Integrated model of service blueprint and house of risk (HOR) for service quality improvement

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Abstract. These days, the business world experienced a very tight competition, so that the products and services offered in the market became more and more diverse. Good service quality is not enough for the company to survive in the face of increasingly fierce business competition. This study uses a Service Blueprint that is integrated with the House of Risk (HOR) with the aim of identifying service failures that can occur and then prioritizing the service quality improvements to give guidance for the service provider to improve service. To show how the model works, a cafe is used as a demonstration of this integrated model. Steps in this research used Service Blueprint to identify fail points and excessive wait. The result was used as an input in HOR 1 to determine the priority of risk which was then resumed in HOR 2 so that strategy priority was obtained. The results of the case studies show that the model could identify 20 risk events, identifies 20 risk agents, could assign 10 risk priorities agents and could give 4 main priority strategies for service quality improvement.

Keywords – Service Blueprint, House of Risk, Integrated Model of Service

1. Introduction

Competition in the business world has becoming more intense and the offering of product and service becoming more and more diverse. Good service quality is not enough for the company to survive in the face of increasingly fierce business competition. According to Zeithaml et al, one of the keys to matching service specifications to customer expectations is the ability to describe critical service process characteristics objectively and to depict them so that employees, customers, and managers know what the service is, understand their role in the process, can recognize all the steps and the service flows [1]. A well-known model in planning, designing and also for improvement and innovation of service is a Service Blueprint because of this tools it customer-focused approach [1,2,3].

Shostack is the first to introduce a service blueprint in 1984 [4]. Thus, the serviced blueprint used by many researchers over the years due to its benefits to portrays the service steps and give the management a valuable information to see the service in customer's eyes and found the bottleneck and fail point that may occur. Service Blueprint is a diagram that portrays and mapping the flow of customer experience in every stage of service that often called “moment of truth” where the interaction and connection between customer and employee from the moment they have touch point in the service until finished including backstage processes was mapping, which objectively shows the people who provide the service to have the same point of view [1, 5, 6].

The disadvantage of Service Blueprint is that this tool only identifies service failure in a certain stage of the service process. Due to the Service Blueprint disadvantage, the researcher has attempted to improve the tools. Szende proposes a revision to the depth of the service blueprint and pairing it with service decomposition, Chang and Yang combining Kano Model and Service Blueprint to improve service quality [5,7]. Another researcher, Chuang attempt to design failure-free service by combining Service Blueprint with FMEA and Wang and Ho do the application of Service Blueprint and FMEA in Security Management [8,9]. Failure-free service is an interesting topic and this research wants to explore further another tool to combine with Service Blueprint to improve service quality.

House of Risk (HOR) is an adaptation from House of Quality (HOQ) where this model is focused on preventive actions to reduce occurrence probability of risk agents, thus prevent the risk events and the model capable to determine which risk agents have the large potential to cause risk events [10]. Therefore, this study uses a Service Blueprint that is integrated with the House of Risk (HOR) with the aim of identifying service failures that can occur and then prioritizing the service quality improvements. The HOR model used in this study is a model adapted from the House of Quality (HOQ) from research conducted by Pujawan and Geraldin [10]. The proposed integration model of Service Blueprint and HOR was presented in Figure 1. The advantage of this research is that with integration model, the service failure can be identified and prioritize the service quality improvement simultaneously, so this model is valuable as a foundation for further research and also for practical implementation.

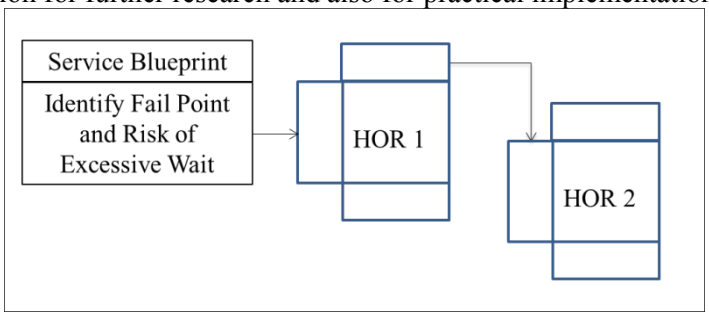

Figure 1. Integrated Model of Service Blueprint and HOR

The purpose of this research is to give guidance for the service provider to improve service quality using an integrated model of Service Blueprint and House of Risk where this model can identify risks agents and prioritize preventive action, thus reducing the risk events with prioritizing strategies. To show how the model works, a cafe is used as a demonstration of this integrated model.

