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MEASURING THE RELATIONSHIP UNDER MULTICHANNEL SERVICE QUALITY

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ABSTRACT

Many firms are apt to provide services through multiple channels recently. The trend of multichannel environments is expected to strengthen further as the use of Internet continues to grow and new technologies make available an increasing number of virtual channels of service delivery. Service quality research in traditional services and, more recently, in e-services tends to take a single-channel perspective. This article argues that a multichannel setting provides a broader conceptualization of service quality, and builds on existing research in e-services and extends the relationship quality measurement in marketing.

Keywords: multichannel, relationship quality, service quality.

INTRODUCTION

Many firms are apt to provide services through multiple channels recently. The trend of multichannel environments is expected to strengthen further as the use of Internet continues to grow and new technologies make available an increasing number of virtual channels of service delivery. This growth of services is linked to the proliferation of e-services that operate increasingly in a multichannel environment, combining the Internet with physical facilities, phone, fax, and other channels of service delivery. Many empirical results also suggest that firms integrate traditional channels with Internet-based channels will be more successful than single-channel firms [9][26].

This article is built on existing research in service quality and is to extend the relationship quality measurement in marketing. In the context of marketing, researchers have even argued that service quality may be the most important determinant of long-term success [23][36]. As a result of bloom in service industry, customers are less willing to tolerate poor service and switch to other firms' products or services easily. Thus, to provide high service quality continually becomes a principal source of competitive advantage in practice. In academic research, there are also several articles mention that service quality will affect the customer satisfaction, trust and loyalty [8][27][34].

However, service quality is susceptible to different situations. Since it is not easy to evaluate service quality via single dimension, some scholars classify it into virtual and physical quality [28]. Additionally, they put emphasis on how the physical and virtual components of service quality are delivered for providing good levels of service quality. Although we understand service quality is associated with multichannel services, we still have no idea how the multichannel services affect the relationship with users from the firm's standpoint. For instance, Venetis and Ghauri indicates an interesting avenue for further research is to investigate which dimensions of customers' quality perception contribute to their relationship [31]. Roberts, Varki and Brodie also suggest future research could measure users' ability to maintain a relationship, and this would enable firms to segment their markets [21]. Thus, we attempt to investigate the relationship quality through multichannel services.

Why the relationship quality is so important? Some articles prove that relationship quality can reflect the users' trustworthiness, reliability, intention, and it also represents a measurement of successful long-term relationships with customers [16][17]. More strength of the relationship quality will be greater benefit to the firm. For example, satisfied customers tend to re-purchase products from the same supplier. The customers will have a long and satisfactory relationship with the firms, even a single unsatisfactory experience will not influence their relationship [25]. Colgate and Stewart also mention the prerequisites for successful relationship marketing and management are that the organization is trustworthy and has the ability to measure relationship performance [6]. Though we appreciate the importance of relationship quality, few articles mention relationship quality under multichannel services. Hence, this study tries to explore the direct and moderator effect between relationship quality and multiple channel services.

Our research questions contain three parts: (1) Do the virtual and physical channel services affect firm's relationship quality with users? If so, how? (2) Does the integration of cross channel services also affect relationship quality? (3) How the self-efficacy or frequency of channel use play a moderate role in relationship quality outcome? And does it affect another channel's outcome?

CONCEPTUAL FRAMEWORK AND HYPOTHESS

Our primary research question combines elements of the virtual channel service, physical channel service, and relationship quality literature. We examine relationship quality that is associated with three constructs, including virtual channel services, physical channel services and the integration of both channel services. Furthermore, we investigate some variables that can possibly have moderate effect between the channel service and the relationship quality, such as self-efficacy of virtual service, frequency of physical channel use and frequency of virtual channel use. Following are our definitions of those constructs:

Relationship quality

Relationship quality is used for measuring the interpersonal influence in marketing research, and it has been defined as the "degree of appropriateness of a relationship of fulfill the needs of the customer" [14]. In a interpersonal perspective, high

relationship quality means that one person is able to rely on another person's integrity and has confidence in the future performance because the level of past performance has been consistently satisfactory [7]. Relationship quality represents a measurement of successful long-term relationships with customers [17].

