectations. Moreover, customer expectations are regarded as desires or wants of customers, i.e. what they feel a service provider should offer more than what would offer. Parasuraman *et al.* (1991a, b) proposed that understanding customer expectations of a service played an important role for delivering satisfactory services. Previous researches had presented that how customers assess the performance of a service provider was based on the single level of expectation standard, which meant customer felt a service provider should offer. However, past researchers kept evolving and extending the conceptual model of expectations, putting a lot of effort to pinpoint the critical element within customer expectations. These researchers offered multi-levels of customer expectations (Parasuraman *et al.*, 1991a, b; Zeithaml *et al.*, 1993; Walker and Baker, 2000). According to their propositions, multiple standards would be more likely to completely understand customer expectations of service.

Parasuraman *et al.* (1991a, b) proposed that customer expectations comprise two levels: desired and adequate (as shown in Figure 1). Desired expectations represented the level of service a customer hopes to receive, defined as the level at which the customer wanted the service to perform. It was a combination of what the customer believed “can be” and “should be”, while adequate expectations, a lower level of expectation, considered to be customer’s acceptable level of performance. It was relied on the customer’s assessment of what the service “will be” (Zeithaml *et al.*, 1993). The latter was the basic expectation level for customers to determine the service performance; whereas, the former expectation level, which was higher than adequate expectation, could attract the customers, i.e. customers



Source: Parasuraman *et al.* (1991a, b)

Figure 1.
Expected service level

might be surprised and overwhelmed while the service providers were reaching or exceeding customer expectations. These actions directly made the customers tend to think the performance better and be satisfied with the service.

This paper adopts the dual levels of expectations and extends their uses in the dynamic service contexts in terms of customer expectation management during service experience delivery. In other words, the paper regards customer expectations as dual-level as well as dynamic. The level of desired and adequate expectation could vary from customers to customers and, potentially, from one situation to the next for the same customer. Those situations might differ from various industry sectors might even cause different expectation levels, enlarging the complexity of customer expectations.

Zone of tolerance

The zone of tolerance of a customer would be influenced by several complex and multiple factors within service encounters (Zeithaml *et al.*, 1993). Zeithaml *et al.* (1993) proposed a comprehensive framework of service expectations and clarified customer expectations by 11 antecedent factors which could affect the desired service level and the adequate service level (as shown in Figure 2).

With our extended use of the desired and adequate service levels, they could change spontaneously because customers have physical and mental vibrations across different services as well as different contexts. Accordingly, the zone of tolerance can become wide or narrow dynamically.

This study attempts to propose a framework to describe the manipulation of customer expectations during service experience delivery based on the antecedent factors of zone of tolerance, given the understanding that the nature and determinants of expectations of service is important. In addition, this study divides antecedent factors into three categories, which includes need, context and effort, according to the nature and distinction of factors. The need group contains factors of customers' mental and physiological demands, such as personal needs, etc. The context group is about factors happened extrinsically, such like situational factors, etc. Moreover, the effort group means that customers would like to expend their money or energy on services (e.g. self-perceived service role) during the service delivery process. Basically, this framework is grounded on the above-antecedent factors.

Research method

This study attempts to employ system dynamics to build the model of service experience design. Forrester first proposed the system dynamics concept in 1956. Since human

