

Exploring IT Outsourcing Governance with Vendor's Interpersonal Networks: A Case Study

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Abstract. The governance of IT outsourcing (ITO) has been identified as an essential determinant for ITO success. Prior studies have shed light on effective governance forms in different organizational contexts, but few have studied the association between governance forms and interpersonal networks. With a single case study from a vendor's perspective in an ITO dyad, this research strives to explore and empirically understand how interpersonal networks reflect and influence ITO governance. Social Network Analysis (SNA) was conducted for whole-network analysis on 24 team members in an ITO vendor company. In addition, open-ended interviews with six selected team members were utilized to identify the governance form from the vendor's perspective. The findings suggest that the similarity between formal and informal interpersonal networks reflects a hierarchical form of governance; and the hierarchy governance is in turn reinforced by the geographically dispersed nature of team members.

Keywords: IT outsourcing, outsourcing governance, Social Network Analysis, mixed methods

1 Introduction

Information technology outsourcing (ITO) has evolved into a significant managerial topic during the last two decades [27]. Research on ITO has shifted from the “make or buy” decision to management of outsourcing relationships. Many prior studies on the post-adoption stage of ITO have suggested ITO governance to be a critical determinant for success [25][26][29]. IT governance is defined as “the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT” ([53], p.3). In the context of ITO, inter-organizational characteristics of governance need to be considered. Multiple governance forms have been distinguished in the prior literature, i.e. market, hierarchy and network governance [1][39]. To facilitate cooperation between client and vendors, governance in the post-adoption stage of ITO focuses on the latter forms of governance, e.g. hierarchy or network [31].

In ITO practices, certain forms of governance not only emerge through persistent interactions across organizational boundaries, but also occur as a result of continuous

activities within the boundary of the involved organizations. Therefore, to assess inter-organizational ITO governance, it is also necessary to understand the governance form within each organization. Several studies have discussed the relations between intra-organizational IT governance and ITO from the client perspective on the ITO decision [2][10], and identified the influence of formal communication procedures on the effectiveness of IT governance [17]. It has also been argued that formal and informal aspects are equally important in an ITO relationship [38][43][48]. In effect, during the implementation of ITO, both formal and informal communications among different actors would influence governance practices. Meanwhile, interpersonal networks can reflect organizational structure, which is essential for the strategic choice between a hierarchy and a network governance form [53]. Governance of IT outsourcing and the role of contracts have been recognized to be important [31], and it has also been highlighted in the field of IS that social network perspective helps to increase organizational and individual network awareness (e.g. [34]). Despite the potential impact of existing interpersonal network on outsourcing governance practices, there is still a lack of studies to mobilize the network view on ITO governance, and the vendor's perspective is still under explored. We attempt to address this gap with our research question: How does vendor's intra-organizational networks reflect and influence the ITO governance form perceived by the vendor employees?

To answer this question, we first have to understand the ITO governance form perceived by the vendor, as well as to delineate the intra-organizational networks in the vendor firm. Only with these understandings can we further analyze the correlation between interpersonal networks and governance form of ITO from the vendor's perspective. For this purpose, we have conducted a single case study in an ITO vendor firm. We carried out Social Network Analysis (SNA) of 24 team members who are dedicated to one particular client firm. In addition, in-depth open-ended interviews with six selected team members were utilized to identify the governance form in their perception on the vendor side of the ITO dyad. The analysis of interview data reveals a hierarchical form of ITO governance perceived by the vendor; while the structural comparison between different interpersonal networks reflects this perception in multiple ways.

In the following sections, we will first review the relevant literature on ITO governance and interpersonal networks. In the methodology section we will present a mixed method approach, followed by a result section where we present a chain of evidences discussing the major findings. And the last section concludes the paper with limitations, contributions and implications for future research.