Relationship quality is a high order construct made of several distinct, though related dimensions. Crosby, Evans and Cowles specify relationship quality as a construct consisting of satisfaction and trust [7]. Morgan and Hunt identify commitment and trust as key variables that are critical to the management of relationship marketing [17]. Bauer, Mark and Leach provide a relationship construct of building customer relation on the Internet, which consists of satisfaction, trust and commitment [3]. Similarly, there are some researchers also recognize the overall satisfaction, trust and commitment as key mediating constructs in successful relational exchanges [12, p.74]. *Satisfaction* is the result of a process of evaluation and is benefit for relationship development [3]. *Trust* as "a willingness to rely on an exchange partner in whom one has confidence." Trusting beliefs represent a "sentiment or expectation about an exchange of partner's trustworthiness". An expectation of trustworthiness results from the ability to perform expertise, reliability, and intention [16]. Morgan and Hunt define trust as the perception of "confidence in the exchange of partner's reliability and integrity." [17] Both definitions highlight the importance of confidence and reliability in the conception of trust. Furthermore, Moorman, Zaltman and Deshpande recognize *commitment* as "an enduring desire to maintain a valued relationship" [16]. Morgan and Hunt also define commitment as an essential ingredient for successful long-term relationships [17].

Base on those articles, (1) *satisfaction*, (2) *trust* and (3) *commitment* usually represent the properties of relationship construct, and we decide to use those three aspects to describe the relationship quality. Besides, Roberts, Varki and Brodie summary the dimensions of relationship quality that have been proposed from 1970, and their empirical results also suggest relationship quality as a high order construct consisting of satisfaction, trust and commitment, so we believe those three dimensions are suitable be our measurement [21, p.174].

Multichannel services

Sousa and Voss define multichannel service as a service composed of components (physical and/or virtual) that are delivered through two or more channels. The channels involve complement each other in the provision of the service, Sousa and Voss categorize these service offers as being *complementary channels*, such as e-commerce service with a logistics component. Alternatively, customers can decide to employ in engaging in a particular service as being *parallel channels* [28].

In a multichannel setting, Sousa and Voss recognize service quality comprises three components: virtual (e.g. Web site), physical (people-delivered, including logistics), and integration quality (seamless service experience across channels), they denote the future empirical work is needed to develop measurement instruments for virtual, physical, and integration quality based on the respective proposed construct domains [28]. For this reason, we believe our study is worth exploring. The detail description of each channel will be discussed in the next sections.

Virtual channel services

In Sousa and Voss's definition, virtual service is defined as the pure information component of a customer's service experience provided in an automated fashion and without human intervention [28]. With most virtual channels encompass more than the Internet, several instruments have been developed to assessing the quality of Internet portal, such as Web quality. Up to this context, we also anchor our discussion on the Internet as the present main virtual channel of service delivery.

Zeithaml, Parasuraman and Malhotra first synthesize the quality of electronic services (E-S-QUAL), and define broadly the concept of all phases of a customer's interactions with a Web site: the extent to which a Web site facilitates shopping, purchasing, and delivery [35][36]. E-S-QUAL Scale consists of 22 items on four dimensions, which are defined as (1) *Efficiency*: The ease and speed of accessing and using the site; (2) *Fulfillment*: The extent to which the site's promises about order delivery and item availability are fulfilled; (3) *System availability*: The correct technical functioning of the site; (4) *Privacy*: The degree to which the site is safe and protects customer information.

Zeithaml, Parasuraman and Malhotra's definition refers to the ability of an online retailer's Web site to fulfill the customer trouble-free shopping needs. Nevertheless, Gummerus et al. indicates that E-S-QUAL only focus on the issues of online shopping, and their definition may neither suitable for overall electronic services nor content-based services [13]. Hence, Fassnacht and Koese expand the definition and propose a quality of e-services (QES) with three dimensions, as the dimension (1) *environment quality* is related to the appearance of the user interface, such as text, icons, digital images, and backgrounds to which are visually represented. (2) *Delivery quality* contains not only the interaction between customer and Web site during service usage, but also aspects that are relevant to the customers while they are looking for information, selecting from available options or carrying out transactions. (3) *Outcome quality* is viewed as how the customer feel after service delivery, including their functional benefit and positive emotional feelings [11].