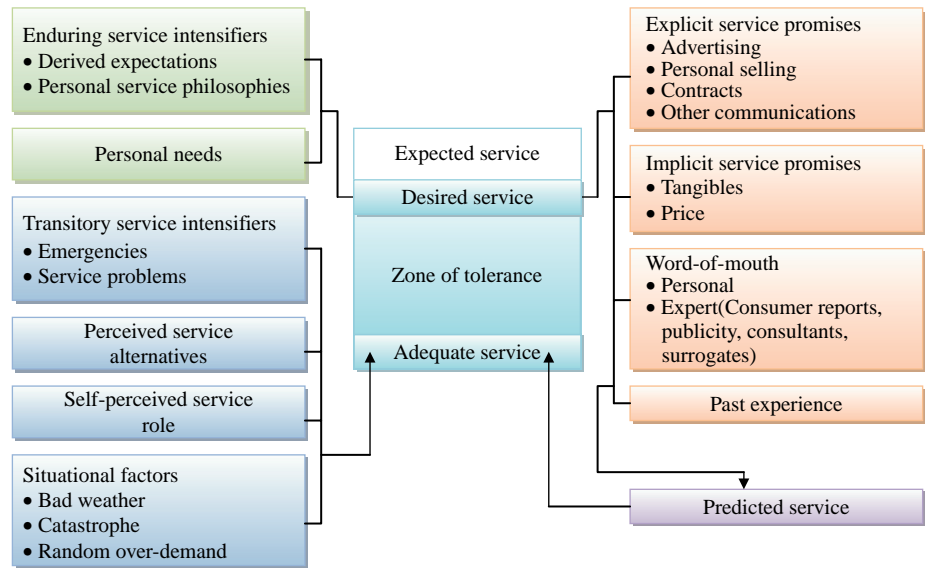


Figure 2.
Nature and determinants
of customer expectations
of service

Source: Zeithaml *et al.* (1993)

behaviors are correlated with time and context factors, it is useful to realize the nature of problems and raise the capability of solving problems via system dynamics (Forrester, 1994). Senge (1990) noted that it is necessary to consider the human world as a complex and dynamic system while dealing with difficulties. Fowler (2003) stated that systems thinking are a framework for managing the strategies, operations, and implementation of comprehensive and diverse systems. Schwaninger and Grösser (2008) described that system dynamics modeling can be a tool for theory building. Accordingly, system dynamics attempts to analyze the dynamic complexity system by CLDs and SFDs.

There are two major characteristics of system dynamics: *feedback* and *time delay*. When a system has feedback loops, the output variables are no longer independent of the input variables. The variables of this system have interactive influences, and then it is different from the linear or sequential systems. The effects of feedback loops would influence the system with the positive or negative results. Besides, the plus sign (+) represents the reinforcing or positive relationship between two variables. In contrast, the minus sign (-) shows the balancing or negative relationship. The feedback loops should lead to the same direction (that is, clockwise or counterclockwise). The positive feedback loop is also called a “reinforcing loop” which contains an even number of negative relations. For example, Figure 3 shows that there are four variables (including A, B, C and D) in the circle which consists of two positive relations (i.e. $A \rightarrow B$ and $C \rightarrow D$) and two negative relations (i.e. $B \rightarrow C$ and $D \rightarrow A$). Hence, this circle represents the reinforcing loop diagram. Moreover, the reinforcing loop means that if the cause increases, the effect increases in the system. In contrast, the negative feedback loop is represented as a “balancing loop” which includes an odd number of negative relations (as shown in Figure 4). The balancing loop means that if the cause increases, the effect decreases in the system.

Time delay (\parallel) is the other important property of system dynamics which often occurs in the complicated system. For example, advertisement marketing would affect customer purchasing expectations; yet, the results of buying goods cannot occur in a short time. In other words, an input variable influences an output variable over time or during a period of time; and therefore, the effect of the input variable does not immediately take place. Accordingly, feedback and time delay are two major features of system dynamics to portray the process of real world system. This study can utilize these concepts to describe the variation process of designing service experience in order to demonstrate the real-time circumstances.

The conceptual framework of customer expectation management

As mentioned earlier, customers play an active participative role during service experience delivery. There is no doubt that customer expectation management is the critical factor of service experience design. Accordingly, before modeling the processes of service experience design by system dynamics, this study proposes a conceptual framework first (as shown in Figure 5) to show that how service providers can employ

