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Chia-Shiang Hsu
National Kaohsiung First University of Science and Technology, ours.hsu@gmail.com

Shih-Wei Chou
National Kaohsiung First University of Science and Technology, swchou@nkfust.edu.tw

Hui-Tzu Min
National Cheng Kung University, minhuitz@mail.ncku.edu.tw

UNDERSTANDING SOFTWARE-AS-A-SERVICE (SAAS) COMMITMENT FROM A CLIENT-PROVIDER COLLABORATION APPROACH

Chia-Shiang Hsu, College of Management, National Kaohsiung First University of Science and Technology, Kaohsiung, Taiwan, R.O.C., ours.hsu@gmail.com

Shih-Wei Chou, Department of Information Systems, National Kaohsiung First University of Science and Technology, Kaohsiung, Taiwan, R.O.C., swchou@nkfust.edu.tw

Hui-Tzu Min, Department of Foreign Languages & Literature, National Cheng Kung University, Tainan, Taiwan, R.O.C., minhuitz@mail.ncku.edu.tw

Abstract

Understanding the formation of commitment in service-oriented outsourcing such as SaaS is important. We draw on the relational view to examine how client-provider collaboration and a client's outsourcing management capability, that have hitherto been considered independently, can be combined to improve commitment. Empirical results from 169 firms supported most of our hypotheses. The results show that a client's outsourcing management capability (behavior control, knowledge capability, relationship capability) positively affects client-provider collaboration (service investment, service flexibility, effective communication), which in turn positively influences commitment. Theoretical and practical implications of our results are discussed.

Keywords: commitment, relational view, capability, collaboration, SaaS outcomes

1 INTRODUCTION

Software-as-a-service (SaaS), which describes software applications delivered and shared from a service provider over the Internet, aims to provide firms with Internet-based access to resources or value-added services to gain benefits (Benlian & Hess 2011; Benlian et al. 2012). SaaS clients are motivated to use SaaS due to reduced installation cost and uncertainty pervading tradition information technology (IT) initiatives, but sharing software applications and IT infrastructure across clients, providers' control over future IT development, and limited customization (multi-tenant architecture) cause problems associated with interdependence (e.g., mutual adaptation for inter-firm process enhancement) and uncertainty, which in turn reduce client commitment. Commitment represents customer retention and improvement of a client-provider relationship and collaboration. The level of SaaS success depends on client-provider collaboration because it serves as the key means to increase providers' revenues and selling software services, and get client input to their product management such as developing new features and solutions into service. However, SaaS studies (Benlian et al. 2012; Goode et al. 2015) show that uncertainty and limited customization make client commitment difficult and the formation of commitment remains inconsistent, reducing new opportunities for SaaS development. This present study focuses on the drivers of SaaS clients' commitment, because they help providers understand how to enhance SaaS value and clients accrue benefits from client-provider collaboration.

The flexibility and currency of SaaS products lead to an ever increasing demands and revenues, with spending on SaaS applications forecasted to grow to $258 billion by 2020 (Forrester 2011). However, some companies and market researchers lack confidence in online service (e.g., SaaS) viability and outcomes, particularly applicability in enterprise application software such as ERP (Benlian & Hess 2011; Susarla et al. 2010). They have identified the barriers for preventing firms from improving outcomes and commitment, including service quality concerns, inability to manage inter-firm resources between clients and providers effectively, and lack of flexibility for outsourced task execution such as changing contractual or functional aspects.

