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Relationships among school service qualities, innovation management and student retention via school image: The case of public junior-high schools in Taoyuan City, Taiwan

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Abstract. This study investigates the causal relationships among service quality, innovation management, organization image, and student retention for public junior high schools. Empirical results indicate that school image mediates the relationships between the antecedents (school service quality and innovation management) and student retention, moreover the relationships between innovation management and student retention are much stronger in comparison. School service quality has a stronger direct effect on student retention than through school image. Regarding innovation management, the indirect through school image is stronger than the direct effect to student retention.
Keywords. Market orientation, School service qualities, School innovation management, School image, School student retention, Recursive model.
JEL. A21, I20, O30.

1. Introduction

Recently, the birth rate in Taiwan has constantly declined. The tendency of fewer students has thus hit the operation of elementary schools and junior high schools. To make the educational resources cost-effective and service quality improvement, a public school has to be merged with one another or reduces its number of classes (Wu, 2006; Sultan & Wong, 2013). The merger or size reduction causes a surplus of teachers. Furthermore, because of reduced family sizes, more parents consider to choose an ideal school for their children regardless of the cost of money and time. In the past, parents just let their children go to the nearest public school, or they just followed the regulations of the government about school districts. But nowadays, parents would like to choose a school far from home by moving to another school district or choose a private school with higher tuition (Chien, 2007). As time goes by, the traditional school district system will not ensure the survival of public schools. Public schools cannot survive without competing with one another. They begin to learn from an enterprise to realize the importance to improve service quality, innovation management and good image.

An enterprise aims at attracting consumers' purchase for the purpose of earning profits to run its operation. However, consumers' demand changes over time. The focus of marketing should emphasize consumers' satisfaction, that is, market orientation. If an enterprise is able to identify what the consumers need and provide

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what the consumers need, the consumers will be satisfied and will repurchase its products or services. Schools, non-profit organizations, do not aim at seeking profits, but pay the same attention as a business to consumers' (students' and their parents') satisfaction and loyalty to enhance student retention. School education is thought as a kind of service, so a school provides services to its "customers" or "consumers" (Wu, 2002; Li, 2013). An important strategy for an organization to thrive and survive is to provide good service quality (Parasuraman, Zeithaml & Berry, 1985; Prabha & Nundlall, 2013). People's demand changes over time. Gradually, traditional school service activities are unable to meet students' and their parents' demands. Under the situation of constrained resources, it's important for public schools to think about how to improve service quality to satisfy students and their parents and then to enhance and raise their school student retention (Huang, 2007; Yusoff, McLeay, & Woodruffe-Burton, 2015). Because of the reasons proposed above, we suggest that school service quality could be thought as a remarkable variable in this study.

Furthermore, since society as a whole tends to be more open and freer, schools need go along with the change lest being natural eliminated. Challenges for competition have changed. The challenges ten years ago were to restructure, to reduce cost and to improve quality by simple methods, but today's new competitive advantage lies on the availability of innovation (Porter & Stern, 2001). Innovation is the survival element of a business in the harsh economic environment. Innovation is also the driving force for an organization to constantly progress. Nowadays, schools also face harsh environments like businesses, so it's necessary for schools to seek innovation (Wu, 2004; Wu & Lai, 2006; Bulbul, 2012). That's why we suggest school innovation management as another significant variable in this study.

However, making schools and education good is just primary. If a school desires to have no lack of students and get more supporting resources, how to let the customers (students and their parents) of a school understand the school and interact with the school is the key point since students retain and their parents choose a school depends on not only what they exactly experienced but also the information from friends and mass media or their own awareness about the school, that is, school image. Robenstine (2000) stated that there are many factors affecting students to choose and/or retain a school, and even the leader of a school cannot control those factors except school image. Business image can promote consumers to understand more about the products or service so that lowers their uncertainty of purchasing. As a result, a business with good image will earn the trust of consumers and thus consumers' purchasing intentions of its products and services will be stronger (Sung & Yang, 2008; Ali, *et. al.,* 2016). By contrast, if a school has good school image (Maringe & Gibbs, 2009; Tripathi & Mukerji, 2013), it will lower students and their parents' uncertainty of selecting a school, that is, if a school tries its best to mold its good image, the school will earn the trust of students and their parents to enhance their customers (student and parent) retention of the school. Thus, school image is suggested to be also an important mediator in our study.

Recently, public schools seriously compete with one another to recruit or enroll more students although they're under the protection of school district system. Previous studies about school service regard that a school with good service quality will attract students and parents to choose it, but neglect the influence of image as well as the necessity of innovation management for the change of student and parent's demands. There are few researches in Taiwan that explore the relationships between school service qualities, school innovation management and school student retention through school image. As described above, this study tries (1) to verify the causal relationship among school service quality, innovation management, school image and school student retention, where service quality and innovation management are both antecedents, school image is the mediator, and student school retention is the dependent variable; and (2) to prove that school

image is an important mediator that affect school student retention. (3) based on the empirical results, it can provide the useful information or implications for public junior high schools to set up their recruitment strategies.