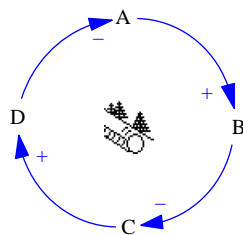


Figure 3.
Reinforcing loop

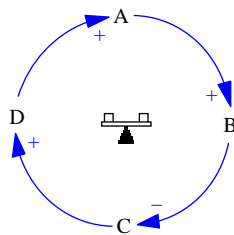


Figure 4.
Balancing loop

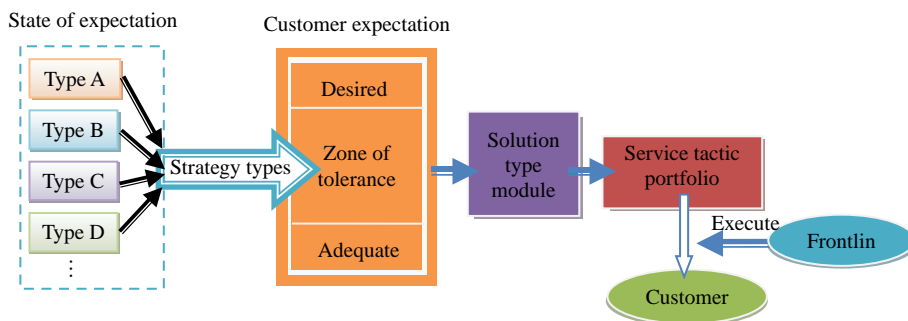


Figure 5.
Conceptual framework of
customer expectation
management

further the formulation of service tactics to manage customer expectations during service experience delivery. According to the service encounter triad (Fitzsimmons and Fitzsimmons, 2006), there are interactions between the three roles – service provider, contact personnel and customer – in the service encounter. This framework is then described in terms of the three phases:

- *Phase 1.* Service providers have to classify their objectives into a strategy type. According to different strategy types, such like selling new product or recovery services, each type is associated with a kind of state of expectation attempted (e.g. decreasing the adequate expectation and keeping the desired expectation for low-capability service providers). This state of expectation would capture a promise that while customers are under this kind of expectation (through the organization's expectation-factor manipulation), the manipulator could not only achieve the objectives but have customer satisfied. For example, when a secondary service provider promotes a new product, customer expectations may be too low, such as the lower adequate service level of customers, to expect a perfect and multi-functional product or service. However, if customers suffer a failure service in service encounters, their expectations should become high for the better recovery service from the service provider. In summary, service providers can apply different strategy types to achieve customer expectations based on different service conditions.
- *Phase 2.* After completing the stage of state-of-expectation classification, the solution type module, which is a knowledge-based database with three types of influences (e.g. need, context, and effort), is to compile factors that affect customer expectations based on the expectation determinants of Zeithaml *et al.* (1993). The service firms then indicate the factors required to be operated on expectations and how expectations would be effected to pick up directions for forming the service tactics. However, there is no need to employ every direction recommended. The service firms could just assemble some of them into a particular portfolio (i.e. a service tactic) in response to each individual customer. Briefly, a service tactic is an operational way to affect customer expectations. In order to manipulate customer expectations availablely, combining helpful tactics to form a portfolio is essential and spontaneous.
- *Phase 3.* The service tactics is accordingly executed by personnel or customers themselves.

Consequently, it is useful to determine what primary processes can be procured according to this conceptual framework, when service providers would like to manage customer expectations during service experience delivery. This conceptual framework can support the explanation and integrity of delineating service experience design.

The reference model of service experience design

After depicting the conceptual framework of customer expectation management, this study, then, proposes a reference model of service experience design to be on the basis of system dynamics modeling. Service experience design is an approach to promote highly positive emotions for customers by designing virtual or tangible services (Pullman and Gross, 2004). The objective of service experience design is to create functional, purposeful, engaging, compelling, and memorable experiences for customers (McLellan, 2000). Especially, service providers can deliver high-quality services for customers with

pleasant and memorable experiences through appropriate service experience design. In other words, customer experiences can be divided into several service segments, and then service design can be embedded in experience design. Voss *et al.* (2008) proposed the architecture of the service delivery system to describe the service design concepts, which includes stageware, orgware, customerware, and linkware. Stageware focuses on the physical servicescape such as facilities layout or flows. Orgware represents the abilities of enterprises to manage and control the business strategies. Customerware pays attention to customer encounter points or touch points in a service delivery system. Linkware is the communication mechanisms that integrate or transfer service information with customers and enterprises (Roth and Menor, 2003). According to the architecture of service delivery system, this study tries to portray the reference model of service experience design (as shown in Figure 6) to show the relationship among above important factors. According to Voss *et al.* (2008) and Zeithaml *et al.* (1993), this study combines the concepts of service design strategies with customer expectations to form the reference model of service experience design. This study tries to use the reference model to describe the constructional process of service experience design. The reference model can be the fundamental infrastructure to represent the complex and dynamic design circumstances.

