Service recovery and customer satisfaction in container liner shipping industry – an ordered logit approach

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Abstract: This paper assesses the responsiveness of service recovery process to customer satisfaction in container liner shipping (CLS) industry. The research deals with real-world business events, conducted using a survey method, in which customers evaluate service recovery scenario and complete a questionnaire with respect to CLS carriers they had recently patronised. Estimated by ordered logit regression method, the results show that timeliness of communication is the most significant service recovery attribute. It also finds that customers in different segments prefer receiving recovery resources in different ways; effective service recovery could help improve customer satisfaction and service recovery paradox exists in the industry. The findings contribute to the understanding of theoretical explanation of service recovery attributes and provide managers with useful guidelines for establishing effective recovery process. Unlike other research, this paper draws on data from actual customers in CLS industry and therefore benefits from increased external validity.

Keywords: container liner shipping; CLS; service recovery; beneficial cargo owners; BCOs; customer satisfaction; freight forwarders; FFWs; service recovery paradox; ordered logit model; survey; recovery attributes; external validity.

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1   Introduction

Service failure exists in any service industry. Although service failure has the potential for destroying customer satisfaction, effective application of recovery techniques may enable service managers to maintain or even increase loyalty (Miller et al., 2000). However, effective service failure recovery is always formidable, especially for failure occurred in a critical service quality dimension.

This paper estimates the effect of service recovery for reliability related service failures in container liner shipping (CLS) industry. Yuen and Thai (2015) suggest that four key dimensions can represent service quality in CLS: reliability, speed, responsiveness and value. Out of the four dimensions, reliability has the largest impact on customer satisfaction. It is meaningful to investigate the effect of reliability related service failure recovery on customer satisfaction. Reliability is associated with accurate presentation of the product and delivery of products on-time. On-time delivery is essentially evaluated against the original transport plan[1] that shipper was confirmed at booking. Deviations to original transport plan, especially those caused by liner carrier's operational issues, seriously damage the carrier's service reliability

Applying real-world survey data, this research analyses the effect of service recovery activities on customer satisfaction. The key objectives are to:

1   assess the effect of reliability related service recovery activities

2   identify if customers in different segment prefer receiving recovery resources differently

3   test if service recovery paradox exists in CLS industry

4   provide liner companies with guidelines for handling service recovery process.

The rest of the paper is organised as follows. Section 2 reviews previous research and develops research hypothesises. Section 3 demonstrates the methodology. Section 4 presents the empirical analysis and results. Discussion of the findings, managerial implications and limitations are detailed in Section 5. Section 6 contains the conclusions.

2   Literature

The shipping industry is classified as a service sector (Branch and Stopford, 2013). Although CLS service represents a key subset of business-to-business service sector, there are few studies addressing service strategy, service failure and recovery issues in CLS service. The following section reviews key literature on service recovery and customer satisfaction in a general scope.

2.1   Service recovery

Service recovery refers to the actions an organisation takes in response to a service failure (Gronroos, 1988). Service failure occurs when the expectations set by the customer are not met by the service performed (Michel, 2001).

Service recovery management is considered to have a significant impact on customer satisfaction level. Customers expect effective recoveries to service failures, and

successful service recovery can enhance customer's perception of service quality and customer's satisfaction (Bitner et al., 1990). The success may depend on type of service (Mattila, 2001), the type of service failure (McDougall and Levesque, 1999), and the speed of response (Boshoff, 1997).

2.2 Customer satisfaction

Despite extensive research on customer satisfaction, researchers cannot agree on a common definition for the concept. This research adopts the definition given by Chang et al. (2009) that customer satisfaction is the psychological reaction of the customer with respect to his or her prior experience with the comparison between expected and perceived performance. Satisfaction has been measured through either a single transaction, or a series of interactions with a product over time.

Satisfaction in a service failure situation is determined by two factors: the outcome of the original service encounter based on specific service attributes (Singh, 1990), and the attributes associated with the service recovery process (Parasuraman et al., 1991).

