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UNDERSTANDING THE SUCCESS OF SOFTWARE-AS-A-SERVICE (SAAS)—THE PERSPECTIVE OF POST-ADOPTION USE

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Abstract

Understanding the antecedents and consequences of trust in an online and on-demand outsourcing context is important. This study explores the effects of service quality on trust, which in turn affects a client firm's post-adoption use in SaaS. A research model was developed based on the dedication-constraint framework of social exchange theory to measure service quality, trust, and SaaS post-adoption as multiple dimensions. We empirically examined the model by collecting data from 246 firms (key informants) that have adopted SaaS. Results show that while all three dimensions of service quality (client orientation quality, client response quality, environment quality) positively affect trust in service quality, client orientation and environment quality have positively influence on trust in provider. Both types of trust positively influence post-adoption intention. Finally, we discuss the theoretical and practical implications.

Key words: service quality, trust, post-adoption, SaaS continuance, SaaS exploration

1 INTRODUCTION

Software-as-a-service (SaaS) refers to on-demand software delivery service models that offer firms Internet-based access to service, resources, and an integrated portfolio of applications (Benlian & Hess 2011; Benlian et al. 2012). The promising opportunities and ever increasing demand for highly specific and large-scale SaaS for service innovation (e.g., enterprise resource planning (ERP)) lead to increased SaaS spending forecasted to grow to $258 billion by 2020 (Barrett et al. 2015; Forrester Reserch 2011). However, SaaS architecture reflects a paradox--SaaS clients get advantages from SaaS use, including low installation cost and switching cost, reduced uncertainty pervading tradition IT initiatives, and flexibility in choosing service providers to meet clients' demands, while they face disadvantages induced by limited customization and limited client-specific investment, including difficulties in post-adoption use of SaaS (e.g., loyalty, continuance, SaaS exploration), uncertainty (e.g., unpredictability of service quality, lack of localized customer service), and interdependence (e.g., dependence of client's outcomes on vendors' environment and resources) (Han et al. 2013; Susarla et al. 2010). Post-adoption use of SaaS reflects clients' repeated use and continued dedication and exploration that serve as a key means to avoid their switch to a new SaaS provider, increase their word-of-mouth, and help them access SaaS resources (e.g., IS applications, knowledge) (Kim & Son 2009; Reichheld et al. 2000). This present study focuses on the determinants of post-adoption use of SaaS, because they help both providers understand how to enhance service quality and solve the SaaS paradox, and clients better explore SaaS features for outcome improvement.

Due to mixed views of explaining IT-featured paradox, SaaS researchers have struggled to develop research model to explain the phenomenon of post-adoption use of SaaS. They have suggested that a social-technical perspective should be employed by combining individual, organizational, service-oriented, technological, and outcome-oriented factors (Kim & Son 2009; Mishra & Agarwal 2010; Susarla et al. 2010; Zhou et al. 2012). Accordingly, some studies have considered the key drivers of phenomena of online post-adoption behavior, including individual and social characteristics (e.g., perceived usefulness, ease of use, trust), service quality (e.g., customer service capabilities, environment quality), and performance (e.g., perceived benefits) (Benlian et al. 2012; Chandra et al. 2012; Jasperson et al. 2005; Setia et al. 2013; Zhao et al. 2012). However, less attention has been given to the solution to SaaS paradox and a systematic examination for the formation of post-adoption use of SaaS remains absent. Responding to call for more understanding on both context specific (e.g., SaaS features) and post-adoption phenomena (Brown et al. 2010; Jasperson et al. 2005), and attempting to address the gap in explaining the SaaS paradox, this study draws on the dedication-constraint framework—theoretically grounded in social exchange theory (Blau 1987), to examine IT managers' post-adoption formation when assessing SaaS service quality and development of trust in SaaS providers. We pose the following research questions:

RQ1: How does clients' trust affect their post-adoption use of SaaS?

RQ2: How does providers' service quality affect clients' trust?