2 Literature Review

2.1 ITO Governance

IT governance is a multi-dimensional concept, which is defined in different ways with alternative interpretations [46][55]. IT governance has also been analyzed in various ways [7][9][11][44][48][57]. The focuses and perspectives in prior research are two

folds, i.e. on the governance of IT itself [55] or on governance of organizational issues in relation to IT projects [9]. Some researchers argue that these two perspectives are intertwined with each other. For instance, Weill and Ross [54] highlight that IT governance is linked to other key organizational assets, such as financial, human, intellectual property, and physical relationships. According to Boynton, Jacobs and Zmud [5], IT governance is concerned with “the location, distribution, and pattern of managerial responsibilities and control that ultimately affect how IT resources are applied and then implemented” (p. 1). This is consistent with the widely accepted definition by Weill [53], “the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT” (p. 3).

Van Grembergen and De Haes [51] claim that IT management, focusing on the daily IT services and IT operations, is part of the governance process; thus, IT governance embrace a broader perspective, e.g. how to perform and transform IT to meet both present and future demands of the business and the business ‘customers’. This viewpoint is applicable in the context of ITO, where the client’s business needs is an essential goal of the governance [36][37]. Additionally, in practice governance of services and operations in ITO is not only pre-defined in the contracts, but will also develop during interactions between client and vendor.

Croteau and Bergeron [9] observe a scarcity of research exploring how organizations demarcate inter-organizational governance of IT. However, ITO as a typical type of inter-organizational relationship has attracted much attention of researchers. A distinction between contractual and relational governance is made [27]. Some researchers argue for the combination of these two governance forms [13][38][43][45]; whereas other research focus on governance forms, making a distinction between contract types, e.g. formal/written contract and psychological contract [20]. In the practice of ITO, certain forms of governance not only emerge in the interactions between client and vendor firms, but also occur within the boundary of each participating firm, i.e. vendor and client firm. Therefore, to assess the overall landscape of ITO governance, it is necessary to understand the governance form within each organization.

The relations between intra-organizational IT governance and ITO have been discussed in prior literature. Ali and Green [2] examined how the effectiveness of IT governance would impact an organization’s level of IT outsourcing decisions. Similarly, Dahlberg and Lahdelma [10] argue for measurable interdependences between IT governance and IT outsourcing. These studies have provided valuable evidence from the client perspective and contributed in the research area of ITO decision. During ITO, vendors have to provide technical expertise while managing the relationship [45]. And the vendor is also able to develop and provide competencies, which are costly for the client to imitate [28]. In this paper, we choose to focus on vendor’s perspective and study ITO dyad within the vendor’s organization.

2.2 Interpersonal Networks and Governance Forms

The structure of interpersonal communication networks has attracted research attention in the field of IT governance. Among the different governance mechanisms discussed by Weill and Ross [54][55], formal communication are addressed together

with decision-making structures and alignment processes. Various formal channels are recognized for the communication in IT governance, such as general management announcements, formal committees, regular communication sessions, and so on; the mechanism of communications via these formal channels can “spread the word” in the organization with governance decisions, processes and related desirable behaviors [54]. Later on, the influence of formal communication channels is further identified on the effectiveness of IT governance [17].

Although the structure, process and relational mechanisms of governance are intentionally designed for interactions within the organization [50], in effect, during the implementation of ITO, the organizational members both in the client and vendor organization are executing governance tasks [47]. So patterns of interaction are generated among different actors for coordination, conflict resolution, building trust and share understandings that contribute to governance. Moreover, interpersonal communication networks can reflect organizational structure, which is essential and needs to be explicit when implementing IT governance [53][54]. Weill and Ross [55] also highlighted that management teams with knowledge of desirable behaviors enforced by the organizational structure can better identify and promote the additional behaviors to balance the trade-offs of formal and informal controls, i.e. synergy and autonomy. Therefore, it is meaningful to examine patterns of interpersonal networks, including formal and informal communication and control.