2. Methodology

The steps in this research starts with literature study and it is decided to integrated model of Service Blueprint and HOR to enhance the advantage of the models, which it portrays the customer experience and the service system to identify the fail point and risk of excessive wait, with prioritisation of improvement for the service failure that has been identified. HOR model based on the notion that focus on preventive action, for example, reducing the probability of risk agents to occur where Pujawan & Geraldine use House of Quality with modification of Failure Mode of Effect Analysis (FMEA) in their model [10]. There are two deployment model, HOR1, and HOR2, where HOR1 is used to determine which risk agents are to be given priority for preventive actions and HOR2, is to give priority to those actions considered effective but with reasonable money and resource commitments.

The next step is gathering data from the café and processing the data into the model with the first step is made the Service Blueprint, followed by HOR1 and HOR2. After that, analyze the results. Finally, this research made the conclusion and suggestion for further research.

3. Data collection and Analysis

The café is located in Graha Boulevard, Gading Serpong, Tangerang, Indonesia. The founder has expertise in the bakery and they wanted to have a different workspace that makes them open a café with co-working space. This cafe provides a unique concept that in addition as a coffee shop which located in the 1st floor, this cafe also provides a working space in the 2nd and 3rd-floor area for students, college students and office workers to work. This place not only provides facilities for students and office workers but also available for meeting and events. This café is hoping that customers can create communities and get networking that suits their business or work interests.

The data collection and processing in this research was presented in 2 parts: Service Blueprint and House of Risk (HOR).

3.1. Service Blueprint

There are five components in making Service Blueprint, which is customer action, physical evidence, the front of stage interaction, back of stage interaction and support processes. The five components are separated by lines. There are three lines used the first line of interaction that is the line that separates between customer action with the front of stage interaction. Customer action is an activity performed by the customer, while the front of stage interaction is an activity performed by employees where there is direct contact with customers. Second is a line of visibility, this line separates between a component of the front of stage interaction with the back of stage interaction. Back to stage interaction is an activity performed by employees without getting involved with customers. The third is the line of internal interaction, this line separates the back of stage interaction with support processes. Support processes are the parts that support the service process that employees provide to customers, where this activity should not be done at that time. While at the top of the timeline is the time or sequence of the process of the customer. Service standard and script is a standard service that must be done by employees to customers.

IT Interaction is a supportive system to calculate expenditure and input of raw materials. The round symbol with the letter "F" is the fail point or a failure that may occur during service delivery, while the triangle symbol inscribed with the letter "W" is the risk of an excessive wait which is the excessive time that customer have to wait.

The service process that occurs at the café is as follows and depict in detail in Service Blueprint. The Service Blueprint is not presented in detail. Figure 2 gives an example of the Service Blueprint for service process 1, 2 and 5 to give the reader a glimpse of the blueprint.

1. The process when the customer arrives. Service standard is greeting the customer by saying welcome and good morning/afternoon/night. Physical evidence: a standby employee, employee friendliness in greeting and the appearance of a tidy employee. Front of stage interaction: the employee greets and gives the table option to the customer. Support processes: maintain cleanliness of the cafe.
2. The process when customers see, select and order the menu. Service standard is the employee gives the menu book to the customer. Physical evidence: the menu and attitude of the employee. Front of stage interaction: employees provide menu books to customers.
3. The process when customers choose food and beverages. Front stage: employee records the customer's order and then repeat saying the customer's order to avoid errors. Back of stage interaction: employee input customer orders into the system. Support processes: maintain updating the system (MOKA Point of Sale software).
4. In the payment process, the customer has to wait when employee calculating the total order. Service standard: receive payment in cash or non-cash (using the card), double check the order and total price, give change if pay in cash and need a change. Physical evidence: bill, money, debit card or credit and EDC machine. Back of stage interaction: Employee input payment to the system, print the bill and give order notes to the kitchen. Support processes: maintain the billing system (EDC).