The underlying premise of our model is that SaaS clients' willingness for post-adoption use is likely to be influenced by the provider's ability to resolve paradox and uncertainty, which are captured by high quality of customer service processes to earn the client's trust. Specifically, this study draws on the dedication-constraint framework of social exchange theory to characterize two mechanisms of trust, trust in information (dedication) and trust in the SaaS provider (constraint) (Kim & Son 2009; Srinivasan et al. 2002). Dedication and constraint reflects clients' perceived benefits and difficulty for them to switch to an alternative respectively. We highlight the role of trust as an intervening variable connecting the causal relationship between service quality and post-adoption use. We contribute to online and on-demand service literature in general and SaaS in particular by providing a theoretical model and empirical evidence that extends our understanding about how SaaS paradox can be explained through increasing service quality to meet clients' needs and earning their trust. We also advance the dedication-constraint framework by enriching its conceptualization in an on-demand service outsourcing context and examining its impact on post-adoption use.

2 THEORY BUILDING

2.1 .Post-adoption use of SaaS—continuance and exploration

IS studies have viewed post-adoption use as one of the most important measures of IS success in general and outsourcing in particular (Jasperson, et al. 2005; Lacity et al. 2010). From an innovation diffusion perspective, adoption is only the first step of innovation from the newly adopted IT, which can not deliver great benefits for IT users (Rogers 1995). Rather, post-adoption that emphasizes both continuance and exploration plays a key role in reaping benefits from innovation.

In this study, continuance emphasizes to what extent clients are willing to use SaaS applications as a whole, while exploration focuses on how they make good use of SaaS features (e.g., innovation, productivity, incorporating the various of aspects of IT-enabled features into one's task). They reflect two different but complementary aspects (comprehensive measures) for post-adoption use of SaaS to improve SaaS outcomes. We focus on SaaS-enabled work systems with unique features and large-scale enterprise applications (e.g., ERP, SCM, CRM applications). Understanding the formation of post-adoption use is important to a new business model such as SaaS because in the early stage of SaaS implementation (e.g., adaptation), SaaS paradox and uncertainty may prohibit clients' continuance and exploration, leading to failure for leveraging SaaS-enabled resources and customer retention. Given the role played by post-adoption use in reaping real benefits, there is a strong incentive to examine how post-adoption use of SaaS is formed.

The SaaS model represents a special type of on-demand outsourcing (Lacity et al. 2010; Susarla et al. 2010). Providers hope to improve outsourcing outcomes (e.g., client retention) through offering

SaaS-enabled applications with high quality service to earn clients' trust (Goode et al. 2015). Providers use a multi-tenant architecture in which IS applications and IT infrastructure are shared across SaaS clients (Benlian et al. 2012). Multi-tenant architecture has implications for SaaS clients. First, SaaS offers clients high network bandwidth and processing power, which enhances their potential for increasing SaaS feature breadth and task-related extensions of the available SaaS features (Benlian & Hess 2011; Benlian et al. 2012). SaaS providers should not only increase a client's perceived benefits (dedication) but also put the constraint that makes the switch to an alternative difficult for the client. Second, SaaS model gives more control over future IS development to the provider (Chou & Chiang 2013). This implies that the provider's localized customer service (e.g., customer orientation, supportive environment) and earing the client's trust play a key role for a long-term client-provider relationship and the client's post-adoption use (Marston et al. 2011; Zhang et al. 2011; Zhao et al. 2012).

2.2 The research model—trust and service quality

This present study expands theory of outsourcing and IS use by proposing a model that combines three streams of prior work. First, we build on SaaS and outsourcing literature by posit that the level of post-adoption use depends on a client's perception on SaaS features and SaaS service quality that can remove uncertainty, thus leading to the client's trust on the provider and subsequent use behavior (e.g., continuance). Prior work mainly focuses on IS continuance (with individuals' perceived usefulness and satisfied outcomes as the key antecedents of continuance) and task-technology fit (perceived fit between the user's needs and the IT application) to explain post-adoption behavior (Bhattacherjee 2001; Jasperson et al. 2005). The IS continuance model provides limited diagnostic and practical value in a SaaS context due to a rather abstract notion of SaaS-enabled service quality. The task-technology fit model falls short of explaining post-adoption behavior because of the ignorance of a user's history of interacting with the IT applications.