The interplay between formal and informal communication and control has been studied with both statistic models [14][48] and qualitative approaches [16] in ITO governance research. However, it has been hardly explored with the method of social network analysis (SNA). SNA can bridge the gap between the organizational level i.e. the formal organizational structure, and the micro level of individual actors by capturing the activities of each individual in a collective web of interactions [18]. The network perspective enables a structural comparison between formal and informal networks, which can reveal the degree of formalization in an organization [40]. As different governance forms of ITO are associated with the degree of formalization in the vendor and client firm, as well as with regard to the sourcing relationship, it is sensible to investigate the association of ITO governance form with the formal/informal network comparison both inside the vendor firm and in the outsourcing dyad between vendor and client. For this purpose, the concept of network consistency [47] is adopted to show the overlap between formal and informal networks.

We take the view that ITO governance is a framework embracing both deliberately designed structures as becomes explicit through formal communication channels, and informal cooperative interactions, which is embodied in the patterns of interpersonal networks among organizational actors. To scrutinize the formalization of different governance forms, we adopt part of Miranda and Kavan’s [31] Moments of Governance (MoG) model, which inscribes governance elements into two forms of governance, namely hierarchy and network, on the post-adoption stage of ITO. We will discuss this model in details in the next section.

2.3 Moments of Governance (MoG) Model

Miranda and Kavan [31] have synthesized prior perspectives on ITO governance with a Moments of Governance (MoG) model, consisting of processes and structures derived from Ring and Van de Ven's [41] framework of cooperative inter-organizational relationships and Nahapiet and Ghoshal's [32] development on the theory of social capital. This model provides for ITO a sequential order of two governance stages (i.e. promissory contract and psychological contract) leading to differentiated inter-organizational rents. The moment of promissory contract includes the negotiation process as "paid for promises" ([42], p.4), and the establishment of commitment between parties. Psychological contracts have been considered in terms of vendors' and clients' expectations of each other's obligations [31], referring to "an individual's beliefs regarding terms and conditions of a reciprocal exchange agreement between that person and another party" ([42], p.19). The MoG model has also circumscribed the three governance forms of market, hierarchy, and network [1][39] into each governance stage, respectively promissory contract and psychological contract moments, pertaining to the outsourcing context.

In this study, we aim to investigate the post-adoption governance of ITO, so we will focus on the stage of psychological contract in the MoG model. In this stage, only two governance alternatives are viable, i.e. hierarchy and network [31]. Psychological contract is developed during the execution process of promissory contract, when the routinized coordination occurs together with the non-routinized conflict resolution. Simultaneously, three elements of social capital [32], i.e. inter-organizational linkages, affect, and the extent of shared understandings, emerge in this stage to moderate the ITO relationship. These three elements correspond to the structural, relational and cognitive attributes of social capital [8][19]. Table 1 shows how the distinctive characteristics of the two governance forms, hierarchy and network, are inscribed in each of the governance element at the moment of psychological contract. In addition, our focus on the post-adoption stage would also expand the understanding of governance in the lifecycle of ITO.

Table 1. Governance forms at the stage of psychological contract (Adapted from [31])

Governance element		Governance form	
		<i>Hierarchy</i>	<i>Network</i>
<i>Execution</i>	Coordination	Document-based	Interaction-based
	Conflict resolution	Distributive	Integrative
<i>Social Capital</i>	Inter-organizational linkages	Few and formal	Extensive and informal
	Affect	Presumed opportunism	Presumed trust
	Shared understandings	Discrete understandings	Shared understandings

We adopted the MoG model as a theoretical scaffold to look at the post-adoption stage of ITO, from the vendor's perspective, where psychological contract dominates the relationship. Although this model is originally developed from the client's perspective, it provides a comprehensive framework also compatible for

understanding the intra-organizational relationships by mapping governance elements into two forms of hierarchy and network governance. Meanwhile, our study from the vendor's perspective will in turn enrich the understanding of psychological contracts by expanding the boundary of this model. Moreover, this model also supports our methodological choices. The process elements of execution, i.e. coordination and conflict resolution, can be mainly assessed by interviews; while the structural elements of social capital, i.e. inter-organizational linkages, affect and shared understandings can be revealed by the method of Social Network Analysis (SNA) from the network view. These methodological considerations are explained in the next section.