Due to the inconsistency, SaaS researchers have struggled to develop research models by identifying the key determinants of client commitment. They have suggested that a socio-technical approach should be employed by combining individual, technical, organizational, and service management factors (Lacity et al. 2010; Winkler & Brown 2014). Accordingly, some studies have investigated the key determinants of commitment, including organizational characteristics (e.g., interaction process, relational governance, client capability, service provider capability, formal and informal control) (Bharadwaj et al. 2010; Han et al. 2008; Tiwana 2010) and service management (e.g., service mechanisms to gain benefits, facilitating service production process) (Montoya et al. 2010; Susarla et al. 2010). However, less attention has been paid to the unique features of SaaS partners' capability development and a systematic and empirical examination on the formation of a SaaS client's

commitment remains unclear. Without the minimal degree of commitment, clients are required to pay more costs (e.g., transition costs, switching costs, redeployment costs) and providers fail in customer retention, recovering their investment, competing with other SaaS providers. Thus, it is important to understand commitment. Responding to Lacity et al's (2010) calls for more empirical studies on cloud computing outsourcing model and attempting to explain SaaS inconsistencies, this study poses the following research questions.

RQ1: How does client-provider collaboration affect client commitment?

RQ2: How do clients' service management capabilities affect collaboration with the provider?

This study draws on theories in several domains to enhance our understanding about how commitment is formed, including the relational view, strategic management, and service marketing (Bharadwaj 2000; Dyer & Singh 1998; Han et al. 2013; Susarla et al. 2009, 2010). The underlying premise of our model is that client firms' commitment is most likely to be influenced by the client-provider collaboration to both increase value and reduce uncertainty, which in turn is affected by clients' capabilities to manage the inter-firm processes in service delivery. We highlight the role of collaboration as the intervening variable connecting the causal relationship between service management capability and commitment. This research contributes to the study of on-demand service outsourcing by accounting for the influence of inter-firm value creation on service management phenomena in a SaaS context.

2 THEORETICAL FRAMEWORK

2.1 Commitment and SaaS

Prior outsourcing research has treated user commitment as one of the most crucial measure of IT outsourcing in general and on-demand service outsourcing in particular (Lacity et al. 2010; Susarla et al. 2010). Commitment to a service provision reflects the extent to which users have positive affect toward the relationship with the provider (*durability*) (e.g., continuance) and confidence in the stability of the relationship (*consistency*), and are willing to be involved in the relationship with the provider through investment of capital (*input*) (Kumar et al. 1995).

Despite the popularity of SaaS and its critical role in a firm's value creation, understanding on SaaS commitment is still in its infancy. This increases uncertainty and loses the opportunity to enhance value, including quality improvements, inter-firm process improvement, client-provider collaboration and access to specialized resources (e.g., IT-related know-how). To address this gap, this research aims to deepen our understanding about the formation of commitment.

The SaaS model reflects a special type of on-demand outsourcing, in which clients outsource their IS applications to the SaaS provider and receive online services from them. Multi-tenant architecture of

SaaS has the following implications. First, this architecture offers providers benefits (i.e., economies of scale) due to shared IS applications across clients. However, this architecture may pose challenges to clients' commitment and collaboration with the provider, particularly for the client focused on enterprise application software. This is because every client firm has its specific needs for outsourced service, but multi-tenant architecture usually yields limited customization that may not meet these needs (Susarla et al. 2010). For example, a client's outsourced CRM service may entail both transactional processes (e.g., automation of tasks, auto-response e-mail) and strategic processes (e.g., customer analytics) (Mani et al. 2010). Second, higher network bandwidth and processing power in the SaaS model increase client expectations of provider performance (e.g., reliability, responsibility). Besides, limited customization reduces SaaS client switching costs and loyalty. This implies that customer retention becomes more difficult than traditional outsourcing including IT outsourcing and application service provision (ASP) where the provider is dedicated to a single client and offers it customized service (Lacity et al. 2010; Winkler & Brown 2014). Thus, it is important that SaaS providers should have more flexibility in addressing client needs and increase investment if they want to retain the current client. Finally, the SaaS model gives providers more control over future IS development and service upgrades. Besides, prior SaaS studies have identified security concerns and process interdependence (e.g., service quality) as the key barriers for client continuance and collaboration with the provider (Benlian & Hess 2011; Goode et al. 2015). This implies that both client and provider should make efforts on inter-firm process improvement (e.g., aligned working styles). Besides, effective governance mechanisms (e.g., formal control) are required to safeguard provider opportunism and alleviate client concerns, which in turn encourage the client to participate in the collaboration with the provider.