Aladwani and Palvia develop a Web quality (WebQUAL) instrument to assess user-perceived service through virtual channel. The instrument measures four dimensions of web quality: (1) *specific content*, (2) *content quality*, (3) *appearance*, and (4) *technical adequacy*. *Specific content* reflects concerns relating to finding specific details about products and services, customer support, and other important information. *Content quality* consists of information usefulness, completeness, accuracy, and conciseness. *Appearance* means the proper use of fonts, colors, multimedia, and other Web site's attractive factors. *Technical adequacy* reflects to the security, ease of navigation, search facilities, and availability [1].

Similar to what Aladwani and Palvia indicate [1], Yoo and Donthu also develop an instrument to measure quality of an Internet shopping site (SiteQUAL), it includes four dimensions as (1) *Ease of use*: easy to use and search related information; (2) *Aesthetics design*: the Web appearance with excellent multimedia and color graphics; (3) *Processing speed*: interactive

responsiveness to a consumer's requests; and (4) *Security*: concerns about the security setting and privacy protection of the Web site [33].

According to the instruments above, we know quality of virtual channel services have been developed by several measurements, and some researchers mention that quality of virtual channel services is associated with customer's outcome, i.e. individual benefit [11]. Besides, some researchers demonstrate EC channel service quality will positively affect channel satisfaction and performance, and channel satisfaction is an important construct in studying channel relationships because it affects participants' motivation to stay with the channel and makes them less prone to exit the channel [10]. Taylor and Hunter further prove that e-service quality will affect user satisfaction, loyalty and word of mouth [30]. Since, we want to further examine whether quality of virtual services will affect its relationship quality, further we test the following hypothesis.

H1. The quality of virtual services is positively related to relationship quality.

Physical channel services

Quality of physical services is used to denote the quality of a firm delivery service via physical channel, such as real personnel support. In Sousa and Voss's definition, physical service is defined as the portion of a customer's service experience provided in a nonautomated fashion [28]. Additionally, Parasuraman, Zeithaml and Berry first develop an instrument for measuring customer perceptions of service quality – SERVQUAL [19][20]. Afterwards, a number of published studies use SERVQUAL and assess the scale's reliability and validity [5].

SERVQUAL includes five dimensions – *tangibles*, *reliability*, *responsiveness*, *assurance*, and *empathy*. The definition of *tangibles* is a firm's physical facilities, equipment and appearance of personnel. *Reliability* means the ability to perform the promised service dependably and accurately. *Responsiveness* denotes the willingness to help customers and provide prompt service. The definition of *assurance* is the employees' knowledge, courtesy, and ability to inspire trust and confidence. *Empathy* represents caring and individualized attention the firm provides for its customers.

So far, SERVQUAL is still widely applied to measure firm's service, and a great deal of empirical studies verify SERVQUAL is related to customer satisfaction, behavior intention and relationship (e.g. [22][29]). Zeithaml, Berry and Parasuraman propose the results of an empirical study suggesting strong evidence of behavioral intentions (e.g. customer loyalty) being influenced by service quality [34]. Shemwell, Yavas and Bilgin believe delivering high quality service and having satisfied customers are viewed as indispensable for gaining a sustainable advantage in today's competitive milieu. Their research results also show that service quality has a strong direct effect on satisfaction, and further affect commitment [27]. Dabholkar and Overby denote that most of users said they first evaluate service quality and then decide if they are satisfied. In contrast, only few people preferred the opposite order, i.e. deciding if they are satisfied and then basing service quality evaluations on that determination [8, p.21]. Thus, the frequency distribution suggests that service quality as antecedent to customer satisfaction is the typical order of service evaluations.

Hence, we believe that SERVQUAL is suitable for being a physical service measurement in our study. To further examine whether relationship quality would affect relationship quality or not, we test the following hypothesis.

H2. The quality of physical services is positively related to relationship quality.

Integration of cross channel

Although a huge amount of articles have demonstrated that both physical and electronic channel service are important determinant of providing customer products or services, the integration and consistence of both channel are also deserved to pay much attention by us. Such as Neslin et al. denote multichannel customer management presents a myriad of challenging issues that need to be addressed - data integration, channel migration, allocation of resources across different channels, and synchronization of channel strategies [18]. However, we mainly concern about the *consistency* of channel integration, which contains two components representing the *content* and *process consistency*. Content consistency refers to the consistency between the information exchanged with the customer through different channels, and process consistency refers to the consistency between the relevant and comparable process. For example, users would have negative perceptions of service quality if there were inconsistency among information and services of both channels. On the contrary, firms and users (or customers) would benefit from the integration of cross channel – (1) Increasing the transparency of the multichannel configuration [28]; (2) Users easily can choose either channel services depending on their interesting and requirement [24, p.118]; (3) Firms can provide users with more consistence services; (4) Firms could share the channel workload equally.