3 Methodology

3.1 Research Site

The research site, Alpha, is a Nordic-based multinational IT service company. The sampling strategy in a single site is not uncommon in studies based on social network analysis [22][49], since this kind of research design can define a clear boundary of the network, and contextual factors can be controlled with minimum differentiation. When the data was collected in autumn 2012, Alpha employed more than 16000 people worldwide. And its annual net sales exceeded two billion USD in the same year. This research is conducted within a team of 24 people in Alpha, who are providing exclusive outsourcing services to a large insurance company Beta. In the team there are seven sales persons, one financial controller, and 16 service delivery personnel in the team. The team members are based in dispersed geographical locations, 11 in Sweden, eight in Finland, four in Russia, and one in Czech Republic. Similarly, their direct contacts in the client company also sit in different offices in Finland, Sweden, Norway, Denmark and Russia. As a team, these 24 people work together; although their primary tasks are mainly carried out with the client branch in the same country, they are also responsible for many collaborative tasks for the other Beta offices abroad.

The contract of IT infrastructure services outsourcing between Alpha and Beta was signed in 2005. Thus, this ITO relationship which has existed for a period of seven years can be labelled as being at a post-adoption stage, and as long-term and on-going. So the governance forms on the stage of psychological contract (see Table 1) are applicable here. The outsourcing contract includes the services of server and storage delivery and development, end-user and mainframe services, as well as other ad-hoc IT projects. This paper is part of a research project on the outsourcing networks among Alpha (vendor), Beta (client) and other vendors; in this study, we zoom in to Alpha's intra-organizational networks from the larger picture, and attempt to understand its employee's perception on the ITO governance with their client Beta.

3.2 Data Collection

Empirical data was collected by the first author. Before the data collection started, a Non-Disclosure Agreement (NDA) was signed, which guaranteed both the company and the team members will remain anonymous. The data collection consists of two parts, in-depth interviews and a social network survey.

Due to the rich context for the governance form, qualitative approach is appropriate to generate deeper insights from the interviewee and enhance relevance of the research [3]. Lacity, Khan and Willcocks [26] have also suggested to use qualitative methods in outsourcing studies as they helps researchers to understand for example why some factors are important and how relational governance develops over time. Moreover, interviews ensure a common understanding between the researcher and interviewee. With the face-to-face meetings, the researcher can build certain extent of rapport with participating team members, and thus facilitate the following survey in the whole team. Therefore, semi-structured interviews with open-ended questions were first carried out with 6 selected team members to understand the governance form (i.e. hierarchy or network governance) inside Alpha (especially in the team), as well as in the outsourcing relationship with the client Beta. The interviews were done in a small Alpha team and the selected interviewees are considerably small. In order to keep the case anonymous, we do not mention the specific informant in quotations. The 6 team members were selected based on their role and frequency of contact with the client – we attempted to cover all the important functions including sales, financial controller and service delivery; meanwhile, we also tried to interview the ones who have most frequent contact with the client. Two of them are team leaders respectively in the area of sales and service delivery. And four of them belong to the service delivery function because the proportion of service delivery personnel is higher than the other two functions in the team. The basic information of the 6 interviewees is shown in Table 2. To keep them anonymous, we use pseudonyms here. The interviews are tape-recorded and partially transcribed based on relevance.

Table 2. Roles of interviewees

Interviewee	Role	Team leader?
Ann	Customer manager	Yes
Tania	Financial controller	No
Rod	Service delivery	No
Jack	Service delivery	Yes
Nielson	Service delivery	No
Thomas	Service delivery	No