2.2 The research model: intra-firm relationship capability, collaboration, relational outcomes

Drawing on the relational view, we view client-provider collaboration as a series of inter-firm value co-creation processes through relationship-specific investment and combining resources in unique ways (Dyer & Singh 1998). These inter-firm processes in turn are influenced by a client firm's intra-firm capability, reflecting the firm's capability to both contribute to service delivery (e.g., intra-firm coordination between IT and business groups, IT expertise) and safeguard provider opportunism (e.g., formal control, provider management) (Bharadwaj 2000; Rustagi et al. 2008; Tiwana 2010). Thus, as shown in Figure 1, our model emphasizes three dimensions of relation-related variables—intra-firm relationship capability, collaboration, and relational outcomes. The model shows how to increase understanding of the features of capabilities, either internal to a client firm or external to it, that affect SaaS relationships. We evaluate the required capabilities from the client's perspective in resolving uncertainty and building a successful relationship. In our model, the features of intra-firm capability in management of service delivery are antecedents of collaboration (or inter-firm capability),

reflecting relationship formation processes to reduce uncertainty and enhance value. This in turn affects relationship outcomes and SaaS success.

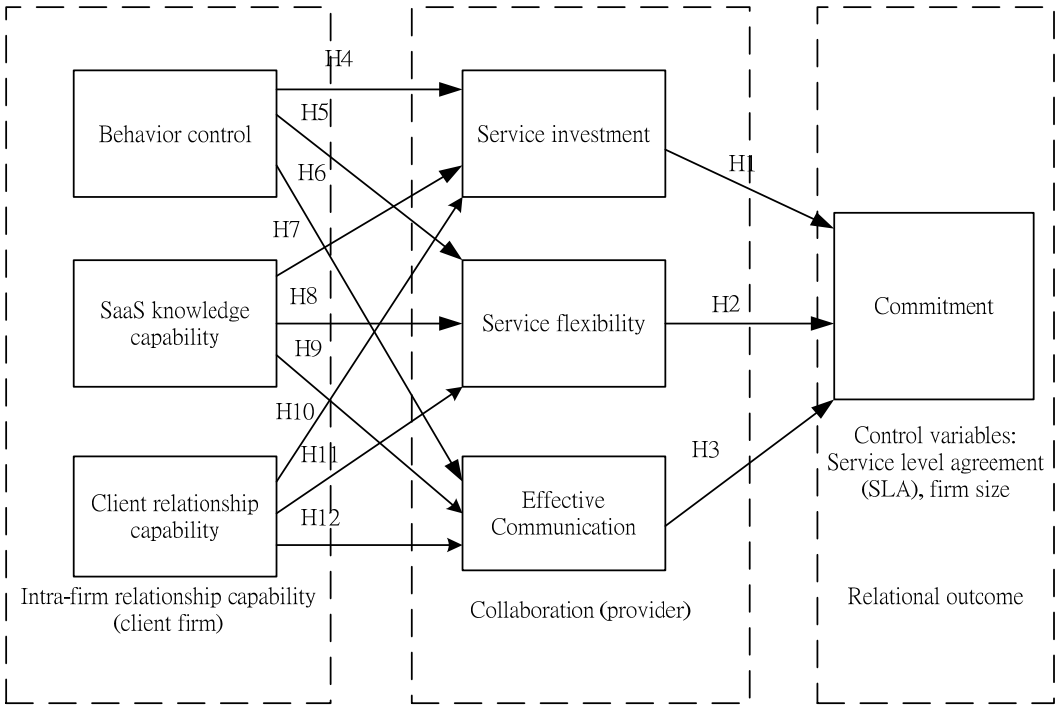

Figure 1. Research model

In this study, we use intra-firm relationship capabilities to represent client firms' ability to manage the outsourced SaaS applications that help the firms to enhance SaaS performance (Benlian et al. 2012; Rai & Tang 2012). These capabilities are conceptualized as clients' SaaS knowledge capability, relationship capability, and behavior control capability, which are the manifestation of IT capability, organizational relationship capability, and vendor management capability respectively based on a client's outsourcing management capabilities (Bharadwaj et al. 2010; Goo et al. 2007). SaaS knowledge capability refers to a client's ability to apply knowledge (technical knowledge and managerial knowledge) to SaaS implementation to monitor service delivery and use SaaS functionalities effectively. Clients with knowledge on SaaS applications and outsourcing management not only improve interaction processes with the providers but also increase pressure on them to offer better services (e.g., investment, flexibility). Technical knowledge enables clients to work with providers to develop SaaS applications that better meet the client operational needs (e.g., efficiency improvement). Managerial knowledge allows providers to deploy SaaS applications (where and how they are deployed) that achieve clients' strategic business objectives (e.g., analyzing the opportunity of SaaS-based competitive advantage). Client relationship capability is defined as the extent to which a client firm can facilitate coordination, integration, and collaboration between IT and business groups of the firm. Behavior control capability refers to a client's ability to govern providers' behavior during

