

# Effects of Job Satisfaction on Service Quality, Customer Satisfaction, and Customer Loyalty: The Case of a Local State-Owned Enterprise\*

PANSOO KIM & JANG-HYUP HAN

School of Business

Kyungpook National University

1370 Sankyuk-Dong Buk-Gu Daegu, 702-701

SOUTH KOREA

pskim@knu.ac.kr

*Abstract:* This study examines how customers can be maintained, which is a particularly important issue for service industry area. Customer service is important not only to private firms but also to public organizations. To improve service quality and maintain customers, organizations must ensure their employees' job satisfaction. This study measures job satisfaction and examines its effects on service quality, customer satisfaction, and customer loyalty. We measured job satisfaction by considering a sample of employees from Daegu Metropolitan Transit Corporation (DMTC) who provide customer service and by employing various measures of job satisfaction based on previous research, including workplace environments, job content, relationships with co-workers, relationships with supervisors, pay and benefits, and performance assessments. We measured service quality by using a SERVQUAL item developed by Parasuraman, Zeithamal, and Berry [42]. We conducted a survey of customers who used the city train at least once and adapted the items for customer satisfaction and loyalty from previous studies. Most studies have focused on railway facilities and management (e.g., safety systems and emergency management) after the DMTC subway tragedy in 2003. In this regard, this study is the first to explore the service quality of DMTC's subway system. This study is particularly meaningful in that it relates job satisfaction to service quality. The results indicate the following: First, job satisfaction partially influenced service quality. Performance assessments, relationships with co-workers, and pay had significant effects on service quality, whereas supervisor relationships, job content, and workplace environments had no significant effects. Second, among the dimensions of service quality, tangibility and reliability had positive effects on customer satisfaction. Finally, customer satisfaction had a positive effect on customer satisfaction.

*Key-Words:* Job Satisfaction, Service Quality, Customer Satisfaction, Customer Loyalty

## 1 Introduction

### 1.1 The Necessity and Purpose of Research

Customer management is a very important issue for organizations across the world. Because a large majority of firms pursuing global management are considering diverse strategies to achieve dominance in fiercely competitive markets and reduce gaps in product quality between brands through technological development, it is vital that they strengthen their competitiveness in terms of intangibles such as services. This change is not limited to private firms. That is, it also applies to the public sector because the public sector has increasingly realized that it may have difficulty competing in contemporary markets by offering outdated products or services.

In reality, many public organizations have made efforts to strengthen their organizational competitiveness by pursuing diverse changes such as customer-oriented and performance-based management, incentive systems, reorganization, workforce reductions, and outsourcing, among others.

Many studies have suggested that it is not possible to improve service quality, organizational performance, and productivity until internal customer satisfaction is established ([43] and [56]). In addition, public service providers can enhance their ability to manage customer satisfaction by paying more attention to their employees' job satisfaction. This means that service quality depends on job satisfaction. In this regard, the present study examines the effects of job satisfaction among employees in the public sector on service quality and customer satisfaction and offers some important implications for organizations in the public sector that are looking to

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establish service policies and pursue personnel policy agendas in the future.

## 1.2 Research Methodology and Scope

This study provides a literature review and an empirical analysis. For the validity and reliability of this study's questionnaire for the assessment of job satisfaction, the study considers various factors influencing job satisfaction through the literature review. By using a questionnaire developed based on various measures of job satisfaction widely employed in previous research, the study examines the level of job satisfaction for employees at Daegu Metropolitan Transit Corporation (DMTC), a representative state-owned enterprise providing public services, and investigates the level of service quality as well as customer satisfaction for DMTC passengers by using a SERVQUAL model for service quality.

In sum, this study provides a survey of DMTC employees and suggests some ways to enhance their job satisfaction. In addition, the study examines the level of service quality as well as customer satisfaction for DMTC passengers. Finally, the study analyzes the effects of job satisfaction on service quality and customer satisfaction and their causal relationships in terms of whether job satisfaction ultimately influences customer loyalty.

## 2 Theoretical Review and Analysis of Previous Studies

### 2.1 Theoretical Review

This section addresses this study's variables: job satisfaction, service quality, customer satisfaction, and customer loyalty.

#### 2.1.1 Job Satisfaction

Many scholars have suggested diverse definitions of job satisfaction. Generally, job satisfaction is defined as the psychological state of employees participating in the production of goods and services [32].

Locke divided job satisfaction into intrinsic satisfaction which emphasized psychological and emotional aspects and extrinsic satisfaction which emphasized reward aspects [34]. Intrinsic satisfaction means a sense of satisfaction from the inherent value of the work itself, such as the difficulty, challenging nature, importance, and diversity of work, whereas extrinsic satisfaction means satisfaction with pay, fringe benefits, and working conditions,

among others, which are provided externally according to job performance.

Early studies of job satisfaction examined the topic by considering only job satisfaction, but recent studies have verified that various factors can influence job satisfaction simultaneously [22]. Previous studies have considered job satisfaction and its measures as important research agendas and highlighted pay, promotion, supervision, fringe benefits, contingent rewards, operating conditions, co-workers, the nature of work, and communication, among others, as its critical constructs [50]. Many studies have examined job satisfaction in the contexts of organizational behaviours and human resource management [32] and investigated the effects of job satisfaction on organizational performance ([8], [13] and [50]).

Some studies have examined job satisfaction among employees working for public organizations in Korea. Cho [11] suggested seven factors that may have considerable influence on teachers' job satisfaction, including reward systems, workplace environments, responsibilities, social relationships, administrative control, social safety, and growth and development, and found high levels of dissatisfaction for reward systems, workplace environments, and responsibilities. Seo [48] analyzed various factors influencing job satisfaction by dividing it into six factors—duties, pay and benefits, opportunities for promotion, communication with the supervisor, social relationships, and workplace environments—and found that the level of job satisfaction measured based on these six factors is higher than the average. Han [18] examined job satisfaction by dividing it into six dimensions: the job itself, pay, promotion, supervisors, co-workers, and overall job satisfaction. Jegal [19] provided a survey of public servants in Daegu City to identify the direct determinants of their job satisfaction and suggested organizational satisfaction, relationships with co-workers, and external rewards, in that order. In addition, Jaegal [21] examined job satisfaction among local public officials and their personal characteristics by considering a sample of officials of Andong City and identified the following five types of job satisfaction: overall job satisfaction, satisfaction with the supervisor, satisfaction with job tasks, satisfaction with relationships with other departments, and satisfaction with job training.

