Active and Latent Failures in Customer Services and Opportunities for Quality Innovation for Convenience Stores

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Abstract

Due to the characteristics of customer participation and heterogeneity in service operations, the demands and contents of service tasks are usually with great diversity. Therefore it is usually preferred to conduct failure analysis, instead of rigidly structured questionnaire, for the purpose of assessment and innovation in service quality. Furthermore, rather than conducting the survey to customers directly that seems to comply with the concept of customer orientation, it possesses great advantages in expertise and insights in failure analysis through service personnel surveys. In this study, service failure cases were collected using the Critical Incident Technique through the interviews to the service personnel from various chain convenience stores in Taiwan. These service failure incidents were then analyzed using the active-latent framework proposed in this study. Both active failures and latent failures from these collected incidents are categorized in hierarchical structures. These two failure categorizations were further mapped for providing empirical bases to the opportunities of quality innovation in system design and personnel training/education for this particular service domain. The interpretations and implications from the resulted failure patterns are also discussed.

Keywords: service failure analysis; quality innovation; retailing

1. Introduction and Background

Innovation in providing interactive customer services is critical and beneficial in retailing. (Berry et al., 2010) Due to the characteristics of customer participation and heterogeneity in interactive service operations, the demands and contents of such service tasks are usually with great diversity. Therefore, instead of using rigidly structured SERVQUAL-based questionnaires (Parasuraman et al., 1988) which are oriented for strategic planning, it is usually preferred to conduct service failure analysis, which has the advantage in preserving crucial context information, for the purpose of assessment and innovation for service quality in particular. (Stauss, 1993)

1.1 Critical Incident Technique and Latent Failure Analysis

Among various data collection methods, Critical Incident Technique (CIT) is the most common instrument utilized for collecting cases of service failure in service quality research (Bitner et al., 1994). The failure

cases collected were then usually categorized in terms of their common features to establish the bases for service quality analysis. Most of the categorizations established by previous research in service quality are, however, mainly from the perspective of active failures, i.e., the errors or violations committed at the "sharp end" of the system by the "front-line" operators: mostly customers or service personnel in service domains. Latent failures are, in a different sense, those adverse conditions that derive from the decisions or activities made by supervisors and managers who are separated in both time and space from the physical system. (Reason, 1990; 1997) As Reason (1990 & 1997) further pointed out, in comparison with active failure analysis, the investigation on latent failures provides a greater beneficial effect upon the improvement and error prevention in system designs. Therefore, in order to have better understandings on the opportunities of innovation in interactive customer services, it is important to conduct analyses on latent failures, in addition to the conventional active failure analyses.

In fact previous studies, such as Wenner & Drury (2000) and Chen (2002 & 2006), have attempted to conduct investigations on the potential avenues for quality interventions through the analysis of the interrelationships between active failures and latent failures in various service domains. Wenner & Drury (2000) used SHELL model as the basis of framework in classifying latent failures and further make cross-classifications with the active failure patterns in aircraft ground damage incidents with promising suggestions on preventing human errors. Chen (2002 & 2006) also used similar approach as Wenner & Drury (2000) for cross-classifying latent failures with active failure patterns, but the categorization schemes used to classify the latent failures collected in these two studies were specifically constructed for customer services. Chen (2002 & 2006) also showed meaningful results in applying the active-latent mapping approach to reduce human errors for quality purposes in various service domains. However, the frameworks of failure analysis generated in the studies mentioned above are either team-work oriented (Wenner & Drury, 2000) or focused on the services dealing with intangible services (Chen, 2002 & 2006) such as financial transactions or making reservations. That is, the failure analysis frameworks of similar kind but oriented for retail services, i.e. only one or two service persons assisting customers with tangible merchandises such as corner drugstores or convenience store services which are also of a significant portion of service industries, has not yet been established.

For service quality purposes, rather than conducting the survey to customers directly that seems to comply with the concept of customer orientation, it possesses great advantages in expertise and insights in failure analysis through service personnel surveys. (Bitner et al., 1994; Chen & Hsu, 2006) It is therefore effective and efficient to conduct service failure survey by interviewing service personnel especially for preliminary studies.