service delivery to both pressure and encourage their involvement of inter-firm value creation. These types of outsourcing management capabilities represent three different but complementary aspects of management capabilities—knowledge (SaaS capability), intra-firm collaboration (relationship management capability), and effective governance (behavior control capability), that both reduce client uncertainty and increase provider pressure on quality service provision, leading to enhanced value co-creation (Rustagi et al. 2008; Saraf et al. 2007). Thus, we posit that these outsourcing management capabilities of client firms motivate the collaboration between clients and providers.

We apply the four factors of relational value in the context of SaaS. Inter-firm relationship-specific investments are conceptualized as service investment, complementary capabilities as service flexibility, knowledge sharing as effective communication, and effective governance as behavior control (Dyer & Singh 1998; Rai et al. 2012). The first three factors reflect a provider's capabilities to reduce uncertainty and increase collaboration, while the last factor, referring to a client's behavior control over the provider's service delivery and opportunism, belongs to the client's service management capability (Goo et al. 2009). Service investment refers to the perceived provider investment on improvement of both inter-firm processes and SaaS performance, including knowledgeable support, support tailored to a client's needs, availability and performance of SaaS, and reliability and accuracy of service (Benlian & Hess 2011). Service flexibility is defined as the extent to which a provider is willing to change contractual or functional aspects of SaaS service provision that better meet the client's requirements. Effective communication focuses on the accuracy, timeliness, adequacy, and credibility of the shared knowledge to improve the quality of mutual interaction (Montoya et al. 2010). These factors reflect a provider's resource management and capability-building needed for fulfilling SaaS tasks (Han et al. 2008). We thus expect that these factors of relational value solve the challenges associated with multi-tenant architecture (e.g., limited customization, uncertainty) and play a key role in client-provider relationship improvement and value creation, thus leading to a client's commitment.

3 HYPOTHESIS DEVELOPMENT

3.1 Hypotheses between collaboration and relational outcomes

Service investment reflects a provider's willingness and effort to dedicate to the SaaS relationship and ensure reliable service and availability of SaaS services through knowledgeable support and support tailored to a client's needs (Benlian et al. 2012). This implies that providers are willing to align their service provision with the client's needs and solve problems together. This in turn allows the client to access the relationship-specific resources (i.e., service investment) and jointly create value with the provider. Thus, this investment not only helps clients gain benefits but also reduces their uncertainty due to limited customization and lack of control over service upgrades. Therefore, we posit that service investment increases clients' confidence on the durability and stability of the relationship with the provider and encourages the client's input—leading to H1.

H1: a provider's service investment positively affects a client's commitment.