Second, research on relationship marketing and online service has viewed trust as a manifestation of customer loyalty, social relationship quality and interaction quality, and uncertainty elimination, which positively affect individuals' post-adoption behavior such as repurchase and exploration (Chandra et al. 2012; Zhang et al. 2011). IS researchers have viewed trust as a beliefs, defined as the trustor's perceptions that the trustee has attributes to help the trustor gain benefits and reduce uncertainty during their interaction and collaboration (Komiak & Benbasat 2006). They characterize trust as a multi-dimensional variable, including cognitive trust (rational expectation and calculative performance of the trustee) and emotional trust (feeling or affective evaluation toward the service-related benefits from the trustee). Studies of online setting behavior view trust as trust in providers and trust in service quality (Chai et al. 2012; Fan et al. 2014). Trust in provider represents individuals' calculative performance of the provider which causes them to be locked in the

relationship with the provider due to its service investment that is unlikely to be transferred to other providers (e.g., knowledgeable support, support tailored to the individual needs, reliability). Trust in service quality captures users' positive beliefs (or attitude) based on affective evaluation on service features, including environment, and assurance of IT and privacy protection policies. Trust in turn encourages individuals to engage in interaction and relationship-building with the service provider, leading to trust-related outcomes such as continuance, IS exploration (e.g., bloggers' knowledge sharing).

In this study, we use the dedication-constraint mechanism as a theoretical lens to explain how service quality influences post-adoption use of SaaS through building SaaS clients' trust in the provider. According to social exchange theory, individuals are motivated to participate in a relationship because they either gain benefits from the relationship or believe that they have no option (Blau 1987; Wulf & Odekerken-Schronder 2001). Dedication represents the individuals' perceived benefits based on their affective evaluation on the interaction with the service provider, while constraint focuses on their recognition of being locked in the relationship with the providers due to their economic, social, and psychological investments which are not transferable with discontinuance (Kim & Son 2009). We use dedication-constraint mechanisms as guidelines to theorize trust and explain the formation of post-adoption phenomena because they capture the multi-dimensional features of trust (cognition, affect). Besides, empirical studies on online service give evidence that these mechanisms are appropriate for examining post-adoption use (Zhou et al. 2012).

Trust in service quality refers to a client's positive evaluation of the SaaS artifact in improving the performance of SaaS applications, thus reflects perceived benefits. Examples include service quality in technology, environment, and policies to reduce uncertainty and increase the success of the SaaS transaction. Trust in provider refers to a client's confidence on the unique features and service-specific investments offered by the provider that are not easily transferable to other SaaS provider. Thus, these two types of trust capture the spirit of the dedication-constraint framework and represent two different but complementary aspects of trust that motivate a client's post-adoption use.

Finally, studies on service quality have emphasized the importance of service providers' ability to offer clients the services that meet their needs (or localized service provision) (Benlian et al. 2012; Chou & Chiang 2013; Goode et al. 2015; Setia et al. 2013). Following this stream of work, this study conceptualizes service quality as three factors--client orientation quality, client response quality, and environment quality. The first two factors focus on the provider's ability to improve localized client service performance (provider-based quality), while environment reflects the features of SaaS artifact (artifact-based quality) that are helpful for client task execution. A conducive environment should focus on facilitating both clients' familiarity with SaaS features and compatibility between clients' IS applications and SaaS features, and other performance management mechanisms, including reliability, flexibility, and security management. Client orientation quality and client response quality reflect two

very different aspects of quality possessed by a SaaS provider and they contribute to customer service performance collectively. Client orientation quality refers to a SaaS provider's willingness and effort to sense and monitor the client's needs, while client response quality is defined as the extent to which a provider has the ability to quickly and effectively respond to client needs. These quality-related factors reflect a comprehensive assessment of service quality to improve service performance and reduce clients' uncertainty. Thus, we expect that these qualities motivate clients to engage in building the relation with and trust in the provider.