After the interviews, the second round of data collection was conducted with an online questionnaire sent to all 24 team members. The questionnaire was designed for a whole network Social Network Analysis (SNA) to reveal the informal and formal interpersonal communication networks among team members, as well as their contact with the client. As the team is geographically distributed in different Nordic countries, both face-to-face and virtual communications are examined to control for the location factor. The questionnaire is designed as follows. First, the purpose was clarified in a

short introduction on the first page, and the focus on ITO governance was specified explicitly. Second, each respondent was requested to select up to 5 colleagues in the team whom he/she was most frequently in contact with; with every the selected colleague, he/she was asked to indicate if (or how often) each of these types of communication occurred: (1) formal and face-to-face, (2) formal and virtual, (3) informal and face-to-face, (4) informal and virtual, (5) social/personal. Third, each respondent nominates 10 most frequent client contacts in Beta, and answer the same set of questions as in the last part for his/her colleagues. In the survey, the name lists for selection are discussed and decided together with one team leader (Jack), involving 24 team members and 88 client contacts. Formal communications are described as “in scheduled meetings”, while informal communications are “outside scheduled meetings”, and both communications are governance related. Moreover, as prior research emphasizes the importance of friendship ties in the informal organization [12][23], the social/personal communications are also obtained and specified as “communications for social/personal reasons during leisure time”, regardless of face-to-face or virtual. In addition, the frequency of communications is rated on a 5 point Likert scale, with pre-defined frequency for each point from 5 to 0: “Several times a week”, “Every week or two”, “Once or twice in the past two months”, “Every quarter”, “Once or twice a year”, and “N/A”. These suggested frequencies were also discussed with Jack beforehand. Out of the 24 people, 23 people completed the questionnaire.

The mixed methods of qualitative interviews and social network analysis are adopted because of the exploratory nature of this study, and it enables the corroboration of findings by each method. Thus, multiple views of the same phenomena can be obtained and contrasted in the same repository of empirical data [30][56].

3.3 Data Analysis

The data analysis was carried out after the completion of data collection, so that the two parts of collected data could have minimum interference to avoid the fallacy of circular reasoning. In accordance with the data collection, the analysis of data incorporates the interpretation of interview transcription to identify the characteristics of governance forms, as well as SNA [52] based on the questionnaire data to construct formal, and informal interpersonal networks both in face-to-face and virtual contexts. A subset of interpersonal relation can be characterized as friendship networks

We started with Miranda and Kavan’s [31] model for the stage of psychological contract (see Table 1) to identify the governance elements when analyzing the qualitative interview transcripts, so that the governance forms can be distinguished with solid theoretical grounds. We highlighted the evidences in the transcription texts for each of the five elements including coordination, conflict resolution, inter-organizational linkages, affect, and extent of shared understandings. Based on the evidences, we interpreted the governance forms in the ITO relationship from the vendor’s perspective.

We constructed two sets of interpersonal networks with the questionnaire data, which are respectively internal (i.e. networks inside the team) and external networks (i.e. vendor-client networks) of the team. Consistent with the survey design, there are five different networks in each network group: (1) formal and face-to-face, (2) formal and virtual, (3) informal and face-to-face, (4) informal and virtual, and (5) friendship relations as a subset of informal interpersonal relations. We analyzed the networks with UCINET [4] employing two SNA methods – calculation for network density, and Quadratic Assignment Procedure (QAP) [21] for network correlations – to assess the consistency across different networks.

Density is the ratio of actual number of ties over possible number of ties in the entire network [52]. As one of the most widely used network index, density indicates the extent of connectivity among network actors. We calculated all the density figures of the networks with UCINET, and compared them with a density table shown in the next section of results. The comparison across the different types of networks can roughly reveal the patterns of coordination and inter-organizational linkages. To further explore the multiplicity and consistency between different types of networks among the same actors, we applied QAP in UCINET to analyze the network correlation. QAP is a permutation based procedure to test the interdependency of networks with multiple relations among the same sets of actors [15], thus it is suitable for our purpose to find the correlations across different networks in the same team.