The remaining of this study organized as follows. Section 2 describes a review of the relevant literature and hypothesis development. Section 3 presents model specification and data collection. Section 4 discusses empirical results and analysis. The study then provides the concluding remarks and policy implications in section 5.

2. Review of relevant literatures and hypothesis development

For the purpose of conducting an effective and reliable study to achieve our research objectives, we establish a conceptual framework for this study on the basis of the related theories for school service quality, school innovation management, school image, and school student retention as Figure 1. The conceptual framework consists of two antecedent variables, school service quality and school innovation management, an intermediary variable, school image, and the dependent variable, school student retention. Based on the conceptual framework, the following hypotheses are developed.

Hypothesis 1. School service quality has positive causal relationship with school image.

Hypothesis 2. School innovation management has positive causal relationship with school image.

Hypothesis 3. School service quality has positive causal relationship with school student retention.

Hypothesis 4. School innovation management has positive causal relationship with school student retention.

Hypothesis 5. School image has positive causal relationship with school student retention.

To set up and illustrate the above hypotheses, related theories and literatures are reviewed as follows.

2.1. Service Quality and School Image

Service quality is a comparison between expectations and performance, involving quality evaluations of outcomes of a service and processes of service delivery (Parasuraman *et al.,* 1985; Gawyar, Ehsani & Kozehchian, 2014). Since service is heterogeneous, intangible and inseparable, service quality is more difficult for the consumer to evaluate than goods quality. To assess customer perceptions of service quality in service and retailing organization, Parasuraman *et al.*, (1985) developed a 22-item instrument, called SERVQUAL, in 1988. SERVQUAL has been widely applied to various fields. Education is a representative example. They applied five dimensions - tangibles, reliability, responsiveness, assurance and empathy to assess the overall service quality. The definitions of these five dimensions are as follows. Tangibles refers to physical facilities, equipments and appearance of the personnel. Reliability means the ability to fulfill the promised service dependably and accurately. Responsiveness is the willingness to help customers and provide prompt service. Assurance refers to the employees' knowledge and courtesy and their ability to inspire trust and confidence. As for empathy, it means whether the firm provides its customers caring and individualized attention (Parasuraman, Zeithaml, & Berry, 1988).

In this study, applying SERVQUAL to measure the service quality of public junior high schools, tangibles refer to what students and their parents can see in the campus such as classrooms, playgrounds and the appearance of teachers. Reliability means if the school performs service in line with its calendar and keeps an exact record like the performance and attendance of its students. If a crisis event such as food poisoning happens at school and teachers and staff are both able to handle it well instantly, then we say the school's service is responsive. Also, if the teachers and staff are active or volunteer to help students, then we say the school's

service is responsive, too. Assurance means teachers and staff have professional knowledge to teach and serve students. For example, an English teacher can teach students English grammar and pronunciation. Because of their professional knowledge, students and their parents can trust them and have confidence on what they do. If the teachers and staff have empathetic minds, they pay attention to the demand of individual student and they are glad to listen to them (Li, 2013; Ali, Zhou, *et al.,* 2016).

On the other hand, school image is defined in accordance with corporate image or business image for nowadays a school just like a corporate has to market itself to attract customers' (students' and their parents') attention. Corporate image refers to the people's overall impression about a firm. It is related to business name, architecture, variety of products or services, tradition, ideology and even to the impression of quality communicated by each person interacting with the firm's clients (Nguyen & Leblanc, 2001; Tu, Wang, & Chang, 2012). Similarly, school image is the overall impression made on the minds of the publics about a school. Or it can be said that people's opinions about the school consist of the image of the school. And the people consist of those connected with the past, the present and the future of the school (Toper, 1986; Ali, Omar, & Amin, 2013). An education organization has its individual "image," and the image refers to whatever people recall about the school when it being mentioned, but the image may not be a clear concept (Chung, 1988).

As a subjective concept, image is hard to measure. In spite of that, there are still some researchers trying to make the measurement possible. There are several meaningful ways to classify business images, but particularly important to consumers is to classify business images as institutional, functional or commodity images. Institutional image is based on the consumer's attitude toward the enterprise as a whole, including the consumer's impression of the business as a member of the community. Functional image has to do with some particular aspect of the firm's operations like service offering, price discount and advertising (Walters, 1978; He, & Lai, 2014). As for commodity image, this study is going to neglect it since schools provide no commodity.