Previous studies of job satisfaction among railway employees in Korea include the following: Jegal and Hwang [20] examined job satisfaction among railway employees in Yeongju City by dividing it into the following five dimensions: leadership, job structures, achievement, support systems, and

organizational cultures. Kim [23] measured job satisfaction among railway employees residing in Seoul by considering the following variables for job satisfaction: the facilitation of communication, the fairness of personnel management, and satisfaction with human relationships.

In sum, previous studies have generally emphasized the following factors: relationships with co-workers, relationships with supervisors, pay and benefits, performance assessments, workplace environments, and job contents. In this regard, this study employs these six factors to explore job satisfaction among DMTC employees.

### 2.1.2 Service Quality

The concept of service quality, which has been a topic of special interest in the service sector since the 1980s, has been addressed as an essential strategic agenda ([26]). As discussed in the Introduction section, the quality gap between tangible products has narrowed gradually, and therefore many firms have started to focus on services or intangibles, resulting in sharp increases in service quality. Since Lehtinen's [33] seminal work on the concept of service quality, Grönross [17] established the concept of service quality and measured it from the perspective of consumers, and Parasuraman, Zeithamal, and Berry extended the concept.

Parasuraman et al. [42] defined the concept of perceived service quality as "an overall judgment or attitude in relation to excellence of service," and by suggesting that perceived quality is shown as the degree of consumers' perceptions and expectations, they related perceived quality to the concept of expectations and performance [54]. Parasuraman et al. ([41] and [42]) developed the SERVQUAL model to measure service quality, and Parasuraman et al. suggested 10 determinants of service quality that are not independent of one another [54]. Parasuraman et al. [42] extended this model by classifying these factors into the following five dimensions: tangibility, reliability, responsiveness, assurance, and empathy through an empirical analysis. Unlike comprehensively suggested dimensions of service quality, the SERVQUAL model suggests detailed determinants of service quality and respective assessment standards, making it possible to verify consumers' evaluation of each standard and determine their satisfaction based on their psychological responses to perceived service quality [26].

Although Parasuraman et al. [42] examined service providers such as banks, credit card issuers, laundromats, and fast-food restaurants, they suggested applying the SERVQUAL model to other service providers by modifying it appropriately [42].

Based on this suggestion, this study employs the five dimensions and 22 items in the SERVQUAL model to measure the service quality of DMTC.

### 2.1.3 Customer Satisfaction

Since Cardozo [9] introduced the concept of customer satisfaction, it has been a major research topic for many scholars. Using the American Customer Satisfaction Index (ACSI) and the National Customer Satisfaction Index (ACSI), which have been measured and announced annually since the 1990s as objective data, a number of studies have examined the relationship between customer satisfaction and firm performance at the business level, and there has been growing interest in research on customer satisfaction in the public sector ([30]).

Theories of customer satisfaction have become increasingly sophisticated in the last two decades. Oliver [39], who is known to have provided the most appropriate explanation of customer satisfaction, explained the properties of various constructs in detail by defining customer satisfaction as "customers' judgement about whether satisfaction state (cognitive judgment) was provided at a pleasant level (emotional judgment)." Yi [51] divided various constructs of customer satisfaction suggested by many researchers broadly into outcomes and processes. In sum, scholars emphasizing outcomes refer to customer satisfaction as the cognitive state or emotional response of consumers in terms of the extent to which they perceive the price to be fair, whereas those focusing on processes view customer satisfaction as an evaluation that a given consumption experience is at least better than expected or that the chosen alternative corresponds to the a priori belief about the alternative. In short, customer satisfaction can be seen as some corporate activity performed to improve or supplement consumers' dissatisfaction through a comparative analysis of before-purchase expectations and after-purchase satisfaction and to meet their demands continuously [1].

### 2.1.4 Customer Loyalty

With the development of industries, customer loyalty has long received wide attention from researchers. A core corporate strategy is to retain as many existing customers as possible and attract new ones by increasing customer loyalty. Therefore, a key challenge facing firms is to verify the important determinants of customer satisfaction and loyalty. Researchers have defined customer loyalty somewhat differently. Oliver [39] defined customer loyalty as the "deep solidarity of continuously purchasing or supporting products or services which cus-

tomers prefer despite potential situational influences or marketing efforts which might give rise to shift behavior.”

According to Rosenberg and Czepiel [34], retaining existing customers is six times more likely to reduce costs than attracting new ones. Recicheld and Sasser [45] stated that if a firm reduces its customer defection ratio by 5% or increases the number of loyal customers by 5%, then it can witness a 25%-85% increase in its profit. According to Lee and Hong [31], retaining loyal customers means reducing the cost of attracting new ones and maintaining those who are willing to pay high prices. Zeithaml, Berry and Parasuraman [55] observed that customer loyalty leads to word-of-mouth (WOM) and repurchase intentions and defined WOM communication and informal discussions as the oldest mechanism that facilitates the spread of opinions on products or brands and that plays a critical role in consumers' purchasing decisions on a wide range of products and services.

Existing scales for customer loyalty generally measure behaviours or attitudes. Those measuring behaviours include repurchase and long-term choice probabilities for specific brands ([10], [12] and [15]) and shifts in brand preferences ([44]), among others, whereas those measuring attitudes include WOM intentions ([7]), repurchase intentions ([3] and [14]), and intentions to pay premium prices ([35] and [55]), among others.

## 2.2 Previous Studies

### 2.2.1 Job Satisfaction and Consequence Variable

Schlesinger and Zornitsky [47] examined job satisfaction and service quality and found that employees' perception of job satisfaction and service ability has a positive correlation with their perception of service quality and that service ability is an important factor increasing job satisfaction. Bitner et al. [5] observed that a low level of job satisfaction can reduce the level of service performance. It is well known that there is a significant correlation between employees' job satisfaction and service performance ([5], [46]), which implies that the higher the level of job satisfaction, the more likely the employee is to show customer-oriented attitudes and behaviours, resulting in an increase in customer satisfaction. That is, job satisfaction has a positive effect on service quality, which influences customer satisfaction. Bolton and Drew [6] suggested that job satisfaction can directly influence customers' perception of service quality. According to Holland, job satisfaction has a significant effect on service quality. In addition, Albrecht and Zemke [2] argued that job satisfaction is a critical factor influencing customers' perception of im-

provements in service quality. Steffen suggested that job satisfaction is positively correlated with service quality.

