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IT outsourcing research from 1992 to 2013: A literature review based on main path analysis

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ABSTRACT

Applying main path analysis, this paper investigates the IT outsourcing (ITO) field by identifying a set of papers that have played a central role in the development of the field and the major research themes emerging from the citation patterns. We selected the top 120,000 main paths from 6.45 million main paths among 798 ITO papers, resulting in a data set of 280 papers that represent the most important nodes supporting ITO knowledge flow. Based on our analysis of the multiple main paths, twelve major research themes emerged: ITO motivations, ITO decisions, ITO risks, debate around transaction cost theory, client–vendor relationship, the vendor's perspective, psychological and formal contracts, ASP, BPO, opensourcing and crowdsourcing, offshore outsourcing, and multisourcing. Finally, we discussed future directions of ITO research based on our findings. Our study is among the few studies that have used bibliometric analysis methods to analyze and visualize the citation network characterizing the rich body of ITO literature. The main path analysis precisely identified and visualized the major knowledge flow in the evolution of ITO research and major ITO research streams, thus providing an in-depth understanding of ITO research in the last 20 years.

1. Introduction

With more than 20 years' development, information technology outsourcing (ITO) has experienced tremendous growth and has aroused great enthusiasm among academic researchers [91]. A large body of diverse theoretical and empirical work in the ITO field demands that researchers continuously review state-of-the-art research activities so that an in-depth understanding of this growing field can be achieved.

The ITO field has become increasingly complex for several reasons. First, a variety of theoretical bases have been applied in ITO research. In initial stage of ITO, researchers have explained the ITO phenomenon from a neoclassical economic perspective [117,72]. Later, many other theories from reference disciplines were used to study ITO issues. Lacity et al. [92] reported that researchers had studied ITO from over 20 theoretical perspectives. Second, findings from ITO publications are often inconsistent and even contradictory [91,92,45]. For example, Lacity et al. [92] found a large number of contradictory conclusions in 741 relationships between 36 dependent variables and 138 independent variables extracted from 164 empirical ITO articles. Third, there are many sourcing varietals, including offshoring, business process outsourcing (BPO), application service providers (ASPs), multisourcing, backsourcing, and recent crowdsourcing. New sourcing varietals continued to emerge with the advancement of IT and dynamic changes in the business landscape. For example, economic and market globalization is the antecedent of the emergence of offshoring [51], and the economic downturn in recent years significantly changed the traditional manner of offshoring [91]. The prevalence of the Internet has increased the popularity of ASPs. With the recent development of Web 2.0, cloud computing and the Internet of Things, more novel issues related to ITO will begin to appear. In the context of new sourcing varietals, past topics such as ITO decision and client–vendor relationship may take on new meanings due to new characteristics of the sourcing environment, and novel issues that are specific to the new varietals and have not emerged in previous varietals have also stimulated research.

A comprehensive review that precisely analyzes the complex ITO literature is imperative to gaining a proper understanding of

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the constantly updating ITO field. Such a review will help researchers understand the developing path of the field so that they can judge what was important, what is important, and what will be important. This will facilitate the healthy growth of the ITO field by guiding researchers to focus on meaningful research questions. In addition, the sheer scale of the ITO literature makes it difficult to conduct a comprehensive review without quantitative methodologies. Most existing ITO reviews are descriptive and based on researchers' manual processing. These reviews may be constrained by the researchers, who had limited time and energy and who could only review papers within the limit of their cognitive capacity [142]. It is necessary to confirm the findings of these reviews with more objective methodologies. There is also the real possibility that important ITO articles may be neglected. For instance, the review by Gonzalez et al. [52] was based on 131 papers, and the review by Lacity et al. [92] included 164 papers. Although the authors of these reviews might have strived to select the most representative papers, the size of the ITO literature is much larger than what has been reviewed. A global review that more objectivity embraces and incorporates as many articles as possible is desirable.