Figure 6 shows that customers would like to have a good service experience; service providers should take service functions and customer expectations into account. Functions represent the nature of services which customers can be served. For instance, services are to provide customers with many basic functions which include purchasing, convenience, or time saving. The concept of customer expectations is the important factor for designing services to enable service providers to deliver good services that can meet customer needs. In addition, customers in pleasant surroundings easily enjoy acquiring a good and memorable service experience. It is necessary to use service operations for implementing the functions and customer expectations in practice in experience design. The major objective of environment design is to build atmospheric surroundings for customers (Kotler, 1973; Donovan and Rossiter, 1982). The employees' external behaviors (such as warm smiles or friendly dialogs) can directly affect the perception of customers (Pugh, 2001; Lewis and Entwistle, 1990). Applying information technology into service encounters can enable easily customers to achieve high customer satisfaction (Meuter *et al.*, 2000; Johnson *et al.*, 2008). Consequently, service operations are the vital kernels of designing services which contain the environment setting, information technology, and friendly employees. Since three major service operations are built, customers can have an expected and enjoyable service experience to acquire appropriate services.

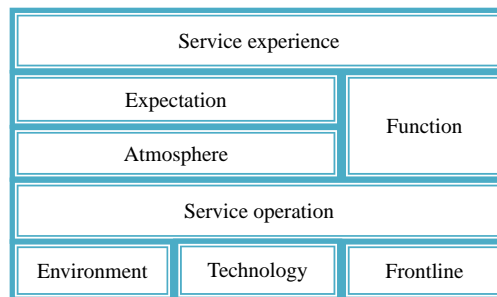


Figure 6.
Reference model of service
experience design

Therefore, this study, which is based on theoretical literature support, purports to expound and propose the conceptual framework of customer expectation management and the reference model of experience design. According to these two theoretical and structural models (i.e. building blocks), this study can explicitly analyze and model the relationships in the processes of service experience design by utilizing the system dynamics perspective. In this paper, this analysis and modeling is deployed with the system dynamics approach in order to understand the dynamic behavior of service experience design over time in terms of the CLDs and SFDs.

Analysis of CLDs in service experience design

As mentioned earlier, the feedback structure is an important feature of system dynamics. According to Sterman (2000), CLDs are an analytic tool for portraying the feedback structure of complex systems. Using CLDs cannot only easily define the hypotheses of the causes of systems but also find out the core model of problems (Senge, 1990). This study first uses CLDs to demonstrate the proposed experience design process (as shown in Figure 7).

Figure 7 shows the feedback structure of the service experience design process based on the aforementioned conceptual framework and reference model. During the design process, service providers with higher capabilities can utilize more determinants to manage customer expectations simply. Customer expectations are the desires in the customer psychology, while in contrast customer perceptions are the customer experiences or behaviors in practice. When the perception of a customer does not meet her/his expectation when she/he receives services, a gap is immediately generated between two factors. In other words, as the customer expectation is higher, the gap is wider. Then, the higher customer perception leads to the decrease of the gap. Once the gap becomes narrow, it can result in high customer satisfaction.

Consequently, service providers get high customer satisfaction that can raise the repurchase rate and increase the business profit. It is obvious that service providers with much higher profit would have a greater opportunity to increase investment in

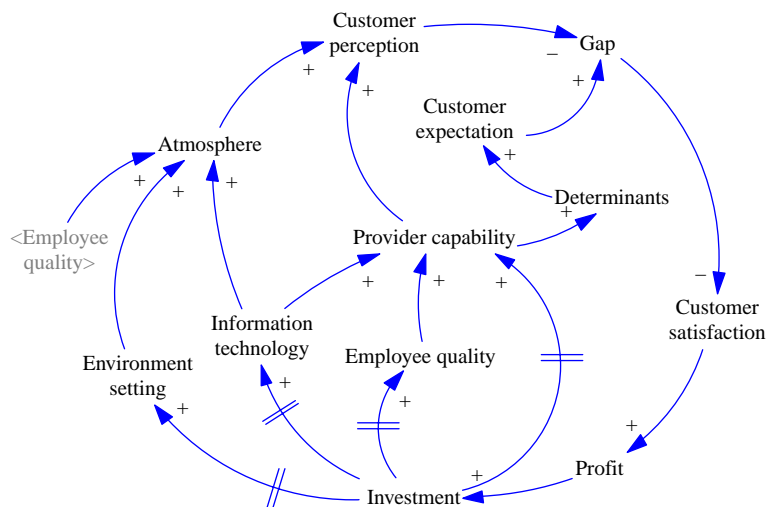


Figure 7.
CLD of the service
experience design process

environment settings, information technology, and employee quality. However, information technology and employee quality are the major elements of the provider capabilities. Besides, increased service provider investments (such as advertisements, reputation, or service quality management) can also increase their capabilities. Nevertheless, service providers invest their money in environment settings, information technology, employee quality, or provider capabilities that will be observed in a while. Hence, time delay influences the process of experience design. The atmosphere is another important factor in an experience design system that is directly influenced by environment settings, information technology, and employee quality. Use of perfect design strategies and operations of environment settings, information technology, and employee quality will enable customers to have good service experiences in a happy, exciting, or comfortable atmosphere.

