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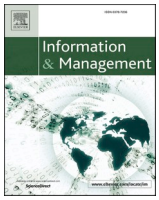

The impact of psychological contract under- and over-fulfillment on client citizenship behaviors in Enterprise systems projects: From the client's perspective

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ABSTRACT

This study focuses on examining client citizenship behaviors (CCBs) from a psychological contract perspective in enterprise systems (ES) vendor–client relationships. Using polynomial modeling to capture the discrepancy between expected obligations and delivered fulfillments, this stud unpacks psychological contract and investigates the impacts of psychological contract *under-fulfillment*, *fulfillment*, and *over-fulfillment* on CCBs. The results show that both under-fulfillment and over-fulfillment of psychological contract are negatively related to CCBs. CCBs are shown to be higher when expected obligation and delivered fulfillment are both high than when both are low. The theoretical contributions and practical implications are discussed.

1. Introduction

Client participation has been regarded as a critical factor to the success of enterprise systems (ES) project [1,2]. Although many ES vendors have succeeded in promoting their clients to participate in ES projects through contractual regulations [3,4], it is still challenging for ES vendors to encourage their clients to exhibit a series of *client citizenship behaviors (CCBs)* which are voluntary and not explicitly detailed in formal contracts [5]. CCBs, including providing ES usage feedbacks, recommending ES to partners, and helping partners with ES implementation, are critical for ES vendors to achieve competitive advantage [6]. Specifically, feedbacks from clients are helpful in finetuning software modules to better integrate multiple business processes [7]. Clients' recommendations assist ES vendors in promoting their products because opinions from a neutral party are more convincing [8]. Helping behaviors are more effective in transferring domain knowledge and achieving ES project success [9]. Conceivably, it is imperative for ES vendors to understand how to increase the willingness of their clients to conduct CCBs in achieving the success of ES projects.

As contended by literature, citizenship behavior is discretionary and voluntary in nature, which is free from being explicitly regulated [10]. Instead of formal written contract, *psychological contract*, which contains a set of unwritten beliefs and expectations concerning reciprocal obligations [11], is widely considered as an effective enabler of citizenship behaviors [12–14]. In the context of ES project, the vendor–client relationship is a social exchange relationship where both parties pursue mutual benefits with the principle of reciprocity [15]. The social exchange between an ES vendor and its client creates a set of norms—beliefs and perceptions of obligations—that establish a psychological contract of client [16,17]. From the clients' perspective, clients tend to behave based on their own *implicit* beliefs rather than *explicit* complex contractual rules that are impractical to execute [18,19]. Once the psychological contracts get fulfilled, these beliefs can intrinsically motivate CCBs based on the norm of reciprocity in social exchange relationships [20,21]. However, the role of psychological contracts in influencing CCBs in ES projects has rarely been mentioned. Therefore, this study attempts to scrutinize the influencing mechanisms of psychological contract fulfillment status on CCBs in ES projects.

Extant literature has widely explored the influence of breach or violation of psychological contract on citizenship behaviors (e.g., [12,13,22]). While findings of these studies have indeed extended our understandings of the role of psychological contract in citizenship behaviors, they still share some limitations. First, there is a paucity of research concentrating on inter-organizational contexts to empirically examine citizenship behaviors from the psychological contract perspective, given that previous research mainly focused on intra-organizational contexts

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(e.g. [12,14,23,24],). Yet, the literature indicates that, in a buyer–supplier relationship, the buyer maintains a set of expectations toward the supplier's obligations, which introduces a distinct psychological element into the contractual relations [11,25,26]. This exchange of obligation supports the existence of a psychological contract between these two parties. In an ES project, the exchange between an ES vendor and its client involves implied obligation of reciprocity for mutual benefits [11], which thereby establishes a psychological contract between them. Given this, it is appropriate and necessary to apply psychological contract as a lens to investigate the cognitive and psychological aspects of managing CCBs in ES vendor–client relationships [11,25].

Second, although many studies have explored the effect of the under-fulfillment of psychological contract (e.g., [16,27–29]), few studies have investigated its over-fulfillment [29]. In an ES project, over-fulfilling obligations may come at a huge cost to ES vendors due to complex ES implementation processes. Meanwhile, maintaining cooperative relationships in ES projects involves more resources and energy, for example, building buffers into contracts to accommodate scope changes and investing time in building good relationships [19]. Furthermore, over-fulfillment may lead to clients' perception of violation because they suspect ES vendors going beyond the boundary such as deliberately accessing business intelligence [30,31]. Specifically, when ES vendors develop an overly close bond with staff from client firms to foster knowledge sharing, it may induce clients' concern of misappropriating their intellectual assets held by staff. Thus, comparing with under-fulfillment of psychological contract, its over-fulfillment deserves equal attention regarding its influence in ES projects.

Third, scholars normally operationalize breach and fulfillment of psychological contract by reflecting the extent to which a firm has kept its promises (e.g., [32]), omitting the joint effects of the components that comprise breach and fulfillment (i.e., expected obligations and delivered fulfillments) on citizenship behaviors [33]. In ES projects, both expected obligations and delivered fulfillments are critical factors that influence clients' behaviors. As ES implementation is a knowledge-intensive project that requires ES vendors' sustained support, clients believe ES vendors are obligated to perform certain behaviors to ensure the success of ES projects. These expected obligations involve a clear understanding of ES vendors' roles and responsibilities that clients are likely to react to. The final delivered fulfillments joint with expected obligations ultimately determine the behaviors that clients respond with. Hence, it is necessary to take an expanded view of psychological contract by considering the distinction between obligations and associated fulfillments [33].

Addressing these research gaps is practically meaningful and theoretically important. Practically, although legal contracts exist between ES vendors and clients, written obligations cannot cover all concerns from clients and must be supplemented by unwritten promises [18]. Because ES implementation implies an unwritten set of expectations from clients, psychological contracts ubiquitously exist in ES vendor–client relationships. However, CCBs are free from explicit contractual regulations but can be intrinsically motivated by fulfillment of psychological contracts. Therefore, it is important for ES vendors to pay attention to the influence of psychological contracts on CCBs in achieving ES project success. Theoretically, the social exchange nature of ES vendor–client relationship implicitly establishes psychological contracts between ES vendors and clients [34,35]. While IT outsourcing research has drawn on social exchange theory (SET) [34,35], little accounts for the breach and/or fulfillment of psychological contracts that occur within social exchanges impacting ES vendor–client collaboration. By considering the distinction between expected obligations and delivered fulfillments, a psychological contract provides a more nuanced theoretical perspective to shed light on the theoretical mechanisms that how ES vendors' fulfillment of expected obligations influences CCBs in the ES implementation context. This research contributes by employing SET to investigate CCBs in ES vendor–client relationships using a psychological contract perspective.

Based on the clients' perspective, this study aims to examine how CCBs are influenced by ES vendors' fulfillment of their clients' psychological contracts. Specifically, we considered a full range of potential situations of *under-fulfillment* (i.e., client perceived fulfillments fall short of expected obligations), *fulfillment* (i.e., client perceived fulfillments match expected obligations), and *over-fulfillment* (i.e., client perceived fulfillments exceed expected obligations) of psychological contract. Furthermore, we compared the performance of CCBs under perfect fulfillment between situations in which delivered fulfillments and expected obligations are both low and both are high. By capturing the discrepancy between expected obligations and delivered fulfillments, this study enhances the understanding of CCBs in ES projects by considering the full range of psychological contract fulfillment situations (e.g., under-fulfillment, fulfillment, and over-fulfillment) and using polynomial modeling to examine the curvilinear relationships between psychological contract fulfillment situations and CCBs. Our research results suggest that both psychological contract *under-fulfillment* and *over-fulfillment* are negatively associated with CCBs. We further observe that, in the *fulfillment* situation, CCBs will be higher when fulfillments and obligations match at a high level as opposed to when they match at a low level.