In this article, we conduct a bibliometric study to map the field of ITO research. This approach allows us to identify the knowledge structure of ITO research and to uncover underlying knowledge diffusion patterns from different angles. The citation relationships between publications shape a network that reveals structural and knowledge flow and provide an opportunity to quantitatively evaluate the importance of specific papers. Specifically, we perform a main path analysis of the ITO field to identify major research themes that have emerged in the history of ITO research and describe how these themes evolved over time; in addition, we compare the findings of the current review with existing reviews. Our analytic approach and findings are of value to ITO researchers. The findings can help to understand the genesis and current state of the field, and meaningful and fruitful avenues for future research can hopefully be found based on this paper. In addition, to the best of our knowledge, this review is among the first to demonstrate how the main path analysis method can be employed to examine important IS areas. The review can make a methodological contribution to IS research by providing a novel approach to reviewing existing literature.

The remainder of this paper is organized as follows. The paper first provides a description of background in Section 2. Then, it explains the analysis methodology in Section 3. Data collection is discussed in Section 4, followed by detailed analysis results in Section 5. We predict future directions of ITO research based on our findings in Section 6. Section 7 concludes the paper by summarizing limitations and contributions.

2. Background

2.1. Previous reviews of ITO research

Scholars have surveyed the ITO literature and reviewed ITO development in different time periods from various angles. These reviews take three different approaches–qualitative, quantitative, and hybrid. The quantitative approach to reviewing ITO research is rather straightforward. For example, Alsudairi and Dwivedi [4] quantitatively surveyed the ITO field by employing a meta-analysis approach to profile theoretical and methodological underpinnings of ITO-related articles. Statistical analyses were performed to analyze attributes of the papers such as subject category, journal, publication year, author, author's institution, country, citation frequency, keywords, and abstract. Such reviews focus on characteristics of the publications rather than their content.

Most ITO review articles employed a qualitative/descriptive approach. Among these reviews, Dibbern et al.'s [35] global assessment of 15-year ITO research is the most noteworthy because of its depth and breadth [92]. Some papers examined the ITO literature from a historical perspective. For example, Gottschalk and Solli-Sæther [63] identified three stages for ITO relationship evolution: the cost stage, the resource stage and the partnership stage. Hätönen and Eriksson [72] recognized three phases of the history of ITO development from both practical and theoretical perspectives. Furthermore, some reviews focused on specific ITO issues. King and Torkzadeh [84] described the state of and issues concerning offshoring. Chadee and Raman's [24] review focused on empirical studies on international outsourcing of IT services and identified four main research areas during the 1992–2007 period. Lacity et al. [91] extracted practical insights on six topics relevant to ITO practitioners by reviewing 191 ITO articles.

A few recent reviews employed a hybrid approach by applying both qualitative and quantitative methods. Gonzalez et al. [52] identified major topics and the most-often applied methodologies in ITO and applied a quantitative analysis of paper attributes. Lacity et al. [92] analyzed 164 empirical ITO articles published from 1992 to the first quarter of 2010 and developed an ITO decision model and ITO outcome model based on empirical evidence of significant relationships between predictors and dependent variables. Using the same method, Lacity et al. [93] reviewed 87 empirical BPO articles published between 1996 and 2011 to develop BPO decision and BPO outcome models.

The existing reviews provide many insights into a variety of ITO issues. These reviews facilitate a rich discussion on specific topics with great depth and have deepened our understanding of the ITO literature. However, given the vast body of ITO literature, there remains much to learn. First, the previous descriptive reviews can be constrained by the knowledge structure of their authors [142], and a less subjective approach may offer an alternative approach to interpreting ITO research. Second, although some reviews adopted a quantitative approach, the statistical analyses are relatively simple and have not analyzed each paper's importance in the citation network of ITO research. Third, the reviews taking a hybrid approach often focus on empirical studies that represent a small number of ITO papers. For example, the review by Gonzalez et al. [52] was based on 131 papers published between 1992 and 2005. Our search indicates that 230 ITO papers were published during this period. A holistic review of the ITO literature that considers more publications may provide a more complete understanding of the ITO research.

In light of the limitations of previous reviews, we comprehensively survey the existing ITO literature by conducting a main path analysis. Specifically, we will create a citation network of the ITO field that considers every ITO article's influence and use bibliometric analysis techniques to analyze the evolution and structure of the ITO field.