Lee [29] examined the relationships between job satisfaction among bank tellers (managers of banking services) and service quality and customer satisfaction and found that their job satisfaction has significant positive effects on service quality and customer satisfaction. Oh and Yoon [37] found that job satisfaction among employees in the service sector has a significant effect on service quality and concluded that job satisfaction also influences customer satisfaction. Based on these findings, we propose the following hypotheses about the relationships between service quality, customer satisfaction, and customer loyalty:

### **Hypothesis 1: Job Satisfaction Has a Significant Effect on Service Quality.**

**Hypothesis 1-1:** Satisfaction with relationships with supervisors has a significant positive effect on service quality.

**Hypothesis 1-2:** Satisfaction with performance assessments has a significant positive effect on service quality.

**Hypothesis 1-3:** Satisfaction with relationships with coworkers has a significant positive effect on service quality.

**Hypothesis 1-4:** Satisfaction with job content has a significant positive effect on service quality.

**Hypothesis 1-5:** Satisfaction with pay and benefits has a significant positive effect on service quality.

**Hypothesis 1-6:** Satisfaction with workplace environments has a significant positive effect on service quality.

### **Hypothesis 2: Job Satisfaction Has a Significant Effect on Customer Satisfaction.**

**Hypothesis 2-1:** Satisfaction with relationships with supervisors has a significant positive effect on customer satisfaction.

**Hypothesis 2-2:** Satisfaction with performance assessments has a significant positive effect on customer satisfaction.

**Hypothesis 2-3:** Satisfaction with relationships with coworkers has a significant positive effect on customer satisfaction.

**Hypothesis 2-4:** Satisfaction with job content has a significant positive effect on customer satisfaction.

**Hypothesis 2-5:** Satisfaction with pay and benefits has a significant positive effect on customer satisfaction.

**Hypothesis 2-6:** Satisfaction with workplace environments has a significant positive effect on customer satisfaction.

**Hypothesis 3: Job Satisfaction Has a Significant Effect on Customer Loyalty.**

**Hypothesis 3-1:** Satisfaction with relationships with supervisors has a significant positive effect on customer loyalty.

**Hypothesis 3-2:** Satisfaction with performance assessments has a significant positive effect on customer loyalty.

**Hypothesis 3-3:** Satisfaction with relationships with coworkers has a significant positive effect on customer loyalty.

**Hypothesis 3-4:** Satisfaction with job content has a significant positive effect on customer loyalty.

**Hypothesis 3-5:** Satisfaction with pay and benefits has a significant positive effect on customer loyalty.

**Hypothesis 3-6:** Satisfaction with workplace environments has a significant positive effect on customer loyalty.

**2.2.2 Service Quality and Customer Satisfaction**

A number of studies have examined the causal relationships between service quality and customer satisfaction. Recent studies have reported that service quality is a vital prerequisite for customer satisfaction ([14] and [41]), and this finding is widely accepted ([52], [53] and [14]).

Lee [30] examined 17 central government organizations and verified various constructs of service quality that influence customer satisfaction by using the SERVQUAL model. Kim [25] examined the traditional expectancy disconfirmation paradigm of public services by using SERVQUAL dimensions based on the assumption that the model can be used as a tool for measuring service quality in the public service sector and found that the customer satisfaction process according to the specific situation. Based on these findings, we propose the following hypotheses about the relationships between service quality and customer satisfaction:

**Hypothesis 4: Service Quality Has a Significant Positive Effect on Customer Satisfaction.**

**Hypothesis 4-1:** Empathy has a positive effect on customer satisfaction.

**Hypothesis 4-2:** Responsiveness has a positive effect on customer satisfaction.

**Hypothesis 4-3:** Tangibility has a positive effect on customer satisfaction.

**Hypothesis 4-4:** Reliability has a positive effect on customer satisfaction.

**Hypothesis 4-5:** Assurance has a positive effect on customer satisfaction.

**2.2.3 Customer Satisfaction and Customer Loyalty**

Many studies have reported that customer satisfaction is directly related to customer loyalty ([16] and [40]). Oliver [38] conducted a path analysis and found that customer satisfaction can influence after-purchase attitudes and repurchase intentions, and Kim and Oh [24] suggested that customer satisfaction can strengthen repurchase intentions. Anderson et al. [3] found that the higher the level of customer satisfaction, the stronger the repurchase intention. Yi et al. [52] provided an empirical analysis of the current status of 10 service providers and found that customer satisfaction can influence WOM (word of mouth) intentions, and Shin et al. empirically analyzed department store customers and reported that an increase in customer satisfaction increases WOM intentions. Roh and Gwon provided an empirical analysis of KTX (a high-speed railway in Korea) users and found that customer satisfaction has a significant positive effect on reuse intentions and referrals. Kim found that, in the context of railway services, customer satisfaction has a significant positive effect on referral and reuse intentions. Based on these findings, we propose the following hypothesis about the relationship between customer satisfaction and loyalty:

**Hypothesis 5: Customer Satisfaction Has a Significant Positive Effect on Customer Loyalty.**

**3. Research Model and Research Design**

**3.1 Research Model**

We constructed the research model based on previous research. Although many studies have examined each concept considered in this study, we considered an integrated model because we needed to analyze all concepts in an integrative manner. As shown in Fig. 1, we employed the research model to examine the correlations between job satisfaction, service quality, customer satisfaction, and customer loyalty.

**3.2 Research Design**

**3.2.1 Measures**

We based the operational definitions of the variables in the research model on previous research, and Table 1 shows these definitions and items for measuring these variables.

### 3.2.2 Data Collection and Demographic Characteristics

We collected the data from subway station employees of DMTC and its users. The researcher explained the purpose and implications of this study to DMTC and requested its cooperation. Then the researcher explained the same to those employees working in stations of Lines 1 and 2 and distributed 350 copies of the questionnaire under the agreement. Similarly, the researcher explained the study to DMTC users and distributed 350 copies of the questionnaire under the agreement.