5. The process when a customer requests a Wi-Fi password. The physical evidence: politeness and attitude of an employee when explaining how to use Wi-Fi. Front of stage interaction that occurs is the employee gives the Wi-Fi password to the customer.
6. Customer look for available tables and chairs. Physical evidence: table and chairs, the facilities such as the TV, magazines, and stationery on the table. Front of stage interaction: employee gives suggestion to customers. Support processes: cleanliness of table and chairs.
7. An employee delivers food or drinks to customers. Physical evidence is that food or drink is the same as the customer order. Front of stage interaction is the way employee give food or drink to the customer. Back of stage interaction: the chef made the food or drink in the kitchen. Support processes: availability of raw material using records from MOKA Point of Sale.
8. Customers enjoy food and drinks. Employees standby near customers in case they want to ask or order something.
9. Customers request for condiment such as salt, chili sauce for food or sugar to drink. Physical evidence is employees are responsive and give standard serving methods. Front of stage interaction is when employees give the condiment to customers. Back of stage interaction is the employees take spices from the kitchen. Support processes: availability of condiment supplies.
10. Customer finished eating or drinking. Physical evidence: a separate table with tissue, straws, toothpicks, and cutlery. Front of stage interaction is the customer asking an employee to give tissue, straw, extra cutlery and toothpick on that table.
11. Printer use. Physical evidence: printers, printer cables provided by employees, ink in the printer is available and papers. Front of stage interaction: customers request printer cables to employees and employee inform how to use the printer. Back of stage interaction: employees take printer cables in storage cabinets, add ink to the printer
12. Customers make payments for printing documents. Physical evidence: bill. Front of stage interaction: the employee gives the total cost of printing cost to the customer. Back of stage interaction, the employee inputs the total cost of printing to the system.
13. Customers use the toilet. Physical evidence: cleanliness of toilets and toilet design. Back of stage interaction: employees perform toilet cleaning and the availability of other toilet appliances. Support processes: maintain restroom and ensure soap and toiletries are available.
14. Customers play the board game. Physical evidence: the completeness of the game and the way employees explain the game. Front of stage interaction: employees provide instructions to play boardgame to customers. Back of stage interaction: the employee prepares the board game. Support processes, employees ensure that the game parts are complete and ready.
15. Customers engage in activities such as relaxing, talking or doing tasks. Employees must standby and keep watch when there are customers who want to ask for anything.
16. The cafe provides free mineral water in the dispenser. Physical evidence: empty cup available. Front of stage interaction: employees give the cup to customers. Back of stage interaction: employees take the empty cup in storage cabinets. Maintain cleanliness and available cup.
17. Customers leave the cafe. Physical evidence: employees. Front of stage interaction: employees say thank you. Back of stage interaction: the employee immediately cleans the dirty table.

3.1.1. Fail Point.

The manager and researcher discuss the Service Blueprint and identify together the fail points or failure of processes that occur when delivering services to customers. There are 9 sub-systems and subdivided into sub-process/activity. Table 1 represents the fail point in the research objects.

3.1.2. Excessive Wait

This section contains an excessive wait indicating the time that makes the customer wait. There are 10 sub-systems subdivided into the sub-process / activity. The excessive wait is obtained from the direct observation of the process of providing services provided by the cafe and customer experience gained previously. The excessive wait depicts in table 2.