2. Theoretical background and hypotheses development

2.1. Social exchange theory

Social exchange theory was initially applied to examine interpersonal exchanges that are not purely economic [36]. This theory defines social exchange as "voluntary actions of individuals that are motivated by the returns they are expected to bring and typically in fact bring from others" ([37] p. 91). While developed at the individual level, scholars have extended SET to the organizational level [36,38,39]. At this level, SET proposes that corporate groups interact for a reward or with the expectation of a reward from their interaction with partners [38,40]. Generally, the exchange parties are interdependent and the exchange requires a bidirectional transaction involving reciprocity [41]. The norm of reciprocity that represents the "rules" governing social exchange indicates the exchange as reciprocal in that, if one party supplies a benefit, the receiving party should respond in kind [41].

Social exchange theory provides a general approach for understanding how clients are likely to respond when they perceive their psychological contracts have been fulfilled or not. Because inter-organizational relationships, such as ES vendor–client relationships, are not only governed by contractual elements but also regulated by social norms, such as beliefs concerning reciprocity [42]. In ES vendor–client relationships, an ES vendor wants to maintain its market share, while its client wants to successfully implement ES for operational efficiency. Hence, ES vendors and their clients are highly interdependent with mutual benefits and commitments [15]. In the course of cooperation, both parties abide by the certain "rules" of exchange that guide the exchange processes [43]. For example, ES vendors maintain an expectation of return from their clients when contributing to clients. Because the fulfillment status of a psychological contract may break or maintain the "rules" of exchange which, in turn, affects the readiness of clients to exchange with CCBs. In this view, we deem SET as an appropriate theoretical lens to examine the effects of psychological contract on CCBs.

Social exchange theory is composed of a series of propositions that outline social exchange. First, the *success proposition* argues that, for all actions taken, the more often a particular action is rewarded, the more likely the exchange partner is to perform that action again [40]. In the ES vendor–client context, knowledge share between these two parties is reflective of this principle. The *reward proposition* argues that the more deprived the reward, the more value it gains [38]. The *value proposition* argues that the more valuable the exchange one party perceives as the result of an exchange, the more likely the party to perform the action

again [38]. In the ES vendor–client context, clients will engage in reciprocal activities in response to how valuable the actions ES vendor performed. The *aggression proposition* argues that the exchange party will aggressively withhold the action in the future when its action does not receive the expected reward or receive unexpected punishment [40]. Finally, the *rationality proposition* argues that, in choosing between actions, the exchange party will choose that which will bring a greater expected value of reward [40]. Hence, we argue that SET provides a general approach for understanding how clients are likely to respond upon perceiving whether their psychological contracts have been fulfilled by their ES vendors.

2.2. Client citizenship behavior

Citizenship behavior was initially studied at the individual level (e.g., [44–47]). This individual discretionary behavior promotes the effective functioning of the organization but is not directly or explicitly recognized by the formal reward systems [48]. Gradually, researchers widely studied this behavior at the group level and consider citizenship behavior as a collective voluntary behavior that done by a group (e.g. [5,49–51],). Their antecedents and outcomes have been studied in diverse fields such as organizational behavior (e.g. [50,52],), human resource management (e.g. [52,53],), marketing (e.g. [54],), information systems (e.g. [5,55],), and leadership (e.g. [46],). Recently, scholars have increasingly realized that citizenship behavior might grow in a context [56,57] and have called for research on citizenship behaviors at the firm level [58]. Autry et al. [59], for example, contended citizenship behaviors as discretionary interfirm behavioral tactics that promote the effective functioning of the whole system, but are not directly or explicitly included in formal agreements. Based on the work of Autry et al. [59], Skinner et al. [60] described the development of a scale for measuring citizenship behavior at the firm level. In IS field, researchers investigated the role of citizenship behavior at various levels. Table 1 provides an overview of recent IS research on citizenship behavior.

In this study, we theoretically ground the concept of CCBs in prior studies of firm-level citizenship behavior and define CCBs as a client firm's readiness to engage in extra-role behaviors that are *not* explicitly detailed in formal business contracts [57,65]. Following Groth [65]'s work, we conceptualize recommendations, helping other customers, and providing feedback as three dimensions of CCBs. Because ES vendors not only care about expanding their market shares but also interest in improving their outsourcing service quality [66]. Therefore, the three dimensions are citizenship behaviors that an ES vendor most valued in an ES vendor–client relationship. Specifically, recommendations refer to clients' voluntary behavior (i.e., that which is not required by ES vendors) to recommend ES products to other firms [67]. Helping other customers denotes a client's discretionary engagement in constructive behaviors to assist other customers in implementation and ES usage [67]. Providing feedback refers to a client's discretionary behaviors in providing valuable information, including usage feedback and related services, to ES vendors [68]. Given the significance of CCBs in ES vendor–client relationships, it is necessary to understand how to increase a client's propensity to engage in citizenship behaviors in an ES project.

Table 1
Summary of related IS research on citizenship behavior.

Study	Context	Research level	Main findings
Han & Hovav [61]	IS project	Individual level	Helping others positively related to knowledge sharing among project teams. While civic virtue and sportsmanship are not significantly related to knowledge sharing.
Chou et al. [62]	IS project	Individual level	Job commitment positively influences IS personnel' citizenship behavior and it serves as a mediator between the organizational justices and IS personnel' citizenship behavior.
Yen et al. [63]	IS project	Team level	The citizenship behavior of implementation team positively influences IS success, which is mediated by integration climate and effective project management.
Wang et al. [64]	IS project	Organizational level	ES task efficiency and ES coordination improvement positively influence *renqing*, which, in turn, positively impact CCBs. ES coordination improvement positively influences *ganqing* and subsequently positively influences CCBs.

2.3. Psychological contract

A psychological contract is a set of beliefs about reciprocal obligations between two parties in an exchange relationship [69,70]. Unlike expectations, psychological contracts are based on perceived promises of reciprocity and are established when one party believes that the other party is obligated to perform certain behaviors [71]. Hence, researchers have argued that each party in a relationship possesses a unique psychological contract based on its own understanding of the reciprocal obligations [19]. Central to psychological contract theory is the perception of breach. Psychological contract breach is a continuum ranging from *under-fulfillment* to *fulfillment*, to *over-fulfillment* [72]. Under-fulfillment occurs when one party perceives another party's insufficient fulfillment of obligations within a psychological contract [73]. Fulfillment happens when one party perceives that obligations have been sufficiently fulfilled by another party [73]. Over-fulfillment happens when one party perceives delivered fulfillments exceed promised obligations [74].