According to the concept of system dynamics, this study tries to model the structure of service experience design based on CLDs. The diagrams, which can clearly define the feedback and time delay characteristics of systems, are different from the principles of a linear model. It is useful and distinct for service providers to consider and analyze causal and interactive relationships among factors, especially in service experience design. Thus, service experience design needs to be considered from the customer aspect, service provider aspect and service operation aspect. The CLD can easily not only describe the whole circumstances but also interpret the influences of factors.

Analysis of SFDs in service experience design

Sterman (2000) described that “the net rate of change of a stock is the sum of all its inflows less the sum of all its outflows.” The definition of stocks is to calculate the net rate of change. In other words, stocks can contain their net flows, and the net flow can be derived from the stock. Using SFDs is to build a dynamic model for describing the system process. In addition, it can help service providers grasp the crux and find the right guide through computer-based simulations. The results of simulations can be regarded as the service operation strategies in order to figure out the above problems. Consequently, it is demonstrable that analyzing the dynamic process of service experience design through SFDs is effective and useful.

In this paper, system dynamics is used to understand the dynamic behavior of service experience design and different service operation strategies and policies can then be simulated and tested so that the service providers can obtain some insights regarding the further refinement required for their strategies in order to achieve their business goals.

The SFDs of service experience design is shown in Figure 8, which is developed based on the CLD. There are three stocks, which include profit, customer satisfaction, and provider capability, in the SFDs. These stocks can be considered as the key performance indexes (KPI) for the evaluation of the variations of the service experience design process. According to these KPI, service providers can immediately realize what effect and result will be procured through service experience design. Consequently, it is understandable to observe the dynamic circumstance and modify the design strategies and operations immediately through simulations (as shown in Figures 9-11).

This study uses a software package, called Vensim (www.vensim.com), to describe the SFDs and simulate the process of dynamic service experience design. Vensim also enables designers to delineate a CLD such as shown in Figure 8. Simulations are the