1.2 Quality Innovation in Retail Services

For interactive retail services, Berry et al. (2010) proposed a model for identifying the opportunities for innovative customer services through five important avenues; namely, the increasing power of consumers, channel synergies, pre- and post-transaction service, optimal use of resources, and consumer heterogeneity. Their research further suggested that demand-driven innovations with better understanding of the cumulative cross-channel effects on customers and retailers throughout all the consumption stages. Mou et

al. (2018) proposed that considering omni-channel retailing, facilitating new technologies, and emphasizing workforce management for better customer experience are the three directions of research opportunities in retail store operations. In particular, this study identified the critical roles of the interactive relationships among customers, employees, and products in retailing.

With the impact of service failure, Bougoure et al. (2016) showed that a service firm's effective complaint handling positively impacts satisfaction with complaining, overall satisfaction, and service brand credibility. Their study demonstrated the possibilities of maintaining service brand credibility during a service failure and therefore encouraged brand managers develop and implement effective handling procedures to service failures. By conducting a comprehensive literature review on retail store operations, A variety of literature in retail services suggest that quality judgement and customer royalty may also be influenced by, for example, perceived insecurity during service encounters (Koistinen & Järvinen 2016), perceived justice in failure recovery (Lopes & da Silva, 2015), and the response time of failure recovery (Crisafulli & Singh, 2017). Therefore, in order to identify the opportunities for quality innovation in retail services, it is necessary that service failure analysis should address both the interactive nature of customer behaviors as well as the processes during service encounters.

2. Method

2.1 Data Collection

In this study, failure cases were collected using the Critical Incident Technique (CIT) through the interviews to the service personnel from various chain convenience stores in Taiwan. Each interviewee was asked to report error or problematic incidents encountered on the job. Each incident "story" collected was then transcribed from the conversation audio-recorded in the interview.

2.2 Analysis of Service Failures

From each incident story, as the first stage of the analysis framework, the active failure associated with the outcome was determined. For service quality purposes, service failures are generally defined as unfavorable or dissatisfied service encounter experiences, i.e., from the customer's perspective. In this study, in a broader sense, service failures are defined as any error or incompliance, either intentionally or unintentionally, of the goals of the service system instead. The goals of a service system are often set for both the final outcome (e.g. customer satisfaction) and the process (e.g., correct change). For each active failure, the failure medium/interface, such as merchandise or payment, was identified as the primary category. The failure medium/interface of each active failure is further described by the primary interface between the active human (such as a customer or a service personnel) whose action directly contributes the active failure.

In the second analysis stage of this study, for the classification of latent failures, a framework that derived from those proposed by Wenner & Drury (2000) and Chen (2002 & 2006) is established considering the characteristics of the service interactions in convenience store services. The analysis framework of latent failures in this study consists of four major categories: *Human*, *Tangible*, *Procedure*, and *Supply*. The Human category can be further divided into two categories: *Customer* and *Personnel*. Another latent failure

category – Tangible – can also be broken down into *Equipment* and *Environment* categories.
Cross-classification of latent failures with active failure patterns is the third stage of the research framework proposed in this study. By analyzing these mapping patterns may provide useful insights or implications in ergonomic interventions for this particular service domain.

3. Results and Discussion

3.1 Active Failure Classification

The active failure pattern and the detailed case counts which generated in this study are presented in Table 1. Four major categories - *Access*, *Facility*, *Merchandise*, and *Payment* – are resulted. These failure cases are also sorted by the committed person, either customer or service personnel. As the results show, a great part (65%) of the active failure cases found in convenience store services in this study are associated with the interactions between merchandises and humans, customers in particular. *Poor quality*, *not complied with needs*, and *processing error* are the three subcategories found in this *Merchandise* category.

Table 1 The active failure patterns in convenience store services

Active failure category			Customer	Personnel	Total	% of Total
1	**Access**		**5**	**-**	**5**	**10%**
	1.1	difficult to enter	3	-	3	6%
	1.2	slip & fall	2	-	2	4%
2	**Facility**		**4**	**-**	**4**	**8%**
	2.1	failed to operate	1	-	1	2%
	2.2	unclean	3	-	3	6%
3	**Merchandise**		**30**	**3**	**33**	**65%**
	3.1	poor quality	15	-	15	29%
	3.2	processing error	5	1	6	12%
	3.3	not complied with needs	10	2	12	24%
4	**Payment**		**1**	**8**	**9**	**18%**
	4.1	incomplete checkout	-	1	1	2%
	4.2	incorrect change	-	7	7	14%
	4.3	incorrect payment type	1	-	1	2%
	Total		**40**	**11**	**51**	**100%**