3 HYPOTHESES

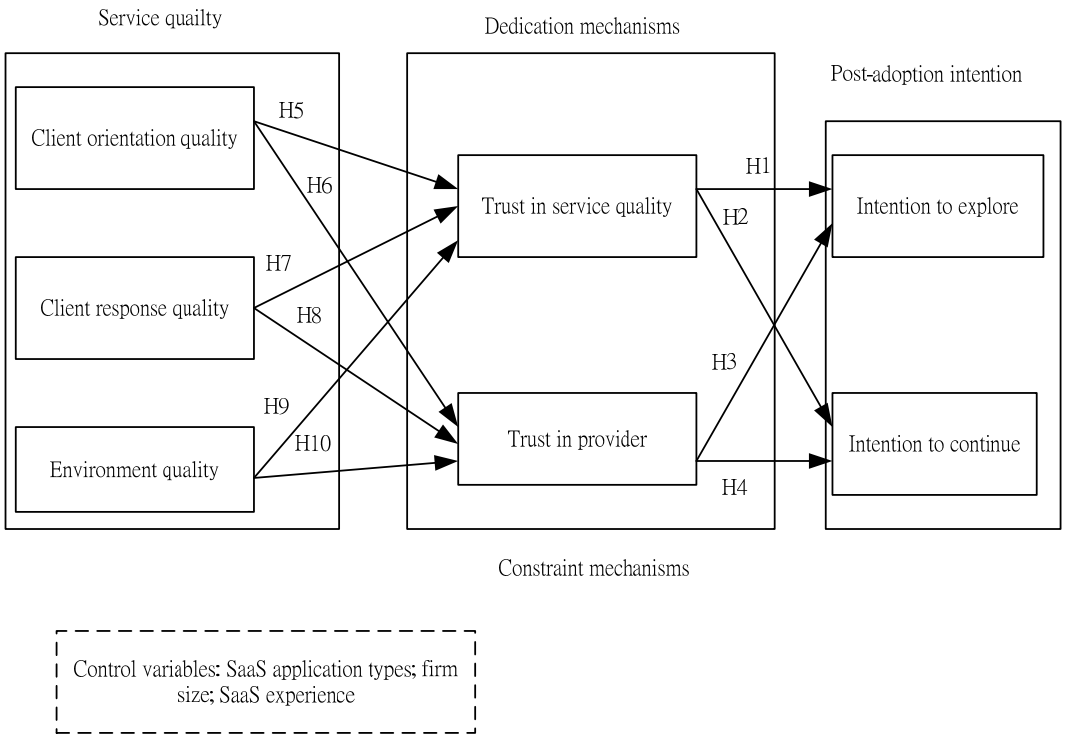

Figure 1. Research model

Figure 1 lists the research model. We conceptualize the dedication mechanism as trust in service quality and the constraint as trust in service quality. When SaaS clients build trust in the service quality, their experience of prior service consumption is positive, which is derived from a supportive environment and high quality of SaaS-related service. This service entails outcome improvement (e.g., innovation, improving IT and business opportunities) and benefits from both operational benefits (e.g., cost savings for product development) and strategic benefits (e.g., alignment of business processes) (Mishra & Agarwal 2010; Rai & Tang 2010). This positive perception on outcome and processes from SaaS also reflects that the clients' uncertainty on limited customization and provider control over SaaS innovation has been reduced significantly, thus encouraging them to make good use of SaaS features.

Empirical work on IS use in general and online service in particular gives evidence that clients' affective evaluation or perceived benefits (from the service) motivates them to explore the service from the provider, including innovation and incorporating the various service-enabled features into work (Maruping & Magni 2012; Kim & Son 2009). Thus, we propose H1.

Because trust in service quality reflects SaaS clients' perceived benefits from the service, which implies that their barriers for continuance are reduced, including uncertainty (e.g., providers' opportunism, security issues), interdependence (the extent to which clients improve outcome depends on the provider's ability, knowledge, and supportive environment). This in turn motivates the client to continue SaaS use because affective evaluation on prior service delivery serves as the key driver for the client's expectation on the provider's future behavior. Empirical studies support this argument by showing that individuals' perceived benefits (e.g., performance improvement) positively affect their continuance (Benlian et al. 2012; Bhattcherjee 2001). This leads to H2.

