IDENTIFYING THE GIANTS: A SOCIAL NETWORK ANALYSIS OF THE LITERATURE ON INFORMATION TECHNOLOGY OUTSOURCING RELATIONSHIPS

Complete Research

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Abstract

After more than 25 years of research on information technology outsourcing (ITO) in general and ITO client-vendor relationships in particular, an already comprehensive body of knowledge is available on this important topic and related phenomena. This study sheds further light on the existing knowledge on ITO client-vendor relationships by applying social network analysis and content analysis methodologies. Based on our approach, we were able to (1) evaluate key articles, authors, and journals covering the research topic, (2) analyse the development of ITO client-vendor related research in the last 10 years and, most importantly, (3) identify gaps in our knowledge on ITO client-vendor relationships. Specifically, our research identified several gaps in our knowledge on important ITO client-vendor relationship concepts such as trust, control, and knowledge transfer. In accordance to Lacity et al. (2010), our results show the need for indigenous theories on ITO as a next step in further enhancing our understanding of the topic. We emphasize further research on ITO client-vendor relationships and provide distinctive research directions for the research community.

Keywords: Information Technology Outsourcing, Client-Vendor Relationship, Literature Review, Social Network Analysis, Content Analysis.

1 Introduction

Despite recent calls for insourcing (Qu et al., 2010), the outsourcing of information technology (IT) services such as software development or IT infrastructure maintenance to external vendors remains an important aspect of IT strategies for client organizations (Fjermestad and Saitta, 2005, Seddon et al., 2007). For example, a recent Gartner study evaluates the worldwide market of information technology outsourcing (ITO) at $286 bn. USD in 2013, further estimating a growth rate of 5.2% for 2014 (Gartner, 2014). Additional studies expect further growth of the ITO market, especially based on new IT-induced services and trends such as cloud computing, consumerization, and software-as-a-service (IDC, 2014).

From a research perspective, an already comprehensive body of knowledge covers more than 25 years of ITO-related research (Lacity et al., 2010). Hereby, former research encloses various theories and concepts related to ITO, for example, contractual and relational governance (Cao et al., 2013, Goo et al., 2009), ITO strategy and management aspects (Fink, 2010, Grover et al., 1996), ITO decision frameworks and determinants (Ang and Straub, 1998, Nam et al., 1996), control mechanisms (Gopal and Gosain, 2010, Kirsch, 1997), as well as specific aspects of IT offshoring (Beck et al., 2008, Mathew, 2011). In addition to research focussing on specific aspects of ITO, there are also several comprehensive,

general literature reviews on ITO available (Alsudairi and Dwivedi, 2010, Dibbern et al., 2004, Lacity et al., 2010).

Current research on ITO strongly emphasises the critical role of managing the *client-vendor relationship* for delivering successful ITO projects (Cata and Raghavan, 2006, Pannirselvam and Madupalli, 2011). This critical role is especially valid for long-term ITO engagements, where an a priori definition of complete contracts is both difficult and expensive (Chengxun and Siew Kien, 2006, Jin Kim et al., 2013). In this context, various researchers postulate the need for further research on the topic of ITO client-vendor relationship management, for example, by examining the cyclical relationship between contractual and relational governance (Jin Kim et al., 2013), by adding the vendor's point of view (Xu and Yao, 2013) as well as by analysing the ITO client-vendor relationship across countries and different cultures (Dibbern et al., 2004, Lacity et al., 2010). Despite the known criticality of developing and maintaining a successful client-vendor relationship in ITO (Lee and Kim, 1999) and the current call for further research on this topic (Grover et al., 1996, Lacity et al., 2010), there is so far, to the best of our knowledge, no thorough and specific review on ITO client-vendor relationship-related knowledge available. Such a review is important to identify our current level of knowledge on ITO client-vendor relationships and especially relevant for detecting knowledge gaps and future research directions. Hence, this study addresses this issue and provides a baseline of the existing body of knowledge on ITO client-vendor relationships by answering the following research questions:

1. *How did the research on ITO client-vendor relationships developed recently?*

2. *What are the main research concepts and related knowledge gaps for explaining and analysing the ITO client-vendor relationship?*

To answer our research questions, we conducted a literature review using social network analysis (SNA) and content analysis. Within our study, we developed and analysed so-called *citation network graphs* between more than 2,000 articles on ITO client-vendor relationships to identify patterns and to analyze concepts and gaps in the body of knowledge. Based on our analysis, we were able to identify important articles, authors, and journals as well as the key concepts used in research on ITO client-vendor relationships. In addition, the content analysis based on the key articles revealed important gaps in our current knowledge, therefore emphasizing future research. Consequently, our results support researchers on ITO by both providing a structured assessment on the current body of knowledge as well as fostering future research directions.

The remainder of the paper is structured as follows. Section 2 offers a brief overview about the theoretical background and related work on ITO. Within Section 3, we provide details about SNA as our chosen research method and explain our corresponding research design and approach for data collection and analysis. The main section of our paper is Section 4, which contains the results of our SNA-based literature review, including gaps in our knowledge on the ITO client-vendor relationship. Within Section 5 and Section 6 we discuss and conclude our results, explain important limitations of the study, and provide directions for future research.