Bendoly et al. consider the role that perceptions of channel integration have on such beliefs and their impact on purchasing decisions (e.g., repurchase), and their findings suggest that firms simultaneously managing both online and in-store channels should not only reassess the repercussions of availability failures but also consider efforts that encourage the transparency of channel integration [4]. Thus, this mentions us that integration of cross channel might bring the opportunities of encouraging customer behavior [18]. We test the following hypotheses.

H3. The integration of cross channel services is positively related to relationship quality.

Moderate variables

In this study, independent variables (quality of virtual/physical channel service) are chiefly concern with users' behavior; users might have different perceptions according to their experience and condition. For instance, people who use e-services frequently might be more aware of quality of e-service than those who use e-services infrequently. We take into account that some variables might have moderate affects between independent and dependent variables, and further affect the result of relationship quality. Therefore, we summary the four variables that might have moderate effects – *Self-efficacy of virtual service*, *frequency of virtual channel use* and *frequency of physical channel use*.

Self-efficacy of virtual service. This variable means the experience of users who use the e-service functions, which is also called *deftness*. This idea comes from the social cognitive theory [2]. Performance successes strengthen self-beliefs of capability. Failures create self-doubts. However, if people experience only easy successes, they come to expect quick results and are easily discouraged by failure. People's beliefs about their efficacy can be developed by influence. The most effective way of creating a strong sense of efficacy is through mastery experiences [32].

Why this idea is worth to consider in our study? For example, maybe some of people has no experienced of using e-services at all (low self-efficacy on virtual service), they might decide to withdraw and turn to physical service, and further moderate the final research outcome. However, self-efficacy has been empirically extended to contexts and shown to have strong association with performance outcome [32]. Thus, we stated in hypotheses:

H4a. Self-efficacy of virtual service will moderate the quality of virtual service on the relationship quality: the effect will be stronger when self-efficacy is high and weaker when self-efficacy is low.

H4b. Self-efficacy of virtual service will moderate the quality of physical service on the relationship quality: the effect will be weaker when self-efficacy is high and stronger when self-efficacy is low.

Frequency of virtual/physical service use. Dissimilar to “self-efficacy of virtual service”, frequency means the number of use times within a particular period, such as one year. The main discrepancy between them is “self-efficacy of virtual service” emphasizes the users’ past experiences of virtual service, but “frequency of virtual/physical service use” highlights the number of virtual/physical service use times. For instance, maybe some users may be familiar with using e-services, but they are hardly using them. That might has different influence in the perception of relationship quality or other constructs. We divide this concept into frequency of virtual service use and physical service use, therefore predict:

H5a. Frequency of virtual service use will moderate the quality of virtual service on the relationship quality: the effect will be stronger when frequency is high and weaker when frequency is low.

H5b. Frequency of virtual service use will moderate the quality of physical service on the relationship quality: the effect will be weaker when frequency is high and stronger when frequency is low.

H6a. Frequency of physical service use will moderate the quality of virtual service on the relationship quality: the effect will be weaker when frequency is high and stronger when frequency is low.

H6b. Frequency of physical service use will moderate the quality of physical service on the relationship quality: the effect will be stronger when frequency is high and weaker when frequency is low.

Figure 1 provides an overview of our research framework.