Most of the prior literature focuses psychological contract at the individual level of analysis (e.g., [28,75–78]), while some studies have extended it to relationships at the firm level (e.g. [11,19,25,79–82],). Blancero and Ellram [79] noted that the key aspect of psychological contract allows it to be applied in inter-organizational contexts, such as relationships between buyers and suppliers. In a buyer–supplier relationship, a psychological contract is the conceptualization of an exchange agreement between the buyer and the supplier in which one party maintains a set of beliefs toward the other party's obligations [25]. In an ES vendor–client relationship, clients hold beliefs about what their ES vendors are obligated to provide and beliefs about how well the ES vendors have fulfilled the obligations [19]. To make clear the critical customer–supplier obligations in an IT outsourcing relationship, Koh et al. [19] developed and empirically validated their research models of customer and supplier obligations in the context of IT outsourcing. Through qualitative analysis, Koh et al. [19] identified six major components of what clients believe are ES vendors' obligations in IT outsourcing. We draw on their finalized set of validated obligations to develop our research model. These components are well established in literature to reflect psychological contract in IS outsourcing relationship, which is consistent with the relationship in our research context [19]. These components are evaluated from the perspective of clients to reflect their opinions on key aspects in IT outsourcing relationships. Particularly, clients can evaluate to what extent they believe that an ES vendor should take these obligations and how well the ES vendor fulfills these obligations. Table 2 shows an ES vendor's basic obligations that constitute the basis of psychological contracts in an ES vendor–client.

2.4. Hypotheses development

Under-fulfillment of psychological contracts occurs when clients perceive a discrepancy between what they think ES vendors are obligated to provide and what they actually receive. In ES vendor–client relationships, clients seek to maintain equality between their costs and beliefs in the exchange relationship [83]. However, from the clients' perceptive, the discrepancy between delivered fulfillments and expected

Table 2
ES vendor obligations and definitions [19].

ES vendor's obligation for:	
(1) Accurate project scoping	Define precisely the nature and range of services covered in the outsourcing contract, and be flexible in handling customers' requests for changes in these services.
(2) Clear authority structures	Delineate the decision-making rights and reporting structures in the project, in terms of the roles and responsibilities of all parties involved.
(3) Taking charge	Complete the job and solve problems independently, with minimal customer involvement.
(4) Effective human capital management	Assign high-quality staff to work on the project and minimize staff turnover during the project.
(5) Effective knowledge transfer	Educate customers in terms of the necessary skills, knowledge, and expertise associated with using the outsourced system or service.
(6) Building effective interorganizational teams	Invest time and effort to foster a good working relationship among the team of customer and supplier staff working on the project.

obligations creates *inequality* in the social exchange [84]. In this sense, as long as clients perceive that they have adequately met their obligations to their ES vendors, clients may feel shortchanged by ES vendors' failure to fulfill their obligations. Thus, clients will incline to rebalance this unfair social exchange by reducing the extent of their voluntary actions (i.e., CCBs). Besides, obligations are based on beliefs in promises or debts [11]. ES vendors' failure to comply with their obligations may foster the clients' perception that ES vendors not give serious consideration to the promises of ES projects success and are thereby not dependable. This leads to negative beliefs on the client's behalf about the integrity of ES vendors, and, therefore, inflicts severe damage on the norms of reciprocity in the social exchange relationships. Given this, the under-fulfillment of a psychological contract by ES vendors may affect not only what clients have expected to receive but also what clients feel obligated to offer in return. In such cases, clients may feel much less obligated to perform citizenship behaviors because the obligations in the psychological contracts are no longer valued. Hence, we predict that clients will withhold CCBs if they feel the psychological contract has not been adequately fulfilled.

Hypothesis 1. The CCBs will be reduced to the extent that clients perceive that the obligations comprising their psychological contracts have been under-fulfilled by their ES vendors.

When delivered fulfillments exceed expected obligations, clients receive more inducements than they expected. Such excess also creates *inequality* in social exchange. SET suggests that clients are motivated to engage in CCBs when they perceive that their relationships with ES vendors are based on the foundation of fair social exchanges [12]. To maintain equality in the reciprocal exchange, clients tend to reciprocate the exceeded fulfillments by increasing their CCBs. Besides, prior research suggests that excess increases client satisfaction [65,72]; the more satisfied the clients are with the degree to which their ES vendors are "living up to their obligations", the more reciprocal CCBs the clients are likely to respond with. Thus, as clients receive more benefits from their ES vendors, they perceive that the obligations comprising their psychological contracts are highly valued and that their ES vendors are therefore highly dependable. This leads to clients' positive assessment of beliefs about their ES vendors' benevolence and integrity. In this sense, clients will more likely respond in kind in terms of CCBs to maintain a good relationship with their ES vendors. Taken together, these arguments about the over-fulfillment of a psychological contract lead us to posit the following:

Hypothesis 2. The CCBs will increase to the extent that clients perceive the obligations comprising their psychological contracts have been over-fulfilled by their ES vendors.

Psychological contract fulfillment is conceptualized as a continuum where received inducements and promises range from low to high levels with the stipulation that received inducements equal those promised. As clients perceive their ES vendors' obligations—such as clear authority structures and dedicated project staffing—to be critical to the success of the ES projects and difficult to accomplish, clients tend to believe that their ES vendors are fulfilling an ambitious standard [19]. Compared with a low level of obligation that is fulfilled, the higher the level of an obligation being fulfilled, the more certain the clients believe their ES vendors have fulfilled an ambitious commitment to them. For example, clients may believe that their ES vendors are more obligated to assign adequate staff dedicated to the project and lower the staff turnover during the project than to work as a team with them. Compared with fulfilling the obligation of working as a team, fulfilling the obligation of dedicated project staffing is more likely to enhance the clients' perception of fulfilling an ambitious commitment. Therefore, clients will willingly reciprocate the high level of delivered fulfillment with more CCBs. Additionally, higher levels of obligations fulfilled will generate higher levels of perceived organizational support from ES vendors, which give impetus to clients to reciprocate this benefit with higher performances of CCBs [23]. Following this logic, we posit the following:

Hypothesis 3. The CCBs will be higher when expected obligations match delivered fulfillments at a high level than match at a low level.

3. Research methods

3.1. Data collection

As the variables we studied are primarily psychological concepts, it is more effective to apply a survey design to capture the key characteristics in which we are interested. A survey was conducted in collaboration with one of the largest ES service suppliers, BS Company, in the Chinese garment industry. We chose to collect data from its client firms whose ES services are at the post-implementation stage. The post-implementation stage is suitable and helpful for our research because, by this stage in the process and relationship, clients can comprehensively evaluate the ES vendor's fulfillment of obligations with respect to the entirety of the ES implementation service. Furthermore, clients also tend to have a clear evaluation of their willingness to engage in citizenship behaviors.

To obtain a representative sample, we filtered 200 clients whose ES services are at the post-implementation stage from a list of client firms provided by BS Company. The executives in charge of ES implementation in the client firms were selected as our key respondents because of their vast amount of knowledge on ES services and their familiarity with ES implementation processes. The client representatives of BS Company have the names and addresses of their client firms as well as the names and contact information of the key respondents. So, the client representatives of BS Company assisted us in distributing the questionnaires to the key respondents through an online link. Meanwhile, we kept in touch with client representatives in BS Company and make sure they invited and distributed our questionnaires to the key respondents. The liaison between client representatives in BS Company and client firms is useful for improving response rate as well as quality. To minimize the biases induced by personal links, we specified in questionnaires and when distributing the questionnaires what our academic purpose was and promised no further use of their personal information. Several rounds of follow-up reminders were conducted to maximize the response rate.

Out of a total of 200 questionnaires, 135 complete questionnaires were obtained, with a response rate of 62.5 %. As all data were collected through the survey, non-response bias is a concern. To access this potential non-response bias, we compared early and late responses on key firm characteristics. The *chi-square test* on ownership type ($\chi^2(3) = 3.276$, $p = 0.351$), firm size ($\chi^2(5) = 8.780$, $p = 0.118$), firm history ($\chi^2(5) = 3.576$, $p = 0.612$), and number of IT employees

($\chi^2(3) = 5.627$, $p = 0.131$) showed no significant differences, indicating that non-response bias was not a serious problem in this study [85]. Table 3 shows the demographic information.