Table 1 Summary of justice and recovery attributes

Justice	*Recovery attributes*	*Literature*
Distributive justice	The perceived fairness of the outcome, e.g., the principles of equity, equality, need, compensation, repairs, replacement.	Tax et al. (1998), Mattila (2001)
Interactional justice	The perceived fairness of the manner in which customer is treated; demonstrations of politeness, concern, honesty, explanation and effort put into resolving the problem.	Tax et al. (1998), Goodwin and Ross (1992), Smith et al. (1999)
Procedural justice	The perceived fairness of the interpersonal treatment people receive during the enactment of procedures, e.g., speed to response, accessibility and flexibility of procedure, company policies, etc.	Tax et al. (1998), Michel (2001)

Table 2 Descriptive statistics

Variables		*Mean*	*SD*	*Description*
A1	Frequency	3.256	1.197	Frequency of failure
A2	Details	3.416	1.089	Content (level of detail) of the information
A3	Accuracy	3.447	1.088	Accuracy of the information provided
A4	Timeliness	3.275	1.135	Timeliness of recovery communication
A5	Goodwill	3.405	1.227	Fairness of manner in recovery communication
A6	Satisfaction	3.324	1.134	Overall satisfaction
N = 262				

Note: SD is standard deviation.

2.3 Service recovery paradox

Service recovery paradox refers to situations where satisfaction of recovered customers actually exceeds that of customers who have not encountered any problems with the

initial service (Michel, 2002). Empirical evidences provide mixed support for the existence of a recovery paradox (Matos et al., 2007). A possible explanation for the mixed findings may be that recovery paradox is dependent on a number of factors:

1   failure expectations, recovery expectations and recovery performance (McCollough et al., 2000)

2   the difficulty in statistically detecting what appears to be a rare event with small size effects (Michel and Meuter, 2008).

2.4   Justice theory

Justice theory is one of the dominant theoretical frameworks applied to service recovery (Tax et al., 1998). Basis on justice theory, customers evaluate perception of fairness with the service recovery by three factors: outcomes, procedural fairness and interaction treatment (Table 1).

To achieve the research objectives, this study designs a service recovery framework (Figure 1) in CLS industry based on justice theory.

Figure 1   A framework for examining service recovery handling relationships
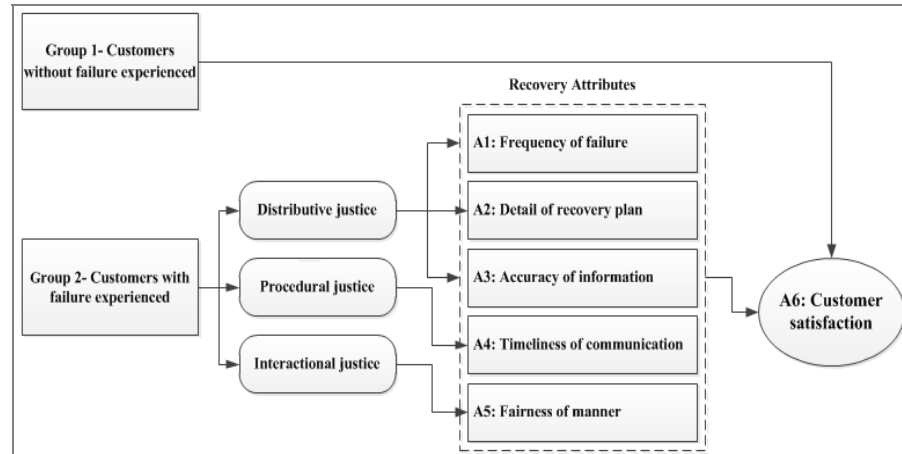
        Source: Author compiled

2.5   Research question and hypothesis

Previous studies on the relative effects of the justice dimensions in service recovery are dividing. To summarise:

1   service recovery techniques vary in their effectiveness relative to the failure types (e.g., Craighead et al., 2004)

2   procedural justice and interactional justice may have a stronger influence than distributive justice on long-term or holistic evaluations (e.g., McFarlin and Sweeney, 1992)

3 distributive justice is the most important predictor of satisfaction (e.g., Teo and Lim, 2001).

The lack of convergence between the conclusions of relevant literature may lie in the specific characteristics of the services analysed and the research method used (Martínez-Tur et al., 2006).

Since reliability is the most important service quality dimension in CLS service (Yuen and Thai, 2015), and reliability is essentially measured by on-time delivery, timeliness attribute may play important role. The first hypothesis is:

H1 Timeliness (A4) has the largest impact on customer satisfaction.

Typically, there are two types of customers in CLS service: freight forwarder (FFW) and beneficial cargo owner (BCO). FFW is a company specialising in arranging storage and shipping of goods on behalf of its shippers. BCO refers to an importer that takes control of their cargo at the point of entry and does not utilise a third party source like FFW. Based on business nature, BCO shippers and FFW shippers may have difference preference in receiving recovery process. The second hypothesis is thus:

H2 Customers in different segment prefer to receive service recovery resources in different ways.