H1: Clients' trust in service quality positively influences their intention to explore SaaS.

H2: Client's trust in service quality positively influences their intention to continue SaaS.

SaaS clients' trust in the provider reflects their positive perception from calculative evaluation on the provider's performance over time, including its unique-service investments that enable safe and robust process management and environment to execute SaaS-related tasks. For example, clients' trust in the provider represents their confidence that the provider will try its best to improve SaaS outcome and the quality of SaaS applications. Besides, the provider will behave in a fair manner (e.g., flexibility and reliability in handling SaaS tasks) and is less likely to have opportunistic behavior (e.g., data breaches), leading to reduced uncertainty. This in turn implies that the client possesses more confidence in finding potential SaaS-enabled applications to its work, productivity enhancement, and completing a sophisticated array of tasks, because of a trustworthy provider who is willing to offer the client the needed help for making good use of SaaS features. Thus, we expect that SaaS clients' trust in the provider motivates them to explore SaaS-enabled applications, leading to H3.

Empirical studies present evidence that individuals' trust on service provider encourages their involvement in the interaction with the provider and continuance for service consumption (Fang et al. 2014; Zhang et al. 2011). Trust on the provider removes clients' uncertainty caused by the provider's multi-tenant architecture (lack of control over the provider's future upgrades on service, low customization). Besides, this type of trust also creates difficulty in transferring to a new provider due to constraint (locked-in phenomena). Given the influence of locked-in phenomena and reduced uncertainty on SaaS clients' cognition and behavior, we expect that trust in the provider motivates their continuance, leading to H4.

H3: Clients' trust in the provider positively influences their intention to explore SaaS.

H4: Clients' trust in the provider positively influences their intention to continue SaaS.

We define client orientation as the extent to which SaaS providers are willing to make effort on monitoring the client's needs and adjusting their service provision based on these needs. When client orientation quality is good, the concerns associated with multi-tenant architecture such as limited customization and lack of control over the future SaaS development, tends to be alleviated. Besides, high quality of client orientation implies that providers are willing to offer knowledgeable support from their sensing client needs and pay individualized attention to the client, which not only improve service quality but also offer the client pleasant feelings of being treated with care and kindness. This in turn leads to satisfied clients and their trust in service quality. Thus, we propose H5.

Prior work has viewed customer orientation as a localized service provision, reflecting a provider's service-specific investment through sensing the customer's needs and meeting these needs (Setia et al. 2013). In a SaaS context, localized service provision reflects a SaaS provider's willingness to pay individualized attention for the client, offer support tailored to its needs, and increase flexibility (e.g., contractual and functional aspects of service delivery to satisfy the client's needs). Localized service provision can minimize a client's uncertainty caused by limited customization and lack of control over future service upgrades. Thus, client orientation quality is likely to lead to the satisfied client and its trust in the provider. Besides, not every provider views client orientation as worthwhile and is willing to make the same level of efforts on localized service improvement—not transferrable service investment. Thus, we expect that client orientation quality results in locked-in (constraint) phenomena, which reflect the client's rational evaluation of the provider's performance and trust in the provider—leading to H6.

H5: Client orientation quality positively influences a client's trust in service quality.

H6: Client orientation quality positively influences a client's trust in the provider.

In a SaaS context, providers' response quality reflects their ability to offer needed expertise and handle the outsourced task swiftly. This in turn remove the client's uncertainty for limited customization and solve the problems related to the dependence of the provider's resources (e.g., expertise, support) for outsourced task execution—leading to client's positive perception on service performance. Because high quality response reflects successfully solving challenges associated with SaaS execution and leading to good performance and satisfied clients, we anticipate that they build trust in the service quality based on their affective evaluation on performance. Thus, we propose H7.

