A STUDY ON EVALUATING THE LOGISTICS SERVICE QUALITY FOR VIETNAM COFFEE INDUSTRY

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A STUDY ON EVALUATING THE LOGISTICS SERVICE QUALITY FOR VIETNAM COFFEE INDUSTRY

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Abstract

Purpose: Vietnam is ranked as the second largest coffee manufacturer and exporter all over the world. However, the inefficient performance of logistics in the coffee industry is an endemic problem and can be a great treat for sustainable growth in the near future. This study provides a set of factors affecting the logistics service quality for two major stakeholders, providers and users, and compares their different viewpoints.

Methodology: Factor analysis (FA), reliability test and linear regression analysis are sequentially conducted.

Findings: As results, four main factors including information quality, ordering procedures, timeliness and order condition were defined. Providers believed timeliness is the most important factor for customer satisfaction, while users thought order condition has the greatest impact. Regression models demonstrated the factors affect customer satisfaction positively.

Unique contribution to theory, practice and policy: This research provides government, relevant organizations and firms involved in the Vietnam coffee industry with decision making guidelines and references to improve logistics infrastructure and process.

Keywords: Vietnam coffee industry, logistics service quality, factor analysis, linear regression, reliability test
1.0 INTRODUCTION

Coffee, one of the most traded products, is cropped up in the south and mainly consumed in the north of the planet. Being one of the most globally favorite drinks and enjoyed by metropolitan people, coffee shows its popularity in developed countries. People from these countries often consume two or more cups of coffee per day, during their free time. Not only becoming an international culture and a modern style, coffee also renovates a classic product into a phenomenon of the consumer age (Lewis, 2011). Furthermore, a variety of countries are taking part in the global competition for coffee importing (i.e. US, UK, Germany, etc.) and exporting (i.e. Vietnam, Brazil, Colombia, etc.), as a result of the increasing demand of coffee (Brown, 2012).

Vietnam, the world second largest coffee manufacturer, goes behind Brazil showing the total production in the former and the latter of 2015, 51 and 29 million of bags, respectively. Out of 6 per cent to be consumed domestically, the remaining partition of Vietnam’s total production is sold overseas, resulting in the fact that coffee is one of this country’s key export commodities (Tranh, 2013). Although the volume of export has experienced a slight growth since 2016, the price of coffee is still lower than other country due to the fact that the rate of bean breakage is high (Tran & Vu, 2017). It is worth to note that one of the major problem is the inefficient logistics performance in the Vietnam coffee industry. A huge amount of coffee bean is broken during the transportation process.

Figure 1 shows the recent trend of the logistics performance index (The World Bank, 2016). This graph shows the increasing patter although a significant drop occurred in 2015.

![Figure 1. Logistics performance index.](image-url)

Modern firms on the present day are at sustainable competitive edge owing to the logistics and supply chain management (Daugherty, 1994). In addition, the capability approach to logistics and SCM has become prominent in research studies. This study aims to evaluate the logistics service quality from two perspectives: logistics companies (providers) and coffee enterprises (users). By considering two different sides, logistics companies can improve their performance and make investment plans to further the logistics processes. Enterprises can operate their current logistics steps efficiently.

2.0 LITERATURE REVIEW

2.1 Coffee industry

Ehrenberg (1991) studied the U.S. instant coffee market with consideration on new and existing coffee brands. This study utilized the ideas of Porter’s Five Forces Model to access
the behaviors of light and heavy buyers for three coffee brand names, including Maxwell Coffee, Nescafe, and Maxim. It was identified that the bigger brand name would attract the customers’ consumption than the smaller brand name. The research result indicates that the coffee industry is under high competition with many coffee brand names and the customer attention to coffee brand names is various and highly depends on the marketing as well as creativity of coffee companies in order to attract their customers.