Many scholars discuss service delivery paradox in different service industries. Customers are usually more emotionally involved in and observant of recovery service than in routine, consequently they are often more dissatisfied by an organisation's failure to recover than by the service failure itself (Berry and Parasuraman, 1991; Bitner et al., 1990). Ok et al. (2005) suggest that although a service failure initially hurts customer satisfaction, effective complaint handling through service recovery may reinforce the reliability perception and relationship continuity.

The service delivery paradox may exist in CLS service. The business nature essentially decides that service failure is inevitable in CLS service. For example, weather condition, vessel capacity constraint, port or terminal congestion, incorrect documentation and operation mistake. A customer who usually uses multiple CLS carriers for different consignments can easily compare carriers' recovery efforts. As a result, customer tends to rate higher for a liner company who recovers service failure more effectively than its competitors do. The third hypothesis is:

H3 Service recovery paradox exists in liner shipping service.

3 Methodology

3.1 Design of research instruments

This study collects feedback from real-world customers reporting actual service failure recoveries through online survey. Comparing to experimental design method, it ensures the external validity. This is because the respondents are part of the service setting – they do worry about delays, financial loss, and so on.

In the questionnaire (Appendix), respondents were asked to provide feedback to service failures in the past two months when carriers failed to deliver as per original

transport plan. They were asked to rate the perceived importance of the five service recovery attributes and satisfaction level (A1–A6 in Figure 1) on a five-point Likert scale.

To test the research hypothesises, this study uses a stratified random sampling of both satisfied and dissatisfied customers, rather than focussing on dissatisfied customers only.

3.2 Method of data collection

The sampling frame for this research is constructed from CLS customers located worldwide. The questionnaire was distributed to respondents through online survey portal during October to November 2016. The survey is anonymous but respondents were advised to specify the type of shipper they acted as – either FFW or BCO; and the survey should take less than ten minutes to complete. By the cut-off date, 262 completely answered questionnaires were returned, of which 156 were from FFW shippers, 106 from BCO shippers. The sample consists of respondents from 81 countries.

4   Empirical analysis and results

4.1 Internal consistency reliability analysis

Since Likert-type scale is used in the survey, it is imperative to report internal consistency reliability. Internal consistency reliability is a way to gauge how well a survey is actually measuring what it is intended to measure. For this purpose, this paper calculates and reports Cronbach's alpha coefficient (α). Cronbach's alpha (Cronbach, 1951) is a function of the number of items in a test, the average covariance between pairs of items, and the variance of the total score. Many statisticians recommend a minimum α coefficient between 0.65 and 0.8 (or higher in some cases), while α coefficient less than 0.5 is usually unacceptable. The overall alpha value of 0.854 indicates that the survey instrument is reliable (Table 3).

Table 3   Internal consistency and normality test results

Service recovery factors		Cronbach's alpha value (α)	Shapiro-Wilk W test (W)
A1	Frequency	0.898	0.948***
A2	Details	0.805	0.960***
A3	Accuracy	0.805	0.963***
A4	Timeliness	0.801	0.968***
A5	Manner	0.858	0.995
A6	Satisfaction	0.789	0.972***
Test scale (N = 262)		0.854	-

Note: *** indicates 1% significant level.

4.2 Normality test

Shapiro-Wilk W test (Shapiro and Wilk, 1965) is conducted to test variable normality. The null hypothesis that variable is normally distributed can be rejected at 1% significance level for all variables except for 'manner' (Table 3).

4.3 Analysis of variance

The purpose of this analysis is to test if there were a significant difference between the answering tendencies of two groups of customers – group 1 consists of customers who did not experience service failure and group 2 customers who experienced.

Mann-Whitney test (Mann and Whitney, 1947; Wilcoxon, 1945) is applied for the analysis since independent variable 'frequency' are ordinal scores and do not follow a normal distribution. The null hypothesis is that the two groups have same scoring tendency. The test result ($p = 0.924$) fails to rejected the null hypothesis that there is no difference between the two group of customers.

Table 4 outlines the satisfaction score of the two groups. Customers experienced service failure recovery (group 2) rated higher than those who did not (group 1). Service recovery paradox is observed in liner shipping industry. The result provides evidence for Hypothesis 3.