The *Payment* category is the second largest category that possesses almost one-fifth of the failure cases collected. It is worth notifying that most of the failures in this category were committed by service personnel, especially in the *incorrect change* subcategory. On the other hand, another two main categories - *Access* and *Facility* - are solely encountered by the customers, as depicted in Table 1. *Difficult to enter* and *slip & fall* are the two subcategories found in the *Access* category while the *Facility* category also consists of two subcategories - *failed to operate* and *unclean*. As a summary, the active failures involved in customer-merchandise interactions and personnel-payment interactions should have higher priorities and be with greater leverage in service process improvement, i.e., better opportunities for quality innovation.

3.2 Latent Failure Classification

Table 2 shows the latent failure classification found in this study. Among all, the *Human* category possesses more than half of the total latent failure counts. In this latent category H (*Human*), *lack of awareness* and *lack of knowledge/skills* subcategories are commonly found in H1 (*Customer*) and H2 (*Personnel*). These two subcategories are the majority in H1 (customer) category as well, but relatively less prominent in H2 (Personnel) category. *Not checking as needed* and *time pressure* are in fact the two major subcategories in terms of failure counts in the *Personnel* category. Therefore, between customers and personnel, there exist similar subcategories in latent conditions but the emphases seem diverse. For customers, most of the latent problems are associated with unfamiliarity to service systems. On the other hand, overloading seems to be the primary issue in latent failures for personnel.

Table 2 Incidence of latent failures*

Latent failure category				Number of incidents	% of total
Human				**45**	**58%**
	H1	Customer		17	22%
		H1.1	lack of awareness	6	8%
		H1.2	lack of knowledge/skills	8	10%
		H1.3	incorrect knowledge	3	4%
	H2	Personnel		28	36%
		H2.1	lack of awareness	5	6%
		H2.2	lack of knowledge/skills	3	4%
		H2.3	not checking as needed	10	13%
		H2.4	time pressure	10	13%
Tangible				**8**	**10%**
	T1	Equipment		5	6%
		T1.1	Inappropriate for task	4	5%
		T1.2	lack of proper equipment	1	1%
	T2	Environment		3	4%
		T2.1	poor condition	1	1%
		T2.2	lack of space	2	3%
Procedure				**13**	**17%**
	P1	Procedure		13	17%
		P1.1	lack of proper procedures	2	3%
		P1.2	less reactive	2	3%
		P1.3	low maintenance	9	12%
Supply				**12**	**15%**
	S1	Supply		12	15%
		S1.1	no inventory/supply	8	10%
		S1.2	poor production/delivery	4	5%
Total				***78***	***100%***

*Note: Totals exceed the number of incidents due to multiple latent failures per incident.

The *Tangible* category, which consists of *Equipment* and *Environment* subcategories, is rather minor (10%)

in terms of latent failure counts. *Inappropriate equipment for the task* is the most crucial issue among all subcategories in *Tangible*. As to the *Procedure* category, three subcategories – *lack of proper procedure, less reactive, and low maintenance* – are derived from incident data. Among them, the *low maintenance* subcategory, which represents the latent conditions associated with the procedure design that the maintenance to merchandises, equipment/facility, or environment is less frequent as necessary, possesses the most failure counts. This specific result suggests frequent maintenance procedures are needed. In the *Supply* category, the *no inventory/supply* subcategory has twice the failure counts twice than the other subcategory – *poor production/delivery*. Therefore, strategic decisions in supplier management also play an important role of quality innovation in convenience store services.

3.3 Active-Latent Mapping

These latent failures discussed above are further mapped with their consequent active failure pattern in order to capture any specific significant cause-effect relationships for improvement purposes. Figure 1 shows a general cross-classification of the latent failure categories from Table 2 with the active failure patterns from Table 1, both at their top classification levels.