Vrontis & Thrassou (2006) focused on the U.K. beverage industry applying both Porter’s Five Forces Model and PEST analysis. The comparison among suppliers’ market shares on coffee drink was conducted with two years of 1990 and 2000. This study also investigated the competitiveness among current players and made an effort to define player grouping, resulting in direct competitors and indirect competitors. Durevall (2007) analyzed that competition in the Swedish coffee market concentrating on roasted coffee. This paper also used utilized Porter’s Five Forces model. It was identified that the Swedish coffee market has very few coffee suppliers and they do not affect much on the coffee market due to coffee companies carry importing activities from external suppliers. Furthermore, the entrants of new companies were difficult because the Swedish coffee market was covered by 4 big players showing 87% of the market share.

Arifin (2010) discussed the coffee value chain in Indonesia. This study proposed a value chain model with the involvement of farmers, collectors, traders, farmers’ groups, middlemen, large traders, exporters, roasters, and commercial companies in both of domestic and international markets. The farmer in Indonesia’s coffee industry was small in term of scale and they have less bargaining power to the traders, coffee roasters, and exporters. Therefore, some of farmers tried to cooperation with others in order to formulate the farmer’s group that allow them to have better prices and negotiation powers. In addition, the role of Indonesia’s Government in the context of improving coffee quality was highlighted, especially from the small producers in each coffee production center across the country.

Gingrich & King (2012) found the impact of fair trade in value chain of the coffee industry in global context. This research identified that the farmers in coffee value chain would take beneficiaries from their participations on fair trade. Geereddy (2014) from Harvard University took a strategic analysis of Starbucks Corporation. It was shown that the threat of new entrants was moderate as there was not adequate measure to block new competitors from participating in the market. The social experience of Starbucks could also be alternated by Bars and Pubs with non-alcoholic beverages. Hence, the threat of substitute products to coffees was very high. Starbucks had the largest market share and its closest competitors also had enormous market shares, resulting in a monopolistic competition that brought significant pressure on Starbucks.

2.2 Logistics service quality

Quality means something whether it is good or not. Throughout the literature, in order to define the concept of quality with related aspects, a general way has never been a reality despite the existence of the research agenda. Quality is an exclusive concept but the object of quality in the service industry was studied overwhelmingly with both agree and disagree opinions (Anderson & Sullivan, 1993; Gupta & Zeithaml, 2006; Van Doorn & Verhoef, 2008).

One of the most frequently used model to measure the service quality is SERVQUAL considering elements like the appearance of the personnel, physical facilities, equipment and
communication materials, reliability, the factor of service supplier’s capacity to conduct the promised service dependably and accurately, responsiveness, the factor of the skill of the service supplier’s to complete prompt service and the willingness to help customers, assurance, the factor that performs the knowledge and courtesy of service providers and their ability to transmit trust and confidence; empathy, and the factor of the ability of the service provider in giving responsibility and attention individually to every customers (Parasurman et al., 1988). Some researches defined that SERVQUAL model is the most accurate one to determine the quality of the services (Munusamy et al., 2010; Banomyong et al., 2011; Ooi et al., 2011). On top of that, Lopez & Poole (1998) found that efficiency, timeliness and security are contributors for the service quality. Franceschini & Rafele (2000) provided six factors to evaluate the logistics services including lead time, regularity, reliability, completeness, harmfulness and productivity.

These factors were highlighted with a survey on the commitment of logistics services firms in manufacturing industry. Colonna (1997), utilized the concept of customer satisfaction by measuring Parasuraman et al. (1985) in order to evaluate the logistics services. Collona (1997) proposed four elements as the appearance of tangible transportation means, the reliability of logistics services, the responsiveness of logistics services, the assurance of logistics services, and the empathy of logistics services firms to their customers. Huang et al. (2009) defined factors, including the loyalty, information quality, ordering procedures, timeliness, order condition and order discrepancy handling to examine another model to evaluate the logistics services quality. Mentzer et al. (2001) created a logistics service quality model to determine customer satisfaction. The model defined factors like personnel contact quality, order release quantity, information quality, ordering procedures, order accuracy, order condition, order quality, timeliness and order discrepancy.

Table 1. Previous studies on the logistics service quality.