4 Findings

4.1 Governance Forms

First we report the findings generated from the qualitative material of interview transcripts. We present them with reference to the governance elements of psychological contract in ITO [31], i.e. *coordination, conflict resolution, inter-organizational linkages, affect, and shared understandings* (see Table 1). In our case, some of the elements are closely associated with each other; and our primary aim is not to categorize the findings into the governance elements, but rather using these elements as scaffolds for the interpretation of Alpha's governance forms. Therefore, we will not discuss the evidence of each element in absolute isolation.

For the team members, the coordination with clients mainly relies on the specific ITO contract. And in conflict situations, contracts are referred to as a source of judgment.

“(When) they said that ‘this is incorrect now’, then you really need to know what's in the contract, (to decide) if you can say ‘yes, it's incorrect’.”

Considering interpersonal communications with the client, each team member is assigned in different forums with scheduled governance meetings (e.g. daily, weekly, or monthly), which are essential for the information flow between the vendor and the customer. These inter-organizational linkages via formal communications channels

are valued by most of the interviewees, and are considered as an effective way to maintain professional relationships.

“The reason why I have such a good relation with Beta is that I am included in (some specific governance) meetings. I have been in different type of forums where we have been all together.”

“We try to be professional with the customers.”

Meanwhile, particularly one interviewee (specified as X hereinafter) expressed the close personal relationship with his/her counterpart in Beta, and he/she also considers that such informal contacts enhanced the efficiency. For example, Alpha has agreed with Beta that when issues occur their reaction time can be within four hours, but this person prefers to communicate with the counterpart right away whenever possible.

“We have [...] those official forums where we meet, but then we can talk whatever issues we have in mind [...] I think we have a very good and open relation, so I don't bother too much to call [him/her]. So if I have something, why not ask, right away, and not to wait, there is a four hour or whatever.”

Most of the interviewees tend to be cautious in the communication with the client, in order not to be misunderstood. The presumption of affect is rather opportunism than trust in this ITO relationship, as the two firms have discrete code of communication, resulting in a lack of shared understandings.

“You cannot be in the same way with everyone. That is a fact because you can be misinterpreted many times, [...], it depends on which scenario and in which case you are.”

“If you ask them, they say ‘quality, quality, quality’, and then, comes other things.”

However, the same interviewee X also showed significant trust with his/her counterpart in Beta, as he/she would rather share personal opinion with his/her counterpart than anyone else.

“And there can be questions that cannot be addressed (openly), or I don't want to address elsewhere but just with [name of his/her counterpart in Beta], if I have some doubts. Sometimes you will have doubts that you will need to check and verify.”

In general, according to the characteristics of governance forms illustrated in Table 1, the hierarchy governance is revealed in this ITO relationship, as it emphasizes the document-based feature of coordination and formal way of conflict resolution in the governance process; it also promotes formal forums to link the two parties, and generally shows a low level of presumed trust and shared understandings. However, we also identified one interviewee who is willing to have a closer personal and work relationship with the counterpart in the client company. This person might be the bridge to promote a network governance form in the ITO, which remains to be explored in further studies.

4.2 Structural Comparison across Networks

Table 3 to 6 present the results of the social network analysis derived from survey data. The five types of networks are represented with Formal_F2F (formal and face-to-face), Formal_Virtual (formal and virtual), Informal_F2F (informal and face-to-face), Informal_Virtual (informal and virtual), and Personal/Social. The analyzed networks are in two sets, internal and external. The internal network consists of 24 nodes of the Alpha team, and the external vendor-client network is single directional from 24 nodes of Alpha to 88 nodes of Beta.

Table 3. Density of Vendor's internal networks

N = 24	Avg Value	Avg Wtd Out-Degree
Formal_F2F	0.369	11,625
Formal_Virtual	0.433	13,625
Informal_F2F	0.364	11,458
Informal_Virtual	0.409	12,875
Personal/Social	0.295	9,292

Table 4. Density of external vendor-client networks

N = 24+88	Avg Value	Avg Wtd Out-Degree
Formal_F2F	0.036	7,708
Formal_Virtual	0.059	12,667
Informal_F2F	0.026	5,583
Informal_Virtual	0.041	8,667
Personal/Social	0.014	3,083