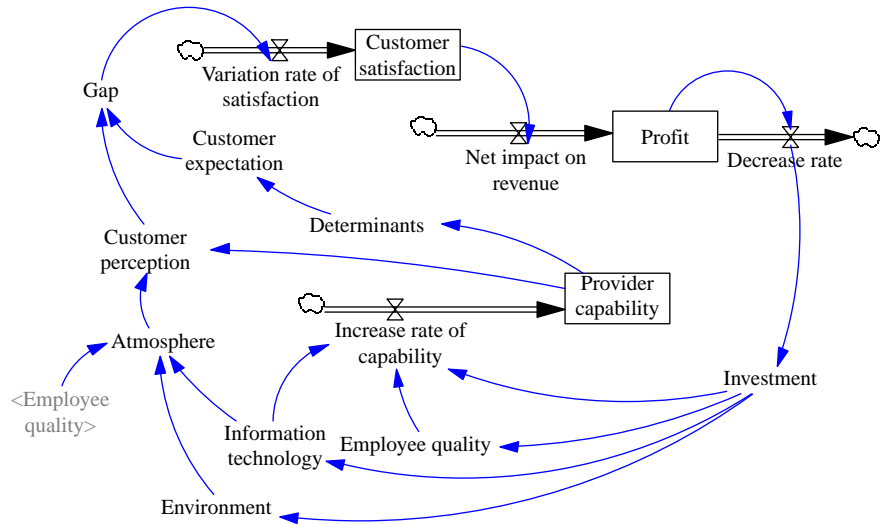


Figure 8.
SFDs of the service
experience design process

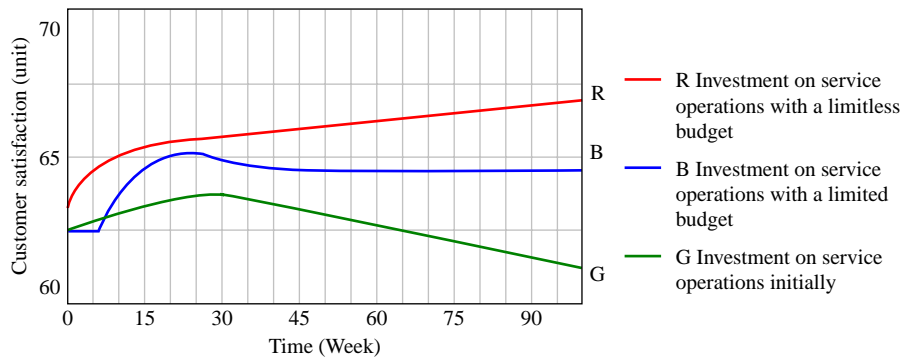


Figure 9.
Distributions of customer
satisfaction across
different design strategies

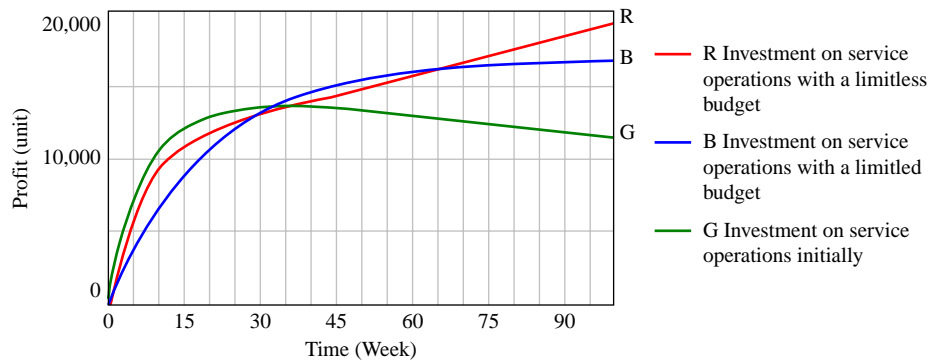


Figure 10.
Distributions of profit
across different design
strategies

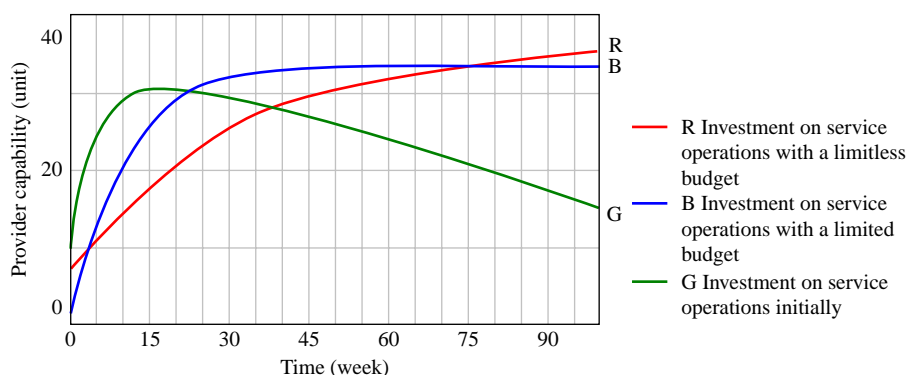


Figure 11.
Distributions of provider
capability across different
design strategies

major research method used to analyze the dynamic system. In the SFDs, designers can set up the formula or initial value of each parameter according to different situations and times. However, it is different from the traditional simulation method, because there is a clear causal model to express the complex system. Accordingly, it is easy for designers (or service providers) to test design strategies and operations dynamically.

According to our proposed reference model of service experience design, a service provider can adopt an expectation strategy (e.g. decreasing the adequate expectation and keeping the desired expectation to extend the zone of tolerance) to manage customer expectations. Figures 9-11 show a simulation that assumes that a service provider initially has low capabilities and customer satisfaction and changes its strategies of service experience design leading to the change of its service operations (e.g. increasing investment for environment settings or employees qualities). This would improve the functions of services and manage customer expectations and then its customer satisfaction, profit, and capabilities that are all gradually raised and reach the stable values to make the customers have satisfactory service experiences. Service providers can easily and immediately understand the simulation results; so, they can modulate their strategies to achieve their business goals. As mentioned earlier, this study tries to employ customer satisfaction, profit and capability as the performance indexes in order to examine the effectiveness of the proposed experience design. Each index has its unit measurement (depending on the choices made by the service provider); for instance, this paper uses a week as the basic unit of time when simulating the processes of experience design over time.