<table>
<thead>
<tr>
<th>Previous studies</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parasurman et al. (1988)</td>
<td>Tangible; Reliability; Responsiveness; Assurance;</td>
</tr>
<tr>
<td></td>
<td>Empathy</td>
</tr>
<tr>
<td>Franceschini &amp; Rafele (2000)</td>
<td>Lead time; Regularity; Reliability; Completeness;</td>
</tr>
<tr>
<td></td>
<td>Harmfulness; Productivity.</td>
</tr>
<tr>
<td>Collona (1997)</td>
<td>Appearance of tangible transportation means; The reliability of logistics services; The responsiveness of logistics services; The assurance of logistics services; The empathy of logistics services firms to their customers.</td>
</tr>
<tr>
<td>Lopez &amp; Poole (1998)</td>
<td>Efficiency; Timeliness; Security.</td>
</tr>
<tr>
<td>Huang et al. (2009)</td>
<td>Loyalty; Information quality; Ordering procedures, Timeliness; Order condition; Order discrepancy handling.</td>
</tr>
<tr>
<td>Mentzer et al. (2001)</td>
<td>Personnel contact quality; Order release quantity; Information quality; Ordering procedures; Order accuracy; Order condition; Order quality; Timeliness; Order discrepancy.</td>
</tr>
</tbody>
</table>

2.3 Research gap

Various studies in section 2.1 analyzed the characteristics and recent trend of the coffee market in many countries. Very few studies have focused on Vietnam so far. Therefore, this paper analyzes the Vietnam coffee industry, the second largest market of coffee in the globe.
The study attempts to assess the logistics service quality in the Vietnam coffee industry from logistics providers and users’ points of view.

Based upon literature in section 2 and interviews with experts, this research determined the four main factors affecting to the coffee logistics service in Vietnam including information quality, ordering procedures, timeliness and order condition.

![Figure 2. Factors for logistics service quality.](image)

Here is a basic assumption that the four factors affect positively to the customer satisfaction for the logistics services provided by Vietnam coffee companies. Each main factor includes several minor variables, as shown in Table 2.

**Table 2. Factors for evaluating logistics service quality of Vietnam coffee industry.**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information quality (IQ)</td>
<td>In-time information delivery (IQ1)</td>
</tr>
<tr>
<td></td>
<td>Accurate information delivery (IQ2)</td>
</tr>
<tr>
<td></td>
<td>Rich information delivery (IQ3)</td>
</tr>
<tr>
<td>Ordering procedures (OP)</td>
<td>Well-designed order tracking (OP1)</td>
</tr>
<tr>
<td></td>
<td>Public order placement (OP2)</td>
</tr>
<tr>
<td></td>
<td>Simple order procedures (OP3)</td>
</tr>
<tr>
<td>Timeliness (T)</td>
<td>Commitment delivery (T1)</td>
</tr>
<tr>
<td></td>
<td>Optimal delivery time (T2)</td>
</tr>
<tr>
<td></td>
<td>Late delivery informing (T3)</td>
</tr>
<tr>
<td>Order condition (OC)</td>
<td>Physically guarantee order (OC1)</td>
</tr>
<tr>
<td></td>
<td>Non-missing goods (OC2)</td>
</tr>
<tr>
<td></td>
<td>Insurance provision (OC3)</td>
</tr>
<tr>
<td>Customer satisfaction on quality of logistics services (S)</td>
<td></td>
</tr>
</tbody>
</table>

### 3.0 METHODOLOGY

#### 3.1 Data collection

Saunders et al. (2009) assert that primary data is more helpful in case that the researchers cannot find the data from another sources. In this context, the paper collected primary data from a survey of questionnaire by asking 100 workers, including 18 directors, 26 deputy directors of coffee company, and 56 directors of the logistics department or the sales department, who work for Vietnam coffee firms and use the logistics service. In additional, their average years’ experience is about 14 years. On top of that, in order to understand the view point of both side this study also collected survey from 60 employees in logistics companies, whose average years’ experience is approximately 11 years. They are 11 directors, 22 vice directors and 27 department managers. The survey of questionnaire was delivered by email to those people accordingly.
3.2 Methodology

There are some fundamental data analysis methods to be deployed in this study, including descriptive statistics, factor analysis, reliability test analysis and linear regression. Frequency analysis allows to understand how many customers agree or disagree with the context. The analysis of this study to be carried out with five steps as given in Figure 3.