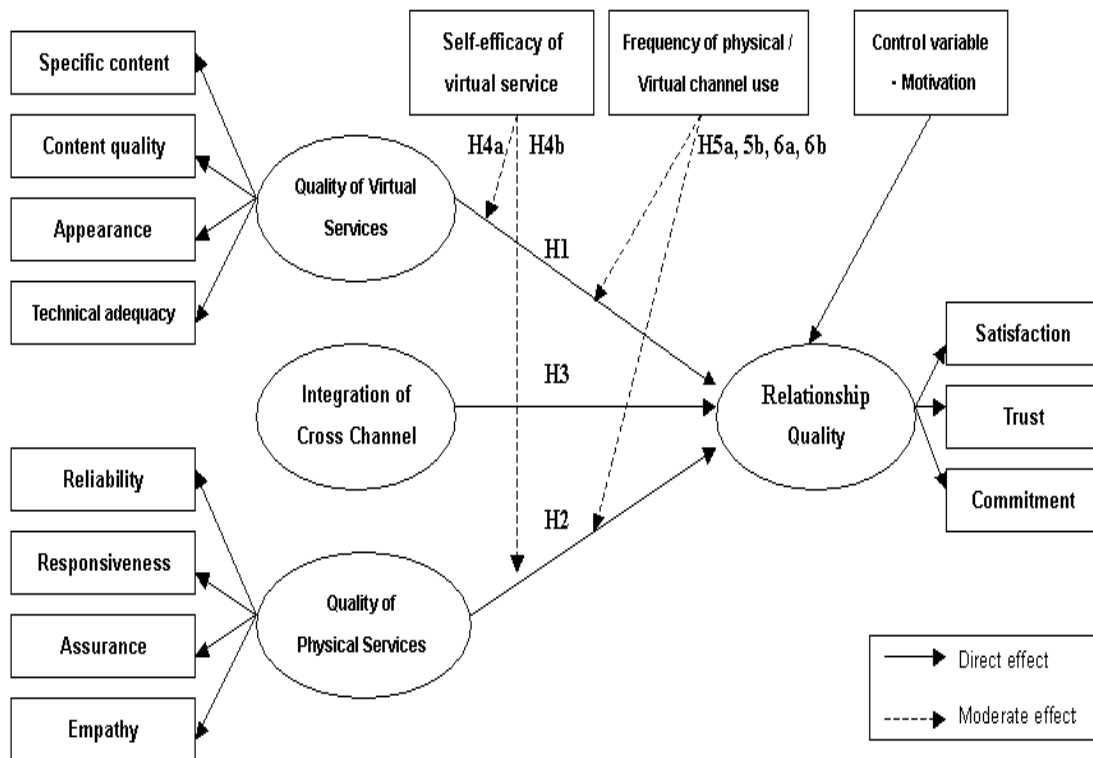


Figure 1. A framework of measure relationship quality in multichannel services

METHOD

Research object and sample

Our research objects are the alumni of Fu-Jen University in Taiwan. The Fu-Jen University has been established more than 40 years, and the amount of the alumni is more than 130,000 persons. The Public Affairs Office (PAO) of Fu-Jen University is an institution responsible for alumni services, and its officers felt the service tasks became more and more heavy because of increasing population of alumni each year. In order to share some tasks, PAO decided to establish an e-service channel on Web. In Sept. 2003, PAO totally hold the three seminars and invited the principal, dean, all the chief managers of department, secretaries,

and major represents of alumni to attend, then PAO illustrated the main purposes of e-service to let them participate in our plan and encourage alumni to use it. In Nov. 2003, e-service of alumni had formally started.

The e-services of PAO include providing alumni to contact other alumni service, helping alumni to seek lost-contact alumni, providing alumni to seek talent pool, updating personal contact data, helping to apply for diploma of graduation and so on. Alike, the PAO also provide those services in physical channel (face-to-face), thus the multichannel setting of PAO belongs to *parallel channel*.

Although university belongs to nonprofit organization (NPO), there are no powerful motivations that school should provide services for alumni, but universities in Taiwan are faced with a radical restructuring, resulting from the government education policy of the unrestrained establishing colleges and universities. According to the report of Ministry of Education from 1998 to 2006 [15], the amount of universities increase 19% (137-163). Thus, they are faced with financial problems and survival issues, such as insufficient students enrollment and diminishing government subsidization. However, most universities in Taiwan are still mainly dependent on public financing, and educational funds are drying up which is due to the general tightening in governmental budgets. There is no doubt that university's enlisting alumni's help is the most efficient way to solve those problems, but the PAO indeed has to provide services and evaluate it's relationship quality with alumni. Therefore, we believe that university is also suited to be a research object.

To let most of alumni get used to e-service, this study uses some ways to assured. (1) We established an administration process: while students are going to graduate, secretaries of department will ask them to use this e-service and make sure they had corrected their personal data. This way also reminded students that there are e-service for them, and they can still use this service even they graduated. (2) During every annual alumni activity, PAO encouraged alumni, who had graduated for many years and have not learnt of this e-service, to use e-services. (3) To make sure most alumni own the experience of e-service use, we decide to provide e-service last for more than 3 years, then finally conduct this survey.