Table 4 Satisfaction score by group

Group		Satisfaction score (mean)	SD	N
Group 1	Customers without failure experienced	3.225	1.405	40
Group 2	Customers with failure experienced	3.342	1.080	222
Combined		3.324	1.134	262

Note: SD is standard deviation.

4.4 Regression

In the context of survey responses, it does not take much for customers to move from 'very dissatisfied' to 'dissatisfied', but it takes a lot for customers to jump from 'satisfied' to 'very satisfied'. Therefore, it is far better to treat the data as ordinal rather than cardinal. With ordinal data, each higher category represents a higher degree of satisfaction, but respondents do not necessarily treat the intervals between adjacent categories as equal. One of common methods for determining relationships among ordinal variables is to apply order models, for example ordered logit model.

Following the work of McCullagh (1980) and Greene (1993), the ordered logit model is setup in the following way. Consider a latent variable model of the following form, where y^* is the unobserved dependent variable, x^T is a vector of explanatory variables, β is the vector of regression coefficients, and ε is the error term:

$$y^* = \beta x^T + \varepsilon \tag{1}$$

Since y^* is unobserved, instead of y^*, the following is observed:

$$y = 0 \text{ if } y^* < 0$$
$$y = 1 \text{ if } 0 < y^* < \mu_1$$
$$y = 2 \text{ if } \mu_1 < y^* < \mu_2$$
$$.$$
$$.$$
$$y = j \text{ if } \mu_{j-1} \leq y^*$$

where y is the frequency of attendance and μ_j the vector of unknown threshold parameters that is estimated with the β vector. ε is assumed to have a standard logistic distribution. Consequently:

$$\Pr[y_i = j] = \Pr[y^* \text{ is in the } j^{\text{th}} \text{ range}]$$

Hence, the probability of observing an outcome is written:

$$\Pr[y_i = j] = F[\mu_j - \beta'x_i] - F[\mu_{j-1} - \beta'x_i] \tag{2}$$

where $F(.) = \exp(.) / [1 + \exp(.)]$.

   This implies,

$$\Pr[y_i = j] = 1/[1 + \exp(-u_j + \beta'x_i)] - 1/[1 + \exp(-u_{j-1} + \beta'x_i)] \tag{3}$$

which can be used to derive a likelihood function and, subsequently, maximum likelihood estimates of μ and β. Three models M1, M2 and M3 are estimated in this way. M1 is for BCO customers, M2 for FFW customers and M3 for combined segments.

   Table 5 sets out the estimation results. For simpler interpretation, the log odd ratio [$\exp(\beta)$] instead of coefficient (β) are reported. All models are statistically significant.

Table 5   Estimation results (dependant variable = satisfaction)

Variables		M1 (BCO)		M2 (FFW)		M3 (combined)	
		Odds ratio	SE	Odds ratio	SE	Odds ratio	SE
A1	Frequency	1.179	0.470	1.290	0.446	1.190	0.290
A2	Details	6.567***	3.097	4.425***	1.791	4.099***	1.143
A3	Accuracy	5.681***	2.412	5.678***	2.557	4.532***	1.308
A4	Timeliness	3.059***	1.131	26.623***	13.945	8.827***	2.625
A5	Manner	1.112	0.287	2.533***	0.750	1.715***	0.306
Log likelihood		−54.211		−50.635		−114.325	
Chi-squared		164.73		231.27		378.87	
P-value		0.000		0.000		0.000	
Pseudo R^2		0.603		0.696		0.624	
N		99		123		222	

Notes: SE is the standard error, chi-square is likelihood ratio chi-square, *** indicates
       1% significant level.

The odds ratio gives the amount of change expected in the odds ratio when there is a one-unit change in the predictor variable with all of the other variables in the model held constant. An odds ratio close to 1.0 suggests that there is no change due to the predictor variable.

   Pseudo R^2 is McFadden's (1974) pseudo R-squared. Logistic regression does not have an equivalent to the R-squared that is found in ordinary least squares (OLS) regression. Instead, the pseudo-R^2 is computed to evaluate goodness of fit for logistic regressions. It is defined as $(1 - L1 / L0)$, where L0 and L1 are the constant-only and full model log-likelihoods, respectively. A higher Pseudo R^2 value indicates better model fit. A higher pseudo R^2 value indicates better model fit.

5   Findings and limitations

5.1   Findings

The odds ratio of 'timeliness' variable is of the largest magnitude in all models, indicating that timely communication to customers is more effective to increase satisfaction level than efforts in other recovery activities. Hypothesis 1 is proved.