3.2. Measures

As our domain of interest in this study concerns psychological concepts and behaviors, we reviewed the literature on psychological contracts, organizational behaviors, and interfirm relationships. Grounding our theoretical model in the extant literature allowed us to adapt existing scales for measurement. An English questionnaire was first developed, which adopts a five-point Likert scale with measurement ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Following translation/back-translation procedures [86], the questionnaire was then translated into Chinese and checked by two scholars and six doctoral students in relevant fields to ensure content validity. The Chinese questionnaire was then translated back into English by a professional and no semantic discrepancies were identified when compared with the original English version. A complete list of items in the questionnaire is shown in the Appendix.

3.2.1. Psychological contract obligation and fulfillment

The measurements of psychological contract obligation and psychological contract fulfillment were adapted from Koh et al. [19]. Psychological contract obligation (PCO) and psychological contract fulfillment (PCF) were formulated as reflective second-order constructs, each having six dimensions: accurate project scoping (APS), clear authority structures (CAS), taking charge (TAC), dedicated project staffing (DPS), knowledge sharing (KNS), and building effective interorganizational teams (BEI). The expected obligations and corresponding fulfillments were tested separately by asking: "My firm believes that the ES vendor should take following obligations" and "In fact, the ES vendor fulfilled the following obligations."

3.2.2. Client citizenship behavior

The CCB measurement was adapted from Groth [65] and was formulated as a reflective second-order construct with the following categories: recommendations (REC), helping other customers (HEP), and providing feedback (PFB). Each category was tested by asking: "My firm willing to…."

3.2.3. Control variables

We controlled for several variables that could affect CCBs. Dummy variables were used for firm ownership. Ownership 1 refers to state-owned companies, ownership 2 refers to privately owned companies, ownership 3 refers to foreign-owned companies, and ownership 4 refers to sino-foreign joint companies. Dummy variables were also used for firm age where firm age 1 refers to less than 1 year, firm age 2 refers to 1–3 years, firm age 3 refers to 4–6 years, firm age 4 refers to 7–10 years, firm age 5 refers to 11–15 years, and firm age 6 refers to more than 15 years. Firm size was measured by dummy variables that represent the number of employees, where firm size 1 refers to less than 10 employees, firm size 2 refers to 10–50 employees, firm size 3 refers to 51–100 employees, firm size 4 refers to 101–200 employees, firm size 5 refers to 201–300 employees, and firm size 6 refers to more than 300 employees. IT department size was also measured by dummy variables representing the number of IT employees, where size 1 denotes less than 2 IT employees, size 2 denotes two to five IT employees, size 3 denotes 6–10 IT employees, size 4 denotes 11–15 IT employees, and size 5 denotes more than 16 IT employees.

Table 3
Demographic information (N = 135).

	Frequency	Percent (%)
Ownership		
State-owned	3	2.22
Privately owned	127	94.07
Foreign controlled	5	3.70
Number of employees		
Less than 10	8	5.93
10–50	73	54.07
51–100	46	34.07
More than 100	8	5.93
Firm age		
Less than 4 years	14	10.37
4–6	59	43.70
7–10	45	33.33
More than 10	17	12.59
Number of IT employees		
Less than 2	84	62.22
2–5	42	31.11
More than 5	9	6.67

3.3. Analysis

3.3.1. Multicollinearity and common method bias

Although several inter-construct correlations were greater than the benchmark of 0.600 (see Table 2), the test results revealed that the highest variance inflation factor (VIF) was 4.526, lower than the suggested benchmark value of 5 (e.g., [87]). Therefore, multicollinearity was not a severe problem in our dataset. To further mitigate multicollinearity, we mean-centered PCO and PCF before regressions were conducted.

Since the data were perceptual and collected from one informant to answer the self-reported questionnaire, common method bias might be a potential threat to the validity of the study. To minimize this bias, we adopted different instructions for different scales and arranged the constructs into distinct sections when designing the questionnaire [88]. Furthermore, we conducted three tests to check for potential common method bias. First, Harman's one-factor test was performed using exploratory factor analysis (EFA) [88]. The results showed that 14 distinct factors with eigenvalues of more than 1.0 explained 72.5 % of the total variance. The first factor explained 25.0 % of variance (not the majority of the total variance), thereby indicating that the common method bias was not likely to be a serious problem. Second, we compared the fit between the one-factor model and measurement model to assess the occurrence of common method bias [89]. The one-factor model yielded fit indices ($\chi^2/df = 3144.777/902 = 3.486$, CFI = 0.354, NNFI = 0.322, RMSEA = 0.136, SRMR = 0.143) that were unacceptable and significantly worse than the fit of the measurement model ($\chi^2/df = 1860.003/1070 = 1.738$, CFI = 0.806, NNFI = 0.778, RMSEA = 0.074, SRMR = 0.061). Third, we employed the confirmatory factor analysis (CFA) marker-variable technique to check whether there is a significant correlation between the maker variable (i.e., a method factor) and the hypothesized variables [90]. The marker variable that specifically designed for observing the shared variance between a method factor and hypothesized factors is theoretically unrelated to our hypothesized variables. In this study, a single-item scale for the marker variable was adapted from B. Fynes* et al. [91], which was included in the questionnaire to evaluate the competitive intensity of the industry. Respondents are asked to evaluate the question: "Competition in our industry is cut-throat" (1 = strongly disagree, 5 = strongly agree). Following the procedure of Malhotra et al. [90], the CFA marker-variable technique evaluates common method bias by checking statistical differences between a basic measurement model (with only hypothesized variables) and an extended measurement model (with both hypothesized variables and a marker variable). The results show no significant improvement in model fit indices: the basic model ($\chi^2/df = 1860.003/1070 = 1.738$, CFI = 0.806, NNFI = 0.778, RMSEA = 0.074, SRMR = 0.061) vs. the extended model

($\chi^2/df = 1919.986/1105 = 1.738$, CFI = 0.803, NNFI = 0.773, RMSEA = 0.074, SRMR = 0.061). The results indicate that common method bias was not a serious problem in this study [91].

3.3.2. Confirmatory factor analysis

We conducted CFA to evaluate the reliability and validity of the measurements. The composite reliability (CR) of first-order constructs followed the procedure of first-order factor analysis [92]. The second-order factors are predicted to account for the correlations among the first-order factors. We followed the procedure of second-order factor analysis to estimate the CR of second-order constructs (i.e., PCO, PCF, and CCBs) [92]. As shown in Table 4, all items are reasonable indicators of their respective first-order factors with factor loadings higher than the suggested benchmark 0.700. Table 5 presents the correlations among the first-order factors and are significantly interrelated, which speaks to the viability of second-order constructs. Thus, the composite reliabilities of second-order factors are calculated based on the loadings of their respective first-order factors that loaded onto the second-order factors. The results indicate that the values of CR are also higher than the benchmark value of 0.700. Furthermore, the values of the average variance extracted (AVE) are higher than the threshold of 0.500 [93]. Therefore, the constructs have acceptable convergent validity. Table 5 shows that the inter-construct correlations are lower than the corresponding square root of AVEs, suggesting good discriminant validity [94]. Overall, the results of second-order CFA suggest that the second-order aggregates (i.e., PCO, PCF, and CCBs) fit the data appropriately. To better describe and summarize features of a collection of information, we presented the mean values of aggregated first-order variables as well as their standardized deviations in Table 5. In the subsequent regression analysis, we performed the value of the second-order aggregates as the average value of their first-order aggregates that were aggregated from the value of respective indicators.