In addition to image, we observed another concept which is closed to it and cannot be neglected. That is "reputation." Both image and reputation are derived essentially from the customer's perception of a firm, and sometimes they shared the same measurement scales. Reputation can be viewed as a mirror of the firm's history. It serves to communicate to its target customer information about the quality of its products or services in comparison with those of its competitors (Yoon, Guffey, & Kijewski, 1993; Brown, Pratt & Whetten, 2006; Abd-El-Salam, Shawky & El-Nahas, 2013). Based on the above discussion, this study constructs school image with institutional image, functional image and school reputation. School institutional image refers to students and their parents' attitude toward the whole school, especially regarding the interactive relationship between school and community. For instance, when the school participates in the activities for public welfare and students and their parents will have a good impression on the school. Functional image is students and their parents' attitude toward school's services such as teaching, courses planning and subsidy offering, and news reporting about the school. School reputation is the common and accumulated judgment over time of the various groups who interact with the school.

In general, school image is the overall impression and judgments on the minds of the people about the school. They are caused by the recognition which school's target students received regarding the school. Therefore, we can propose that if students and their parents experience good school services, they will give the school a favorable judgment. This means the school has good image. Furthermore, if a school has good service quality, it can promote itself more. Then there will be more positive recognition about the school. The recognition which students and their parents receive will be spontaneously more positive. Thus, this study proposes hypothesis 1.

Hypothesis 1. School service quality has positive causal relationship with school image.

2.2. Innovation Management and School Image

"Innovation management" in this study is derived from the concept of business innovation management. First of all, we have to know what innovation is. Several researchers have defined innovation. Innovation is the new ability to create wealth, enabling resources to perform the best (Drucker, 1985). It involves the improvement of technology and better ways of doing things. It can be the change of products, change of processes, development of a new market and new marketing skill (Poter, 1990). Thus, for an organization, innovation refers not only to new technology and products but also new processes, strategy and structure.

To enrich external competitive advantage and internal competence, an enterprise desires to innovate in products or processes (Geroski, 1994; Bulbul, 2012). For similar purpose to an enterprise, a school introduces new methods and ideas to improve the effectiveness of students' learning, the efficiency of its administration or even to differentiate from those of its competitors because in Taiwan, elementary and junior schools now increasingly face competition in the education market. Under such environments, individual schools keep improving themselves in order to compete with one another for the best students and thus innovation management plays an important role.

Different scholars classify school innovation management differently. Wu & Lin (2003) define school innovation management as the processes of applying creative ideas to improve the performance of school's service and administration in line with the purpose of education and at the same time, to develop its unique characteristic. School innovation management classified into five dimensions - administration innovation, course and teaching leading, multiple student performance, campus landscaping, and social resources application. Innovation management for school activities will promote teaching-learning performance and enhance relationship between total quality management practices and school image.

Since the formation of an image is based on the theory of halo effect and simple inference, school innovation management may build a favorable image on the minds of its customers (students and their parents). Halo effect refers that consumers get used to building the whole impression of a thing by parts but not all the information of the thing. Simple inference means that people usually associate a thing spontaneously with some characters (Reynold, 1965; Volberda, Van Den Bosch, & Heij, 2013). Halo effect makes students and their parents prone to interpret an innovational activity as the overall characteristic of the school. Besides, simple inference makes "innovation" often connected with positive features such as initiative (Preston & Goldring, 2012). Thus, if a school performs innovation in schooling activities, its school image will be more favorable. That is the hypothesis 2 in this study.

Hypothesis 2. School innovation management has positive causal relationship with school image.

2.3. Service Quality and School Student Retention

Whether an enterprise running constantly depends on the supports of its consumers. Consumers' behavioral intentions influence their future consumption. School student retention in this study is in accordance with the theory of consumer behavioral intentions for students and their parents are the key consumers of a school. Their retention means the intention to remain with this school. If a school can control and predict the intentions of students and their parents' choice of schools, it's easy for the school to build a long relationship with them and ensure its future development.

Consumers' overall evaluation of a thing is based on their beliefs and feelings with regard to the thing. Their attitudes toward the thing will affect their behavioral

intentions and the intentions affect their final behavior as shown in Figure 2 (Engel, Blackwell & Mimiard, 1995; Duerden, & Witt, 2010; Dado, *et al.,* 2012). Zeithaml, Berry & Parasuraman (1996) split behavioral intentions into favorable and unfavorable intentions. If consumers exhibit favorable intentions to an enterprise, they will praise the company, prefer the company over others, or increase their purchasing volume. On the contrary, if consumers exhibit unfavorable intentions to an enterprise, they are ready to leave the company, spend less with the company, or complain of something regarding the company. Inferring from Zeithaml *et al.,* (1996) and Alavijeh, Rezaee, & Hosseinabadi (2014), if students and their parents exhibit favorable intentions, they will praise the school, express their preference for the school over others, or approve to study in the school, that is, they have the intention to retain with the school. Thus, school student retention can be the predictor of the school choosing behavior.