Not every SaaS provider can offer the same degree of client response service and response quality reflects the provider's ability to fulfill localized and high quality service delivery. Besides, client response quality also captures the provider's ability to improve SaaS performance and satisfy the client, representing the provider's service-specific investment to discourage the client to switch to a new provider (constraint phenomena), which motivates the client to develop trust in the provider. Given the degree of uncertainty reduced by client response quality and its positive influence on a client's rational perception on performance, we propose H8.

H7: Client response quality positively influences a client's trust in service quality.
H8: Client response quality positively influences a client's trust in the SaaS provider.

High environment quality in a SaaS context reflects SaaS-enabled environment to improve performance through the proper management of SaaS features, including user interface, reporting, security management to ensure regular measures (e.g., regular security audits), flexibility in functional/technical aspects of SaaS implementation (e.g., interoperability, compatibility) (Benlian et al. 2012). Environment quality enables clients to perform their task more effectively, which in turn removes their uncertainty on limited customization and lack of control over service upgrades. Thus, environment quality represents the assurance of good performance and perceived benefits, and the reduction of uncertainty, which in turn positively affects clients' establishment of trust in the service quality, leading to H9.

Good environment quality represents a SaaS provider's willingness to increase flexibility and reliability of SaaS-enabled function and applications, and ensure user-friendly interface and security management. While a standard SaaS artifact can be acquired from any providers, it is not necessary for them to ensure the same level of environment quality, which enables the client to fulfill SaaS tasks with better performance management (e.g., compatibility improvement), and security management. Thus, good environment quality not only reduces clients' uncertainty but also increases their switching cost based on their calculative evaluation towards the current provider—leading to locked-in phenomena and trust in the provider. Thus, we propose H10.

H9: Environment quality positively influences a client's trust in service quality.
H10: Environment quality positively influences a client's trust in the SaaS provider.

4 METHOD

4.1 Sample, data collection, and measurements

This study identified 650 senior managers from firms with SaaS experience, which was performed with the help of Market & Intelligence & Consulting Department under the Institute for Information Industry in Taiwan. Following similar studies on B2B online service and firm-level IS use (Goo et al. 2007; Mishra & Agarwal 2010), we use a key informant approach for data collection. Both senior IT managers and senior business managers were chosen as the key informants because of their experience and knowledge on on-demand outsourcing and IS use. Specifically, these managers are the ones who are mostly likely to understand how and what issues related to SaaS outsourcing and post-adoption use should be handled to gain benefits from SaaS. These managers are familiar with tactical and operational details of IT, including consulting services, systems integration, and IS strategic management, applications, and maintenance. Of the 650 distributed surveys, 298 responses were received. We discarded 52 responses because they either did not provide complete data or had

experience in firm-level SaaS outsourcing less than two years. This results in 246 responses for the final analysis (38% response rate). Table 1 shows the sample characteristics. About 60% of the respondents have more than 6 years of SaaS experience and most of them come from small and medium-sized firms with fewer than 200 employees.

Measure	Item	Frequency	Percentage
Number of employees	<= 100	158	64.2
	101~200	37	15.0
	201~300	7	2.8
	301~400	11	4.5
	More than 401	33	13.4
SaaS Adoption Experience	2-5 years	101	41.1
	6-8years	70	28.5
	9-10 years	31	12.6
	11-12 years	29	11.8
	More than12 years	15	6.1

Table 1. Sample characteristics (N = 246).

We measured survey items by using a seven-point Likert scale ranging from 1(completely agree) to 7 (completely disagree). The items to measure post-adoption use, including intention to explore (IE) and intention to continue (IC), were adapted from Maruping and Magni (2012) and Zhou et al. (2012) respectively. Variables for trust include trust in service quality (TS)(Chandra et al., 2012) and trust in provider (TP) (Fang et al. 2014). Service quality incorporates client orientation quality (COQ), client response quality (CRQ), and environment quality (EQ), which are based on related studies (Setia et al. 2013; Zhao et al. 2012). Following literature on service provision and IS use, this study focuses on three control variables—SaaS application type, firm size, and SaaS experience (Goo et al. 2007; Mishra & Agarwal 2010; Montoya et al. 2010). SaaS application type was measured by asking the respondent to specify the complexity of their SaaS application—0 for highly idiosyncratic enterprise systems and 1 for standard commodity applications.