![Steps of analysis](image)

**Figure 3. Steps of analysis.**

### 3.2.1 Factor analysis

Factor analysis give us information to understand the construct between variables in the dataset. Factor analysis models aim to provide an explanation of the mutual relation between the observable variables in terms of a small number of common factors. Therefore, factor analysis is used in variety fields such as image recognition (Kyungim, 2002), chemistry (Xu, 2006), environment (Kou, 2010), etc.

Factor analysis finds the relationship among variables which could be explained by minimizing data or creating factors. The term "explained" shows how pairs of measured variables related to each other in terms of their use of common factors. Therefore, the relationship among pairs should be around zero. For this, factors indicate new variables. Each of them is the linear combination of the original variables. Each factor also contains a volume of information which is measured by its variance. From these reasons, factors indicate the sequence of variance size in which the largest factor holds the largest information volume. This factor could become the first factor while the smallest factor with the least information could become the last factor. It is preferred to analyze based on the level reduction. The variation of variables could confuse due to their co-relationship. Therefore, it is necessary to analyze using a few factors not related to each other rather than to analyze the variables. When primary factors are finished in extraction, analysts can obtain the factor score for individual observation. The calculation of factor score is therefore necessary due to the following reasons. First, factor space contains the location of individual observation to be reviewed. Second, new variables can be indicated as the factor score of individual observation in the following multiple regression, etc. Analysts can obtain factor score by using linear combination of the standardized factor score coefficient and the value of standardized variable.
Table 3. Results of Factor analysis and reliability test.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variables</th>
<th>Providers</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Factor analysis (Component score coefficient)</td>
<td>Reliability test</td>
</tr>
<tr>
<td>IQ</td>
<td>IQ1</td>
<td>0.366</td>
<td>0.435</td>
</tr>
<tr>
<td></td>
<td>IQ2</td>
<td>0.348</td>
<td>0.957</td>
</tr>
<tr>
<td></td>
<td>IQ3</td>
<td>0.346</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OC1</td>
<td>0.399</td>
<td>0.498</td>
</tr>
<tr>
<td>OC</td>
<td>OC2</td>
<td>0.372</td>
<td>0.891</td>
</tr>
<tr>
<td></td>
<td>OC3</td>
<td>0.367</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>T1</td>
<td>0.423</td>
<td>0.382</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>0.423</td>
<td>0.857</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>0.375</td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>OP1</td>
<td>0.375</td>
<td>0.388</td>
</tr>
<tr>
<td></td>
<td>OP2</td>
<td>0.504</td>
<td>0.730</td>
</tr>
<tr>
<td></td>
<td>OP3</td>
<td>-0.385</td>
<td>-0.382</td>
</tr>
</tbody>
</table>

The formal model linking manifest and latent variables is essentially that of multiple regressions. In detail:

\[ x_1 = \lambda_{11} f_1 + \lambda_{12} f_2 + \cdots + \lambda_{1k} f_k + u_1 \]

\[ x_2 = \lambda_{21} f_1 + \lambda_{22} f_2 + \cdots + \lambda_{2k} f_k + u_2 \]

where \( f_1, f_2, \ldots, f_k \) are the latent variables (common factors) and \( k < p \).

This analysis requires to calculate KMO value and to conduct Barlett’s test. KMO value should be higher than 0.5 and Barlett’s test should be statistical significant at 5% of confidence interval. Moreover, this analysis requires to derive how many components are extracted from dataset. The study has to calculate the factor loading and variables with factor loading higher than 0.3 are selected.