Service flexibility reflects a provider's willingness to change contractual or functional aspects (interoperability) of SaaS provision and offer features (functionalities, design features of use interface) that meet clients' needs (Benlian et al. 2012). SaaS studies have emphasized the importance of provider's service flexibility to satisfy clients' needs, which not only facilitates collaboration between them but also exploit new opportunities for combining their resources for value co-creation (Susarla et al. 2010). Flexibility also allows both clients and providers to coevolve their joint resources, capabilities, and knowledge they can combine and reconfigure, leading to improved relational outcomes such as accumulation and exploitation of collaborative know-how over time (Wang et al. 2013). Because service flexibility facilitates mutual adaptation and joint problem solving that help clients gain benefits and reduce their uncertainty, we expect that service flexibility positively affects clients' willingness to maintain the long-term relationship with the provider, leading to H2.

H2: a provider's service flexibility positively affects a client's commitment.

Effective communication refers to the extent to which a client and a provider exchange information with accuracy, timeliness, and adequacy for SaaS application development. SaaS development activities require both a providers' understanding about a client's domain specific knowledge (e.g., what is the needed knowledge for handling a client's outsourced task) and client-provider joint learning to improve boundary-spanning problem-solving processes (Susarla et al. 2010). The success of these activities relies on effective communication from which clients share their insights, know-how for business development, and market needs with the provider, while the provider offers knowledgeable support, support tailored to the client needs, and other IT development (e.g., modularity of SaaS applications, key functionalities, user interface). Empirical studies on outsourcing show that effective communication and joint learning not only increase relational benefits but also reduces the client's uncertainty due to limited customization (Han et al. 2008). Thus, we hypothesize that effective communication serves as the key means for a client's commitment to the SaaS relationship—leading to H3.

H3: Effective communication positively affects a client's commitment

3.2 Hypotheses between a firm's service management capabilities and collaboration Behavior control

Behavior control reflects a client's capability to manage providers and improve inter-firm processes through safeguarding opportunism and motivating the providers' involvement in collaboration. Behavior control helps providers understand what goals they have to achieve and how to meet clients' needs based on their prescribed rules and procedures, and expectation. Matching clients' needs through these rules and expectation improves SaaS outcomes due to reduced uncertainty. This in turn implies

that providers are more willing to invest in the relationship-specific assets (e.g., support tailored to the client's needs, service investment) because of their expected SaaS outcomes to recover their investment, leading to H4. Behavior control motivates providers to contribute to inter-firm process improvement due to behavior control to ensure that their effort on service provision (e.g., flexibility in changing contractual and functional aspect of service provision, offering features to fulfill clients' needs) is rewarded. Thus, we posit that behavior control encourages providers' service flexibility. We propose H5. Since behavior control reflects that social relationships and interaction between clients and providers are well managed and facilitated, they follow the explicit rules and procedures to communicate with each other. Thus, we hypothesize that behavior control leads to effective communication between SaaS partners. Thus, we propose H6.

H4: a client's behavior control positively affects a provider's service investment.

H5: a client's behavior control positively affects a provider's service flexibility.

H6: a client's behavior control positively affects effective communication with a provider.

SaaS knowledge capability represents a client's ability to manage SaaS outsourcing to ensure the quality of SaaS. Since SaaS knowledge capability encourages a provider's collaboration with the client, we expect that the provider is willing to increase service investment in the client-provider relationship due to expected performance improvement from this relationship-specific investment, leading to H7.

A client's SaaS knowledge capability increases the provider's service flexibility due to its willingness to collaborate and flexibly combine inter-firm resources (e.g., combination of the client's domain knowledge and the provider's SaaS expertise). Besides, SaaS knowledge capability enables the provider to better understand the client's requirements. Thus, the provider can offer SaaS features, and change contractual and functional aspects of SaaS delivery that fulfill the client's needs—service flexibility. Thus, we hypothesize that a client's SaaS knowledge capability exert a positive influence on a provider's service flexibility, leading to H8.

A client's SaaS knowledge capability reflects its technical knowledge and outsourcing management knowledge related to SaaS applications, and good communication skills. Besides, this capability motivates the provider to improve SaaS performance and address the client needs through knowledgeable support and effective communication. Thus, both clients and providers are willing to achieve joint learning and exchange new, accurate, and useful information. We thus posit that SaaS knowledge capability plays a key role in effective communication—leading to H9.