To assess behavioral intentions, scholars have different opinions. Zeithaml *et al.,* (1996) utilized favorable word of mouth and repeat business to measure consumer behavioral intentions. Mittal & Lassar (1996) applied the overall service quality, overall satisfaction, willingness to recommend to friends, and the possibility to switch to another company as the measures of consumers' patronage intentions. Zeithaml *et al.,* (1996) proposed that previous research has not captured the full range of behavioral intentions so develop a 13-item scale to include a wider range of behavioral intentions which can be grouped into five dimensions by factor analysis: loyalty to company, propensity to switch, willingness to pay more, external response to problem, and internal response to problem, among which is loyalty to company the largest factor, containing saying positive things about the company, recommending the company to someone who seeks advice, encouraging friends and relatives to do business with the company, considering the company the first choice and doing more business with the company (Ali, *et. al.,* 2016).

Muhammad (2012) and Li (2013) denoted that customer loyalty is the feeling of attachment to a company's people, products, or service, and the indications of loyalty are the intent to repurchase, primary behavior like regency, frequency, amount, retention and longevity of actual repurchasing behavior, and secondary behavior like word of mouth. Loyalty is described as a deeply commitment which a consumer held to repurchase a preferred product or service in the future, in spite of situational influences and marketing activities which potentially cause switching behavior. Also, loyalty follows a four-phase pattern in line with the depth of commitment, that is, cognitive loyalty, affective loyalty, conative loyalty, and action loyalty (Muhammad, 2012; Ali, *et. al.,* 2016).

Thus, according to the definition denoted by Muhammad (2012) and Ali, *et. al.,* (2016) and the dimensions of behavioral intentions proposed by Zeithaml *et. al.,* (1996), this study measures school student retention with the modified indications of loyalty such as considering the school the first choice, recommending or encouraging friends and relatives to let their children study in the school, and committing to remain with the school etc..

Research on the relationship between service quality and customers' retention decisions reveals that service quality has positive causal relationship with customers' satisfaction (Cronin & Taylor, 1992; Zeithaml & Bitner, 1996; Ali, *et. al.,* 2016). And Customers' satisfaction is a decisive factor for a customer to repurchase a product (Engel, Blackwell & Miniard, 1995). Zeithaml, Berry & Parasuraman (1996) also show that service quality strongly influences the customers' behavioral intentions. That is, good service quality the customers perceived will forge them to praise the firm, express preference for the company over others and increase the volume of their purchases. Analogizing to school, if students and their parents regard the school service as good service, they will be satisfied and willing to show their preference to the school, that is, they have favorable intention to remain with this school (Prabha & Nundlall, 2013). Thus, this study proposes hypothesis 3.

Hypothesis 3. School service quality has positive causal relationship with school student retention.

2.4. Innovation Management and School Student Retention

An enterprise executes the innovation to promote its competitive advantage in order to survive in the harsh living environments (Bulbul, 2012). Public junior high schools are without exception. They compete with one another not for money but for the best students because students are critical for a school to survive. No students, no schools. After all, non-profit organizations have been established for the demand of people. Innovation at this moment becomes an indispensable ability they must have. If a school introduces new technology or creative teaching techniques to help student to learn, students' parents will have more confidence on what the school does since their children have the opportunity to perform better than before. And if a school build its own characteristics to differentiate from other schools, its customers may be attracted by the difference (Foss, Laursen & Pedersen, 2011). For instance, a school can plan a series of sporting teams, clubs and courses to attract students who like sports and build an image of health and energy. Thus, its students will be willing to remain with the school or even recommend it to others. Hence, this study proposes hypothesis 4.

Hypothesis 4. School innovation management has positive causal relationship with school student retention.

2.5. School Image and School Student Retention

Through school image, students and their parents will have better understanding of the school. The uncertainty on their minds when choosing a school to attend thus decreases. The empirical study of Abd-El-Salam, Shawky & El-Nahas (2013) also revealed that when perceptions of both corporate image and corporate reputation are strongly favorable, the degree of customer loyalty has a tendency to be higher. By applying this inference and considering students and their parents as students for school, this study proposes hypothesis 5.

Hypothesis 5. School image has positive causal relationship with school student retention.

3. Model Specification and Data Collection

Based on the conceptual framework indicated in Figure 1, we specify the recursive system model which is applied for an empirical analysis and then describe the data collection for the information needed.

3.1. Model Specification

We employ recursive modelling approach to investigate the causal effects of variables and test the hypotheses we have described above. The recursive model system is constructed as follows.

$$IMA = a_0 + a_1 SQ + a_2 INNO + \varepsilon_1 \quad (1)$$

$$RTEN = b_0 + b_1 SQ + b_2 INNO + b_3 \widehat{IMA} + \varepsilon_2 \quad (2)$$

Where IMA and RTEN are vectors of dependent variables and respectively correspond to school image and school student retention. The vectors, SQ and INNO, represent independent variables, corresponding to school service quality and innovation management.