We collected the data from DMTC employees between November 28 and December 10, 2011, and obtained a total of 295 responses. We excluded 12 responses because of incomplete data and thus had a final sample of 283 responses for the analysis. We collected the data on DMTC users between December 26, 2011, and February 3, 2012, and obtained a total of 320 responses. We excluded 37 responses because of missing data and thus had a final sample of 283 responses for the analysis. We measured all items by using a five-point Likert-type scale. To minimize statistical errors from heterogeneity across groups, we compared the sample mean between groups. We calculated the means by randomly extracting five responses from each group and to obtain 283 responses for each group (the same sample size as responses) by repeating this process. By extracting a sufficient number of reliable samples, we obtained a normally distributed data. Because we randomly extracted each sample, each sample was representative of each group. Table 2 shows the demographic characteristics of the respondents. We conducted an empirical analysis using SPSS 18.0 and AMOS 18.0.

## 4. Empirical Analysis

### 4.1 Reliability Analysis and Exploratory Factor Analysis

We conducted a reliability analysis and an exploratory factor analysis to test the construct validity of questionnaire items. As shown in Tables 3 and 4, Cronbach's alpha for all variables exceeded 0.7, indicating sufficient reliability ([36]). We conducted a factor analysis of the instruments through a principle component analysis with Varimax rotation, a widely used method for identifying factors.

According to the results of the factor analysis using data on job satisfaction and service quality from DMTC employees and users, not all items loaded on their proposed factors (e.g., Parasuraman et al., [42]), and some showed high factor loadings.

To address this problem, we conducted factor analyses repeatedly after removing those items showing low correlation coefficients between internal items or high correlation coefficients between various factors and external items. Therefore, we conducted a final analysis after removing four variables for job satisfaction, five for service quality, and one for customer satisfaction.

With respect to the exploratory factor analysis, Table 3 shows the results of the factor analysis conducted to identify the number of factors of job satisfaction. According to the results, those dimensions of job satisfaction with eigenvalues greater than 1 included relationships with supervisors, performance assessments, relationships with co-workers, job content, pay and benefits, and workplace environments. The cumulative percentage of the variance explained for the independent variable was 66.462%. Table 4 shows the results of the factor analysis for the numbers of factors of service quality, customer satisfaction, and customer loyalty. Service quality generated five factors with eigenvalues exceeding 1: empathy, responsiveness, tangibility, reliability, and assurance. Customer satisfaction and customer loyalty each generated one factors. The cumulative percentage of the variance explained for service quality was 69.760%, that for customer satisfaction was 51.958%, and that for customer loyalty was 61.629%. All items had factor loadings exceeding 0.5, indicating sufficient validity.

### 4.2 Confirmatory Factor Analysis

Based on the variables selected through the exploratory factor analysis and the reliability test, we conducted a confirmatory factor analysis using a covariance matrix to confirm the unidimensionality of the constructs. Service quality was composed of five primary constructs: empathy, responsiveness, tangibility, reliability, and assurance. To test the structure of questionnaire items for these variables, we considered the parsimony of the model by transforming a number of variables into a single theoretical variable. For this, we conducted a second-order confirmatory factor analysis (Table 5).

We assessed the model fit by considering  $\chi^2$ ,  $\chi^2/\text{df}$ (Q-value), the RMR, the GFI, the IFI, the CFI, the TLI, and the RMSEA. In selecting a goodness-of-fit index, it is appropriate to select one that is not sensitive to the sample size and take into account the simplicity of the model. Based on these criteria, the TLI (NNFI) and the RMSEA are the most appropriate goodness-of-fit indices. There is a good model fit when the GFI, the IFI, the TLI, and the

CFI exceed 0.9 and the RMR and the RMSEA are less than 0.05 ([4]). The results indicate that the p-value of  $\chi^2$  was lower than the threshold but that all other indices were satisfactory. Therefore, we assumed that this p-value would not influence unidimensionality. All factor loadings exceeded 0.5 and were significant at 99% reliability. Composite reliability (CR) exceeded 0.7, and the average variance (AVE) extracted exceeded 0.5. In addition, the t-value was significant ( $CR > 1.965$ ). These results indicate sufficient convergent validity, discriminant validity, and reliability. Therefore, we transformed 5 second-order factors into an observed variable for service quality.

Table 6 shows the results of the confirmatory factor analysis for all factors. The goodness-of-fit indices were as follows:  $\chi^2 = 1640.898$  ( $df=998$ ,  $p=.000$ ,  $p \geq 0.05$ ),  $\chi^2 / df(Q) = 1.644$  ( $\leq 3$ ),  $RMR=.031$  ( $\leq 0.05$ ),  $GFI = .804$  ( $\geq 0.9$ ),  $IFI = 0.913$  ( $\geq 0.9$ ),  $CFI = 0.912$  ( $\geq 0.9$ ),  $TLI = 0.905$  ( $\geq 0.9$ ),  $RMSEA = 0.048$  (acceptable when under 0.05 ~ 0.1). With all factors, the model did not provide a sufficient fit to the data. Therefore, we modified the model without altering its theoretical background. For this, we employed a modification index indicating the magnitude of the improvement in the model fit. Table 7 shows the results of this modification. With the modification, the p-value (p is sensitive to the sample size and the number of dependent variables) of  $\chi^2$  was under the critical value. However, the other indices were all satisfactory, indicating the model provided an acceptable fit to the data. All factor loadings were significant, indicating sufficient convergent validity, discriminant validity, and reliability. The AVE and CR of each variable exceeded their thresholds (0.5 and 0.7, respectively), indicating the sufficient reliability and representativeness of the variables. Table 8 shows the results of the correlation analysis for all input variables used to test the causal relationships. Because the AVE (values along the diagonal matrix) exceeded the square of the correlation coefficient for each factor, that is, the coefficient of determination, there was sufficient discriminant validity between the constructs.

### 4.3 Structural Equation Modeling and Hypothesis Testing

After testing the validity of the model, we employed structural equation modelling (SEM) using AMOS 18.0 to test the hypotheses. The goodness-of-fit indices for the final model were as follows:  $\chi^2 = 252.551$  ( $df=119$ ,  $p=.000$ ,  $p \geq 0.05$ ),  $\chi^2 / df(Q) =$

$2.122$  ( $\leq 3$ ),  $RMR = .024$  ( $\leq 0.05$ ),  $GFI = .915$  ( $\geq 0.9$ ),  $IFI = .932$  ( $\geq 0.9$ ),  $CFI = .931$  ( $\geq 0.9$ ),  $TLI = .900$  ( $\geq 0.9$ ),  $RMSEA = .063$  (accepted when under 0.05 ~ 0.1). These results satisfy the goodness-of-fit standards suggested in Bagozzi and Yi [4], among others. Therefore, we tested the hypotheses about the relationships between job satisfaction and service quality, customer satisfaction, and customer loyalty. The results provide partial support for 5 of Hypotheses 1 to Hypotheses 5 (Table 9).