H7: a client's SaaS knowledge capability positively affects a provider's service investment.

H8: a client's SaaS knowledge capability positively affects a provider's service flexibility.

H9: a client's SaaS knowledge capability positively affects effective communication with a provider.

Once client firms have clearly demonstrated their needs from SaaS applications, SaaS providers are easier to offer them the needed service and better understand what are the needed resources and capabilities to improve SaaS performance. Client relationship capability motivates providers to invest on the relationship with the client, because they can expect more benefits from the collaboration with partners with capability (i.e., intra-firm capability building) than those without relationship capability. Thus, we propose H10.

Uncertainty is removed because of visibility of a client firm's internal process caused by coordination between different groups, solving issues related to knowledge interdependence, ability to discover how intra-firm processes and inter-firm (client and provider) processes can be improved with the flexibility of SaaS applications. Providers expect to gain more benefits from collaboration with the clients with relationship capability than those without it, because the flexibility in mutual adjusting of service delivery activities in SaaS (e.g., functionalities, design features, handling contingencies, resource combination) can be enhanced. Thus, we posit that relationship capability plays a key role for increasing a provider's service flexibility—leading to H11.

Relationship capability both encourages a provider's collaboration with the client and allows the client to control and manage the SaaS outsourcing processes (e.g., coordination between IT (SaaS-related applications) and strategic development), because relationship capability helps both clients and providers remove barriers for facilitating inter-firm processes. They expect more benefits gained from this collaboration, which in turn motivates them to share knowledge, communicate information, and participate in processes of joint learning. Thus, we propose H12.

H10: a client's relationship capability positively affects a provider's service investment.

H11: a client's relationship capability positively affects a provider's service flexibility.

H12: a client's relationship capability positively affects effective communication with a provider.

4 METHODOLOGY

This goal of this study is to understand the formation of a client's commitment in a SaaS context. We draw on the relational view to develop a conceptual model to delineate the relationship between intra-firm relationship capability, collaboration, and relational outcomes (i.e., commitment). This conceptual model is characterized as three types of clients' capability-building and three types of inter-firm capability-building. The proposed hypotheses were based on a client firm's perspective (a firm level of analysis) and examined through survey method.

4.1 Sample, data collection, and measures

To test the proposed hypotheses, this research used a survey method to collect empirical data. We identified 750 firms with SaaS experience through the assistance of Market Intelligence & Consulting

Department under the "Institute of Information Industry" in Taiwan. Following outsourcing and firm-level studies, we used key informant methodology for data collection, in which senior IT managers were chosen as the key informant due to their knowledge about outsourcing enterprise applications in a SaaS context. Of the 750 distributed surveys, 215 responses were received and 46 were discarded because of incomplete data or without more than one year SaaS experience. Thus, we retained 169 (22.5%) responses in the final analysis. Table 1 shows that more than 50% of the respondents have more than 5 years experiences in SaaS, and nearly half of them are from small and medium-sized firms with fewer than 200 employees and annual revenues less than NT100 million.

Measure	Item	Frequency	Percentage
Experience in outsourcing or SaaS (only respondents with more than 1 year are included)	1-3 years	50	30
	4-5 years	33	20
	6-9 years	42	25
	>10 years	44	25
	Other managers	18	10
Number of employees	Less than 200	85	50
	201-400	20	12
	401-600	19	11
	More than 600	45	27

Table 1. Sample characteristics (N=169)

We measured survey items by using a seven-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree). The items to measure SaaS clients' commitment were adapted from Goo et al. (2009). The variables draw on the relational view (Dyer & Singh 1998) include service investment (SI) (Susarla et al. 2009; Wang et al. 2013), service flexibility (SF) (Benlian et al. 2012; Rai & Tang 2010), effective communication (EC) (Han et al. 2008; Susarla et al. 2010), and behavior control (Tiwana 2010). The variables related to a client firm's capability building were based on literature of outsourcing and SaaS, incorporating SaaS knowledge capability (SKC)(Rustagi et al. 2008; Susarla et al. 2010) and client relationship capability (CRC) (Bharadwaj et al. 2010; Han et al. 2008).