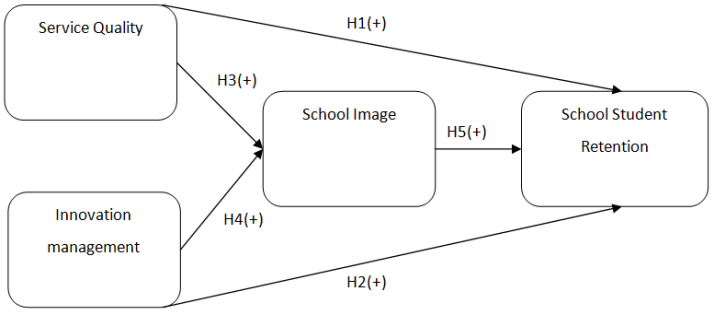

Figure 1. *Conceptual Framework of This Study*

There are four variables in this model system, which are exogenous variables including service quality (SQ) and innovation management (INNO); endogenous variables including school image (IMA) and school student retention (RTEN).

3.1.1. Defining and Measuring Each Variable

Service quality. In the research field of service quality, Parasuraman *et al.*, (1988) and Zeithaml *et al.,* (1996) are the most representative, having the widest and the farthest influence. Thus, our study based on their studies to measure school service quality with five dimensions - tangibles, reliability, responsiveness, assurance and empathy. Each dimension consists four to five items, including the teaching equipments, teaching attitude and convenience of contact, and etc.

Innovation management. Our study is based on the spirit of InnoSchool Award (2010) in Taiwan and we cites Chin and Pu's study on the concepts and implementations of school innovation management to classify school innovation management into five dimensions- administration, course and teaching, external relationship, student activity and campus environment (Chin & Pu, 2006; Hall, Agarwal & Green, 2013). The most widely accepted dimensions for classifying school innovation management are similar to InnoSchool Award and can be simply described as follows. (1) Administration innovation: to improve administrative efficiency and quality. (2) Course and teaching innovation: to construct creative courses and teaching activities. (3) Student activity innovation: to develop students' multiple intelligences. (4) Campus environment innovation: to map out a safe and comfortable place for learning and creative thinking. (5) External relationship innovation: to introduce external resources to promote school operation. We propose four to five items such as the use of high-tech information system, new student performance assessing method, and the interaction with external institutes, etc. to measure each dimension.

School image. Based on the discussion of business or corporate image (Walters, 1978), we regard that those factors constructing school image are from the physical entity and behavior of the school which the students and their parents perceived (Li, 2013; Ali, *et al.,* 2016). And because of the characteristics of schools, we exclude price image and commodity image that Walters (1978) mentioned to split school image into three dimensions- community image (institutional image), service-promotion image (functional image) and school reputation. There are six to seven items such as open to community, course variety and enrolment rate of entering senior high schools, etc. for each dimension in our questionnaire.

School student retentions. There are five items including student retention willingness and recommending the school to others. To measure school student retention, the contents of student retention willingness and recommending can be derived from the concept of customer and brand loyalty because loyalty as a good indicator of customers' retention decision (Zeithaml *et al.,* 1996; Muhammad, 2012; and Li, 2013; Abd-El-Salam, Shawky & El-Nahas, 2013; Alavijeh, Rezaee, & Hosseinabadi, 2014).

3.1.2. Measuring variables

To obtain the variable measurements, this study is conducted by using a questionnaire. Our questionnaire consults foreign and domestic literatures and

employs a 5-point Likert scale to measure each variable with the items in the questionnaire. The range is from "strongly disagree" to "strongly agree." Among them, "1" represents "strongly disagree," and "5" represents "strongly agree." We employ the addition of the score in each item to represent the measurements of each variable.

3.2. Data Collection

The survey samples are drawn from parents whose children are now studying in public junior high schools in Taoyuan. In Taiwan, parents play a more critical role than students in deciding which junior high school to attend. To make our sample representative and feasible, we use quota sampling to determine the ratio of sample schools, then dispatching questionnaires to each sample school. In more detail, we divide Taoyuan into three areas based on its geographical shape (Figure 3) and compute the number of sample schools in each area at first. Then we separate the sample schools depending on their sizes (the number of classes) into two groups, one of which is more than 38 classes and the other is not more than 38 classes. Finally, the number of questionnaires we dispatch to each sample school is twice the average number of its grade classes. For illustration, if there are 39 classes in a school and 13 classes belong to the first grade, 14 to the second and 12 to the third, the average number of its grade classes is 13 and we will dispatch 26 questionnaires to the school. There are totally 58 public junior high schools in Taoyuan, and 14 schools which approximate to the proportion of 1/4 are sampled in our study. We draw 442 samples in total and sample structure is also presented in Table 1.

4. Empirical Results and Analysis

In this section, the empirical results are depicted as follows.