2 Theoretical Background and Related Work

2.1 The ITO Body of Knowledge

An already comprehensive body of knowledge exists on ITO, covering multiple aspects and concepts in regards to ITO-related theories and models. A recent and thorough literature review by Lacity et al. (2010), who conducted an in-depth meta-analysis of 164 empirical ITO articles published between 1992 and 2010 in 50 journals, specifically revealed two major research streams on ITO: (1) research focussing on the process of *ITO decisions* and corresponding determinants, and (2) research concentrating on the concept of *ITO outcome* and related processes such as management of the client-vendor relationship. Further well-acknowledged ITO literature reviews produced detailed overviews about the body of knowledge on ITO in general by analysing ITO-related articles with a specific analysis focus. A list of

available ITO literature reviews including the covered period of investigation, sample size, number of journals covered, applied research method, and analysis focus is given in Table 1.

Review	Covered Period	No. of Articles	No. of Journals	Applied Method	Analysis Focus
Dibbern et al. (2004)	1992-2000	84	21	Meta-Analysis	General ITO literature analysis
Fjermestad and Saitta (2005)	1981-2004	29	not discussed	Meta-Analysis (academic and industry publications)	Development of a critical factors framework on ITO
Mahnke et al. (2005)	1995-2002	19	not discussed	Meta-Analysis (empirical ITO studies only)	ITO process model definition
Gonzalez et al. (2006)	1988-2005	131	18	Meta-Analysis (journal studies only)	ITO literature review focussed on research approach and perspective
Lacity et al. (2009)	1990-2008	191	70	Meta-Analysis	Literature review with focus on answering six specific questions
Alsudairi and Dwivedi (2010)	1992-2008	315 (128 ITO)	30	Meta-Analysis	Literature review focussing on analysis of citation frequency
Lacity et al. (2010)	1992-2010	164	50	Meta-Analysis (empirical ITO studies only)	General ITO literature analysis
This review	*1937-2014*	*2,146*	*>500*	*Social Network Analysis*	*Literature review on ITO client-vendor relationships*

Table 1.   ITO Literature Reviews (based on Lacity et al. (2010))

Despite the already large number of ITO literature reviews and the acknowledged importance of developing and maintaining a successful client-vendor relationship in ITO (Ang and Straub, 1998, Levina and Ross, 2003), no literature review available so far focuses on analysing and explaining the ITO client-vendor relationship. To cover this gap in our knowledge, we solely focus our analysis on ITO client-vendor relationship literature covering both prior empirical and conceptual studies. This approach is especially important for evaluating our current level of knowledge and identifying knowledge gaps as well as future research directions.

3   Research Design

3.1   Research Method Overview: Citation Networks and SNA

Based on Yaru (1997), "almost every achievement in research is based on the work of predecessors". Hence, the analysis of already existing research for baseline definition is mandatory for each scientist. Building upon this statement, we use *citation networks* of past articles covering the ITO client-vendor relationship as the unit of analysis for our literature review. A *citation* can be defined as a connection between new and already existent knowledge and is used as an indicator for the development of research (Yaru, 1997). A *citation network* is a special form of a social network with journals, articles, and authors acting as nodes and citations representing the connections (edges) between these nodes (Pieters et al., 1999). Past research on *citation network analysis* mostly addressed the importance of specific scientific

journals (Pieters et al., 1999), but grounded on Jo (2009), *citation network analysis* is also a valid research method for journal-focussed investigations, enabling an in-depth analysis of the concepts and developments in a defined area of research.

In consideration of the fact that citation networks are a special form of social networks, SNA can be used for analysing such networks (Jo et al., 2009). In general, SNA is a method for analysing informal communication networks and the relationship between actors in such networks (Marion et al., 2003). According to Polites and Watson (2009), SNA is a valid research method for evaluating scientific journal and article relationships because it offers a "more objective way […] than studies based on individual perceptions, since it avoids biases". The usage of SNA for literature reviews is already an established research approach, and past studies yielded very useful results (Jo et al., 2009, Otte and Rousseau, 2002, Phillips and Phillips, 1998). Building upon these former studies, we performed an in-depth literature review on ITO client-vendor relationships including more than 2,000 articles in more than 500 journals and books, hence deeply increasing the amount of evaluated knowledge on ITO client-vendor relationship compared to past literature reviews (see Table 1).

In our research, we use graphs as models for our SNA (please see the works of Otte and Rousseau (2002), Knoke and Yang (2008), and Wasserman and Faust (1994) for an in-depth explanation of graph theory and SNA). Based on graph theory, a *graph* is defined as a quantity of nodes and edges (Otte and Rousseau, 2002). Hereby, nodes are defined as the actors of a network; edges consist of pairs (*i, j*) describing a connection between the nodes *i* and *j*. One can separate between directed and undirected graphs, whereas the direction of a link (edge) between two nodes is important in directed graphs. An important indicator within graphs is the graph *density*, calculating the general level of connectedness of the graph, whereas a graph with connections between all nodes is defined as a *complete graph* (Otte and Rousseau, 2002).

Building upon graph theory, SNA comprises manifold techniques for analysing network graphs. This includes concepts for analysing graph structures (e.g., centrality) as well as determining principal roles and actors within a network (Jo et al., 2009, Otte and Rousseau, 2002). Details regarding the applied measurements are provided in Section 3.3 of this paper.