Consistent with prior outsourcing studies, we used firm size and service-level agreement (SLA) as control variables (Goo et al. 2007; Susarla et al. 2010). SLA reflects measures of desired service attributes based on the agreement between the client firm and the provider, emphasizing three dimensions of service agreement—tools to prove SLA achievement, SLA on network reliability, and SLA on customer response time.

4.2 Analysis and results

This study used partial least squares (PLS) to conduct evaluation of both measurement model and structural model(Chin et al. 2003). This study followed Podsakoff et al. (2003) to safeguard Common method biases (CMV). We used Harmen's single factor test to evaluate whether a significant amount

of CMV exists in the data (Podsakoff et al. 2003). Seven factors with eigenvalue > 1 were extracted and collectively accounted for 72% of total variance, with the first factor capturing only 28% of the variance in the data. These results show that CMV is not significant in our data. Item reliability, convergent validity, and discriminant validity were employed to evaluate the measurement model. Factor loading of each item represents individual item reliability. A high loading shows that the shared variance between constructs and its measurement is higher than error variance (Chin et al. 2003). A factor loading higher than 0.7 is considered as high reliability and a loading less than 0.5 should be deleted. The loadings of all indicators are acceptable. Our results show that average variance extracted (AVEs) were greater than 0.65 and Cronbach's alphas were greater than 0.8, demonstrating high internal consistency. The results of Table 2 (correlation) demonstrate that the constructs of our model have adequate discriminant and convergent validity. In addition to the validity check, we also assessed multicollinearity among constructs. The variance inflation factor (VIFs) (2.25 to 3.79) are acceptable.

	Mean	**S.D.**	**CM**	**SI**	**SF**	**EC**	**BC**	**SKC**	**CRC**
CM	5.011	1.018	**0.810**						
SI	4.883	1.022	0.511	**0.816**					
SF	5.092	1.007	0.530	0.309	**0.826**				
EC	5.031	0.987	0.504	0.293	0.266	**0.780**			
BC	5.034	1.086	0.587	0.290	0.316	0.404	**0.872**		
SKC	4.944	0.990	0.485	0.318	0.396	0.402	0.483	**0.812**	
CRC	4.931	1.013	0.456	0.441	0.149	0.130	0.299	0.250	**0.809**

Table 2. Correlation between construct; Note: The bold numbers in the diagonal row are square root of the average variance extracted.

H1 and H2, which examined the influence of a provider's service investment (β= 0.234, p< 0.05) and service flexibility (β= 0.255, p< 0.01) on commitment, were supported. H3, which posits that effective communication positively affects commitment, was significant (β= 0.253, p< 0.01). Our findings did not support H4 that predicts that a client's behavior control positively influences service investment(β= 0.152, p = n.s.). Our results support both H5 and H6, showing that behavior control positively influences both service flexibility (β= 0.362, p< 0.05) and effective communication (β= 0.313, p< 0.01). Our findings on the influence of SaaS knowledge capability on the variables related to collaboration are supported—service investment (H7, β= 0.234, p< 0.05), service flexibility (H8, β= 0.275, p< 0.05), effective communication (H9, β= 0.291, p< 0.01). Our findings showed a positive influence of client relationship capability on service investment (β= 0.449, p< 0.001), which supported H10. We did not find support for H11 and H12 that predicts that the client relationship capability positively affects service flexibility (β= 0.116, p = n.s.) and effective communication (β= 0.048, p = n.s.). One of the two control variables, SLA (β= 0.210, p< 0.01), was significant. This finding implies that the IT-enabled service attributes (e.g., response time) play a key role in a client's commitment.