4.2 Analysis and results

We employed partial least square (PLS) to conduct a simultaneously evaluation of both measurement model and structural model (construct interrelationships)(Chin 1998). Common method biases (CMV) problems may arise in survey-based research eliciting responses for the dependent and independent variables from the same resource (Podsakoff et al. 2003). We performed Harman's single factor test on the seven conceptually crucial constructs of our model, including IE, IC, TS, TP, COQ, CRQ, and EQ (Podsakoff et al. 2003). Results of this test created seven factors and the first factor accounted for only 22.9% of the total variance. Therefore, we conclude that CMV does not cause concern in our data.

Our results show that the values of Cronbach's alpha, composite reliability, and AVE are all acceptable. The result from Table 2 confirms the discriminant validity—the square root of AVE for each construct is greater the level of correlation involving the construct (Fornell & Larcker 1981).

Based on these results, we conclude that the constructs in our model have acceptable convergent and discriminant validity. Besides, we also examined multicollinearity among constructs by checking variance inflation factor (VIF) of our constructs. The VIF ranged from 2.005 to 2.849, which are acceptable.

	Mean	S.D	COQ	CRQ	EQ	TS	TP	IE	IC
COQ	5.01	1.18	**.917**						
CRQ	5.31	0.99	.428	**.886**					
EQ	5.43	1.03	.429	.469	**.907**				
TS	4.97	1.14	.374	.403	.350	**.904**			
TP	5.27	0.91	.358	.330	.485	.493	**.871**		
IE	5.44	1.01	.280	.369	.455	.326	.368	**.908**	
IC	5.26	1.00	.264	.410	.464	.360	.458	.480	**.898**

Note: S.D.: standard deviation; the bold numbers in the diagonal row are square roots of the average variance extracted (AVE).

Table 2. Mean, S.D., and correlation between constructs

H1 examined the influence of trust in service quality on intention to explore and H2 for this influence on intention to continue. Both of them were supported—H1($\beta = 0.243$; $p < 0.01$), H2($\beta = 0.194$; $p < 0.01$). H3 investigated the impact of trust in provider on intention to explore and H4 for this impact on intention to continue. The results supported both of them—H3($\beta = 0.366$; $p < 0.001$), H4 ($\beta = 0.510$; $p < 0.001$). Our findings supported H5 and H6 that posit that client orientation quality positively affects trust in service quality (H5; $\beta = 0.287$; $p < 0.001$), and trust in provider (H6; $\beta = 0.211$; $p < 0.01$). Regarding the influence of client response quality on trust in service quality (H7) and trust in provider (H8), we found that H7 ($\beta = 0.311$; $p < 0.001$) was supported, but H8 was not ($\beta = 0.049$; p= n.s.). As predicted by H9 and H10, environment quality exerted positive influence on trust in service quality (H9; $\beta = 0.178$; $p < 0.05$) and trust in provider (H10; $\beta = 0.541$; $p < 0.001$). One of the three control variables, SaaS adoption experience positively affected intention to explore ($\beta = 0.134$; $p < 0.05$). This result indicate that SaaS use experience enables both SaaS clients to become more familiar with SaaS environment and SaaS providers to offer better quality of localized service due to more time to capture the client's needs. This in turn removes clients' uncertainty and encourages their SaaS exploration (e.g., to innovative with SaaS because of their trust in the provider).