3.2   Research Design and Data Collection

Within our citation network graph, articles focussing on ITO client-vendor relationships are defined as our nodes and citations between these articles are described through directed edges between our nodes. Figure 1 provides a simplified example of our graph structure.
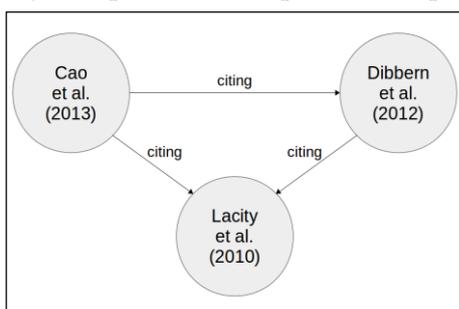

Figure 1.   Graph Structure (example)

As a starting point and baseline for our citation network, we performed a structured literature review based on the literature review guidelines of Levy and Ellis (2006) and focussing on the *Senior Scholar's Basket of Journals* of the AIS Senior Scholar Consortium. Within the eight journals listed in the basket, we manually analysed all issues from 2004 to 2014 while targeting the identification of articles focussing on client-vendor relationships in ITO. Based on this approach, we were able to identify 40 articles concerning our research topic. We used this approach due to the fact that we wanted to start our analysis based on the most recent (last ten years) as well as most important and acknowledged articles on ITO

client-vendor relationship in IS research (therefore focussing on the Senior Scholar's Basket). After identifying and summarizing our initial set of articles, we used a self-developed crawler software for extracting our 40 initial articles' citations from the *ISI Web of Knowledge database*. Within this step, we coded all identified citations, whereas each citation was defined as a node in our graph and each citation between our initial set of articles and the cited articles resulted in a directed edge between the two articles. This approach resulted in a directed citation network graph with more than 2,000 nodes and more than 3,000 edges. Figure 2 shows the initial graph as well as some key graph parameters.
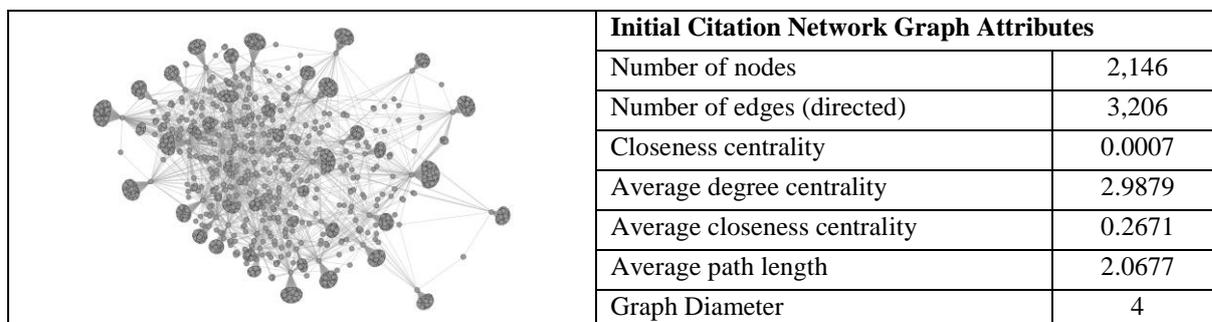

Initial Citation Network Graph Attributes	
Number of nodes	2,146
Number of edges (directed)	3,206
Closeness centrality	0.0007
Average degree centrality	2.9879
Average closeness centrality	0.2671
Average path length	2.0677
Graph Diameter	4

Figure 2.   Initial Citation Network Graph

3.3   Data Analysis

After defining the initial citation network graph as our starting point, our data analysis included the verification of general graph attributes such as *degree centrality* (number of ties of a specific node) and *closeness centrality* (total distance of one node to all other nodes in the graph), the identification of essential articles, the analysis of concepts and developments on ITO client-vendor relationship based on a so-called *main path analysis* as well as the analysis of specific groups and sub-graphs (*k-core graphs*) to identify similarities and gaps in research on ITO client-vendor relationship. In addition to this semi-automatic analysis based on the citation network graph, we performed a manual *content analysis (Neuendorf, 2002, Weber, 1990)* focussing on the evaluation of major concepts for ITO client-vendor relationships. The purpose of this analysis was the identification of research concepts and potential areas for further research. Overall, our data analyses thus covered the following steps.

(1) Recent development of ITO client-vendor relationship research. For analysing the development of the scientific research on client-vendor relationships in ITO, we conducted a *main path analysis*. This analysis approach covers the identification of the most representative network nodes (in our case articles on ITO client-vendor relationships) at different point in time as well as their chronological development (Lucio-Arias and Leydesdorff, 2008). The leading concept behind the main path analysis is that an article "that integrates information from several previous articles and adds substantial new knowledge receives many citations" (Nooy et al., 2011). Therefore, such an article incorporates a lot of relevant knowledge and is central for linking important articles in a citation network. The main path analysis is focussed on identifying these central articles by calculating the traversal count or traversal weight of a citation or article. The traversal count describes "the extent to which a particular citation or article is needed for linking articles" (Nooy et al., 2011). Thereby, articles with the highest traversal count within a citation network graph could be described as the backbone of the research topic. Our main path analysis resulted in a main path including ten articles from 2004 to 2012, which can be described as the main research path on ITO client-vendor relationships.