Among the dimensions of job satisfaction, performance assessments and relationships with co-workers had significant positive effects on service quality, and among the dimensions of service quality, tangibility and reliability had significant positive effects on customer satisfaction. In addition, customer satisfaction had a significant positive effect on customer loyalty. These results provide support for Hypotheses 1-2, 1-3, 4-3, 4-4, and 5.

## 5. Discussion and Conclusion

### 5.1 Summary

Most studies have focused on railway facilities and management (e.g., safety systems and emergency management) after the DMTC subway tragedy in 2003. In this regard, this study is the first to explore the service quality of DMTC. This study is particularly meaningful in that it relates job satisfaction to service quality.

In this study, we focused on clarifying the relationships between service quality, customer satisfaction, and customer loyalty by considering six dimensions of job satisfaction identified through a review of previous studies suggesting that job satisfaction in state-owned enterprises can have considerable influence on service quality, customer satisfaction, and thus organizational performance. Therefore, to examine the effects of job satisfaction on service quality, customer satisfaction, and customer loyalty in the context of DMTC employees, we employed data obtained from DMTC employees (those working in subway stations) and users and conducted an empirical analysis. The results can be summarized as follows:

First, the results indicate that the research model satisfied the fitness standards and factors, indicating sufficient reliability and validity. That is, all factors were measureable through the instruments. Second, job satisfaction partially influenced service quality. Among the dimensions of job satisfaction, performance assessments, relationships with co-workers, and pay and benefits had significant positive effects on service quality, whereas relationships with su-

pervisors, job content, and workplace environments had not significant effects. Therefore, these results provide support for Hypothesis 1-2. This implies that DMTC employees were generally satisfied with performance assessments and opportunities for promotion based on their ability and efforts, which had positive effects on service quality. Relationships with co-workers had a significant positive effect on service quality. Therefore, these results provide support for Hypothesis 1-3. This implies that DMTC employees were generally satisfied with their mutual interest in one another, job-related cooperation, and amicable relationships, which had positive effects on service quality. In terms of Hypothesis 1, noteworthy is that pay and benefits had a significant negative effect on service quality. This implies that DMTC employees were not satisfied with DMTC's wage policies and fringe benefits but that they still provided DMTC users with high-quality customer service. This suggests that these employees may provide even higher levels of customer service if they receive better pay and benefits.

Third, among the five dimensions of service quality, tangibility and reliability had significant positive effects on customer satisfaction. According to the results for the relative influence of each service quality dimension on customer satisfaction based on standardized coefficients, reliability had a greater effect. This may be because "being employees of a state-owned enterprise" can serve as a critical factor influencing customers to rely on those employees. The significant effect of tangibility may be explained by the fact that railway users are likely to place greater emphasis on personal hygiene and environments because of improved living standards. DMTC users emphasized high-quality railway environments, including cleanliness inside and outside subway stations and trains, optimal temperatures, no unpleasant odour, quietness, and ventilation as well as DMTC's main role as a mode of transportation. Fourth, consistent with previous studies, customer satisfaction had a significant positive effect on customer loyalty. Fifth, job satisfaction had a significant positive effect on service quality, and service quality had a significant positive effect on customer satisfaction. This indicates that service quality played a role as a moderator. Finally, job satisfaction had no direct effect on customer satisfaction, indicating that service quality moderated the relationship between job satisfaction and customer satisfaction.

## 5.2 Implications and Future Direction of Research

The results have some important implications. First, enhancing employees' job satisfaction through better pay and fringe benefits can improve customers' perception of service quality. Second, there is a need to increase those dimensions of service quality with no significant effects, namely responsiveness, assurance, and empathy. That is, it is necessary to improve customers' perception of employees' manner and promptness. Third, there is a need for enhancing the quality of customer service through well-designed customer service education programs, which can address customers' elevated standards and expectations. These efforts should increase DMTC users' reuse intentions and loyalty.

As discussed earlier, the present study is distinct from previous studies in that it relates job satisfaction among DMTC employees to service quality and examines the effects of job satisfaction on customer satisfaction and customer loyalty. Most studies examining the relationship between job satisfaction and service quality have been limited to employees, and therefore they have not focused on customers' perception of service quality. This study narrows this gap by examining the relationship between these two factors.

This study has some limitations. First, we focused only on one railway system, and therefore, the generalizability of the results to other types of organizations may be limited. In this regard, future research should consider a wider range of organizations, including private firms. Second, we considered the same number of respondents for both DMTC employees and users. In this regard, future research should expand the research scope and the sample size. Third, we focused only on six variables of job satisfaction. In this regard, future research should consider a wider range of factors from diverse perspectives. Finally, we excluded those employees working in DMTC's consigned subway stations (22 stations). In this regard, future research should include these employees to compare job satisfaction between full- and part-time employees.

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## APPENDIX A - TABLES

Table 1: Composition of Assessment Items and Operational Definitions.

<i>Factors</i>	<i>Operational Definitions</i>		<i>Assessment Items</i>
<i>Job satisfaction</i>	Workplace environments	Working conditions such as cleanliness, illumination, temperature, noise, and risks of industrial accidents, among others, can have considerable influence on job satisfaction.	5
	Job content	In general, employees expect their jobs to be challenging and rich in content and do not like monotonous jobs.	6
	Relationships with coworkers	Employees want to receive material rewards through work and meet their social needs through their relationships with coworkers. Good coworker relationships can have considerable influence on job satisfaction.	6
	Relationships with supervisors	Behaviors of supervisors can be an important factor in job satisfaction. Job satisfaction among employees with amicable and understanding supervisors who listen to their subordinates is likely to be higher than that among employees without such supervisors.	6
	Pay and benefits	The absolute quantity of reward and fairness can have considerable influence on job satisfaction.	6
	Performance assessments	Opportunities for promotion have differential effects on job satisfaction because there are various forms of promotion that accompany various rewards.	7
<i>Service quality</i>	Tangibility	Physical facilities, equipment, and attitudes of employees.	4
	Reliability	The ability to provide services in an accurate and reliable manner.	5
	Responsiveness	The ability to provide services swiftly and help customers.	4
	Service assurance	Employees' knowledge and manner and their ability to instill trust and to trust their job.	4
	Empathy	The ability to provide customers with protection and care.	5
<i>Customer satisfaction</i>	Difference between customers' expectations of services before and after their actual purchase experience.		7
<i>Customer loyalty</i>	Customers' reuse intentions or word-of-mouth communication as a result of their satisfaction with particular products or services.		4