4.1. One-Way ANOVA

We use one-way ANOVA in this study to detect whether the samples applying in this study are reasonably representative. According to the results, no significant differences are found (P-value>0.05). It signifies that the samples are representative. As Table 2, it appears that gender, age, educational level, occupation, income level and school size have no significant differences with reference to school student retention (P-value>0.05).

Table 1. *Sample Structure*

	More than 38 classes	Not more than 38 classes	Number of Sample Schools
Area A in Taoyuan	1	2	3
Area B in Taoyuan	3	2	5
Area C in Taoyuan	3	3	6
Total	7	7	14

Area	School Size	School Name	Average Number of Grade Classes	Number of Samples
A	More than 38	Guang Ming	14	28
	Not more than 38	Caota	7	14
	Not more than 38	Yung An	4	8
B	More than 38	Taoyuan	36	72
	More than 38	Chien Kuo	26	52
	More than 38	Jen Ho	23	46
	Not more than 38	Wun Chang	8	16
	Not more than 38	Hsin Fu	8	16
C	More than 38	Ping Jen	27	54
	More than 38	Chung Li	15	30
	More than 38	Yang Mei	23	46
	Not more than 38	Wu Han	10	20
	Not more than 38	Rui Ping	9	18
	Not more than 38	Daluen	11	22
Total				442

Data source: This study

In consequence, different demographic characteristics do not significantly influence school students' intentions to remain with the school or transfer to another one and neither does school size.

Table 2. *ANOVA Analysis of School Selection Intentions*

	Gender	Age	Education level	Occupation	Income level	School Size
F-value	0.43	1.20	0.82	2.03	0.26	0.73
P-value	0.51	0.31	0.54	0.06	0.93	0.39

Data source: This study

4.2. Reliability Analysis

Reliability refers to the precision and accuracy of a questionnaire. We adopt reliability analysis for the purpose to examine the consistency of the scale of individual items in a questionnaire. In this study, we use Cronbach's α statistic to measure the internal consistency reliability of the constructs. If the statistic of Cronbach's α is higher than 0.7, it means these items have high reliability. In case the statistic of Cronbach's α is between 0.5 and 0.7, the internal consistency of these items should be accepted. But if the statistic of Cronbach's α is lower than 0.35, we should correct or modify these items (Nunnally, 1978).

Table 3 shows the results of reliability analysis. The Cronbach's α statistics of constructs of school service quality -tangles, reliability, responsiveness, assurance and empathy are 0.79, 0.85, 0.86, 0.87 and 0.89 respectively; the Cronbach's α statistics of constructs of school image- community image, service-promotion image, and school reputation are respectively 0.78, 0.87 and 0.93; the Cronbach's α statistics of constructs of innovation management- administration innovation, course and teaching innovation, student performance innovation, campus environment innovation and external resource innovation are 0.86, 0.90, 0.80, 0.82 and 0.86 respectively, and the Cronbach's α statistic of school student retention is 0.82. In terms of a construct with good reliability, the Cronbach's α statistic should be larger than 0.70 (Nunnally, 1970). The Cronbach's α statistics of all dimensions in the examination are all larger than 0.7, meaning each dimension in this study has good reliability.

4.3. Validity Analysis

The results of validity analysis are presented in Table 4 and 5. We find that the average value of coefficient of correlation between constructs in the same variables is larger than that in other variables. Thus, the questionnaires are with validity.

4.4. Results of Recursive System Analysis

By employing multiple regression analysis with MLE, the related coefficients of the model are estimated. The results of recursive system analysis are indicated in Table 6. In terms of equation (1), the variable, school image (IMA), is proved to be affected by school service quality (SQ) and innovation management (INNO). Also, in equation two, school student retention (RTEN) is influenced by three variables, school service quality (SQ), innovation management (INNO) and school image (from the result of equation one, $\widehat{IMA}$). Our model is proved to be reasonably accepted since the adjusted R^2 (0.75, 0.51) are tested significantly by F-statistics at 5% level of significance.

Table 3. *Reliability Analysis of Cronbach's α*

Construct	Cronbach's α	Item to total correlation	Cronbach's α if item deleted
Service Quality	0.91		
Tangibles	0.79	0.57	0.75
Reliability	0.85	0.67	0.82
Responsiveness	0.86	0.57	0.83
Assurance	0.87	0.73	0.84
Empathy	0.89	0.74	0.87
School Image	0.83		
Community Image	0.78	0.53	0.75
Service-Promotion Image	0.87	0.64	0.85
School Reputation	0.93	0.80	0.92
Innovation Management	0.90		
Administration Innovation Couse & Teaching	0.86	0.68	0.83
Innovation	0.90	0.74	0.87
Student Performance Innovation	0.80	0.61	0.75
Campus Environment Innovation	0.82	0.64	0.77
External ResourceInnovation	0.86	0.70	0.82
School Selection Intentions	0.82	0.62	0.78