(2) Gap analysis on ITO client-vendor relationship research. Building upon our analysis of the recent development of research on ITO client-vendor relationships, we conducted two types of analysis targeting on research concept, area, and gap identification: (a) identification of groups within our citation network graph by using *k-core graph analysis* as well as (b) identification of key concepts and gaps in

the light of ITO client-vendor relationship using *content analysis* and corresponding *degree* measurements. At first, we reduced our initial graph (2,146 nodes, see Section 3.3) by using a k-core graph analysis. Hereby, a k-core graph includes all nodes, which have at least k direct neighbours, represented through edges to at least k other nodes in the network (Wasserman and Faust, 1994). Based on Nooy et al. (2011), this method is especially suitable for identifying groups in a given network and therefore valid for identifying research concepts. To identify a suitable network size for concept identification, we continually decreased the k-value and analysed the emerging sub-groups within our citation network. We identified a *k*-value of 7 as most suitable for our analysis. Within the 7-core graph we were able to identify the most relevant number of concepts used for explaining and analysing the ITO client-vendor relationship. A further decrease of the *k*-value resulted in the identification of further concepts, which were not directly related to ITO client-vendor relationships anymore and therefore not suitable for our research. For example a *k*-value of 8 resulted in a network with groups of articles focussing on the concepts of ITO contracting and business process outsourcing, which are not central for our research on ITO client-vendor relationships. Networks with *k*-values lower than 7 resulted in small graphs, which missed central articles and therefore concepts for explaining the ITO client-vendor relationship. Secondly, we performed a content analysis on the identified concepts and their relationship concerning ITO client-vendor relationship quality as well as ITO outcome. For this analysis, we followed the approach of Lacity et al. (2010). Grounded on the initial 40 identified key papers on ITO client-vendor relationships as well as the additionally identified 23 papers within the k-core graph analysis, we coded each independent variable analysed within the articles according to its influence on the dependent variables ITO outcome as well as ITO client-vendor relationship quality. A negative relationship was coded as "-1" and a positive relationship was coded as "1". After the coding, we used SNA methods for visualisation and analysis of the graph, especially by using the *weighted degree* measurement for identifying the most central and important concepts related to ITO client-vendor relationships. After identifying the most central and important concepts, we analysed the concepts in the light of past research focus as well as current research gaps and limitations based on a thorough analysis of the remaining 63 papers. This in-depth analysis was performed simultaneously by two of the authors. Both authors analysed the papers with a specific focus on the findings for the evaluated concepts (e.g., trust, mutual understanding) as well as the research gaps listed within the articles. After this evaluation, the authors discussed the results and jointly developed a table including all identified concepts, the past research focus for these concepts, as well as current gaps in our knowledge on these concepts. An extract of this table, covering the most important concepts based on the SNA, is provided in Section 4.

4   Findings and Results

4.1   Recent Development of ITO Client-Vendor Relationship Research

Figure 3 provides an overview about the main path graph including the traversal count for all connections.
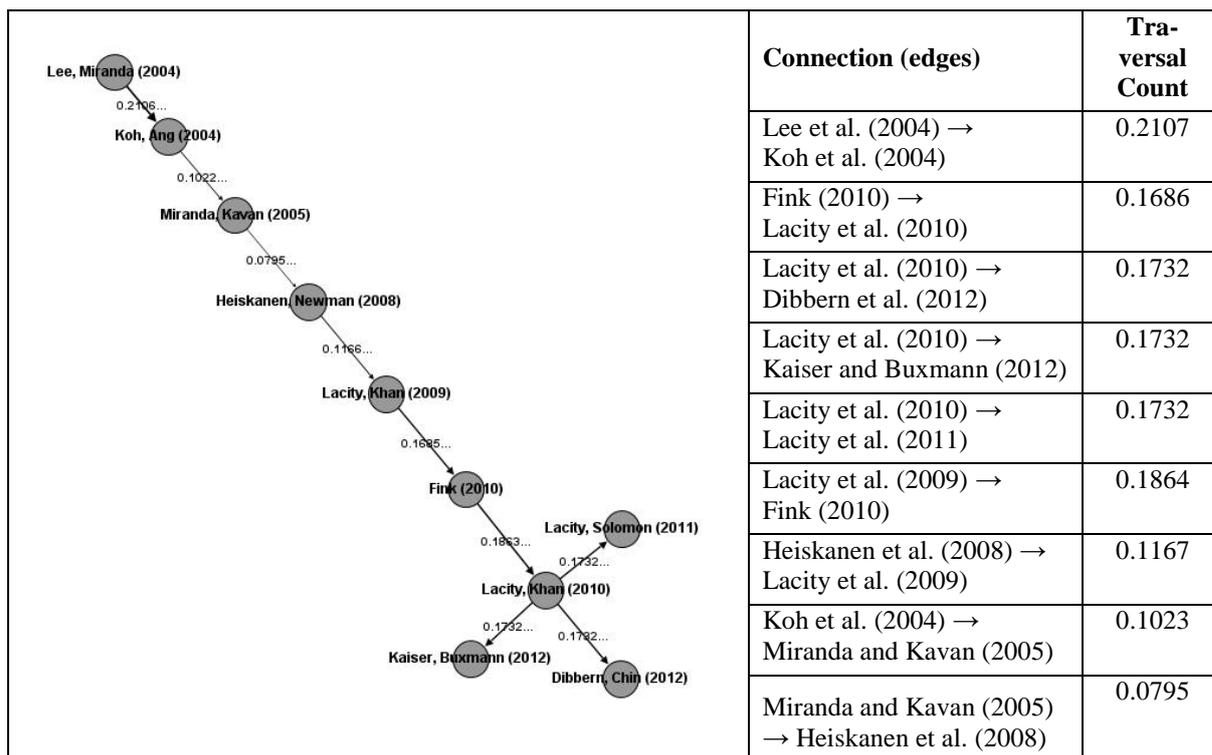
Connection (edges)	Traversal Count
Lee et al. (2004) → Koh et al. (2004)	0.2107
Fink (2010) → Lacity et al. (2010)	0.1686
Lacity et al. (2010) → Dibbern et al. (2012)	0.1732
Lacity et al. (2010) → Kaiser and Buxmann (2012)	0.1732
Lacity et al. (2010) → Lacity et al. (2011)	0.1732
Lacity et al. (2009) → Fink (2010)	0.1864
Heiskanen et al. (2008) → Lacity et al. (2009)	0.1167
Koh et al. (2004) → Miranda and Kavan (2005)	0.1023
Miranda and Kavan (2005) → Heiskanen et al. (2008)	0.0795