**Table 2: Demographic Characteristics.**

<i>Urban rail employees</i>				<i>Urban rail passengers</i>			
<i>Division</i>		<i>Frequency (n=283)</i>	<i>Ratio (%)</i>	<i>Division</i>		<i>Frequency (n=283)</i>	<i>Ratio (%)</i>
Gender	Male	258	91.2	Gender	Male	142	50.2
	Female	25	8.8		Female	141	49.8
Age	30 ~ 39	118	41.7	Age	20 ~ 29	209	73.9
	40 ~ 49	155	54.8		30 ~ 39	28	9.9
	Over 50	10	3.5		40 ~ 49	2	0.7
Academic background	High school	14	4.9		50 ~ 59	19	6.7
	Junior college	51	18.0		Over 60	25	8.8
	College	215	76.0	Frequency of use	6 ~ 7 times a week	21	7.4
	graduate school	3	1.1		4 ~ 5 times a week	40	14.1
Marital status	Unmarried	40	14.1		2 ~ 3 times a week	72	25.4
	Married	243	85.9		Once a week	35	12.4
Position	Staff	4	1.4		3 ~ 4 times a month	47	16.6
	Chief	189	66.8	1 ~ 2 times a month	44	15.5	
	Deputy section chief	45	15.9	Fewer than 5 times a year	24	8.5	
	Section chief	31	11.0	Purpose of use	Commuting	11	3.9
	Station master	14	4.9		Schooling	75	26.5
Years of service	3 ~ 9 years	88	31.1		Business	4	1.4
	10 ~ 20 years	188	66.4		Everyday life	170	60.1
	Over 20 years	7	2.5	Others	23	8.1	
Working place	Line 1	188	66.4	Subway line used	Line 1	160	56.5
	Line 2	95	33.6		Line 2	123	43.5
Dwelling place				Dwelling place	Daegu	249	88.0
					Gyeongsang	34	12.0

**Table 3: Factor Analysis Results and Reliability Analysis of Job Satisfaction.**

<i>Construct</i>	<i>Factor</i>	<i>Variable</i>	<i>Factor loading</i>	<i>Commonality</i>	<i>Eigen value</i>	<i>% of the Variance Explained</i>	<i>Cumulative % of the Variance Explained</i>	<i>Cronbach Alpha</i>
Job satisfaction	Relationships with supervisors	Problem solving	.812	.768	4.532	14.164	14.164	.921
		Sense of respect	.804	.752				
		Supervisor support	.797	.744				
		Courteous listening	.782	.728				
		Job partnership	.726	.713				
		Recognition from the supervisor	.646	.626				
	Performance assessments	Education and training	.802	.678	4.311	13.470	27.634	.902
		Diversity of opportunities	.799	.772				
		Expectations of higher positions	.751	.664				
		Opportunities	.746	.634				
		Satisfaction	.734	.705				
		Fairness	.679	.651				
	Relationships with coworkers	Friendliness	.822	.773	4.059	12.683	40.317	.883
		Sense of trust	.776	.764				
		Cooperation	.750	.634				
		Teamwork	.738	.600				
		Job attitudes of coworkers	.715	.654				
		Interest	.647	.508				
	Job content	Sense of achievement	.812	.833	3.199	9.996	50.314	.851
		Enjoyment	.750	.739				
Pride		.747	.749					
Altruism		.667	.531					
	Authority	.507	.442					
Pay and benefits	Jobs and optimal pay	.794	.705	2.724	8.513	58.827	.806	
	Amount of pay	.748	.633					
	Level of pay	.683	.653					
	Fringe benefits	.661	.594					
Workplace environments	Employment stability	.745	.670	2.443	7.636	66.462	.794	
	Working hours	.657	.601					
	Workplace conditions	.585	.522					
	Workplace atmosphere	.536	.673					
	Labor-management relations	.509	.554					

KMO=.928 p=.000

According to the result of Bartlett sphericity test, the approximated  $\chi^2 = 5582.415$ .

**Table 4: Factor Analysis Results and Reliability Analysis of Service Quality, Customer Satisfaction and Customer Loyalty**

Concept	Factor	Variable	Factor Loading	Commonality	Eigen-value	% of the Variance Explained	Cumulative % of the Variance Explained	Cronbach's Alpha
Service quality	Empathy	Employees' mutual interest	.874	.826	2.709	15.933	15.933	.827
		Organization's interest	.813	.787				
		Comprehension of customers' demands	.647	.629				
		Consideration of customers' interests	.548	.510				
	Responsiveness	Accuracy	.771	.780	2.613	15.371	31.304	.846
		Speed	.756	.787				
		Punctual service	.704	.676				
	Tangibility	Pleasant atmosphere	.746	.704	2.550	14.999	46.302	.804
		Facilities and furnishings	.718	.698				
		Employees' uniform	.713	.639				
		Cutting-edge equipment	.712	.698				
	Reliability	Timely service	.776	.710	2.101	12.359	58.661	.786
		Customer reassurance	.694	.746				
Trust in the organization		.664	.664					
Service assurance	Safety of financial transactions	.802	.683	1.887	11.099	69.760	.711	
	Friendliness and politeness	.670	.638					
	Trust in employees	.502	.684					

KMO=.906 p=.000

According to the result of Bartlett sphericity test, the approximated  $\chi^2 = 2443.051$ .

Customer satisfaction	Transfers	.776	.603	3.117	51.958	51.958	.812
	Overall satisfaction	.756	.572				
	Satisfaction with facilities and safety	.740	.548				
	Satisfaction with ticketing and charging	.730	.533				
	Satisfaction with the headway	.661	.437				
	Satisfaction with the appearance of subway trains	.652	.426				

KMO=.846 p=.000

According to the result of Bartlett sphericity test, the approximated  $\chi^2 = 487.219$

Customer loyalty	Active referrals	.808	.652	2.465	61.629	61.629	.790
	Alternative transit means	.802	.643				
	Continuous use	.782	.612				
	Explanations of subway merits	.747	.558				

KMO=.699 p=.000

According to the result of Bartlett sphericity test, the approximated  $\chi^2 = 359.036$ .