Our research samples only focus on the alumni who have service experience with PAO, service experience in the other departments of university are not include in those because that is hard to investigate via all the departments. This study chose a web survey, the research sample were the alumni who have been serviced by physical or virtual services, and the survey has 46 questions. Our final sample consisted of 862 alumni. Approximately, 54% of the respondents are females, and 46% are males; 57% of the respondents were graduated in near 4 years, and 43% were graduated more than 4 years.

MEASURE

Construct variables

Quality of virtual services. In the quality of virtual service, as our research object is a NPO institution (university), we do not take account of the instruments that is suitable for business context, such as online shopping. Finally, we decided to use WebQUAL instrument to present our quality of virtual service construct, because PAO's e-services was implemented on Web site, and WebQUAL was also suitable for our research context [1]. We total use 15 items to measure this construct, and the sub-dimensions of WebQUAL as *specific content* (2 items), *context quality* (3 items), *appearance* (5 items) and *technical adequacy* (3 items).

Quality of physical services. SERVQUAL is often used to measure service quality in numerous articles, so we also adopted it as our instrument. Deserve to be mentioned in our study, expect "tangible" sub-dimension, other four sub-dimensions - *reliability* (2 items), *responsiveness* (2 items), *assurance* (1 item) and *empathy* (2 items) are include in our construct, like Parasuraman, Zeithaml Berry's definition, "tangible" is appropriate for face-to-face service delivery (such as appearance of personnel) [20], the PAO usually provides physical service via FAX or phone, e.g. alumni reissue a graduation certificate via phone, and hardly through face-to-face. In another reason, if alumni were at school, they could fulfill their requests by themselves, and there was no need to ask PAO for help.

Integration of cross channel. The PAO's channel services are like *parallel channels* [28], alumni can choose any channel that could fulfill their tasks, and acquire the same outcome from both channels. To measure this construct, we asked alumni, "Provided service is consistent between physical and virtual channel" and "I can freely choose physical service and virtual service depending on my demand" two questions - to articulate the integration concept.

Relationship quality. *Satisfaction*, *trust* and *commitment* usually represent the properties of relationship construct (i.e., [21]), so we decide to use those three aspects to describe the relationship quality (totally 9 items).

Moderate variables

Self-efficacy of virtual service. To measure the self-efficacy of e-services, we asked alumni, "How many e-service functions have you operated?" If the alumni didn't have any experience before, the system will request him to link other pages and introduce him the basic functions of e-service. For we wanted our samples to understand our virtual services, we asked them to use at least one function in our e-services. The response items were multiple checkbox, and after gathering samples, we transform this item range from 1 to 5 (1 means only use 1 function; 5 means use more than 5 functions).

Frequency of virtual/physical service use. We divide "frequency" into two parts - the frequency of (1) virtual and (2) physical services to discriminate the channel difference. For instance, we asked alumni, "How many times did you use physical services per year?" The response ranged from 1 to 6 (1 means never used before; 6 means used more than three times per year).

Control variable

Motivation. To measure alumni's motivation for maintaining relationship with the university, we used "the times of participating campus activities after they graduated from university" to represent their perception. In another words, alumni who participated in campus activities frequently denoted they were enthusiastic about keeping and maintaining relationship with university even they graduated. We also use 1-6 scale item, 1 represents they participated infrequently; 6 represents participated frequently.

RESULTS

To ensure the appropriateness of our framework, we first computed reliability coefficients using Cronbach's alpha. The alpha values for quality of virtual service (QVS), quality of physical service (QPS), integration of cross channel (ICC), and relationship quality (RQ) as 0.938, 0.96, 0.811, and 0.931, respectively. Subsequently, we used confirmatory factor analysis to access construct reliability and validity. All constructs show good internal consistency, with construct reliabilities ranging from 0.86 to 0.97, as well as convergent validity, with average variances extracted ranging from 66% to 87%. Table 1 shows the results of discriminant validity, the extent to which a given construct is different from other constructs.

The hypotheses were tested using regression analysis (ordinary least squares: OLS). Table 2 provides the means, standard deviations, and correlations for the variables used in the models. As the result of the correlation of QPS and ICC exceeds 0.8, we also tested the multicollinearity among the QPS, QVS and ICC. The variance inflation factor (VIF) is 3.66 (less than 5), it indicates there is no high degree of multicollinearity among those independent variables. The regression results are presented in Table 3 and depicted in Figure 2. In Table 3, model 1 included all the moderate variables, and model 2 only included significant variables.