Figure 3.   Main Path on ITO client-vendor relationship research

The main path analysis revealed the article of Lee et al. (2004) as the source node and therefore as the starting point for recent research on ITO client-vendor relationships. In particular, the article evaluated the effect of different ITO set-ups ("Gestalten") on positive ITO outcomes from a client perspective. Building upon this article, several researchers conducted further research on specific ITO client-vendor relationship concepts such psychological contracts (Koh et al., 2004, Miranda and Kavan, 2005), the management of the ITO client-vendor relationship over time (Heiskanen et al., 2008), as well as research on the influence of culture on ITO client-vendor relationships (Dibbern et al., 2012). In addition, the main path analysis revealed the centrality of the most acknowledged literature reviews on ITO (Lacity et al., 2010, Lacity et al., 2009). Generally speaking, the main path analysis on recent ITO client-vendor relationship research shows that research on ITO client-vendor relationships remains important over time (constant number of published research from 2004 to 2014) and that the academic community is methodically building new research based upon already identified knowledge, therefore showing sufficient academic rigor. In addition, the main path analysis reveals that up until today, there are no central articles available which focus on the development of indigenous ITO strategies. This phenomenon was already identified as a gap in our knowledge and recent calls for research, for example, by Lacity et al. (2010). Even after additional four years of research on ITO since Lacity et al. (2010) call, most of the research conducted on ITO in general and ITO client-vendor relationships in particular is still descriptive by nature and the normative phase of theory design has not been taken into account so far.

4.2   Concept and Gap Analysis on ITO Client-Vendor Relationship Research

Figure 4 provides a visualization of the *7*-core graph as well as an overview about graph sizes for *k*-values between 1 and 8. Based on our *7-core graph*, we performed a content analysis on all remaining 51 articles (23 new articles compared to the initial list of 40 articles) in our graph, focussing on the identification of specific research concepts evaluated in the light of ITO client-vendor relationships. Due to space restrictions, we will not provide detailed descriptions about all identified concepts within this paper. A complete list of all concepts including descriptions as well as references is available from the authors on request.
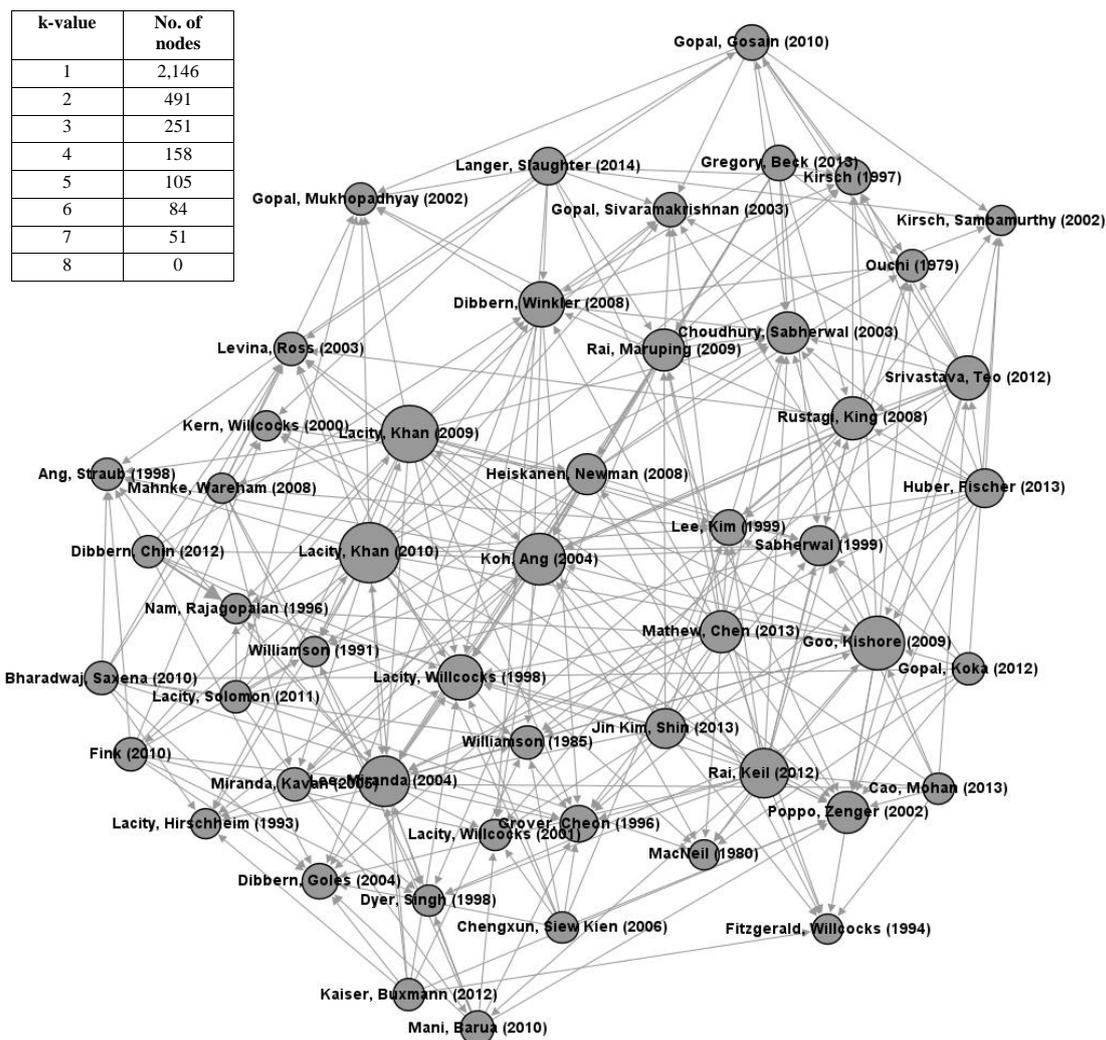
k-value	No. of nodes
1	2,146
2	491
3	251
4	158
5	105
6	84
7	51
8	0