**Table 5: Second Order Confirmatory Factor Analysis of Service Quality.**

Factor		Assessment Items	Unstandardized Coefficients	Standard Error (s.e.)	T-Value (c.r.)	P	Standardized Coefficients	Ave	Construct Reliability
Second order factor	Primary factor								
Service Quality	Empathy (.756)*	Consideration of customers' interests	1.000	-	-	-	0.605	.656	.883
		Comprehension of customers' demands	1.054	0.110	9.543	***	0.730		
		Organization's interest	1.252	0.121	10.373	***	0.838		
		Employees' mutual interest	1.256	0.123	10.200	***	0.812		
	Tangibility (.735)	Cutting-edge equipment	1.000	-	-	-	0.789	.637	.874
		Employees' uniform	0.672	0.07	9.552	***	0.593		
		Facilities and furnishings	0.942	0.073	12.971	***	0.805		
		Pleasant atmosphere	0.816	0.076	10.706	***	0.660		
	Responsiveness (.863)	Punctual service	1.000	-	-	-	0.697	.731	.890
		Speed	1.160	0.087	13.330	***	0.888		
		Accuracy	1.066	0.082	13.051	***	0.860		
	Reliability (.862)	Trust in the organization	1.000	-	-	-	0.777	.669	.856
		Customer reassurance	1.147	0.083	13.780	***	0.850		
		Timely service	0.764	0.076	10.086	***	0.619		
	Service assurance (.899)	Trust in employees	1.000	-	-	-	0.833	.543	.774
Friendliness and politeness		0.787	0.074	10.57	***	0.647			
Safety of financial transactions		0.698	0.086	8.067	***	0.504			

Goodness of fit was as follows:  $\chi^2 = 264.750$  (df=114, p=.000),  $\chi^2/df$  (Q value)=2.322

RMR=.036, GFI=.901, IFI=.937, CFI=.936, TLI=.924, RMSEA=.068

\*Figures in parentheses indicate secondary factors' standard loadings. \*\*\*indicates significance at the 1% level.

**Table 6: Results of Confirmatory Factor Analysis.**

<i>Factor</i>	<i>Assessment Items</i>	<i>Unstandardized Coefficients</i>	<i>Standard Error (s.e.)</i>	<i>T-Value (c.r.)</i>	<i>P</i>	<i>Standardized Coefficients</i>	<i>Ave</i>	<i>Construct Reliability</i>
Relationships with Supervisors	Recognition from supervisors	1.000	-	-	-	0.755	.797	.959
	Job partnership	1.221	0.086	14.204	***	0.813		
	Courteous listening	1.198	0.084	14.323	***	0.818		
	Supervisor support	1.157	0.080	14.389	***	0.822		
	Sense of respect	1.231	0.084	14.660	***	0.835		
	Problem solving	1.215	0.083	14.685	***	0.836		
Performance Assessments	Fairness	1.000	-	-	-	0.773	.690	.930
	Satisfaction	1.15	0.077	14.885	***	0.831		
	Opportunity	1.032	0.079	13.125	***	0.748		
	Expectations of higher positions	1.110	0.084	13.141	***	0.748		
	Diversity of opportunities	1.187	0.077	15.462	***	0.857		
	Education and training	0.982	0.080	12.258	***	0.705		
Relationships with coworkers	Interest	1.000	-	-	-	0.620	.787	.956
	Job attitudes of coworkers	1.087	0.110	9.852	***	0.703		
	Teamwork	1.004	0.104	9.656	***	0.685		
	Cooperation	1.071	0.106	10.077	***	0.725		
	Sense of trust	1.383	0.120	11.550	***	0.884		
	Sense of closeness	1.331	0.117	11.367	***	0.861		
Job Content	Authority	1.000	-	-	-	0.513	.701	.917
	Altruism	0.949	0.136	6.997	***	0.534		
	Sense of pride	1.549	0.172	9.007	***	0.850		
	Pleasantness	1.518	0.168	9.019	***	0.852		
	Sense of achievement	1.699	0.183	9.267	***	0.919		
Workplace Environments	Labor-management relations	1.000	-	-	-	0.630	.571	.868
	Atmosphere	1.056	0.102	10.332	***	0.783		
	Workplace conditions	0.878	0.100	8.738	***	0.624		
	Working hours	0.951	0.101	9.415	***	0.687		
	Employment stability	0.762	0.094	8.122	***	0.571		
Pay and benefits	Fringe benefits	1.000	-	-	-	0.722	.691	.899
	Level of pay	1.012	0.089	11.36	***	0.771		
	Amount of pay	0.898	0.089	10.046	***	0.668		
	Jobs and optimal pay	0.948	0.092	10.348	***	0.690		
Service Quality	Service assurance	1.000	-	-	-	0.711	.733	.932
	Reliability	1.169	0.094	12.377	***	0.796		
	Tangibility	0.931	0.085	10.965	***	0.700		
	Responsiveness	1.243	0.102	12.192	***	0.783		
	Empathy	1.024	0.091	11.273	***	0.721		
Customer Satisfaction	Transfers	1.000	-	-	-	0.585	.516	.864
	Overall satisfaction	0.914	0.121	7.545	***	0.547		
	Satisfaction with facilities and safety	1.085	0.131	8.274	***	0.619		
	Satisfaction with ticketing and charging	1.455	0.159	9.164	***	0.720		
	Satisfaction with the headway	1.263	0.142	8.899	***	0.688		
	Satisfaction with the appearance of subway trains	1.069	0.116	9.251	***	0.730		
Customer Loyalty	Active referrals	1.000	-	-	-	0.665	.563	.837
	Alternative transit means	1.043	0.105	9.919	***	0.707		
	Continuous use	1.065	0.107	10.001	***	0.715		
	Explanations of subway merits	0.901	0.09	9.963	***	0.711		

Goodness of fit was as follows:  $\chi^2 = 1640.898(df=998, p=.000)$ ,  $\chi^2/df(Q\text{ value})=1.644$   
 RMR=.031, GFI=.804, IFI=.913, CFI=.912, TLI=.905, RMSEA=.048

