Service design improvement in Ragunan Zoo using TRIZ methodology

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Abstract. Indonesia is a country that has a great potential in tourism with its beautiful landscape and also the culture diversity. It makes government of Indonesia actively do development programs in the tourism sector to make tourism as one of the biggest contributor to Indonesia GDP. Ragunan Zoo has been selected to be the pilot project in cashless transaction at recreation places all over Indonesia. It has been applied since May 2016 but there still a lot of dissatisfaction from the visitor. So then, this research is trying to improve the service design in cashless transaction for ticket purchasing in Ragunan Zoo accordance with Ragunan visitor preferences to help succeeding government program. Researcher use Themequal to develop a questionnaire that has been distributed to 390 respondents. Result from questionnaire then processed using Fuzzy Gap Analysis and TRIZ method to get the possible solutions. Service Blueprint then used to illustrate the improvement of service design on ticket purchase at Ragunan Zoo based on the results.

1 Introduction

Supporting government program to make tourism as one of the biggest contributor to Indonesia GDP, Ragunan Zoo has been selected to be the pilot project for cashless transaction program. Then since May 2016 Ragunan has implemented the cashless transaction in ticket purchasing but there still dissatisfaction from the visitor. Based on the previous explanation, the goal is to proposed service design for entrance ticket purchasing in Ragunan Zoo that can meet customer preferences.

2. Literatur Study

2.1 Themequal

Service Quality (Servqual) is a method that can examine the gap between perceived service quality and expected service quality. Zeithaml, Berry and Parasuraman have conducted various studies on several types of services and successfully identified five dimensions of

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characteristics used by consumers in evaluating service quality [1]. But the five-dimensional SERVQUAL should be added a new dimension to be used in different conditions [2]. So then Tsang, Lee, Wong, & Chong modified Servqual model to measure the service quality in theme park called Themequal model [3], as explained in Table 1.

Table 1. Six Dimensions of the Themequal Model.

Dimension	Description
Tangibles	Physical facilities, equipment, and appearance of personnel
Reliability	To perform the promised service dependably and accurately
Responsiveness	To help customers and provide prompt service
Assurance	Courtesy knowledge, ability of employees to inspire trust and confidence
Empathy	Caring, individualized attention the firm provides its customers
Courtesy	Politeness, respect, consideration, friendliness, and attitude of contact personnel, enabling visitor to have a pleasant experience

2.2. Fuzzy Gap Analysis

The fuzzy set theory has been developed to solve the problem where the description of activity, observation and assessment is subjective, uncertain and not precise. Exact membership value is does not exist and usually its subjective in practice, and the most commonly used theory are fuzzy numbers, especially the Trapezoidal Fuzzy Number [4]. The mean values of a, b, and c are Fuzzy values (to obtain a single representative value) using Aritmathic Mean formulated as follows:

$$EV(T) = (a + 2b + c) / 4$$

(1)

2.3. TRIZ

TRIZ (Theory of Inventive Problem Solving) is a systematic methodology of problem-based problem solving with human-oriented [5]. The conceptual framework comprises of five main stages. Stage one and two analyze the original problems using cause and effect diagram, in order to provide insightful information for more detailed problem solving. Stage three structures the formulated problems into a typical TRIZ contradiction. Stage four uses TRIZ problem resolution tool which is contradiction matrix to generate the inventive principles solutions for service design. The last stage is evaluation of generated ideas. If solutions are still not found, the problem solving process must be iterated back to the first stage in order to redefine the original problems.

2.4. Service Blueprint

Service Blueprint is created to describe all the activities required for the service to function properly that is visible to the consumer, as well as that unseen by the consumer, it can help provide a clear roadmap for actual service delivery [6]. Service Blueprint is structured in five regions, there are physical evidence, customer action, front-liner, backend, and supporting process.

3. Research Methodology

3.1 Problem Analysis

Questionnaire were distributed to respondents and 390 usable questionnaires result were returned. After processed by fuzzy gap analysis the result is shown in Table 2.