Figure 4.   7-core graph and overview about graph sizes for k-value between 1 and 8

Based on the newly identified 23 articles within the k-core graph analysis as well as our initial set of the 40 baseline articles, we performed our content analysis to identify relevant research gaps for the identified concepts used for explaining and analysing the ITO client-vendor relationship (details see Section 3.3.). This step, as a subsequent to the *k*-core analysis, resulted in a list of 71 concepts with direct or indirect relationships to ITO client-vendor relationship quality. Table 2 provides a description of the 10 most important concepts based on the *weighted degree* measurement including manually analysed research gaps and limitations as well as key references.

Concept	Weighted Degree	Past Research Focus	Research Gaps and Limitations (Extract)
Formal Control	27.0	Effect of task characteristics, client knowledge and trust on the usage of formal control in ITO projects (Rustagi et al., 2008); Analysing the dynamic interaction between control, trust and power in ITO projects (Heiskanen et al., 2008); Configuration of Control (Balancing) in IT	• No differentiation between global and domestic outsourcing; no vendor focus (Rustagi et al., 2008). • Research on client, no focus on vendor's point of view (Heiskanen et al., 2008, Tiwana and Keil, 2009).

Concept	Weighted Degree	Past Research Focus	Research Gaps and Limitations (Extract)
		offshoring projects (Gregory et al., 2013); Effect of mechanistic governance methods on IT offshore outsourcing project performance, especially focusing on answering the question if mechanistic governance complement or substitute the benefits of contract specificity in ITO contracts (Srivastava and Teo, 2012).	• Focus on vendors from India, no cross-cultural analysis (Gopal and Gosain, 2010, Srivastava and Teo, 2012). • Lack of analysis of the usage of formal control based on different cultural backgrounds between client and vendor (Heiskanen et al., 2008)
Knowledge Transfer & Sharing	24.0	Analysis on how distributed and co-located teams performing the same task differ in their patterns of communication, knowledge sharing and performance (Gupta et al., 2009); Moderating effect of social capital dimensions (structural, cognitive, relational) on knowledge transfer in IT offshoring projects (Rottman, 2008); Evaluating the concept of effective knowledge transfer as an obligation within psychological contracts in ITO client-vendor relationships (Koh et al., 2004).	• No evaluation of knowledge transfer & sharing processes based on different levels of trusts between team members and parties (Gupta et al., 2009) • Explorative, single-case study approach, therefore problems regarding external validity and generalizability (Gupta et al., 2009, Rottman, 2008). • No specific focus on ITO relationships, but co-located and distributed teams in general (Gupta et al., 2009). • Analysis focus on Singapore organizations only, therefore no generalization; no specific offshoring focus, which could be an interesting exploration (Koh et al., 2004).
Psychological Contract	14.0	Effect of the psychological contract (and for example psychological contract breaches (Jin Kim et al., 2013) on ITO relationship quality and success (Koh et al., 2004); Theoretical modelling of successful ITO governance structures based on the psychological contract and inter-organizational rents (Miranda and Kavan, 2005).	• For example, lack of evaluation of psychological contracts in the light of cultural settings as well as collaboration quality (Jin Kim et al., 2013). • Data set relatively small; long-term longitudinal results are not provided (Jin Kim et al., 2013). • Focus on Singapore-based organizations only, no cross-cultural context generalizability provided (Koh et al., 2004). • No empirical evaluation of the developed theoretical model (Miranda and Kavan, 2005).
Trust	13.0	Analysis of the dynamic interaction between control, trust and power in ITO projects (Heiskanen et al., 2008); Examination of trust establishment in client-vendor relationships in offshore outsourcing with focus on developing and sustaining adequate levels of psychological security from the client's perspective	• So far, no evaluation of trust development based on the involved parties' cultural backgrounds as well as the underlying ITO object (e.g. software development vs. IT infrastructure outsourcing) (Heiskanen et al., 2008, Sabherwal, 1999). • Single case study based on a University system implementation