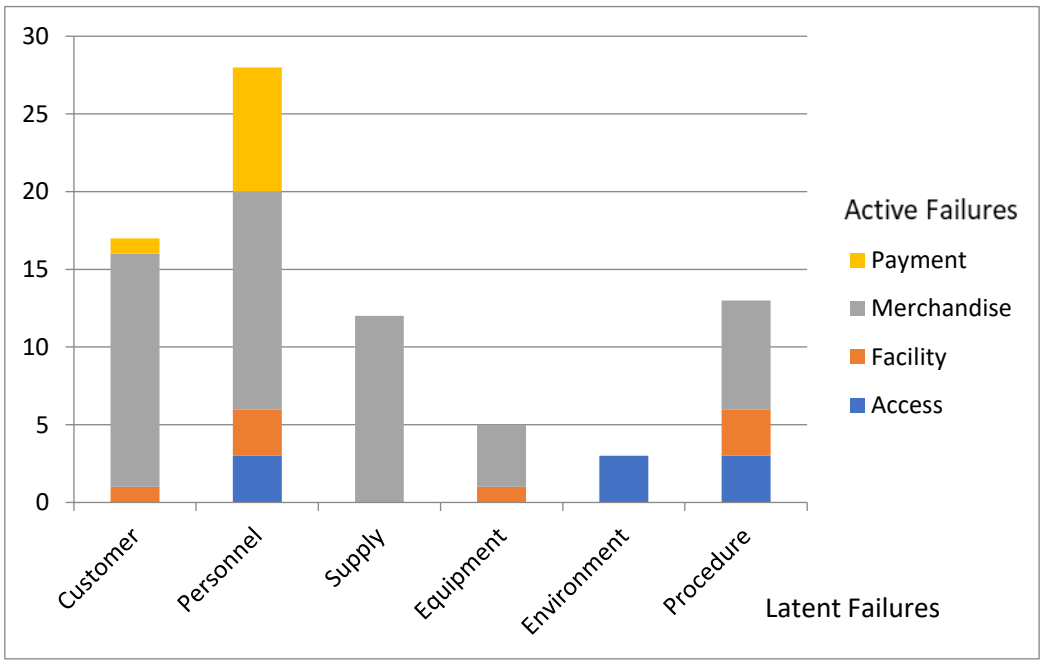

Figure 1. General cross-classification of latent failures with active failures

As depicted in Figure 1, *Customer* latent failures (H1) are linked mostly with *Merchandise* active failures, so are *Supply* (S1) and *Equipment* (T1) latent failures. In a similar manner, T2 (*Environment*) latent failures are exclusively found in the *Access* active failure category. Therefore, the remedy or innovative actions on any one of these four types of latent failures may benefit mostly on one specific active failure pattern linked respectively. These cause-effect relationships are rather straightforward. In a contrary fashion, the mappings to active failure categories with both *Personnel* (H2) and *Procedure* (P1) latent failures rather spread out. These particular mapping patterns with *Personnel* and *Procedure* latent failures actually suggest

their significance in service quality innovation, which may be beneficial in applying the research suggestions by Bougoure et al. (2016) and Lopes & da Silva (2015).

It is also interesting to interpret these mapping results from a different perspective, i.e., from active failure patterns to the related latent failure categories. For *Payment* active failures, almost all of the related latent failures fall into the *Personnel* category.