Data source: This study

Table 4. *Correlations Matrix and Reliability Coefficient between Constructs*

Constructs	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Community	Service Promotion	Reputation	Administration	Course Teaching	Student Performance	Campus	External	Retention
Tangibles	1.00													
Reliability	0.64	1.00												
Responsiveness	0.57	0.77	1.00											
Assurance	0.57	0.74	0.78	1.00										
Empathy	0.48	0.69	0.70	0.77	1.00									
Community	0.43	0.56	0.52	0.58	0.46	1.00								
Service Promotion	0.53	0.70	0.67	0.73	0.62	0.70	1.00							
Reputation	0.40	0.54	0.52	0.53	0.42	0.58	0.65	1.00						
Administration	0.56	0.61	0.60	0.59	0.47	0.63	0.72	0.68	1.00					
Course Teaching	0.49	0.55	0.47	0.59	0.52	0.62	0.69	0.62	0.69	1.00				
Student Performance	0.48	0.54	0.51	0.55	0.53	0.59	0.66	0.49	0.61	0.70	1.00			
Campus	0.47	0.53	0.50	0.48	0.38	0.67	0.64	0.56	0.70	0.61	0.59	1.00		
External	0.45	0.49	0.48	0.42	0.39	0.63	0.65	0.53	0.62	0.57	0.61	0.74	1.00	
Retention	0.40	0.58	0.55	0.59	0.54	0.53	0.61	0.64	0.57	0.58	0.56	0.53	0.54	1.00

Table 5. *Average Value of Correlated Coefficient between Constructs*

Constructs	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Community	Service Promotion	Reputation	Administration	Course Teaching	Student Performance	Campus	External	Retention
Tangibles Reliability Responsiveness Assurance Empathy			0.70											
Community Service Promotion Reputation			0.55				0.65							
Administration Course Teaching Student Performance Campus External			0.51				0.63				0.66			
Retention			0.53				0.59				0.56			1

Table 6. *Result of Recursive System Analysis*

Dependent variables Independent variables	Equation 1 (*IMA*)	Equation 2 (*RTEN*)
Constant (Intercept)	4.12 (1.42)	1.88 (1.13)
SQ	0.45** (6.56)	0.26** (4.98)
INNO	0.62** (14.15)	1.86* (2.12)
IMA		0.39**
Adj. R^2	0.85	0.79
F-value	212.78**	59.88**

Data Source: this study
Note: 1. ( ) is *t*-value and *, ** denote statistical significance at the 5% and 1% levels

According to the above recursive system analysis, we can detect the significance of the hypotheses we proposed. As indicated by equation one, we attempt to explore the cause and effect relationships between school service quality and school image, and innovation management and school image. And we find that the estimated coefficients (a_1=0.45 and a_2=0.62) are tested significantly by t-statistics (t=6.56, t= 14.15) at 5% level of significance (Table 7). This means that hypothesis 1 and 2 are both supported and implies that school service quality has positive causal relationships with school image and also, school innovation management has positive causal relationship with school image. Both service quality and innovation management have significant impacts on school image, of which the influence of innovation management is much stronger. Thus, to build good school image, service quality and innovation management are significant factors, of which innovation is more important.

As for equation (2), we attempt to estimate the causal relationships between the three variables, school service quality, school image and school innovation management, and school student retention. The results are illustrated as follows. The relationship between school service quality and school student retention is significantly positive because the estimated coefficient (b_1=0.26) is tested significantly at 5% level of significance by t-test (t=4.98). And there also significantly exists positive relationship between school innovation management and school student retention because the estimated coefficient (b_2=1.86) is tested significantly at 5% level of significance with t-test (t= 4.12). In addition, the relationship between school image and school student retention is significantly positive because the estimated coefficient (b_3=0.39) is tested significantly at 5% level of significance with t-value, 4.67. Thus, hypothesis 3, 4 and 5 are supported and the results imply that service quality, school image and innovation management are key influential factors on student retention, of which school image has the strongest impact, so schools should try their best to mold an excellent school image to retain or attract more students. The above results of our hypotheses are shown in Table 7 where the standardized estimated coefficients (β_i and β_j, for i= 1, 2 and j= 3, 4, 5 and $\beta_i = \hat{a}_i \times \frac{S_x}{S_y}$, $\beta_j = \hat{b}_j \times \frac{S_x}{S_y}$, of which S_x refers to the standard deviation of the right side variables x and S_y refers to the standard deviation of the left side variables y) are presented to represent the path coefficients.

4.5. Direct and Indirect Effects

In this study, we examine two direct effects, one of which is the effect from school service quality to school student retention and the other is that from school innovation management to school student retention. Also, there are two indirect effects we attempt to explore, one of which is the effect from school service quality to school student retention through school image and the other is that from school

innovation management to school student retention through school image. Table 8 shows the results of the direct and indirect effects.