3.4. Polynomial regression and response surface analysis

To test our hypotheses and capture the differential effects of *under-fulfillment*, *fulfillment*, and *over-fulfillment* of psychological contract, we used polynomial modeling and response surface methodology to address the research gaps [95–97]. Models that utilize a congruence between variables are common in information systems research. Both difference scores and polynomial modeling are used to examine the congruence effect. However, the difference scores methodology has several well-recognized limitations [98,99], including discarded information because of using difference scores to gain a single measure for further analyses and less robust due to unrealistically restrictive constraints on the difference scores model [98]. Polynomial models address the limitations of difference scores (i.e., linear models) by allowing the examination of curvilinear relationships between component measures [98]. Therefore, Edwards and his colleagues recommended using polynomial modeling to generate three-dimensional response surfaces to examine the congruence/incongruence effects [95,100]. The response surface methodology provides an interpretive framework with mathematical and statistical techniques to show the features of the surface corresponding to polynomial equations [101]. When coupled with response surface methodology, polynomial modeling can precisely capture the inherent three-dimensional relationships of obligations and fulfillments with CCBs [33,72], which provides a successful way of revealing the complexity in theories of congruence [102]. After Klein et al. [99]'s recommendation of polynomial modeling as a method of addressing more complex relationships in IS studies, polynomial modeling and response surface analysis have been widely used in information systems (IS) research. Table 6 provides an overview.

The quadratic regression equation is illustrated below:

$$CCBs = b_0 + b_1PCF + b_2PCO + b_3PCF^2 + b_4PCF \times PCO + b_5PCO^2 + e. \quad (1)$$

Table 4
The CR and AVE for the main constructs and their components.

Constructs	Items	Loadings*	CR	AVE
Psychological Contract Obligation	Accurate project scoping	0.711	0.865	0.518
	Clear authority structures	0.755		
	Taking charge	0.642		
	Dedicated project staffing	0.751		
	Knowledge sharing	0.682		
	Building effective interfirm teams	0.770		
Accurate project scoping	PCO_APS1 ~ PCO_APS3	0.810~0.842	0.861	0.674
Clear authority structures	PCO_CAS1 ~ PCO_CAS3	0.832~0.846	0.881	0.712
Taking charge	PCO_TAC1 ~ PCO_TAC3	0.829~0.885	0.888	0.726
Dedicated project staffing	PCO_DPS1 ~ PCO_DPS3	0.730~0.853	0.852	0.659
Knowledge sharing	PCO_KNS1 ~ PCO_KNS4	0.679~0.822	0.849	0.586
Building effective interfirm teams	PCO_BEI1 ~ PCO_BEI3	0.766~0.871	0.857	0.667
Psychological Contract Fulfillment	Accurate project scoping	0.741	0.894	0.586
	Clear authority structures	0.814		
	Taking charge	0.730		
	Dedicated project staffing	0.783		
	Knowledge sharing	0.756		
	Building effective interfirm teams	0.676		
Accurate project scoping	PCF_APS1 ~ PCF_APS3	0.809~0.892	0.898	0.746
Clear authority structures	PCF_CAS1 ~ PCF_CAS3	0.818~0.915	0.899	0.749
Taking charge	PCF_TAC1 ~ PCF_TAC3	0.843~0.852	0.886	0.721
Dedicated project staffing	PCF_DPS1 ~ PCF_DPS3	0.822~0.890	0.891	0.731
Knowledge sharing	PCF_KNS1 ~ PCF_KNS4	0.823~0.861	0.909	0.714
Building effective interfirm teams	PCF_BEI1 ~ PCF_BEI3	0.783~0.837	0.861	0.674
Client Citizenship Behaviors	Recommendations	0.916	0.918	0.789
	Helping other customers	0.893		
	Providing feedback	0.854		
Recommendations	CCB_REC1 ~ CCB_HEP4	0.718~0.853	0.866	0.618
Helping other customers	CCB_HEP1 ~ CCB_HEP4	0.812~0.876	0.910	0.716
Providing feedback	CCB_PFB1 ~ CCB_PFB4	0.765~0.858	0.900	0.601
Ownership	Single item			
Firm Size	Single item			
Firm Age	Single item			
IT Department Size	Single item			

Note: CR = composite reliability; AVE = Averaged Variance Extracted.
* Significant at $p < 0.001$.

We followed the regression procedure that the dependent variable (CCBs) was regressed on control variables as well as five polynomial terms: psychological contract obligation (PCO), psychological contract fulfillment (PCF), psychological contract obligation squared (PCO^2), psychological contract fulfillment times psychological contract obligation ($PCF \times PCO$), and psychological contract fulfillment squared (PCF^2). To mitigate multicollinearity between component measures and their associated higher-order terms, PCF and PCO were centered around the pooled grand mean before calculating the higher-order terms [105].

After polynomial regression, we performed a response surface analysis. Following the procedure described in Edwards and Parry's [100]

Table 5
Descriptive statistics: means, standard deviations, and correlations (N = 135).

	Means	SD	PCO_APS	PCO_CAS	PCO_TAC	PCO_DPS	PCO_KNS	PCO_BEI	PCF_APS	PCF_CAS	PCF_TAC
PCO_APS	4.38	0.46	**0.707**								
PCO_CAS	4.62	0.45	0.390**	**0.821**							
PCO_TAC	4.46	0.51	0.388**	0.398**	**0.844**						
PCO_DPS	4.55	0.44	0.359**	0.530**	0.302**	**0.852**					
PCO_KNS	4.63	0.38	0.347**	0.368**	0.196*	0.479**	**0.812**				
PCO_BEI	4.55	0.43	0.492**	0.453**	0.423**	0.418**	0.414**	**0.766**			
PCF_APS	4.22	0.60	0.384**	0.256**	0.194*	0.112	0.222*	0.293**	**0.817**		
PCF_CAS	4.46	0.52	0.104	0.586**	0.234**	0.353**	0.313**	0.261**	0.560**	**0.750**	
PCF_TAC	4.34	0.53	0.152	0.218*	0.489**	0.150	0.102	0.187*	0.512**	0.527**	**0.864**
PCF_DPS	4.37	0.57	0.059	0.280**	0.047	0.406**	0.356**	0.164	0.467**	0.550**	0.481**
PCF_KNS	4.41	0.58	0.140	0.290**	−0.076	0.258**	0.439**	0.181*	0.437**	0.547**	0.311**
PCF_BEI	4.47	0.45	0.254**	0.228*	0.264**	0.187*	0.178*	0.573**	0.406**	0.474**	0.388**
CCB_REC	4.27	0.51	0.222*	0.120	0.380**	0.149	0.044	0.313**	0.327**	0.246**	0.456**
CCB_HEP	4.22	0.62	0.254**	0.119	0.301**	0.078	−0.003	0.173	0.284**	0.162	0.313**
CCB_PFB	4.33	0.47	0.201*	0.098	0.520**	0.042	−0.060	0.289**	0.318**	0.206*	0.555**
OWN	—	—	−0.288**	−0.443**	−0.240**	−0.319**	−0.147	−0.335**	−0.205*	−0.286**	−0.115
SIZE	—	—	−0.020	0.075	0.216*	−0.022	−0.019	0.060	0.174	0.084	0.199*
HIS	—	—	−0.038	−0.048	0.052	−0.061	0.013	−0.118	0.144	0.084	0.103
ITS	—	—	0.020	−0.052	−0.046	0.016	0.013	−0.080	0.153	−0.033	−0.042