The results indicate that for a one-unit increase in 'timeliness' score, the odds of 'satisfaction' score increase by approximately three times in BCO model and 27 times in FFW model. This may be explained that FFW customers are much more sensitive to timeliness due to the needs of cascading information to their customers. The impact of 'manner' is statistically significant at 1% level in the FFW model but not in the BCO model. These provide evidence for Hypothesis 2 that BCO customers and FFW customers responded differently to recovery resources.

Interestingly, frequency is not statistically significant in all models. Comparing to the frequency of failure, customers care more about other service recovery attributes than frequency.

5.2   Managerial implications and recommendations

From a managerial perspective, the implications are threefold. First, the existence of service recovery paradox as found in this study suggests that more attention should be paid to the phenomenon. Since failures are inevitable and affect satisfaction, effective service recovery management is crucial. Service recovery involves the costs of redressing failures, but it should be handled strategically since it offers opportunity to increase customer satisfaction.

Second, this study provides CSL carriers a theoretical ground that successful service recovery process should emphasise on timely communication to customers.

Finally, BCO customers and FFW customers demonstrated different preferences in receiving recovery resources. Applying different recovery process to BCO and FFW shippers could be more effective and lead to higher satisfaction.

5.3   Limitations

Two limitations regarding this research should be kept in mind. First, the questionnaire is designed with minimised number of questions consciously as a trade-off for achieving increased number of samples. Many studies suggest that a large number of survey items can lead to participant fatigue, boredom and inattention, which in turn can lead to high abandon ratio, or inappropriate response behaviour (e.g., Drolet and Morrison, 2001).

Second, the manipulations involve only one type of service failures – disruption to original transport plan. This type of failure has significant impact to logistics management as well as capital flow, and is one of the most frequently experienced failures in CLS service. Having these acknowledged, it is beneficial to research on other type of CLS service failures in future studies.

6   Conclusions

This study has sought to assess the effect of service recovery attributes on customer satisfaction, and if customers in different segments demonstrate different preference to receive recovery resources. Using an ordered logit regression method, timeliness of communication is shown to be the most significant explanatory variable. Interestingly, frequency of failure is found to have no significant impact on customer satisfaction.

The finding of service recovery paradox in CLS service suggests that service recovery attributes have a relatively greater effect on overall satisfaction than original service attributes. The outcome is congruent with results obtained from recovery situations in a product-marketing context (e.g., Fornell and Wernerfelt, 1987). Specifically, these results support the conceptual claims made by Berry and Parasuraman (1991) that service recovery attributes are more important than original service outcome variables during service recovery.

This study differs from previous empirical research in the field of service recovery with regard to four aspects. First, both customers with and without service failure experience were questioned, thus making it possible to contrast the treatment group (customers with failure experience) with a control group (customers without failure experience). Second, both satisfied and dissatisfied customers are surveyed, therefore it was possible to assess the impact of service recovery even if the customers did not complain after the failure. Third, this paper draws on data from actual customers in CLS industry and therefore benefits from increased external validity. Finally, the sample consists of customers in global coverage instead of regional.

Acknowledgements

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Notes

1   An original transport plan includes detail of intended vessel and routing to the place of delivery, which shipper receives in the form of booking confirmation issued by CLS carrier.

Appendix

Scale items for variables (five-point Likert scale)

a   Thinking about your shipments with container carriers in last two months. Can you please let us know how frequently do you experience a deviation to the original transport plan?

　　1   Always

　　2   Very often

　　3   Sometimes

　　4   Rarely

　　5   Never

b   Thinking about communications from container carriers in last two months. How would you rate the fairness of manner of communication (politeness, honesty and willingness to offer help)?

　　1   Not important

　　2   Slightly important

　　3   Fairly important

　　4   Important

　　5   Very important

c   How would you rate the timeliness of the communication (the communication comes well in time)?

1   Not important
2   Slightly important
3   Fairly important
4   Important
5   Very important

d   How would you rate the accuracy of the information provided?

1   Not important
2   Slightly important
3   Fairly important
4   Important
5   Very important

e   How would you rate the content (level of detail) of the information?

1   Not important
2   Slightly important
3   Fairly important
4   Important
5   Very important

f   How satisfied are you with the overall activities including timeliness, accuracy, detail, and fairness of communication?

1   Very dissatisfied
2   Dissatisfied
3   Neither
4   Satisfied
5   Very satisfied