Taking Figure 9's simulation as the example, the service provider aims to increase customer satisfaction by enhancing investment of capabilities as a feasible business strategy with a limited budget. The blue line (Line B) represents that customer satisfaction lies in an initial value (62.5) during the preceding five weeks. The effect of implementing the strategies would be begun to observe from the sixth week, which is caused by the time delay. After the 30th week, customer satisfaction gradually increases and tends to a stable value (64) because there is no new strategy applied in the design process. Moreover, the green line (Line G) represents that the investment strategy of service operations only in the early weeks (from first to tenth weeks) can immediately raise customer satisfaction. Owing to the limited influence of the short investment customer satisfaction rapidly decreases as the time pass by. Hence, the influence of implementing the strategy for customer satisfaction, profit and capability is extremely

limited, and there is no doubt that the simulation results gradually go down. In contrast, the strategy of the red line (line R) is to continuously invest money in service operations (i.e. technology, employee, and environment) for increasing the provider's capability with limitless budget. Although the values of customer satisfaction, profit and capability increase slower than others at the earlier time, the long-term results are the best of three different strategies testing. In short, Figure 9 implies that the service provider needs to pay more time to manage customer expectations through appropriate strategies. Using a simulation tool, such as the SFD, for policy testing and analysis to realize the dynamic behavior of service experience design is valuable and essential in terms of different situations, times, and events.

From Figures 9 to 11, even though the service provider has the lower capability and customer satisfaction initially, it can adopt a strategy to manage customer expectations first. In addition, the service provider must take account of important factors of service experience design (e.g. service functions, customer expectation, service tactics, and service operations) to deliver good service experiences to customers for high customer satisfaction. According to the description of the red line (line R) in Figure 11, the capability of the service provider continues to increase in terms of the strategy of continuous investments. Hence, it can easily employ expectation determinants to manage customer expectations in order to raise customer satisfaction with high capability (as shown in Figure 9). When customer satisfaction gradually increases, the profit also can continuously accumulate (as shown in Figure 10). In other words, the simulation results shown in Figures 9 and 10 manifest the positive evidences of our model and approach to serve as a new and systematic foundation to support the service experiences design process. Therefore, the service provider cannot only define the expectation strategy and KPI to adapt to its business goals based on the proposed conceptual framework and reference model, but also choose suitable service operation strategies comparing to the simulation results of different strategic policies through the system dynamics approach.

To sum up, good service experience design, as mentioned earlier, needs to take many critical factors into account. The mental status of customers (i.e. customer expectation and satisfaction) is extremely difficult to grasp, even though there have been many empirical approaches used. Hence, the effect of service experience design can be procured over an amount of time. This study attempts to apply system dynamics to the modeling of service experience design in order to understand the dynamic behaviors over time through diverse strategy testing. SFDs with the computer-based simulation can be applied to the process of experience design. According to the results of simulations, service providers cannot only comprehend the outcome of executing strategies in order to facilitate the strategy making before really implementing the strategies of service experience design. Therefore, it can facilitate service providers to adjust the appropriate policy to test and recognize the dynamic behavior of service experience design over time in dynamic circumstances.

Managerial implications

Since customer experiences have been regarded as the main economic activity in the twenty-first century (Pine and Gilmore, 1998), how to deliver a good service experiences to customers is a critical issue for service providers. Furthermore, Haeckel *et al.* (2003) mentioned that service providers need to design experiences with a breadth and depth version in order to attract customers. This paper attempts to model the processes of

service experiences involving customer expectation management through the system dynamics approach.

Accordingly, there are several implications drawing as follows. First, service providers need to analyze the overall situation of service experience design in macro viewpoint rather than the linear thinking. It is helpful for service providers to systematically and theoretically explore the causal relations among all factors of service experience design. The proposed reference model of service experience process can serve as a theoretical support of the causal relations required, and the system dynamics approach via the CLDs and SFDs can attain the systematic influences of the involved factors in service experience design.