Table 2. Fuzzy Gap Analysis Results

		Importance				Performance				Gap
		TFN			Real	TFN			Real	
		Low	Crisp	Upp		Low	Crisp	Upp		
ASSURANCE					8.158				6.974	-1.185
The behavior of the staff gives confidence to the visitors	Assurance1	5.949	8.449	9.462	8.077	4.434	6.896	8.798	6.756	-1.321
Visitor feel safe during transaction	Assurance2	6.179	8.679	9.571	8.277	5.109	7.609	9.229	7.389	-0.888
The staff has sufficient knowledge to answer visitors' questions	Assurance3	5.955	8.455	9.615	8.120	4.447	6.909	8.837	6.775	-1.345
COURTESY					7.634				6.602	-1.032
The visitors of HKDL have a pleasant experience	Courtesy1	4.872	7.308	8.821	7.077	4.094	6.568	8.586	6.454	-0.623
The staff members are consistently polite	Courtesy2	6.071	8.558	9.577	8.191	4.454	6.889	8.766	6.750	-1.441
EMPATHY					7.583				6.775	-0.808
The operating hours of Ragunaan Zoo are convenient for all visitors	Empathy1	5.359	7.846	9.327	7.595	4.987	7.487	9.987	7.487	-0.107
Ragunan Zoo has staff members who gives visitors personal attention	Empathy2	5.359	7.859	9.199	7.569	4.139	6.587	8.548	6.465	-1.104
Ragunan Zoo has the visitors' best interest at heart	Empathy3	5.353	7.795	9.160	7.526	4.338	6.780	8.625	6.631	-0.895
Ragunan Zoo can give visitors individual attention	Empathy4	5.160	7.660	9.122	7.401	4.229	6.677	8.451	6.509	-0.892
The staff of Ragunan Zoo can understand the specific needs of visitors	Empathy5	5.647	8.135	9.391	7.827	4.486	6.947	8.760	6.785	-1.042
RELIABILITY					8.048				6.810	-1.238
When a visitor has a problem, the staff of the Ragunan Zoo will help the visitor to solve the problem	Reliability1	6.224	8.724	9.603	8.319	4.434	6.902	8.824	6.766	-1.553
All the performance and activities of Ragunan Zoo start on time	Reliability2	5.923	8.423	9.571	8.085	4.698	7.172	8.972	7.004	-1.081
The facilities in the Ragunan are safe	Reliability3	6.006	8.506	9.487	8.127	4.994	7.468	9.055	7.246	-0.880
Ragunan can meet the commitment they have made in their advertisements and brochures	Reliability4	6.179	8.679	9.571	8.277	5.109	7.571	9.087	7.335	-0.943
The facilities within the Ragunana Zoo are reliable	Reliability5	5.571	8.045	9.256	7.729	3.798	6.234	8.380	6.162	-1.568
Ragunan Zoo can accurately perform the service	Reliability6	5.590	8.077	9.263	7.752	4.042	6.485	8.393	6.351	-1.400
RESPONSIVENESS					7.948				6.655	-1.292
The staffs are never too busy to respond visitors' requests	Responsiveness1	5.577	8.064	9.205	7.728	4.113	6.575	8.535	6.449	-1.278

The staff can tell visitors exactly when service/performance will be performed	Responsiveness2	5.801	8.288	9.449	7.957	4.460	6.960	8.843	6.806	-1.151
The staffs are willing to help visitors	Responsiveness3	5.788	8.276	9.410	7.938	4.473	6.960	8.843	6.809	-1.128
The visitors can obtain information from the staff easily	Responsiveness4	6.135	8.622	9.571	8.237	4.447	6.934	8.785	6.775	-1.462
The visitor can obtain information from the staff easily	Responsiveness5	5.712	8.179	9.256	7.832	3.901	6.350	8.310	6.228	-1.604
The visitors of Ragunan Zoo can access the staff easily	Responsiveness6	5.853	8.353	9.423	7.995	4.512	7.012	8.927	6.865	-1.130

Table 3. Fuzzy Gap Analysis Results (continue)

		Importance				Performance				Gap
		TFN			Real	TFN			Real	
		Low	Crisp	Upp		Low	Crisp	Upp		
TANGIBLES					7.657				6.431	-1.226
The facilities within Ragunan Zoo have a modern outlook	Tangibles1	5.192	7.679	9.179	7.433	4.460	6.934	8.817	6.787	-0.646
The staff of Ragunan Zoo have neat appearances	Tangibles2	5.891	8.391	9.423	8.024	4.152	6.613	8.586	6.491	-1.533
The facilities within the Ragunan zoo are visually appealing	Tangibles3	5.301	7.776	9.090	7.486	3.515	5.887	8.046	5.834	-1.652
The interpretation materials-e.g., leaflets, signpost, and map-within the Ragunan Zoo are visually appealing	Tangibles4	5.442	7.942	9.417	7.686	4.261	6.729	8.734	6.613	-1.073

3.2 Problem Modelling & Formulation

The cause effect diagram was built through a deep interview with the experts using data from the fuzzy gap analysis result (Figure 3) to understand the relationship among the function in sales and service Office.