2.2. Bibliometric analysis

The citation network among ITO papers creates a map of knowledge dissemination over time. It also provides a quantitative and objective basis for describing the development trajectory of the field. This citation network can be analyzed using bibliometric analysis, which is a quantitative approach to analyzing and visualizing emerging trends, intellectual structures, and citation patterns in scientific literature [26]. There are several ways to conduct bibliometric analysis, and the method used in this study is main path analysis. In contrast to traditional bibliometric methods such as bibliographic coupling and co-citation analysis, the main path analysis focuses on the links between the cited and citing papers instead of the citation counts of a paper. The citation

relationship between two articles indicates how knowledge flows, and a large number of such citation links form a network that reveals how knowledge disseminates [114]. The goal of main path analysis is to trace the main knowledge flow in this citation network. The concept of main path analysis was first proposed by Hummon and Doreian in 1989 [74]. Later, Liu et al. [114] described this method as "local main path" and proposed several variants of the original main path analysis, including "global main path" and "multiple main paths". The validity of main path analysis methods have been proven in previous studies [114,111,119].

Main path analysis offers several advantages. Such analysis makes it possible to reveal the structural backbone of the development of ITO research. Both direct and indirect influences of a paper are considered during main path analysis, thus providing a more accurate estimation of the paper than the conventional 'citation count' method, which reckons only direct influences [114]. Moreover, the detailed information provided by multiple main path analysis helps to identify important ITO themes that emerged at different times and how these themes evolved over time. These research themes result from objective citation relationships among articles, which can more precisely reflect the actual state of the field and avoid researchers' personal interpretations [142].

3. Methodologies

Our review method produces two main paths. The global main path shows the development trajectory of ITO research from a satellite view, and the multiple main paths extend development trajectories at a more detailed level by adding more global main paths with smaller weights. As Liu and Lu [111] described, an integrated approach should be taken to simultaneously generate and analyze these complementary main paths to uncover the evolution of ITO research. In this section, we will briefly describe this method.

3.1. Concepts of main path analysis

In the course of a scientific field's development, new articles draw information from previous articles and add new ideas. The citation relationship between the citing and cited articles indicates the dyadic knowledge flow. The citation network thus is a directional network that indicates the scientific knowledge flows. The longer the field has developed, the larger and denser the network becomes.

A citation network can be viewed as a collection of vertices and edges. A vertex represents an article, and an edge denotes the citation relationship between two articles. There are four types of vertices: sources, sinks, intermediate points and isolate [172]. Sources make no citations but are cited; they are origins of knowledge. Sinks cite other vertices but are not cited; they are the end points of knowledge dissemination. Intermediate points both cite and are cited. An "isolate" neither makes citations nor is cited by other articles, which is relatively rare. Many paths start from sources, traverse through intermediate points, and end in sinks, thus forming a citation network.

3.2. Global main path

The global main path refers to the path that has the greatest weight in a citation network, representing the backbone of knowledge dissemination in the field [111]. In a global main path, the weight of each link reflects the importance of the citation relationship. A citation needed in paths between many articles is assumed to be more crucial than a citation rarely needed for linking articles [187]. The weight of each link is indicated by the traversal count, which measures the frequency that a citation link has been traversed if one exhausts all paths from all sources to all end sinks [111]. Following Batagelj [17]'s recommendation, we apply the search path count (SPC) to calculate traversal counts in this paper.

We use the simple citation network shown in Fig. 1 to demonstrate how SPC works. There are two sources and two sinks in Fig. 1. We can obtain 6 paths from all sources to all sinks. SPC for each link is defined as the total number of times the link is traversed. For example, link V1-V4 has a SPC value of 3 because it is shared by 3 paths: V1–V4–V5, V1–V4–V7–V8–V9, and V1–V4–V8–V9. The larger the SPC value, the more important the link's role in transmitting knowledge [114].

The global main path is the path with the largest overall SPC value, which suggests the overall importance in knowledge flow of the field [111]. In Fig. 1, the path V1–V4–V7–V8–V9 is the global main path because its SPC value is 7, which is larger than any other path's SPC. We developed a program in the C language to search for the global main path.