Table 1. The result of discriminant validity

| | QVS | QPS | ICC | RQ |
|-----|-------------|-------------|-------------|-------------|
| QVS | 0.84 | | | |
| QPS | 0.58 | 0.91 | | |
| ICC | 0.63 | 0.83 | 0.87 | |
| RQ | 0.70 | 0.65 | 0.70 | 0.88 |

Table 2. Descriptive statistics

| Variables | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|------|------|---------|---------|---------|---------|---------|---------|---------|
| 1. SEL | 1.53 | 0.76 | | | | | | | |
| 2. MOT | 1.87 | 1.11 | 0.185** | | | | | | |
| 3. FRE_V | 3.02 | 1.28 | 0.261** | 0.234** | | | | | |
| 4. FRE_P | 1.88 | 1.33 | 0.102** | 0.133** | 0.147** | | | | |
| 5. QVS | 4.31 | 0.82 | 0.099** | 0.080* | 0.217** | 0.071* | | | |
| 6. QPS | 4.12 | 0.93 | 0.071* | 0.026 | 0.177** | 0.230** | 0.583** | | |
| 7. ICC | 4.33 | 0.94 | 0.066 | 0.073* | 0.168** | 0.161** | 0.632** | 0.833** | |
| 8. RQ | 4.78 | 0.81 | 0.071* | 0.083* | 0.214** | 0.089** | 0.707** | 0.646** | 0.705** |

n = 862 (* $p < .05$; ** $p < .01$; *** $p < .001$)

Table 3. The results of regression analysis

| Variables | Model 1 | Model 2 | Hypothesis Test |
|------------------|------------------|------------------|-------------------|
| QVS | 4.423(.000***) | 5.454 (.000***) | H1 supported |
| QPS | 1.981(.048*) | 2.339(.020*) | H2 supported |
| ICC | 8.620(.000***) | 8.649 (.000***) | H3 supported |
| QVS x SEL | -.215(.830) | | H4a not supported |
| QPS x SEL | .044(.965) | | H4b not supported |
| QVS x FRE_V | 2.668(.008**) | 2.670 (.008**) | H5a supported |
| QPS x FRE_V | -2.313(.021*) | -2.315 (.021*) | H5b supported |
| QPS x FRE_P | 2.356(.019*) | 2.020(.044*) | H6a supported |
| QVS x FRE_P | -2.209(.027*) | -2.194(.029*) | H6b supported |
| MOT | -1.480(.139) | | |
| Likelihood-ratio | 140.216(.000***) | 199.911(.000***) | |
| Adjusted R^2 | 0.618 | 0.618 | |

(* $p < .05$; ** $p < .01$; *** $p < .001$)

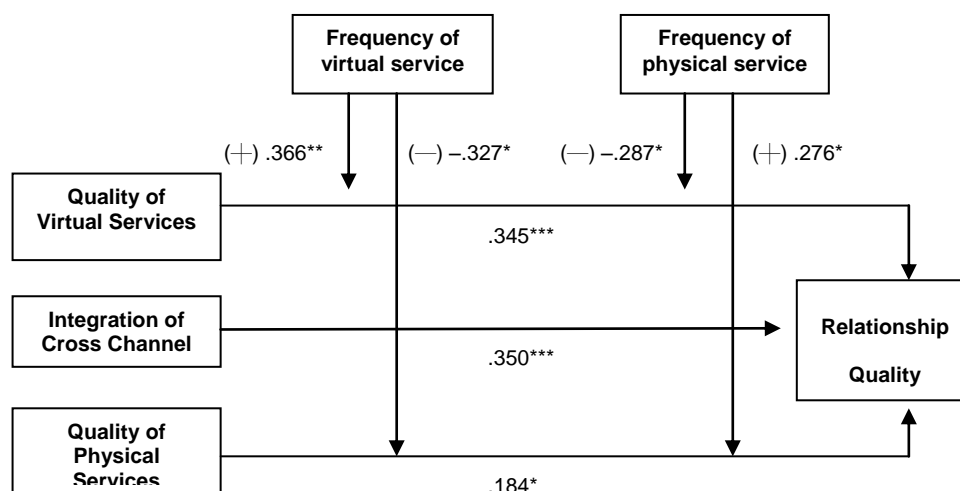


Figure 2. The results of research framework

Hypothesis 1 predicts a positive link between quality of virtual service (QVS) and relationship quality (RQ). The relationship is positive and significant ($\beta = .345, p < .001$), supported Hypothesis 1 as well. Hypothesis 2 and 3 state the same results: quality of physical service (QPS) positively and significantly affect relationship quality ($\beta = .162, p < .05$), and integration of cross channel (ICC) also have positive link with relationship quality ($\beta = .303, p < .001$).