Continued

	PCF_DPS	PCF_KNS	PCF_BEI	CTB_REC	CTB_HEP	CTB_PFB	OWN	SIZE	HIS	ITS
PCF_DPS	**0.865**									
PCF_KNS	0.635**	**0.849**								
PCF_BEI	0.338**	0.456**	**0.855**							
CCB_REC	0.302**	0.197*	0.438**	**0.845**						
CCB_HEP	0.246**	0.116	0.306**	0.779**	**0.821**					
CCB_PFB	0.245**	0.027	0.310**	0.682**	0.582**	**0.888**				
OWN	−0.132	−0.230**	−0.209*	0.120	0.112	0.103	—			
SIZE	0.195*	0.050	0.047	0.181*	0.175	0.247**	0.015	—		
HIS	0.120	0.028	0.037	0.319**	0.183*	0.241**	0.196*	0.363**	—	
ITS	0.194*	0.069	−0.092	0.112	0.089	0.083	0.072	0.285**	0.274**	—

Note: SD = standardized deviations; OWN = Ownership, SIZE = Firm size, HIS = Firm age, ITS = IT department size. The diagonal elements are square roots of AVEs.
* $p < 0.05$.
** $p < 0.01$.

Table 6
An overview of polynomial modeling and response surface methodology usage in IS studies.

Study	Purpose
Venkatesh & Goyal [102]	To examine the effect of usefulness and attitude in the pre-exposure and post-exposure stages on the intention of continuing usage of a system.
Brown et al. [101]	To study the impact of expectations and experiences on technology use by using technology acceptance model (TAM).
Lankton et al. [103]	To understand the nonlinear nature of trust disconfirmation effects on IT from an expectation disconfirmation perspective.
Daniel et al. [98]	To examine the impact of differences in ideology between employees and their coworkers, and between employees and the open-source software community on employee commitment and code contribution to the community.
Nishant et al. [104]	To investigate the nonlinear relationship between perceived/expected service quality and continued use intention.

literature, we examined the basic features of the response surface: slopes and curvatures along lines of interest—fulfillment line (PCF = PCO) and breach line (PCF = - PCO). As shown in Fig. 1A, the comparison of expected obligations and perceived fulfillments was captured by the two-dimensional space on the floor of the graph. The fulfillment line (PCF = PCO) proceeded from the front corner to the rear corner and captured variation at absolute levels where perceived fulfillments equal perceived obligations. The breach line (PCF =–PCO) proceeded from the left corner to the right corner. Along this line, the region where fulfillments are less than obligations represents deficiency, whereas the region where fulfillments are greater than obligations signifies excess. Fig. 1B illustrates the shape of the surface along the fulfillment line and Fig. 1C shows the shape of the surface along the breach line. To test Hypothesis 1 and Hypothesis 2, we examined two key features of the plotted response surface: the *slope* as well as the *curvature* of the surface along breach line (PCF = - PCO). According to Edwards and Parry [100], the shape of the surface along PCF = - PCO line can be calculated by substituting—PCF for PCO in Eq. 1. Then, the *slope* of the surface along PCF = - PCO line can be calculated as (b_1–b_2) and the *curvature* of the surface along this line is (b_3–b_4 + b_5). When the *slope* along the breach line is positive and significant, we are able to conclude that under-fulfillment is negatively associated with CCBs (i.e., Hypothesis 1) and over-fulfillment is positively associated with CCBs (i.e., Hypothesis 2). To test Hypothesis 3, we examined the *slope* as well as the *curvature* of the surface along fulfillment line (PCF = PCO). Similarly, the shape of the surface along fulfillment line (PCF = PCO) can be calculated by substituting PCF for PCO in Eq. 1. Thus, along the PCF = PCO line, the *slope* of the surface can be calculated as (b_1 + b_2) and the *curvature* of the surface is (b_3 + b_4 + b_5). If the sums are zero, then the surface is flat along PCF = PCO line. If the *slope* along the PCF = PCO line is positive and significant, we are able to conclude that CCBs are higher when obligation and fulfillment match at a high level than match at a low level (i.e., Hypothesis 3).

4. Results

4.1. Hypotheses testing

To avoid misleading interpretation of the results, we checked the statistic power with our sample size of 135. We used G*Power 3.1 [106] to test the statistical power of our model. Specifically, we conducted a post hoc analysis (the statistical power $1 - \beta$ is calculated as a function of significant level, sample size, and population effect size) and set the α error probability of 0.05 [103]. The results show that the statistic power ($1 - \beta$) is 0.98 (F = 3.06), above the minimum threshold of 0.80 [107]. Furthermore, the join significant analysis of second-order polynomial

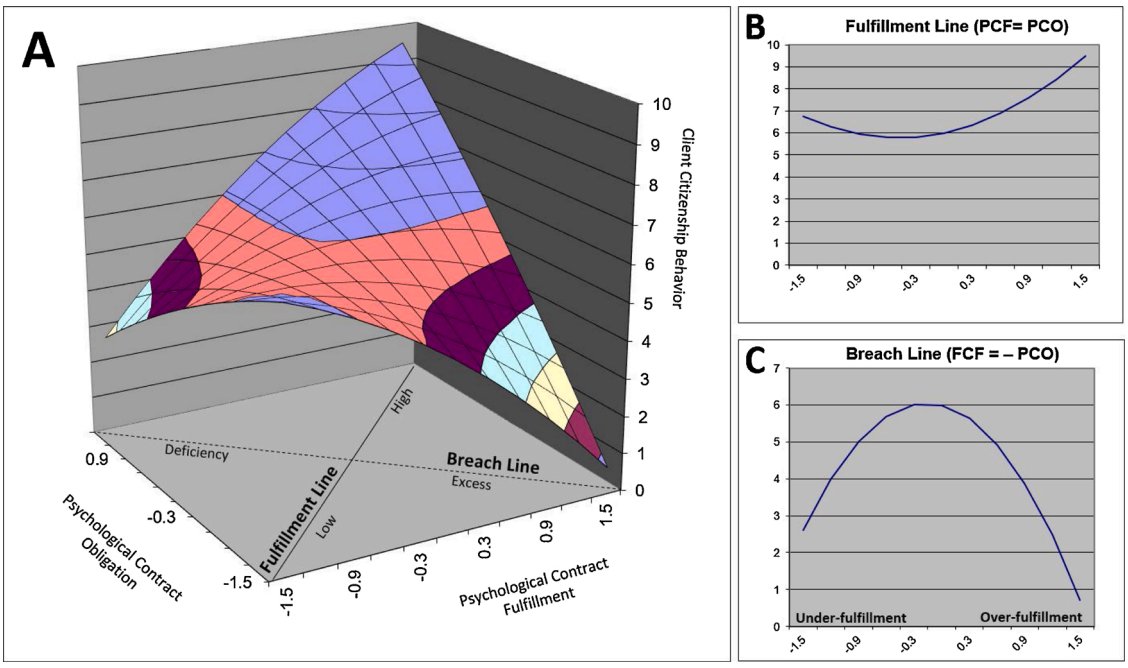

Fig. 1. Response surface relating CCBs to psychological contract obligation and fulfillment.

terms (PCF^2, PCO × PCF, and PCO^2) significantly lead to an increase in R^2 ($\Delta R^2 = 0.109$, $p < 0.01$). Thus, the results showed a satisfactory statistical power for this research model. In addition, extant studies using polynomial modeling have adopted a similar sample size as this research and delivered valid results [96,103–105]. Based on the above, we believe that the sample size of this study is large enough for hypotheses testing.