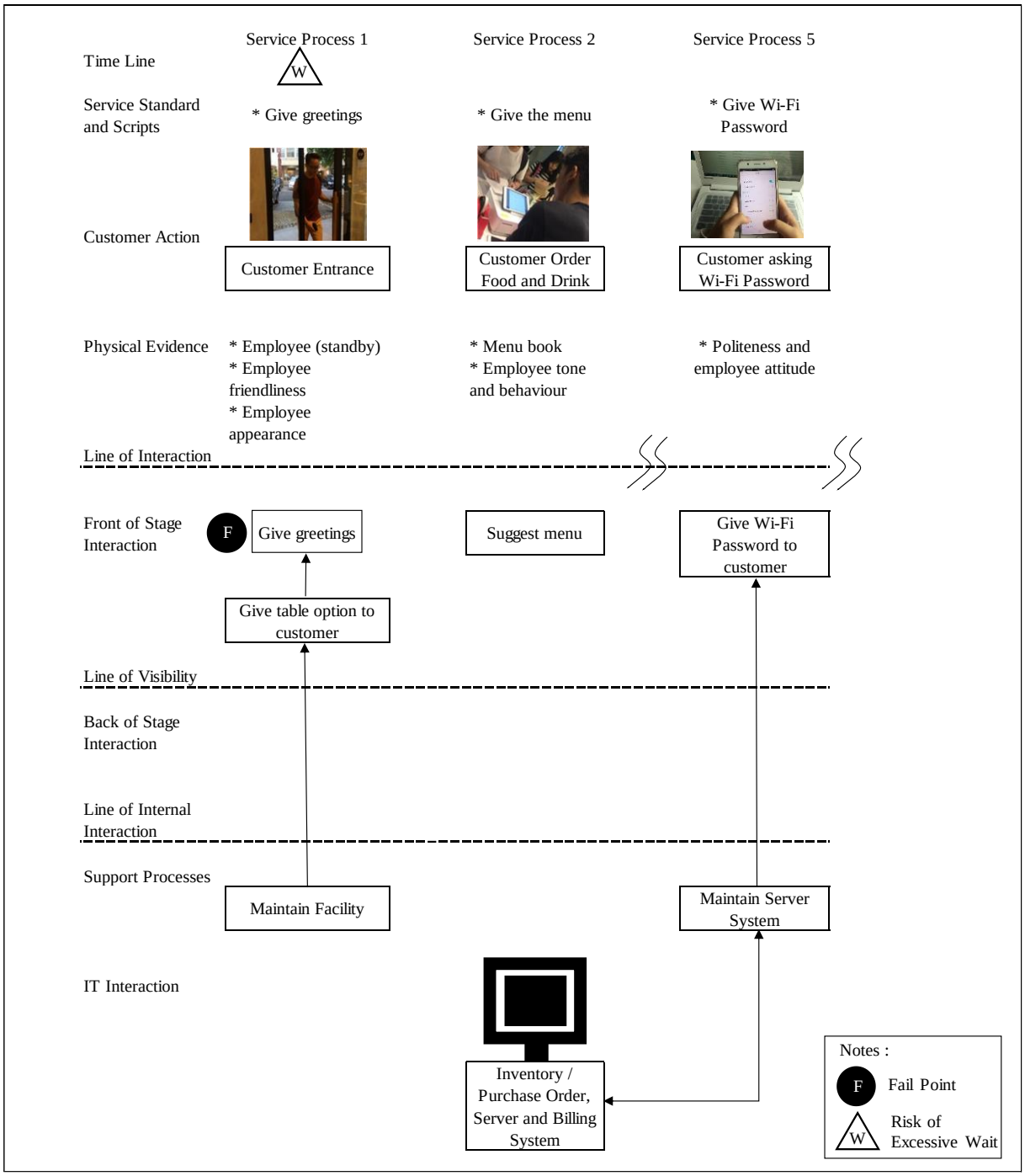

Figure 2. Service Blueprint of Café at Tangerang (Service Process 1, 2 and 5)

Table 1. FAIL POINTS

Fail Point		
Sub-System	Sub-Process/Activity	Potential Fail Point
Customer Come	Give Welcome Greetings	No Employee giving welcome greetings
Choosing Food and Drink	Write orders	Availability of food and beverages
		Did not provide food and drink explanations
		Wrong order input
Payments	Giving the change	Unavailability of change (money)
		Wrong counting change (money)
	The signal of the EDC machine	Bad signal makes EDC machine error
Receive orders	Deliver order to the customer	Deliver food and drink to the wrong customer (table number not available)
Toilet	Toilet appliances	Dirty and trash bin is full
		Availability of toiletries such as liquid hand soap and toilet tissue
Facilities provided	The availability of mineral water	Water dispenser runs out
		Glass is unavailable
Printer Use	Printer Use	Incorrect printer usage instruction
		The printer ink runs out
Payment of printer usage	Provides the cost of printing cost	Gives wrong bill and cost of printing
Playing Boardgame	Provides instructions on how to play	Employee explain how to play the games
		Completeness of game parts
		Lack of knowledge about the games