3.2.2 Reliability test

Reliability test analysis is known as fundamental analysis that allows the study to understand the reliability level in the dataset. Reliability test may be performed at several levels with different purposes. The common method to measure reliability test is Cronbach’s alpha. Coefficient alpha was proposed by Cronbach (1951) to measure reliability in classical test theory. It is calculated as below:

\[ \alpha^c = \frac{p}{p-1} \frac{\text{Var} \left( \sum_{j=1}^{p} Y_j \right) - \sum_{j=1}^{p} \text{Var}(Y_j)}{\text{Var} \left( \sum_{j=1}^{p} Y_j \right)} = \frac{p}{p-1} \frac{\sum \sum_{j \neq k} \sigma_{jk}}{\sum \sum \sigma_{jk}} \]

where \( \sigma_{jk} \) is the covariance of the pair \((Y_j, Y_k)\).

The reliability level is defined on Cronbach’s alpha value and the threshold is more than 0.6. Moreover, reliability test analysis requires to check to two indicators, namely “Cronbach’s alpha If Item Deleted” and “Corrected Item-Total Correlation”. The first indicator should be lower than the Cronbach’s alpha achieved when there is no variable deleted and the second
indicator requires the minimum threshold of 0.3 or “Corrected Item-Total Correlation” should be higher than 0.3.

3.2.3 Linear regression analysis

The last data analysis is linear regression. This data analysis technique requires calculating R-square and higher value means higher correlation between dependent and independent variable. In this study, dependent variable is customer satisfaction for the logistics services while independent variables are information quality, ordering procedures, timeliness, and order condition as mentioned above.

By fitting a linear equation to the observed data, multiple linear regression models find the correlation of multiple explanatory variables and one response variable in terms of their relationship with each other. By doing so, the level of variation among variables could be determined. Equation (3) (Chen and Liu, 2015) shows the MLR line of Y (...) on X (...).

\[ y = b_0 + b_1x_1 + b_2x_2 + \ldots + b_ix_i \]

where \( x_i \) is the value of the \( i \)th predictor, \( b_0 \) is the regression constant, and \( b_i \) is the coefficient of the \( i \)th.

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Factor analysis and reliability test

KMO value and Barlett’s test is used to check if the new data is appropriate for factor analysis. KMO values of providers’ data and users’ data are 0.7 and 0.755, respectively, which are higher than 0.5. The Barlett’s test comes up with \( p \)-value of 0 and it was lower than 0.05. In this context, the received value of KMO is statistically significant at 5% of the confidence interval.

According to eigenvalues, the data is sorted to four components. Based on the correlation between four components are:

Component 1: all variables of information quality;
Component 2: all variables of order condition;
Component 3: all variables of timeliness;
Component 4: all variables of order produces.

Table 4. Linear regression results.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Providers R-square</th>
<th>Providers Unstandardized coefficients</th>
<th>Sig.</th>
<th>Users R-square</th>
<th>Users Unstandardized coefficients</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>0.102</td>
<td>0.000</td>
<td></td>
<td>0.188</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>OC</td>
<td>0.110</td>
<td>0.000</td>
<td></td>
<td>0.708</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0.686</td>
<td>0.000</td>
<td></td>
<td>0.138</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>0.101</td>
<td>0.000</td>
<td></td>
<td>0.135</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Constants</td>
<td>3.39</td>
<td>0.000</td>
<td></td>
<td>3.39</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 indicates that in providers’ data set, the Cronbach’s alpha of information quality, order condition, timeliness, and order produces are 0.957, 0.891, 0.857, and 0.730, respectively. On top of that, those of users’ data set are equal to 0.772, 0.822, 0.877, and
0.855. In a word, they are all higher than 0.7 which implies all fours factors are ensured completely to the requirement of reliability test.