Table 3 and Table 4 show the density and average weighted out-degree of internal and external networks for each network type. In both tables, non-work related personal/social networks have the lowest density among all network types. This is consistent with the interview findings that professionalism is generally valued over personal relationships in the Alpha team, especially in the communication with their client Beta. The formal associations are also shown by the density comparison between formal and informal networks, where the density figures of formal networks are slightly higher than the informal networks. Meanwhile, virtual communications, including formal and informal, are evidently more frequent than face-to-face. This is attributed to the geographically dispersed location of the team members, as well as the offices of the two companies Alpha and Beta. Moreover, it can be observed that the density figures of formal and informal networks are more similar when they occur in the same context, i.e. either in face-to-face or virtual situations. This resemblance will be validated further in the Quadratic Assignment Procedure (QAP) results.

Due to the disparity of network size between the internal and external networks, we cannot compare across the two sets of networks by the absolute values of density. Meanwhile, in the external network involving the vendor's perceived interaction with

the client, the ties are unilateral directing only from the vendor to the client, not the other way around. Therefore, for the purpose of comparison, we use average weighted out-degree, i.e. the average on the sum of out-directed tie weights. As introduced in the questionnaire design, each tie weights 1 to 5 between two connected actors depending on the frequency of the specified communication. Comparing across Table 3 and Table 4, it is evident that the frequency of internal communications is significantly higher than that of external communications in each of the network type. This resonates with the interviews that Alpha has discrete codes of communications within the team and with the client, inferring the low level of presumed trust and shared understandings.

The QAP results in Table 5 and Table 6 show the figures of Pearson correlations among different types of networks and their significance tests. Although the correlations vary among different types and sets of networks, all achieved statistical significance as the p value is less than 0.001. Therefore, the multiplicity of networks is strongly supported by the results. For example, in Table 5, a correlation coefficient of 0.938 between the formal face-to-face network and informal face-to-face network implies that if the team member A has face-to-face meetings with team member B, there is a 93.8% of probability that these two people also communicate face-to-face in informal situations.

Table 5. QAP correlation of internal networks

N = 24	Formal F2F	Formal Virtual	Informal F2F	Informal Virtual	Personal/Social
Formal_F2F	1	-	-	-	-
Formal_Virtual	0.826 ***	1	-	-	-
Informal_F2F	0.938 ***	0.808 ***	1	-	-
Informal_Virtual	0.810 ***	0.898 ***	0.767 ***	1	-
Personal/Social	0.862 ***	0.770 ***	0.868 ***	0.707 ***	1

***p<0.001

Table 6. QAP correlation of external networks

N = 24+88	Formal F2F	Formal Virtual	Informal F2F	Informal Virtual	Personal/Social
Formal_F2F	1	-	-	-	-
Formal_Virtual	0.809 ***	1	-	-	-
Informal_F2F	0.793 ***	0.697 ***	1	-	-
Informal_Virtual	0.719 ***	0.796 ***	0.690 ***	1	-
Personal/Social	0.559 ***	0.571 ***	0.577 ***	0.514 ***	1

***p<0.001

We highlighted the top three correlations in grey color within each set of networks. In general, both the internal and external networks reveal a large extent of correlation between formal and informal networks when they occur in the same situation of face-to-face or virtual. This is consistent with the comparison of density figures in internal networks, and thus indicates high network consistency in the same communication

contexts. A possible interpretation is that in this ITO relationship people tend to communicate informally mostly before or after the formal meetings. This corroborates with the hierarchical governance form interpreted from the interviews, in which the coordination process between Alpha and Beta rely heavily on scheduled meetings, both face-to-face and virtually. It can also be observed that in the internal networks within the vendor organization, the personal networks correlates strongly, and almost equally, with both formal and informal networks in the face-to-face context; whereas personal networks have generally less correlation with other types of networks in the external communication. This again relates with the interview findings that despite one exception of good personal relationship between Alpha and Beta employees, the Alpha team considers professional relations as more important with the client. It also results in the low level of presumed trust which is essential in building personal relationships. In addition, in the external communication, the high correlation between formal face-to-face and formal virtual networks is also derived from the effect of frequent scheduled meetings, as well as the different locations of the two companies. Because the same series of scheduled meetings are held both in face-to-face and virtual forms, in order to maintain the ITO governance.