Table 2. EXCESSIVE WAIT

Excessive Wait		
Sub-System	Sub-Process/Activity	Potential Time to Wait
Customer Comes	There is only one place to order	The customer can order food and drinks only in the cash register
Order Food and Drink	Menu book is only provided at the checkout	Waiting for other customers to finish ordering
Payment	Input order	MOKA Software Point of Sale is slow
	Giving the change (money)	Employees are slow in calculating the change
	Processing a debit or credit card	EDC signals are sometimes error
Looking for Available Table	Seating availability	Waiting for other customers to finish using the table
Foodservice	Deliver the order	Waiting for food and drinks
Another Request	Equip cutlery	Waiting for employees to take the completeness of cutlery
Toilet	Toilet Use	Only 1 toilet available
Printer	Provide cables	Waiting for employees to pick up printer cables in a drawer
	Using the printer	Only 1 printer available
Printer use payment	Provides total cost of printing cost	Waiting for employees to calculate the cost of printing
Board Game	Playing board games	Limited board game availability

3.2. House of Risk

After identify fail point and risk of an excessive wait, the House of Risk (HOR) model used to identify, analyze, measure and give priority strategy as a preventive or corrective action. The steps of HOR use the Pujawan & Geraldine's research [10]. The HOR adapt the HOQ where we relate a set of requirements (what) and a set of responses (how) where each response could address one or more requirements [10]. These are steps in HOR1 and the HOR1 shown in Table 3.

1. Identify risk events that have been done in Service Blueprint are put in the left column, represented as E_i. This research conduct questionnaire to obtain the risk event and severity based on fail point and excessive wait from Service Blueprint with scale 1 to 5. The questionnaire that can be used is 44 of 55 questionnaires. Validity and reliability show that the questionnaire is valid and reliable. There are 20 risk events that could be identified.
2. Assess the impact (severity) of such a risk event. The severity of risk events is placed in the right column of the table and expressed as severity, indicated as S_i which is calculated from the questionnaire.
3. Risk agents are identified and calculate the probability of occurrence for each risk agents. The risk agent is placed at the top of the table and associated with the occurrence of the bottom row, notated as Oj. Determination of risk agents was using fishbone diagram for each risk events. There are 20 risk agents that could be identified. The occurrence obtains from observation and interview with the cafe owner. Risk events in the first step of HOR1 and risk agents in the third step were presented in Table 3.
4. Develop a relationship matrix between each risk agent and each risk event, R_{ij} {0,1,3,9} where 0 represents no correlation and 1,3,9 represents low, moderate and high correlations, respectively.
5. The aggregate risk potential of agent j (ARPj) is calculated using equation 1 as follows:
$$ARP_j = O_j \sum_i S_i R_{ij} \quad (1)$$
6. Rank risk agents according to their aggregate risk potentials in a descending order (from large to low values).

House of Risk 2 is used to know which actions to be a priority, with regards to effectiveness, resources and difficulties degree to improve.

These are steps in HOR 2:

1. Select a number of risk agents with high-priority rank, possibly using Pareto analysis, but in this research, the owner of the cafe selected 10 highest ARP to be in HOR 2 related with the implementation after HOR 2. The ten highest ARP placed in the left side (what) of HOR2 and put the corresponding ARP_j in the right column. The HOR 2 depicted in table 4.
2. Identify actions that relevant to prevent the risk agents and those actions are put in the top row of HOR 2.
3. Determine the relationship between each preventive action and each risk agent, E_{jk}. The values are the same with HOR 1, which is {0,1,3,9}
4. Calculate the total effectiveness of each action with equation 2.
$$TE_k = \sum_j ARP_j E_{jk} \ \forall k \quad (2)$$
5. Determine the difficulties degree for action implementation, D_k
6. Calculate the total effectiveness to difficulty ratio using equation 3.
$$ETD_k = TE_k / D_k \quad (3)$$
7. Assign rank of priority to each action (R_k) in descending order from highest ETD_k.

The proposed strategy coded as PA1 is making Standard Operating Procedure, PA2 is creating an online queue system to get table number, PA 3 provides another alternative to customers who do not get a table, and PA4 is conducting briefings with the employee before opening or after the café closes. The HOR 2 results that the strategy to prioritize is PA1, followed by PA4, PA2, and PA3 respectively.