**Table 7: Modification Index**

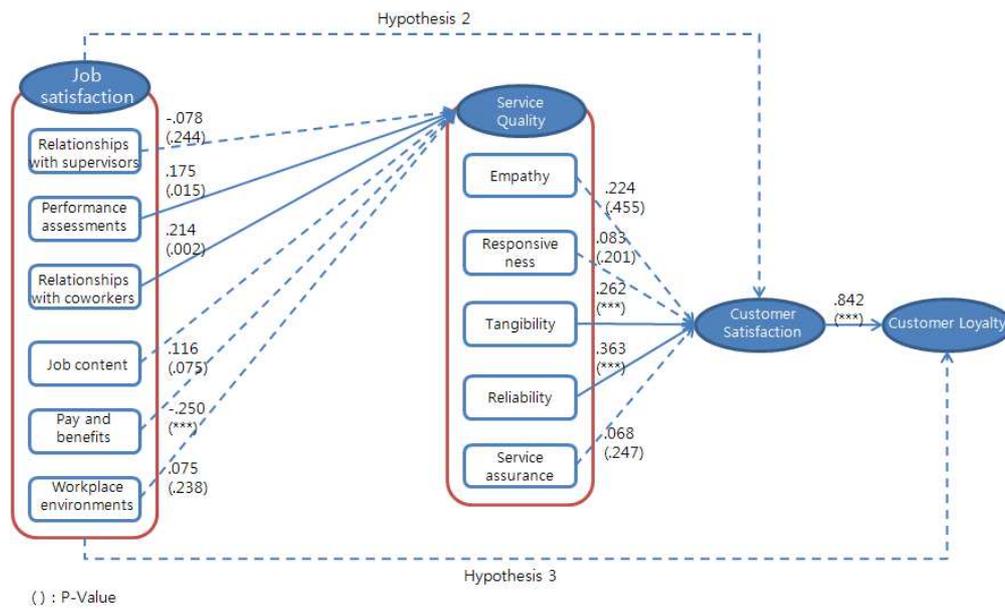
<i>goodness of fit</i>	$\chi^2/df$	<i>RMR</i>	<i>IFI</i>	<i>TLI</i>	<i>CFI</i>	<i>RMSEA</i>
Before modification	$\chi^2 = 3578.761$ (df=2199, p=.000) $\chi^2/df(Q)=1.627$	.036	.874	.872	.864	.047
After modification	$\chi^2 = 1105.740$ (df=666, p=.000) $\chi^2/df(Q)=1.660$	.028	.932	.924	.931	.048
criteria	p>.05	≤.05	≥.9	≥.9	≥.9	≤.05

**Table 8: Correlation Coefficient & Variance Extracted**

<i>Division</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>
1. Relationships with Supervisors	.797*								
2. Performance Assessments	.382	.690*							
3. Relationships with Coworkers	.217	.378	.787*						
4. Job Content	.207	.204	.254	.861*					
5. Pay and Benefits	.275	.315	.366	.299	.692*				
6. Workplace Environments	.149	.281	.220	.122	.193	.690*			
7. Service Quality	.000	.175	.201	.113	-.080	.116	.733*		
8. Customer Satisfaction	.046	.141	.104	.050	-.095	.074	.705	.603*	
9. Customer Loyalty	.000	.093	.181	.113	.065	.062	.619	.646	.563*

Note: \* denotes the average variance extracted.

**Table 9: SEM Results for Hypotheses**



	Hypothesis(path)	Path coefficient	Standard error (S.E.)	T-value (C.R.)	P-value	Accepted or rejected
Hypothesis 1	H1-1 (Relationships with supervisors → Service quality)	-.078	.057	-1.165	.244	Rejected
	H1-2 (Performance assessments → Service quality)	.175	.055	2.434	.015	Accepted
	H1-3 (Relationships with coworkers → Service quality)	.214	.068	3.051	.002	Accepted
	H1-4 (Job content → Service quality)	.116	.050	1.782	.075	Rejected
	H1-5 (Pay and benefits → Service quality)	-.250	.058	-3.565	***	Rejected
	H1-6 (Workplace environments → Service quality)	.075	.059	1.181	.238	Rejected
Hypothesis 2	H2-1 (Relationships with supervisors → Customer satisfaction)	.048	.047	.921	.357	Rejected
	H2-2 (Performance assessments → Customer satisfaction)	.017	.045	.301	.763	Rejected
	H2-3 (Relationships with coworkers → Customer satisfaction)	-.033	.056	-.612	.540	Rejected
	H2-4 (Job content → Customer satisfaction)	-.074	.042	-1.471	.141	Rejected
	H2-5 (Pay and benefits → Customer satisfaction)	-.017	.048	-.306	.760	Rejected
	H2-6 (Workplace environments → Customer satisfaction)	.006	.049	.115	.908	Rejected
Hypothesis 3	H3-1 (Relationships with supervisors → Customer loyalty)	-.077	.108	9.383	***	Rejected
	H3-2 (Performance assessments → Customer loyalty)	-.062	.062	-1.378	.168	Rejected
	H3-3 (Relationships with coworkers → Customer loyalty)	.104	.059	-1.036	.300	Rejected
	H3-4 (Job content → Customer loyalty)	.074	.073	1.785	.074	Rejected
	H3-5 (Pay and benefits → Customer loyalty)	.142	.054	1.357	.175	Rejected
	H3-6 (Workplace environments → Customer loyalty)	-.040	.063	2.405	.016	Rejected
Hypothesis 4	H4-1 (Empathy → Customer satisfaction)	.224	.064	-.746	.455	Rejected
	H4-2 (Responsiveness → Customer satisfaction)	.083	.045	1.279	.201	Rejected
	H4-3 (Tangibility → Customer satisfaction)	.262	.048	4.506	***	Accepted
	H4-4 (Reliability → Customer satisfaction)	.363	.049	5.557	***	Accepted
	H4-5 (Service assurance → Customer satisfaction)	.068	.046	1.159	.247	Rejected
Hypothesis 5	Customer satisfaction → Customer loyalty	.842	.108	9.383	***	Accepted

Goodness of fit was as follows:  $\chi^2=252.551$  (df=119, p=.000),  $\chi^2/df$ (Q value)=2.122  
 RMR=.024, GFI=.915, IFI=.932, CFI=.931, TLI=.900, RMSEA=.063

**APPENDIX B - FIGURES**

**Fig. 1: Research Model**