From the table 4, taking look at the IQ factor, both provider and user regard IQ1 (0.366 and 0.435) as the most important. It is followed by IQ2 (0.348 and 0.419) and IQ3 (0.346 and 0.403). In the remaining factors, the role of variables to provider and user is different. In detail for OC factor, OC1 (0.399) is supposed to be the most important, however, OC2 (0.372) plays a more vital role than OC3 (0.367) to provider while it is opposite to user. For T factor, provider sees that both T1 (0.423) and T2 (0.423) play an equally important role and are followed by T3 (0.375). But user sees T3 (0.377) as the most important factor and the following factors are T1 (0.382) and T2 (0.359) respectively. That means provider believes that delivering on time (commitment delivery time) and optimal delivery time are more important. However, the most essential factor is information in case that the good is delivered late (late delivery informing). In the last factor, provider believes OP3 (-0.385) to be the most important, followed by OP2 (0.504) and OP1 (0.375). However, user needs OP2 (0.397) rather than OP1 (0.388) and OP3 (-0.382), respectively. In addition, all above variables have positive impact except for OP3 which has negative.

4.2 Linear regression analysis

In this step, the generated data from factor analysis are put in linear regression analysis to measure the impacts of the factors on the logistics service quality:

Table 4 shows that R-square of provider and users are 0.997 and 0.921, showing high relationships between dependent and independent variables. P-value of each factor is lower than 0.05, implying that all factors are statistically significant.

It is worthy to note that the point of view from the two sides to the elements is different. In more detail, suppliers suggest that T is the most import factor, followed by OC, IQ and OP, respectively. The consumers, however, consider that OC play a more vital role than others. Moreover, the unstandardized coefficients values are positive. It means that all have potential benefit to customer satisfaction. The equations are:

- For providers:
  \[ S_P = 3.39 + 0.102 \times IQ_P + 0.110 \times OC_P + 0.686 \times T_P + 0.101 \times OP_P \]

- For users:
  \[ S_U = 3.39 + 0.188 \times IQ_U + 0.708 \times OC_U + 0.138 \times T_U + 0.135 \times OP_U \]

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The aim of study is to determine the factors that have impacts on the logistics service quality, like information quality, order procedures, timeliness and order condition. On top of that, this paper also measured the impacts of those on the logistics service quality from both suppliers’ side and consumers’ side. The viewpoints of two sides were clearly different. The main findings of this study are as follows:

First, for main factor, providers believed timeliness is the most important factor for customer satisfaction, while users thought order condition has the greatest impact as the coffee price strongly depends on the shape of the beans. For suppliers, remaining factors were order condition, information quality and order produces in order separately. On the other hand,
another side graded those factors differently. Information quality was placed at the second, and timeliness and order produces factor were followed.

Second, for sub factor, both logistics companies and coffee firms agreed that variables related to in-time information delivery play a more vital role than those related to accurate information delivery and rich information quality in terms of information quality. Two sides accepted that the most significant variable having most impacts on order condition factor is physically guarantee order, followed by non-missing goods and insurance provision for provider while users had a different idea. Considering timeliness factor, from the provider’s point of view, commitment delivery and optimal delivery time together take the first place, followed by late delivery information. Nonetheless, coffee enterprises evaluated the ranking sequence like this, commitment delivery, late delivery informing and optimal delivery time. In terms of order procedures factor, two sides indicated that public order placement is placed at the first. Furthermore, providers believed that well-design order tracking shows less influence than simple order procedures while another side supposes dissimilar opinion.

Although coffee market in all over the world is the interesting target of various studies, only a few look into Vietnam, the world second largest coffee market. Therefore, this paper contributes to the literature by studying on Vietnam cases in the perspectives of providers and users. In this study, organizations and firms related to the Vietnam coffee industry are provided with decision making guidelines and references in order for the enhancement of logistics infrastructure and process. Additionally, suppliers could have a better understanding of the needs of users. By knowing the view of providers, the users would have a more comprehensive view, leading to increased understanding of the two sides about each other. From there, the supplier can give advises to the customers so that they can make the best choice.

Although the logistics service quality is evaluated considering the perspectives of providers and users who directly involve in logistics process, the viewpoint of the government also plays an essential role. It is because the authority decides coffee as one of the most important exported products and establishes policies for developing the Vietnam coffee market. Furthermore, there are various types of coffee with different transportation and preservation procedures. However, this paper has not rated the logistics service quality for each type. These limitations could be considered in the future studies.

References