Concept	Weighted Degree	Past Research Focus	Research Gaps and Limitations (Extract)
		(Kelly and Noonan, 2008); Evaluation of the importance of trust in outsourced information system development projects in general and the substitution effect of trust on structural controls (Sabherwal, 1999).	project in Scandinavia, therefore no generalizability for public organizations or cross-cultural effects provided (Heiskanen et al., 2008). • No cross-cultural focus due to single-case study analysis approach of an Irish-India offshore outsourcing relationship (Kelly and Noonan, 2008). • Case study-based research, no large-scale quantitative evaluation of effects (Sabherwal, 1999).
Task Characteristics	12.0	The concept of task characteristics contains several task-related concepts, which were analysed in the light of ITO client-vendor relationships: For example Langer et al. (2014) evaluated the moderating effect of task complexity on the relationship between client and vendor project manager intelligence and project performance; Evaluation of the influence of task ambiguity, complexity, instability and novelty on the usage of different forms of control in IS projects (Kirsch, 1997).	• Lack of analysis in terms of analysing tasks characteristics and its influence on control modes based on different types of project setups (e.g. offshore development teams, multi-vendor projects) (Kirsch, 1997). • Data based on a single vendor and a limited number of projects (Langer et al., 2014); the authors also suggest the test of other characteristics such as cultural intelligence in further studies. • No specific ITO focus within all analysed projects, partly broader scope of study (Kirsch, 1997).
Culture	10.0	Analysis of communication gaps within offshore outsourcing projects based on cross-cultural work environments (Avison and Banks, 2008); Analysis on the strategic importance of outsourcing and client vendor relationship in the context of eastern culture (Kim et al., 2013).	• Lack of comparative cross-cultural studies taking into account different cultural backgrounds of the involved parties (Avison and Banks, 2008). • No analysis of the effect of cultural differences within the offshore outsourcing-focused case study (Avison and Banks, 2008). • Evaluation of the client side only, no vendor focus (Kim et al., 2013).
Flexibility	10.0	Analysis of the effect of relational flexibility on (asymmetric) ITO success for the client and the vendor. (Gopal and Koka, 2012).	• No analysis of the concept of flexibility in the light of different ITO contract types (e.g. multi-vendor contract set-ups) (Gopal and Koka, 2012). • Empirical data from one vendor organization only, therefore generalization problems (Gopal and Koka, 2012).
Mutual Understanding	7.0	Evaluation of antecedents and processes for creating mutual understanding between client and vendor	• Lack of research on how cultural differences as well as specific boundary objects (e.g. prototypes,

Concept	Weighted Degree	Past Research Focus	Research Gaps and Limitations (Extract)
		in ITO engagements (Vlaar et al., 2008).	drawings) affect the mutual understanding in ITO offshore relationships (Vlaar et al., 2008). • Data derived from only one project and one vendor organization, therefore no generalization (Vlaar et al., 2008).
Communication	7.0	Analysis of telephone conversations between onsite clients and offshore vendors based on conversation analysis methods with a focus on cross-cultural miss-communication (Avison and Banks, 2008); Evaluation of communication and coordination variables and the effect on re-work, effort and time in offshore ITO software development projects (Gopal et al., 2002); Analysis of socio-cognitive acts and communication processes in distributed work teams and their usage to enhance sense-making and mitigate misunderstandings in IT offshoring projects (Vlaar et al., 2008).	• No focus on how cross-cultural differences shape communication acts (Vlaar et al., 2008). • Analysis of clients from UK/US and vendors from India only, no evaluation of further countries and cultures (Avison and Banks, 2008) • Data derived from one vendor in India only, no cross-cultural analysis (Gopal et al., 2002). • Data derived from one project and vendor only, therefore reduced generalizability of the results (Vlaar et al., 2008).
Commitment	6.0	Analysis of the moderating effect of service level agreements (as part of contractual governance) on trust and commitment between client and vendor in ITO relationships (Goo et al., 2009); Evaluation of the effect of the vendor's business risk and absorptive capacity on willingness in terms of personal commitments within the ITO client-vendor relationship (Arnold et al., 2010).	• Lack of research taking into account the length of the relationship as an important factor for mutual commitment to the ITO client-vendor relationship (Goo et al., 2009). • Evaluation of the client's side only, no analysis of vendor point of view (Goo et al., 2009). • Data from organizations in North America only, therefore no cultural effects evaluated (Arnold et al., 2010).