On the predicting moderate effect of our research, self-efficacy of virtual service (SEL) does not have moderate effect between virtual/physical services and relationship quality, and neither motivation (MOT) nor direct effect to relationship quality, so Hypothesis 4a, 4b are not supported. On the other hand, Hypothesis 5a and 5b state frequency of virtual service (FRE_V) plays a moderator role in virtual/physical service and relationship quality, QVS positively affects relationship quality when FRE_V is high ($\beta = .044, p < .01$), but QPS negatively links with relationship quality when FRE_V is high to the contrary ($\beta = -.040, p < .05$). However, Hypothesis 6a and 6b are also supported: frequency of physical service (FRE_P) has a moderator effect between virtual/physical service and relationship quality, QVS is negatively linked with relationship quality when FRE_P is high ($\beta = -.036, p < .05$), and QPS is positively linked with relationship quality when FRE_P was high ($\beta = .034, p < .05$).

Overall, model 1 examines 61.8% variance of relationship quality, and chi-square test is significant ($F = 140.216, p < 0.001$); then model 2 only includes significant variables, and its result is also similar to model 1, explaining 61.8% variance and chi-square test is significant too ($F = 199.911, p < 0.001$).

DISCUSSION AND CONCLUSION

The main contribution of our study lies in providing an insight into how the channel services shapes relationship quality outcomes. There are several major findings in our results. First of all, it shows virtual channel, physical channel, and integration of both channels are equally important for firms to keep relationship. Firms should carefully consider their service management when they develop it in a multichannel context, for any service channel could possibly influence the final relationship outcome and it should not be ignored from services development process. Moreover, firms also have to pay attention to the integration of both channels, such as consistency. It is essential to provide the equal quality of channel services and information, especially when virtual channel and physical channel are parallel.

Second, the most interesting part of this study is that “frequency” plays a moderator role in the evaluation between channel service and relationship quality. In our results, if users were getting used to use virtual service, the importance of the quality of virtual service will increase in affecting relationship quality, whereas, the importance of physical service quality will diminish. If users were becoming used to use physical service, the effect will be reversed. As the service design of our research object belongs to parallel channel, the result might not be the same if users were asked to use both channel (complement channel) at the same time, and other scholars may enrich this part in the future.

Third, self-efficacy of virtual service is not significant for relationship quality. We believe the major reason is that PAO’s e-service functions were fit to ease of use, and self-efficacy (or experience) would not have the moderate effect between channel services and relationship quality; Furthermore, motivation have no direct effect in our analysis, because alumni’s motivation is not a determinant factor in deciding whether to keep relationship with university or not. After further testing, we found there is no differentiation in relationship quality outcome among each motivation subgroup ($F = 1.722; p = 0.127$).

This article also reveals some limitations, and the major issue is self-selection bias, because alumni fill in the questionnaire by themselves, which represents they are willing to keep touch with university. Even so, our sample still shows 76% of alumni originally seldom partake in university activities after they graduated, then we believe self-selection bias is restricted for our

sample.

This article has implications for management. To begin with, this article shows how the service quality plays a decisive role in the overall evaluation of relationship quality. Next that, managers need to aware that each channel could possibly influence the whole relationship, and frequency would strike the balance between those channel services. In brief, managers must realize that users who are used to virtual channel would expect high quality on it. Under such circumstances, managers should understand that the effect of physical channel will diminish.

In conclusion, we hope this article will contribute to developing the conceptual base in the field of relationship quality. As the multichannel environment becomes intensely competitive in recent years, the firms will face the continual pressure from this environment. How to improve the performance of the multichannel utilization and achieve the organizational benefit are current issues that we should pay attention to, and future research might undertake to further expand our framework.

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