5 DISCUSSION, IMPLICATION, AND CONCLUSION

This study aims to understand how dedication-constraint mechanisms reduce clients' uncertainty and motivate their post-adoption intention. Drawing on the on-line service and IS use literature, we develop a theoretical model to examine how SaaS clients are motivated by service quality to build

trust (e.g., trust in service quality and trust in provider), which in turn serves as the dedication and constraint mechanisms to affect their post-adoption intention (Kim & Son 2009; Zhou et al. 2012). We focus on two types of service quality--provider-based quality (client orientation quality, client response quality) and artifact-based quality (e.g., environment quality). Our results confirm that service quality motivates clients to build trust in both service quality and provider, which reflect dedication and constraint mechanism to affect clients' exploration and continuance. Our results are consistent with prior SaaS studies that service quality serves as the key antecedents to resolve clients' uncertainty caused by multi-tenant architecture (e.g., limited customization), which in turn influences post-adoption intention through wining the client's trust (Benlian et al. 2012; Goode et al. 2015; Setia et al. 2015). It is important to note that while these antecedents have been investigated separately in prior work that focuses on either a user behavior perspective or service performance perspective for customer retention. In contrast, we take a comprehensive perspective and evaluate the influence of antecedents associated with service quality and trust on post-adoption intention. This is the first empirical study to delineate the relationship between service quality, trust, and post-adoption intention.

Nine of the ten proposed hypotheses are supported, which gives strong evidence to strengthen many of our theoretical arguments. Our results show that the influence of trust in provider on intention to explore is stronger than that of trust in service quality. Similarly, compared to trust in service quality, trust in provider exerts stronger influence on intention to continue. This implies that dedication-constraint mechanisms, conceptualized as trust in service quality and trust in provider respectively, are suitable to explain the relationship between trust and post-adoption use.

5.1 Theoretical implications

Overall, our results have offered strong support for theorizing post-adoption intention from the social exchange perspective with the emphasis on the dedication-constraint mechanisms and users' history of interaction with the provider (conceptualized as trust). Prior work has provided a limited understanding of how a client's uncertainty of on-demand outsourcing can be solved through service quality enhancement and social relationship improvement in the SaaS context (Benlian et al. 2012; Lacity et al. 2010). This study contributes new knowledge by proposing a framework delineating the relationship between service quality, trust, and post-adoption. This framework explains the effects of provider-based quality and artifact-based quality on trust, which serves as the dedication-constraint mechanisms, to affect post-adoption intention.

This study also contributes to both social exchange theory and service performance by broadening the conceptualization and measurement of both dedication-constraint mechanisms and service quality. Besides, we also integrate them to explain how to achieve post-adoptions use of SaaS, which is critical to customer retention and SaaS success.

5.2 Practical implications

From a practical perspective, understanding the formation of post-adoption use of SaaS helps a provider manage the relationship with the client and increase customer retention. This also helps clients identify the provider who can remove their uncertainty and offer them benefits and localized service. Our findings suggest that SaaS providers seeking to retain customers and help their customer better explore SaaS features should focus their efforts on client orientation quality, client response quality, and environment quality from which they can earn trust from their customers, leading to SaaS success. Understanding the antecedents and consequences of trust provides a comprehensive guideline for both clients and providers to increase SaaS performance.

As to the impact of trust on post-adoption use, our results suggest that winging a client trust, either in service quality or provider, plays a crucial role in motivating clients' exploration. Understanding the multi-dimensional measurements of trust helps design a more feasible mechanism to manage SaaS.

5.3 Limitations and future research

This study has two limitations. First, while cases in Taiwan provide a good opportunity for understanding service quality and post-adoption use of SaaS, the generalization of models in other countries with different cultures and perspectives on building trust is limited. Second, cross-sectional surveys provide limited understanding on attributing and substantiating affirmative causality. Thus, future work may employ process-oriented approach based on social exchange theory to enrich our understanding about SaaS-related innovation behavior and beliefs at different stages of SaaS applications.

5.4 Conclusion

This study develops and tests a model explaining the formation of post-adoption intention of SaaS from an inter-firm relationship management approach. Drawing on the dedication-constraint framework and service quality literature, our model incorporates the variables related to service quality and relationship development. Specifically, we examine client orientation quality, client response quality, and environment quality as the manifestation of service quality to reduce client firms' uncertainty, from which they establish the inter-firm relationship with the SaaS provider, conceptualized as trust in service quality and trust in provider. Our results indicate that the proposed model is suitable to explain the post-adoption phenomena in a SaaS context.

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