Fig. 1. Cause and effect diagram

From Figure 1 we can see the problem performed in the ticketing purchasing service in Ragunan Zoo. It can lead to the problem statement as formulated in Table 4.

Table 4. Problem Statements

No	Problem Statement
1	Find a way to improve effectiveness of ticket purchasing service that provide a pleasure experience
2	Find an alternative way to provide service that give a pleasure experience with a clear information
3	Find an alternative way to make visitor understand the ticket purchasing system without information media
4	Find a way to improve media information to help visitors
5	Find a way to provide a pleasure experience at ticket purchasing by not generating long queue
6	Find a way to shorten the duration of ticket purchasing service in TMR
7	Find a way to take advantage of long queues
8	Find an alternative way to make visitors not confused with the ticket purchasing system
9	Find an alternatives way to provide ticket purchasing service without requiring a lot of front-liner
10	Find a way to solve dissatisfaction caused by lack of competencies from front-liner
11	Find an alternative way to increase front-liner competencies
12	Find another benefit from knowledge management system

3.3 Contradiction Analysis

After finding the problem statement then we do analysis using one of the most used TRIZ tools which is contradiction matrix. To do the contradiction analysis we should mapping the improving parameter and worsening parameter based on the problem statement to get the TRIZ inventive principles that will be proposed. TRIZ inventive principles from this research is listed in Table 5.

Table 5. TRIZ Inventive Principles

TRIZ Inventive Principle	Definition
1	Segmentation Eliminates low value processes and uses high value processes
2	Taking out Customize or customize to provide different features in different environments
3	Local Quality Changing the process to be different from the general process
4	Asymmetry Combine services to create new services
5	Merging Provide multifunctional services
6	Universality Avoid heavy risks by eliminating them
8	Anti-weight Conducting activities before service is provided to make the service faster and easier
10	Preliminary action Map the bad effects by preparing the worst scenarios that can occur
11	Beforehand cushioning Identify necessary changes to a service
14	Spheroidality Make the service more flexible
15	Dynamics Services given at certain times / periods are not done continuously
19	Periodic action Turning bad activity into a beneficial activity
22	Convert harm into benefit Make a result an input to improve the service
23	Feedback Recommend using outside personnel as part of the service to perform additional functions
24	Intermediary Duplicate other processes so that the cost used is cheaper
26	Copying Replacing the service system becomes something acceptable to the senses
28	Mechanics substitution Eliminates problematic processes to improve service quality, reduce costs, and increase reliability

30	Flexible shells and thin films	Eliminates problematic processes to improve service quality, reduce costs, and increase reliability
32	Color changes	Eliminates a number of functions from the service or reuses a number of functions of the service
34	Discarding and recovering	Changed the service resources to improve the experience and value for visitors
35	Parameter changes	Create new services and add value to the service
36	Phase transitions	Adding services with stimulation can speed up the service process
38	Strong oxidants	Creating services that can be used by different people, non-homogeneous
40	Composite material films	Membuat pelayanan yang dapat digunakan oleh berbagai macam orang yang berbeda, non-homogen

4. Result and Discussion

The questionnaire in this research based on previous literature studies which is Themqual, a service quality research in Hongkong Disneyland. Themqual is the modified Servqual to perform service quality analysis at theme park. In that literature, Nelson, Louisa, Alan, and Rita Chong adds an important dimension which is courtesy. But the results from this research in Ragunan Zoo shown that the level of reliability and validity from courtesy dimension is quite low compared to other dimensions. Due to this limitation, future research may verify the the Themqual model so then it can provide a higher level of reliability and validity.

5. Conclusion

After get the possible improvement are then summarized into new service blueprint. Then researcher make two kind of purchasing, the first one is on the spot ticket purchasing service that uses solutions such as maximizing the use of speakers, updating the counter and information boards to make them more visible, separating services at each counter based on services, updating information boards to make it more understandable, expanding cooperation with outsources to conduct transactions other than JakCard, and also separate vehicle parking payments with ticket purchasing. Then the other purchasing method is online purchasing service. Where visitors make reservation through the website which will then provide them with booking code that will be used to print the ticket through a self-service machine. The online purchase service answers some solution points such as using self-service machines, counter separation, creating online services, expanding Ragunan's cooperation with outsources.

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