Table 7 reports the polynomial regressions results as well as the slopes and curvatures along the fulfillment line and breach line. Specifically, in the regression models, we controlled for firm ownership, firm size, firm history, and number of IT employees. In Model 2, we considered the linear model and, in Model 3, we added the three polynomial terms. Our results indicate that the three second-order polynomial terms (PCF^2, PCO × PCF, and PCO^2) were jointly significant in predicting CCBs ($F = 7.16$, $p < 0.001$). As the variance explained by higher-order terms is significantly higher than that explained by the linear model (i.e., Model 2), the curvilinear model (i.e., Model 3) was found to be more favorable than the linear model (see [95,108]). To illustrate the principles of polynomial modeling, Fig. 1 illustrates the three-dimensional response surface based on these coefficients.

Table 7
Polynomial regressions of CCBs on psychological contract obligation and fulfillment.

	Customer citizenship behaviors		
Variables	Model 1	Model 2	Model 3
Ownership	0.050	0.234**	0.132
Firm size	0.104	0.031	0.132
Firm age	0.196*	0.148	0.069
IT department size	0.036	0.033	0.011
PCF		0.320**	0.117
PCO		0.219*	0.510***
PCF^2			−0.180
PCF × PCO			0.576***
PCO^2			−0.047
R2	0.079	0.258	0.366
ΔR2		0.180***	0.109**
Fulfillment (PCF = PCO) line			
Slope			0.908***
Curvature			0.939**
Breach (PCF =–PCO) line			
Slope			−0.630
Curvature			−1.927*
F for the quadratic			7.16***

Note: N = 135; PCO = Psychological Contract Obligation, PCF = Psychological Contract Fulfillment; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Hypothesis 1 suggests that CCBs will be reduced to the extent that the perceived fulfillments fall short of expected obligations, and Hypothesis 2 suggests that CCBs will increase as perceived fulfillment exceeds expected obligations. Examining the response surface, Fig. 1C indicates an inverted U-shaped surface along the breach line with the curvature showing a negative significance (curvature =–1.927, $p < 0.05$). Fig. 1C in the deficiency region shows that CCBs go down when fulfillments fall short of obligations (i.e., under-fulfillment), indicating that psychological contract under-fulfillment is negatively associated with CCBs, thus supporting Hypothesis 1. However, the inverted U-shaped surface along the excess region signifies that CCBs go down when fulfillments exceed obligations (i.e., over-fulfillment), indicating that psychological contract over-fulfillment is also negatively related to CCBs. This is contrary to what we predicted in Hypothesis 2. Thus, Hypothesis 2 was not supported.

Hypothesis 3 suggests that the performance of CCBs is higher when perceived fulfillments and perceived obligations match at a high level as opposed to when they match at a low level. As shown in Table 7, the slope along the fulfillment line is significant and positive (slope = 0.908, $p < 0.001$), indicating that the performance of CCBs is higher when perceived fulfillments and expected obligations are both high as opposed to when both are low. Fig. 1B also indicates that the performances of CCBs are higher at the rear corner (high/high congruence) than at the front corner (low/low congruence), thus supporting Hypothesis 3. Additionally, the positive curvature (curvature = 0.939, $p < 0.01$) along the fulfillment line indicates a nonlinear relationship between psychological contract fulfillment and CCBs.

For post hoc analyses, we tested whether or not clients react differently toward under-fulfillment and over-fulfillment, since both psychological contract under-fulfillment and over-fulfillment were negatively related to CCBs. The quantity of lateral shift of the surface along the breach line is nonsignificant (lateral shift =–0.158, n.s.), indicating that

Fig. 1C shows a symmetrical incongruence effect along the breach line. Thus, CCBs were shown to decrease symmetrically when psychological contract fulfillments deviated from psychological contract obligations in either direction.

4.2. Robustness analysis

To provide additional evidence that both under-fulfillment and over-fulfillment of psychological contract were negatively related to CCBs, we introduced the concept of *fulfillment-obligation match (FOM)* (i.e., the match between the level of delivered fulfillments and the level of expected obligations). Following the difference scores approach [109], we measured FOM as the absolute difference between the delivered fulfillments and expected obligations; that is, FOM = |PCF–PCO|. The higher value of FOM indicates a higher *mismatch* and the lower value indicates a closer *match* between PCF and PCO. Table 8 presents the results. The results show that FOM is negatively related to CCBs ($\beta = -0.253$, $p < 0.01$). The negative correlation between FOM and CCBs indicates the higher mismatch (i.e., higher FOM) the fewer CCBs. Additionally, the higher FOM indicates PCF and PCO deviate from perfect match in either direction (i.e., under-fulfillment or over-fulfillment). In other words, both under-fulfillment and over-fulfillment of psychological contracts were found to be negatively related to CCBs, supporting H1 and H2.

5. Discussion and implications

5.1. Discussion of the results

Based on SET, this study offers a better understanding of CCBs from a psychological contract perspective in the context of ES vendor–client relationships. Our results support that psychological contract *under-fulfillment* is negatively associated with CCBs, which is consistent with existing individual-level research findings that psychological contract breach or violation can lead to various negative employee attitudes and behaviors, such as organizational citizenship behaviors (e.g., [12,13,45]). This finding confirms that *under-fulfillment* of psychological contract leads to inequality in the social exchange between ES vendors and client firms. To maintain equity, client firms tend to reciprocate this unfair social exchange by reducing their CCBs [43]. The result also confirms that the *under-fulfillment* of psychological contract leads to negative beliefs and distrust which damages the reciprocal exchange norms between ES vendors and client firms [29]. Consequently, client firms may feel much less obligated to benefit their ES vendors through CCBs. Furthermore, we found that CCBs still maintain a moderate level of performance when perceived fulfillment fell a little short of expected obligations, which can be explained as a situation where psychological contract obligations are insufficiently fulfilled but not strong enough to arouse perceived violation emotionally [25]. Our findings also support that CCBs will be higher when fulfillments and obligations match at a high level as opposed to when they match at a low level. This indicates that ES vendors fulfilling strong obligations will earn more CCBs than fulfilling weak obligations.

Table 8
Regression results using difference scores approach.

	Customer citizenship behaviors	
Variables	Model 1	Model 2
Ownership	0.050	0.055
Firm size	0.104	0.122
Firm age	0.196*	0.131
IT department size	0.036	0.035
FOM		**−0.253****
R2	0.078	0.138
ΔR2		0.060**

Note: N = 135; FOM = |PCF–PCP|; *$p < 0.05$, **$p < 0.01$.

Counterintuitively, however, our results indicate that psychological contract *over-fulfillment* is negatively associated with CCBs. This differs from what we understood through SET as well as what we learned in individual-level research studies claiming that over-fulfilling employees' expectations will enhance the exchange of positive behaviors (e.g., [45,74]). We provide the following plausible explanation for this counterintuitive finding. Specifically, the high level of exceeded fulfillments may indicate relatively low or even no expected obligations on the clients' behalf toward their ES vendor. Hence, clients might not be willing to reward ES vendors for fulfillments they do not need. Furthermore, the exceeded fulfillments may come at huge costs for ES vendors, of which clients may not be willing to cover. On the other hand, in ES vendor–client relationships, clients pay ES vendors for services. Under this condition, clients may feel it is fair when perceiving that ES vendors try to fulfill more than expected to satisfy them. More importantly, prior research suggests that the likelihood of perceiving over-fulfillment tends to be lower than the likelihood of perceiving under-fulfillment [12,110,111]. Accordingly, clients tend to ignore over-fulfillment behaviors, especially when they perceive their ES vendor as having low levels of obligations. Clients thus have less consciousness to engage in more extra-role behaviors as social exchanges.