Second, with the system dynamics approach service providers can systematically assess different strategies of experience design. With the circumstantiated simulations in accord with the strategies, service providers are empowered to engage the policy testing with respect to their different business goals (e.g. increasing customer satisfaction) and standpoints (e.g. extending the zone of tolerance of customers). Consequently, service providers can realize the predicted effects to decrease the possibility of the failure or risk before implementing the strategies in practice.

Finally, service providers can reduce the cost of time and resources in terms of employing the system dynamics tool. It is very convenient and helpful for service providers to realize the effects of the strategy testing by using the system dynamics tool. Based on the predictions of simulations, service providers can immediately propose an appropriate strategy to respond the external variations of dynamic environments. Therefore, service providers can highly decrease the human, machines and time efforts to make the flexible responses and the timely strategic polices to achieve their goals.

Conclusions

Delivering appropriate service experiences to customers is necessary for service providers within service encounters. However, customer service experiences can be divided into several key service segments. Each service segment also contains many important service encounters. Hence, good design of these basic segments is most important to attain a good experience. Service providers have to explicitly focus on each service encounter in designing service experiences. Customer expectation management is an essential issue for service providers to design proper experiences. Based on the standpoint of zone of tolerance (e.g. desired and adequate expectations), different customers in different situations will generate different kinds of expectations. Realizing the zone of tolerance of a customer is important to achieve high customer satisfaction (Johnston, 1995). Our research proposes that considering the importance of customer expectations leads to high-quality services and experiences. Hence, businesses should take this concept into account in terms of their strategies and market positions. For example, when the business has high capability or resource levels to serve customers, it can raise customer expectations to increase its competitiveness. Competitors should put forth more efforts to overtake this threshold. Accordingly, using customer expectation management as a strategy for businesses should be an important means in service experience design.

Accordingly, this study first gives an overview about the customer expectation research. After a critical analysis of the nature and determinants of customer expectation model, this study attempts to propos a conceptual framework to describe

what and how providers could manipulate customer expectations during service experience delivery. Based on these antecedents of customer expectations, this study comprehends what factors would particularly affect the desired service level and the adequate service level of customer expectations. Then, this study models the process of service experience design through the concept of system dynamics based on the conceptual framework. It is extremely different from linear thinking in terms of feedback and time delay concepts. According to the CLDs and SFDs models, service providers can easily realize and analyze the circumstances of experience design. System dynamics provides a proper tool for understanding the structure responsible while designing service experiences. As mentioned earlier, the simulation results also can help designers and service providers to understand the drawback of designing service experiences. System dynamics models (i.e. CLDs and SFDs) can apply many scenarios in problems for policy testing that enables service providers to reduce considerable cost.

In other words, this paper presents a reference model of service experience involving customer expectation management that can successfully capture the key elements of the service experience design within service operation strategies. By showing this, we use the system dynamics approach to model the macro system viewpoint of service experience design based on the proposed reference model, and the model can be used to test and simulate the effects of any given service operation strategy in order to assist service providers to make correct decisions to achieve the business goals via the simulation results beforehand.

However, there are several limitations associated with this paper. First, the parameters of the stock and flow model are based on the past research which could not be completely suitable for real service providers. Hence, this study would like to propose a generalized approach to apply into different domains. Second, in order to achieve customer satisfaction, service providers should augment or narrow the zone of tolerance substantially depending on different service strategies. Although our research framework is extremely digestible and serviceable, how to categorize service providers' strategy types based on the domination of customer expectations is an uncertain problem up to now. For example, what marketing or selling strategies service providers need to increase or decrease customer expectations is an important issue; nevertheless, literatures are insufficient for us to bind. Third, the conceptual framework just focuses on antecedent factors of the zone of tolerance rather than other influences. According to Zeithaml *et al.* (1993), our research mainly tries to find out what and how service providers can manage customer expectations.

Furthermore, there are some further research directions as follows. One important direction of further research is how to set up the appropriate parameters, initial values, and formulas in simulation models, since it is necessary and useful to fit in with the real situation in practice. Second, the evaluation of the models is also a critical issue for service experience design. Accordingly, we will continue to address these research issues and apply the results to practices in the future. Third, this preliminary study proposes some ponderable insights and importance of customer expectation management and service experience design. Researchers can adopt this conceptual framework and the reference model briskly to build the innovative service systems for delivering proper service strategies. Finally, more research is needed at the zone of tolerance to determine what sizes of the zone should be in terms of different service stages.

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