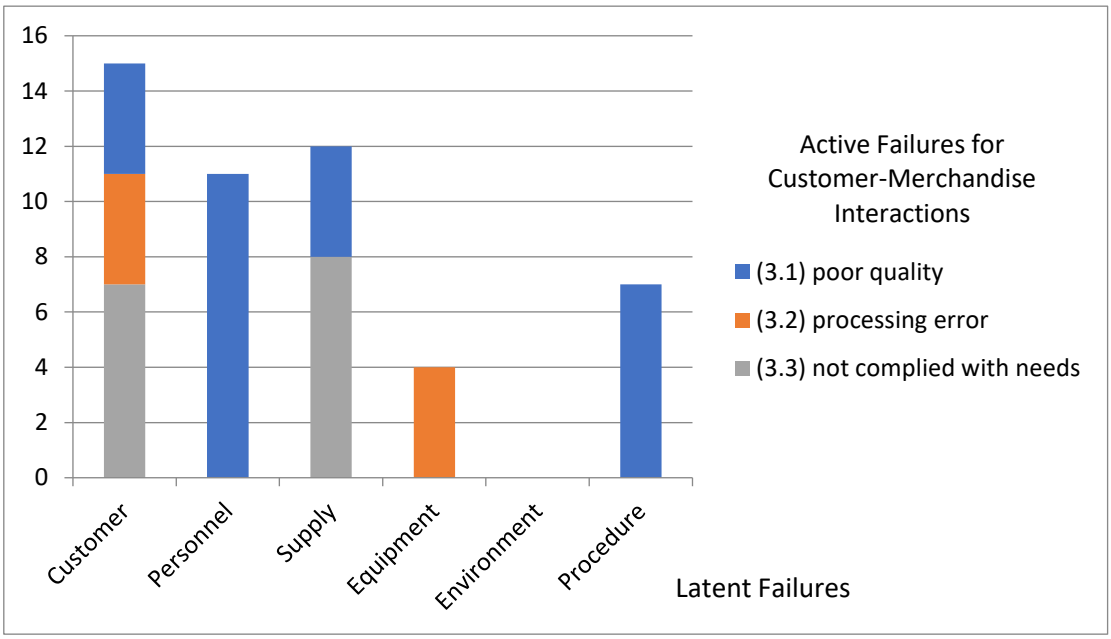

Figure 2. Cross-classification of latent failures with active failures for Customer-Merchandise interactions

Furthermore, as mentioned earlier, *Merchandise* active failures possess more than half of the incidents reported and most of the incidents in this category are *Customer-Merchandise* interactions. As an example, Figure 2 shows the detailed mapping patterns of latent failures with the active failures of customer-merchandise interactions specifically. Among all the cross-classification results in Figure 2, it is interesting to see that the latent failures of *Personnel* and *Procedure* are linked exclusively with the active failures of *poor quality* of customer-merchandise interactions. By further examining the data, it is found that the most incident counts in the active failures of *poor quality* in customer-merchandise interactions, are cross-linked with the latent failures of *not checking as needed* in the *Personnel* category and *low maintenance* in *Procedure*. This specific result suggests that any assistance to enhance the performance of service personnel on checking the statuses of merchandises, such as providing adequate warnings or timely information on food heating processes or expirations, or to improve procedure designs for adequate maintenance tasks, such as better task scheduling or action reminding, may fairly reduce the chances of the quality problems that customers may have with merchandises. As Berry et al. (2010) suggested, optimal use of managerial and technological resources with demand-driven approach may be beneficial to quality innovation. For failure recovery, the emphasis of perceived justice (Lopes & da Silva, 2015) may also be designed into service procedure deployment as well as personnel training. Generally speaking, this type of detailed investigation in those significant links between active and latent failure subcategories provide empirical

examples in such cause-effect mappings for quality innovation especially in failure prevention and recovery for retail services.

4. Conclusions

An analysis framework to service failures is proposed for quality innovation purposes in this study. This framework consists of three stages of analysis. The first analysis stage is active failures classification that is oriented on human-medium interactions. The application to convenience store services in this study results four main categories: Access, Facility, Merchandise, and Payment, along with their respective subcategories. The second stage of analysis is latent failures classification. A classification scheme for latent failure analysis is proposed in this study with four main categories: Human (Customer + Personnel), Tangible (Equipment + Environment), Procedure, and Supply. Those subcategories obtained from the domain of convenience store services may also provide a basis for transferring this analysis scheme to similar service domains. Cross-classification of latent failures with active failure patterns is the third stage of the research framework proposed in this study. The primary purpose of this mapping analysis is to provide empirical bases for the opportunities of quality innovation.

Some major findings for the failure analysis in convenience store services in this study are summarized as follows:

1) The active failures involved in customer-merchandise interactions and personnel-payment interactions should have higher priorities in service process innovation.

2) The latent problems associated with customers most are the unfamiliarity to service systems while overloading is the primary issue for personnel training.

3) Adequate maintenance procedures and supplier management also play important roles in reducing latent failures for convenience store services.

4) Any remedy or innovative actions on the latent failures associated with customers, supply, and equipment may benefit mostly on the active failures associated with merchandises. In particular, the poor quality problems in customer-merchandise interactions may be well reduced by enhancing the performance of service personnel on status checking and better procedural designs in maintenance tasks.

5) The fact that the latent failures in both personnel and procedure categories have diverse connections with active failure patterns suggests their significance in service quality. Optimal use of managerial and technological resources with demand-driven approach may be beneficial to such quality innovation.

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