5 DISCUSSION AND CONCLUSION

Our findings show that improving a client's commitment relies on its collaboration with the provider, which in turn is affected by the client's intra-firm relationship capability. Our results are consistent with prior outsourcing literature that outsourcing outcomes relies on how to reduce uncertainty and increase benefits (Benlian et al. 2012; Lacity et al. 2010; Han et al. 2008), which requires the collaboration between clients and providers to combine complementary capabilities and facilitate the processes of leveraging resources either internal to a client firm or embedded in the client-provider relationship. It is important to note that prior work on outsourcing value creation focuses on capability development from either inter-firm (embedded in inter-firm processes) or intra-firm (i.e., client). In contrast, this study presents a comprehensive perspective by viewing intra-firm capability building as the antecedent of inter-firm collaboration, and commitment as the consequences of the collaboration. To the best of our knowledge, this is the first empirical study to consider the antecedents and consequences of client-provider collaboration in a SaaS context.

Our results support nine of the twelve proposed hypotheses, which give clear evidence to strengthen many of our arguments. First, our findings reveal a fresh insight on how Dyer and Singh's (1998) key dimensions for relational value creation can be implemented and managed in a SaaS context. These findings enrich understanding on measurements of collaboration in on-line and on-demand service outsourcing. Our results indicate that to remove SaaS clients' barriers for commitment, providers should focus on development of inter-firm capability through relationship-specific investments (e.g., aligned working styles), flexibility in combination of complementary capabilities (e.g., mutual adjustments), and high quality communication.

Second, our hypotheses on the influence of a client's intra-firm relationship capability on collaboration are largely supported. Our results imply that behavior control does not always lead to successful management of SaaS providers and encourage their inter-firm relation-specific investments to satisfy individual needs. The possible explanation is that the importance of behavior control in explaining service investment is relatively weaker than other factors of intra-firm relationship capability. This is because, compared to SaaS knowledge capability and client relationship capability, behavior control usually goes with other informal control mechanisms (e.g., trust) that work as complementary governance mechanisms to affect outsourcing outcomes. Future work may examine the influence of complementary mechanisms between behavior control and trust on SaaS commitment.

5.1 Theoretical implications

This study responds to research call for more empirical studies that focus on outsourcing model in a cloud computing context such as SaaS and solving the challenges created by multi-tenant architecture (e.g., uncertainty, interdependence). We advance our current understanding about SaaS by finding that

commitment is influenced by client-provider collaboration. This is in turn is affected by a client's intra-firm relationship capability, including facilitating intra-firm collaboration between different groups, behavior control to safeguard opportunism, and knowledge to increase both joint learning and the provider's pressure on SaaS performance improvement. This study yields a new insight into achieving outsourcing success in a cloud computing setting by providing a comprehensive understanding about the antecedents and consequences of collaboration from a relationship management perspective.

5.2 Practical implications

From a practical viewpoint, our results help a SaaS provider leverage inter-firm resources to increase capability through effective communication, flexibility in providing needed services, and relationship-specific investment for joint value creation. This capability in turn solves challenges related to SaaS multi-tenant architecture, leading to a client's commitment. For SaaS clients, the extent to which they can successful collaborate with the provider depends on their capability of SaaS outsourcing and relationship management (or intra-firm relationship capability) through three dimensions, including formal control, knowledge to collaborate with the provider, and improving intra-firm collaboration.

5.3 Limitations and future study

This study has the following limitations. First, a single-informant approach from a client's view may create the threat of respondent bias even though we have checked thoroughly and found that such a threat was not significant. Future work may use a matched-pair of SaaS clients and providers. Second, we used cross-sectional data to empirically examine our model. While the model and hypotheses were developed theoretically, our results still present associations rather than causality. Future research may take a longitudinal approach to track the formation of commitment over time.

5.4 Conclusion

To fill the research gap in SaaS commitment, we build on a relational view to identify client-provider collaboration as the intervening variable that influences commitment and examined a client's intra-firm relationship capability as the antecedents of the collaboration. Our findings imply that a client's outsourcing capability, conceptualized as behavior control, SaaS knowledge capability, and relationship capability, is positively related to collaboration (service investment, service flexibility, effective communication), which in turn affects commitment significantly.

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