5 Discussion and Conclusion

Earlier studies have recognized that effective communications within the interpersonal networks between client and vendor are compelling for success with ITO [25][29][35]. This study embraces the network perspective on ITO governance, aiming to understand how communication networks reflect and influence the ITO governance form. With the theory of psychological contract as part of Miranda and Kevan's [31] MoG model (see Table 1), we combine open-ended interviews and SNA method, and contribute to ITO research by associating governance forms with formal and informal interpersonal network patterns in the post-adoption relationship of ITO. It has been highlighted in the IS field that "Social network analysis, or more broadly network analysis, provides a rich, rigorous, and systematic means for IS scholars to assess networks and their structure as organized or enabled by various information systems" ([34], p.62). In our empirical research, we use SNA to examine social relationships in the network perspective, and have illustrated its usefulness for analyzing organizational relationships together with qualitative methods.

The results suggest that the consistency between formal and informal interpersonal networks reflects the hierarchy form of governance from the vendor's perspective. The hierarchy governance form is in turn reinforced by the geographically dispersed nature of the team and of the two companies, shown by the higher level of network density in virtual communications over the ones conducted face-to-face. In addition, in both sets of internal and external networks, the Alpha team shows higher density of professional communication over personal relations, and so is it suggested by the interviews. Therefore, the vendor team member's perceived inter-organizational ITO governance form resonates with the vendor's intra-organizational network patterns.

We establish an association between ITO governance and the patterns across communication networks. As prior literature has suggested, IT/business

communication and partnership, including both formal and informal aspects, is critical for the success of governance [33], we explored how network density and the correlation between different communication networks can reveal the governance form. Our findings correspond to prior understandings that informal ties can emerge along with the formal contacts [6][40]. While some other research suggests marginal correlations between formal and informal communication networks where informal communications are much more dense [24]; our empirical study discovered a high level of correlations between formal and informal communications under the same circumstances being face-to-face or virtual, and that the density of formal networks are similar or higher compared to that of the informal networks. We ascribe this discrepancy of findings with Kratzer et al. [24] to the different governance forms of organizations under investigation. In the specific context of ITO, our findings associate the strong correlations across formal and informal networks to the hierarchy governance form, as it reflects characteristics of few and formal linkages across the network, and document based coordination (see Table 1). The mixed approach with two distinct methods corroborates and confirms this association with both strands of qualitative and quantitative evidence [56]. Therefore, we can also predict that the patterns of interpersonal networks would be different in an ITO relationship with network governance, with lower correlation in formal and informal networks, and higher density of informal communication. However, further empirical evidence is needed to confirm this prediction. In reflection to Miranda and Kavan's [31] model of ITO governance in the moment of psychological contract, we have deepened the understanding of the structural attribute of social capital, i.e. inter-organizational linkages. The form of hierarchy governance is not only shown by the absolute value of network density, but more evidently revealed by the correlation and comparison across different type of interpersonal networks. Moreover, we have expanded the boundary of this model, which is primarily developed from the client perspective, with empirical evidences from the vendor's perspective.

Considering limitations of this study, the design of the social network questionnaire might have caused high absolute values of correlation in the QAP analysis. However, our findings are mainly based on the comparison across different coefficient values, and thus are still valid despite this limitation. Meanwhile, the single site of empirical research, although common in SNA based studies, is still considered as a major limitation in this study. The context of the research site, e.g. size of the company and the geographic dispersion of offices, cannot be ignored in the inference of findings. To increase the confidence for further generalization of the findings, more empirical study is needed especially in contrasting sites, such as smaller companies with more dense informal communications, and ITO relations based on network governance.

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