Table 2.   Important Concepts and Research Gaps on ITO Client-vendor Relationship (Excerpt; Top 10)

5   Discussion

5.1   Summary of Findings and Implications

Building upon our pre-defined research questions, our research goal was the analysis of research on the ITO client-vendor relationship over time as well as the identification of research concepts for explaining and analysing the ITO client-vendor relationships as well as the detection of corresponding knowledge gaps. Based on the results described in Section 4, we were generally able to provide answers to our research questions and enhanced our knowledge on ITO client-vendor relationship research by several means.

(1) Extending our knowledge on ITO client-vendor relationship research in general. Despite the importance of successful client-vendor relationship management for positive ITO outcome, there is so far

no focussed literature review on this important research topic available. Our study closes this gap by providing an extensive literature review based on more than 2,000 ITO client-vendor relationship related articles. Within our study, we were able to identify and explain important concepts on ITO client-vendor relationships, analyse and visualize the development of this research area in the last 10 years as well as provide gaps in our knowledge and therefore offering directions for further research. So far, no available study was able to provide such an extensive view on ITO client-vendor relationship knowledge and we are confident that our research will stimulate further research in this field. When looking at our results in detail, we claim that we were able to identify important knowledge gaps for all identified concepts concerning the ITO client-vendor relationship. For example, there is still further confirmative and testing (qualitative as well as quantitative) research required on important concepts such knowledge sharing, trust and control, because so far most research in this areas is exploratory and qualitative by nature, mostly focussing on one case study and hence lacking generalization. Furthermore, we would emphasize further research on the topics of communication and culture, especially in the context of cross-cultural studies, because so far most research on these topics is focused on one client and vendor country only (e.g., USA and India) and our evaluation on research gaps shows that cross-cultural evaluations are still an important gap in our knowledge. Furthermore, our research revealed the need for further comparative studies, for example, studies taking into account different contract types (e.g., single-vendor vs. multi-vendor contracts), different team locations (e.g., onshore, nearshore, offshore) as well as prior relationships between the involved parties (e.g., new ITO client-vendor relationships vs. long-term established relationships).

(2) Further revealing the need for creating indigenous ITO theories. Especially our analysis on the latest research development on ITO client-vendor relationships showed that despite the extensive body of knowledge on ITO, there is still no development of specific ITO theories. Research on ITO is still mostly descriptive by nature, and rarely explanative-predictive, or focussed on adapting and confirming already-known theories and concepts in the field of ITO (e.g., transaction cost economics; social exchange theory). Based on our results, we agree with Lacity et al. (2010), who already campaigned for the development of indigenous ITO theories. In this context, an interesting development could be the definition of an ITO client-vendor relationship theory incorporating and enhancing already known theories on interorganizational relations and social exchanges.

(3) Introducing the concept of social network analysis in ITO-related research. By using SNA methods and measurements for visualization and analysis of the ITO client-vendor relationship body of knowledge, we were able to evaluate a large number of articles in a short period of time and with appropriate effort. To the best of our knowledge, there is no study available using SNA for ITO-related research in general and literature reviews on ITO in particular. The results of our study show that SNA is a valid method for research on ITO in general due to the social exchange basis of such engagements, which could be easily expressed as a social network. In addition, our literature review showed the feasibility of SNA for literature reviews especially based on the fact that this approach enables the evaluation of a large number of articles in a very time- and effort-efficient way.

5.2   Limitations and Future Research

While we were able to provide sufficient answers to our research questions and enhance our knowledge on ITO client-vendor relationships, there are some limitations and corresponding future research directions that need to be acknowledged.

First, we started our literature review based on a relative small number of articles: 40 articles from 2004 to 2014, all identified within the *Senior Scholars' Basket of Journals*. We chose this approach based on the assertion that we wanted to start our analysis with a relatively small number of current and important journals. Nevertheless, the results of our literature review partially showed that an extension of our initial list of articles could have further increased our analysis results, for example, concerning the timely development of the research on ITO client-vendor relationships. This analysis was not the upmost focus

of our research, therefore we are satisfied with our results. However, we nevertheless emphasize that further studies, especially on the timely development, could use a larger set of articles as a starting point.

Second, we need to address the general issues with citation network analysis, which are also valid for our research. One issue to be mentioned here is that we used the articles' citation lists for the analysis of cited articles. Based on this approach, we do not take into account the citation occurrence of a specific article or citation. For example, one can also argue that a citation that is more often cited is more central for the article compared to a citation that is used only once. Another important issue, which should be taken into account here, is that citation network analysis can result in biased outcomes due to frequent citations of very important articles or articles from direct colleagues of the author. To antagonize both biases, all articles would need to be evaluated manually, which was not feasible for more than 2,000 articles in this study. However, further literature reviews on ITO client-vendor relationships using other methods (e.g., enhanced crawler software, usage of text mining and more detailed qualitative analyses) could help in further verifying the results of our study.

6 Conclusion

With this paper, we identified important articles, authors, journals as well as research concepts and knowledge gaps on ITO client-vendor relationships. With our study, we were able to provide an extensive overview about the research domain and foster further research on this important topic. Based on our SNA approach, we were able to process a large amount of already conducted research into our review, therefore further extending the scientific communities' knowledge about ITO. We are confident that our study results provide an appropriate degree of generalizability and completeness. Nonetheless, we would emphasize further literature reviews on ITO client-vendor relationships and especially further research on the identified gaps in our body of knowledge.

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