5.2. Theoretical implications

We expect that the findings of our study can provide the following theoretical implications. First, while prior IS research focuses on studying IT personnel's or employees' citizenship behaviors in IS contracting (e.g., [17,55]) and ES success (e.g. [7,112],), this study extends individual-level citizenship behavior to an inter-organizational context and examines CCBs through a psychological contract perspective in ES projects. The results show that the fulfillment of psychological contract exerts great influence on a client's voluntary engagement in ES projects. Therefore, this study affords a deeper understanding of psychological contract theory in the context of IS outsourcing and provides new insights as to how to encourage client participation in ES projects from a psychological contract perspective.

Second, this study focuses on both under-fulfillment and over-fulfillment of psychological contract, thus enriching the understandings of the effects of psychological contract over-fulfillment on CCBs in ES vendor–client relationships. Although our results show a distinct influence of psychological contract over-fulfillment on CCBs, this counterintuitive finding may indicate that SET is not suitable for predicting behaviors in the situation of over-fulfillment. Exceeding fulfillment in situations where the goal has already been achieved challenges the basic assumption of SET that self-interested parties transact or exchange with each other to accomplish outcomes they could not achieve on their own [113,114]. Therefore, the finding extends our understanding of social exchange between ES vendors and their clients and provides an anomaly that stimulates additional theorizing for future research.

Third, by reflecting on the distinction between obligations and fulfillments, this study extends psychological contract literature by considering the effects of congruence between expected obligations and perceived fulfillments. The results demonstrate that whether the obligations are fulfilled exerts a significant influence on clients' engagement in voluntary behaviors in ES projects. Thus, our study provides a reference point for further research to identify those strong obligations comprising psychological contracts in IS outsourcing.

5.3. Practical implications

Our findings also suggest some practical implications. This study suggests that both under-fulfillment and over-fulfillment of psychological contracts are negatively associated with CCBs. In other words, clients are likely to exhibit the highest performance of citizenship behaviors when ES vendors perfectly fulfill the psychological contracts

of clients. Thus, ES vendor managers should carefully assess their client's expected obligations and pay special attention to avoiding under-fulfilling and over-fulfilling. As clients behave equivalently to both under-fulfillment and over-fulfillment of psychological contracts, ES vendor managers are also advised not to spend more energy and resources in exceeding their clients' expectations. Because clients have no reason to kind mind or complain, ES vendors might not be aware that their efforts at over-fulfillment are likely being performed in vain, and might thus continue to allocate resources to maintain over-fulfillment in exchange for CCBs.

Finally, ES vendor managers should be cautious that under-fulfilling or over-fulfilling a high level of expected obligation might lead to a sharp decrease in CCBs. Therefore, we suggest that ES managers carefully and clearly assess which kinds of obligations are strongly expected by their clients before ES implementation and, during ES implementation, ES vendor managers should make the necessary adjustments to achieve fulfillment and not seriously under-fulfill or over-fulfill these obligations.

5.4. Limitations and future directions

The limitations of this study present avenues for further research. First, we had no avenue to collect data from a random ES vendor–client sample, and the data we did collect came from the clients of a single ES vendor in China. While collecting data from a single ES vendor does make the results more reliable since the obligations perceived by clients are comparable because they face the same ES product and vendor, our results are still limited in generalization. Collecting data from a random ES vendor–client sample in future research would better address this external validity problem.

Second, our results indicate that over-fulfillment of psychological contracts exerts a negative impact on CCBs in ES vendor–client relationships. This finding is inconsistent with what we understood through SET. Although we provided several plausible explanations for this, further research should explore why psychological contract over-fulfillment leads to a negative impact on CCBs in ES implementation.

Third, this study was mainly conducted from the client's perspective as we focused on the obligations expected by clients toward ES vendors. Since each party possesses a unique psychological contract based on its own understanding of the reciprocal obligations in an ES project [19], discrepancies may occur because clients and ES vendors tend to have a difference in opinion regarding what the ES vendor is obligated to provide. It would thus be interesting to explore the impact of congruence/incongruence between the two parties' perceived obligations on CCBs.

Fourth, we focused on the relationship between psychological contracts and CCBs in a buyer–supplier relationship. This relationship may be influenced by contextual elements. Future research should explore environmental or relationship-specific moderators, such as competitive intensity, relationship length, and interfirm governance.

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CRediT authorship contribution statement

Yang Liu: Conceptualization, Software, Formal analysis, Writing - original draft, Visualization. **Hefu Liu:** Conceptualization, Resources, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Zhao Cai:** Conceptualization, Methodology, Data curation, Writing - review & editing, Funding acquisition.

Appendix A

Measurement items

My firm believes that the ES vendor should undertake the following obligations. (In fact, the ES vendor fulfilled the following obligations.)	
Psychological Contract Obligation/Fulfillment (adapted from Koh et al. [19])	
Accurate project scoping (APS)	APS1: Estimates the contract scope accurately (i.e., not underbid or overbid). APS2: Accepts scope change without additional charge. APS3: Builds buffer into contract to accommodate scope changes.
Clear authority structures (CAS)	CAS1: Defines precisely the roles of each party. CAS2: Defines precisely the responsibilities of each party. CAS3: Lays out clearly what each party is to perform.
Taking charge (TAC)	TAC1: Works independently (i.e., minimal reliance on my firm) in getting the job done. TAC2: Completes the job with minimal disruption to my firm's operations. TAC3: Solves problems with minimal involvement from my firm.
Dedicated project staffing (DPS)	DPS1: Assigns adequate staff dedicated to the project (i.e., few staff changes). DPS2: Keeps our staff turnover low during the project. DPS3: Replaces any leaving customer staff with someone more qualified or with equivalent expertise.
Knowledge sharing (KNS)	KNS1: Transfers knowledge to our staff. KNS2: Shares best industry practices with us. KNS3: Transfers know-how of the product or service to us. KNS4: Delivers complete and comprehensive documentation (e.g., manuals, product, and design specifications).
Building effective interorganizational teams (BEI)	BEI1: Invests time in building a good relationship with us. BEI2: Has a common or joint sense of mission and purpose with us. BEI3: Works as a team with us.
My firm is willing to … **Client Citizenship Behavior** (adapted from Groth [65])	
Recommendations (REC)	REC1: Recommend the vendor to the members in our supply chain. REC2: Recommend the vendor to firms with whom we have a good personal relationship. REC3: Recommend the vendor to firms interested in the business' products/services. REC4: Demonstrate ES to prospective customers.
Helping other customers (HEP)	HEP1: Assist other customers in finding appropriate ES products provided by the vendor.

(*continued on next page*)

(*continued*)

My firm believes that the ES vendor should undertake the following obligations. (In fact, the ES vendor fulfilled the following obligations.)	
Providing feedback (PFB)	HEP2: Help other customers with their implementation of ES. HEP3: Teach other customers how to use the ES correctly. HEP4: Explain to other customers how to cooperate with the vendor. PFB1: Fill out a customer satisfaction survey. PFB2: Provide helpful feedback to customer service. PFB3: Provide information when surveyed by the business. PFB4: Inform the business about the great service received by an individual employee.

Note: All items are measured using 5-point Likert scales with 1 = "strongly disagree" and 5 = "strongly agree."

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