Table 7. *Empirical Results of the Hypotheses in Structural Model*

Hypothesized Path	Standardized Coefficient	t-value	Non-Reject
H1: School service quality → School image	β_1=0.73**	5.38	Non-Reject
H2: School innovation management → School image	β_2=0.81**	13.84	Non-Reject
H3: School service quality → School student retention	β_3 =0.28**	2.87	Non-Reject
H4: School innovation management → School student retention	β_4=0.34**	2.58	Non-Reject
H5: School image → School student retention	β_5=0.48**	4.15	Non-Reject

Data Source: this study
Note: *, ** denote statistical significance at the 5% and 1% levels

The direct effect from school service quality to school student retention is 0.28(β_3) and its indirect effect through school image is 0.73*0.48 (β_1*β_5) =0.35 so the indirect effect from school service quality to school student retention is stronger than the direct effect (0.34>0.28). As for the effect from school innovation management to school student retention, the direct effect is 0.34(β_4) and the indirect effect is 0.81*0.48(β_2*β_5) = 0.39 so the direct effect from school innovation management to school student retention is smaller than the indirect effect (0.39>0.34).

Comparing the total effects, which means that the direct effect pluses indirect effect, of school service quality and school innovation management on school student retention, we find that the total effect of school service quality is 0.28+0.35=0.63 and school innovation management is o.34+0.39=0.73. Thus, school innovation management has a stronger impact on school student retention than school service quality.

Furthermore, we propose the path diagram of the recursive system model in Figure 2, recognizing two main paths, school service quality directly affects school student retention and school innovation management in directly affects school student retention through school image.

5. Conclusions and Policy Implications

This study signifies the empirical evidences of the cause-effect relationships among school service quality, school innovation management, school image and school student retention to give public junior-high schools some suggestions to retain students or even to attract more and better students. Our research framework proposes two important factors, service quality and innovation management, which will influence school student retention decisions the most possibly because of the experience of business. According to the empirical results, we determine that there are two main ways for public junior high schools to influence student retention decisions.

The first way (school innovation management → school image → school student retention) is to execute innovation to mold a good school image. This means it's not enough for a school to execute innovation because customers, especially students' parents may be unable to directly perceive what innovation the school does. Schools have to let students know what they do and let s identify with them. To do so, school image is indispensable because it can tell people about the school. Based on our empirical results, school reputation and service- promotion image are the first two influential factors in relation to parents' choosing a school for their children. Thus, a school should apply innovation to build good reputation and service- promotion image. For instance, a school can decorate classrooms to build comfortable learning atmosphere (campus environment innovation) to raise learning efficiency (school reputation). Or a school can introduce new teaching methods (course-teaching innovation) to enrich the courses (service-promotion image). By doing so, a school will turn into be the ideal school on the minds of

students.

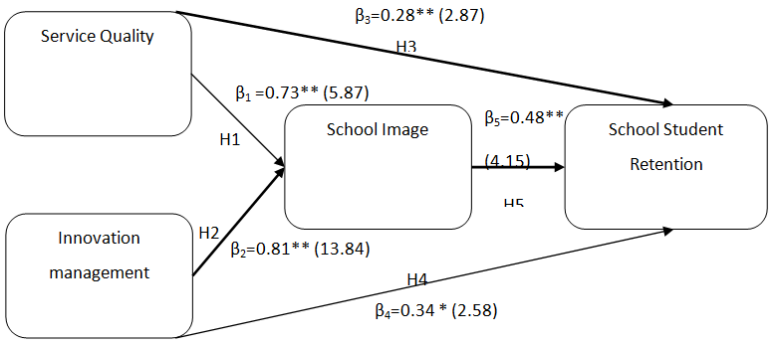

Figure 2. *Path Diagram*

Note: ( ) is t-value and *, ** denote statistical significance at the 5% and 1% levels

The second way (school service quality → school student retention) is to improve service quality. The good service quality relies on customers' satisfaction, so the schools must understand what their customers want. Also, good service quality will build favorable school image to affect school students to retain with the school. Our empirical results show that reliability of service quality is the most influential factor with regard to school student retention and the second one is assurance. Thus, it is useful for a school to improve their reliability and assurance of service quality first to earn its students' favor.

The empirical results and discussions above confirm that the experience of business can be applied to public junior-high schools. Service quality, innovation management and school image are all significant for a school to retain students or even to attract more and better students. By focus group interview, we find that school students can perceive service quality much more than innovation management, that is, comparatively, they are more familiar with the service which the school provides but less familiar with what innovation the school conducts. This confirms to our research results, the effect of service quality being direct and innovation management being indirect. Thus, we can have the following inferences. To retain students, a school should improve its service quality because the students directly experience and perceive the service. To attract more and better students, a school should build a good image by conducting innovation to differentiate from others because based on halo effect theory and our empirical results, the students understand the school indirectly.

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