Table 3. Risk Events and Risk Agents

Code	Risk Event	Severity
E1	Employees do not greet with a smile, polite and friendly	5
E2	Employees do not accurately tell availability of table seat	4
E3	Employees are wrong in delivering food and drinks	4
E4	Employees are not responsive in serving	4
E5	Employees can not understand orders	5
E6	Employees do not provide clear information about food and drink	4
E7	Employees do not provide clear information about the facilities located on the 2nd floor	4
E8	Wifi connection is slow	4
E9	The printer can not be used (ink is out or damaged)	4
E10	Employees do not provide clear information about the use of the printer	4
E11	The cost of printing is not accurate	5
E12	The board game is incomplete	4
E13	Employees do not provide clear information about how to play a board game	4
E14	Toilets were dirty and uncomfortable	4
E15	The mineral water bottle is empty	4
E16	The payment process is pending because there is no change	4
E17	The payment process is delayed or failed due to damaged EDC machine	5
E18	The cafe has only one reservation place and the payments are serviced by one employee	4
E19	There is an unclean cutlery	4
E20	The name of food and drink is hard to understand	5

Code	Risk Agent	Occurrence
A1	Employees are not ready at the front desk or cashier	4
A2	Employees are serving another guest	2
A3	The employee was cleaning the table	2
A4	The table has not been cleared	6
A5	Employees do not ask the customer needs to use the room	4
A6	Too many customers	5
A7	There are no table numbers	4
A8	The briefing did once a week	6
A9	There is another addition requested by the customer	2
A10	The internet connection is slow	2
A11	Not checking the printer before the cafe closed	5
A12	Customer laptop incompatible with the printer	1
A13	There are no periodic checks	4
A14	No change available	4
A15	Signal system is interrupted or error	3
A16	The existence of a queue or waiting for payment	7
A17	Less scrupulous in cleaning cutlery	0
A18	Explanation of the menu in English	4
A19	No pictures of food or drink on the menu	4
A20	There is no SOP (Standard Operating Procedure)	10

TABLE 4. HOUSE OF RISK 1

Risk Event (E_i)	Risk Agents (A_j)																				Severity (S_i)
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	
E1	9	9	3			3		9												9	5
E2				3	1															9	4
E3		1				9	9	3												3	4
E4	3	3	1			9		3	3											3	4
E5									3											3	5
E6						3														3	4
E7					9	1		3												3	4
E8					1	9				9											4
E9					1						9	9	3							3	4
E10					1							3								3	4
E11																					5
E12					3								1							3	4
E13					1															1	4
E14						3							9							9	4
E15													9							9	4
E16														9		9				3	4
E17															9	9					5
E18															3	9					4
E19																	9			3	4
E20																		9	9		5
Occurence	4	2	2	6	4	5	4	6	2	2	5	1	4	4	3	7	0	4	4	10	
ARP	228	122	38	72	272	755	144	486	54	72	180	48	352	144	171	819	0	180	180	2800	
Priority	7	14	19	15	6	3	12	4	17	16	8	18	5	13	11	2	20	9	10	1	

TABLE 5. HOUSE OF RISK 2

To be treated risk agent (A_j)	Preventive action (PA_k)				Aggregate risk potentials (ARP_j)
	PA1	PA2	PA3	PA4	
A20	9			3	2800
A16	3	3			819
A6	3	9	9		755
A8	9			9	486
A13	9				352
A5	9	3			272
A1	9			3	228
A11	9			3	180
A18				3	180
A19				3	180
TE_k	43584	10068	6795	15078	
D_k	4	4	3	3	
ETD	10896	2517	2265	5026	
Priority	1	3	4	2	

4. Conclusion

An integrated model of Service Blueprint and House of Risk (HOR) in this research combines the advantages of Service Blueprint in service process mapping to identify failures and the potential of risk-excessive wait customers with the advantages of House of Risk (HOR) which is the prioritize risk and give strategic priorities for quality improvement.

Results from the case study show that the integrated model can identify 20 risk events that may occur during the service process, the model can identify 20 risk agents that can trigger a risk event, in which 10 selected as priority risk agents, and the model can give priority suggestion and the case study resulting four main possible strategies for service improvement.

Suggestion for the café is to implement the proposed strategies and measure the results of the implementation. Suggestion for further research is to replicate the integrated model of Service Blueprint and House of Risk in another service setting considering that this research was first conducted.

Acknowledgment

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