3.3. Multiple main paths

The global main path only shows the backbone of a citation network; this is insufficient to provide a reasonably complete understanding of a prolific scientific filed with many subfields and research streams. In this study, we found more than six million paths from sources to sinks in the ITO citation network. A single main path would be too simple to represent such a complicated network. To address this issue, multiple main paths can be created to reveal details about the ITO research field. This was achieved by selecting more paths whose SPC values are high but smaller than the global main path [114]. The more paths that are included, the

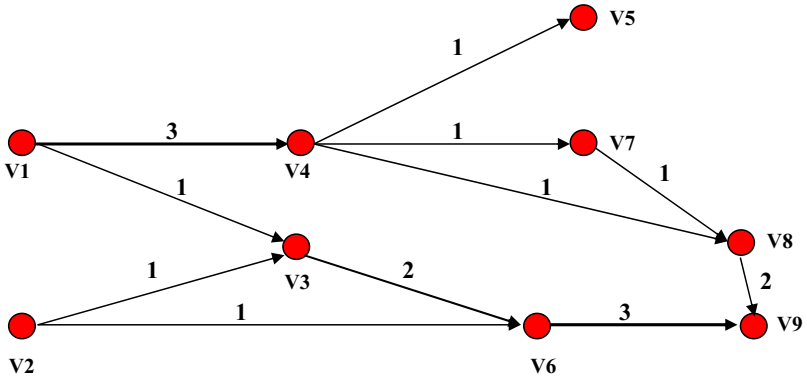


Fig. 1. A simple citation network with SPC values shown.

more precisely the citation network can be described. To maintain a balance between precision and conciseness, we selected the top 2% of the main paths based on SPC values for this review. We also developed a program in the C language to obtain the multiple main paths.

The multiple main paths form a simplified knowledge transferring network that includes the most representative knowledge transferring routes. Therefore, each of the papers in the multiple main paths plays a critical role in disseminating knowledge among the ITO research community, and a collection of these papers represents a knowledge base for reviewing past ITO research. We can further classify these papers in terms of their topics and the citation relationships between them to identify major research streams. However, the multiple main paths remain a fairly complex citation network and do not exhibit clear research themes. A citation link on the main paths could have different natures. A citing paper is substantially connected to the cited paper when the citation is based on the semantic content of the cited paper. In contrast, a citing paper is peripherally connected to the cited when the cited paper is used to support a secondary concept, a special terminology, a statistical method, or a logical argument in the citing paper. Two loosely connected papers could have completely different research topics. Thus, we believe a peripheral connection cannot indicate thematic commonality between the two papers. To uncover research themes, we must prune the multiple main paths by dropping peripheral citation links while retaining substantial citation links. Specifically, we carefully reviewed each pair of linked papers and evaluated whether the citation relationship reflected similarity in their research themes. If the two papers shared no clear common topics, the link was deleted (see Appendix A for an example of pruning). After pruning, only papers with similar topics remained connected, and a set of such connected papers would define a research theme. Whereas the global main path shows the major artery of knowledge flow, multiple main paths reveal important ancillary developments that have branched off this main artery. Both views are necessary in obtaining a comprehensive understanding of the field of ITO research [114]. Therefore, we analyze both the global main path and multiple main paths.

4. Data collection

To obtain a representative data set of ITO publications, we adopted ISI Web of Science (WOS) as the data source for this study. Specifically, we selected Science Citation Index Expanded (SCI-Expanded) and Social Sciences Citation Index (SSCI). The first ITO publication was in 1992; we thus collected ITO papers published from 1992 to 09/01/2013, a 22-year window.

Fig. 2 illustrates how we collected ITO articles for this study. To obtain an exhaustive list of ITO papers from WOS, a variety of combinations of keywords were used. After several tests, we finalized the search conditions as "((IT OR IS) AND (outsourc* or offshor*))" and "((information technology) or (information system*))" in the topic. The wildcard notation asterisks dictate the search engine to consider "outsource" and "outsourcing", "offshore" and "offshoring", "system" and "systems". The searches resulted in 1353 papers. Because many articles in this dataset are not related to ITO, we performed data cleansing. First, we successively refined the dataset based on the WOS discipline categories and journals. A total of 13 obviously irrelevant disciplines (e.g., Zoology) and 136 papers in these disciplines were excluded. After the disciplines were refined, we further excluded 12 journals (e.g., Marine Chemistry) that are unlikely to publish ITO research and 69 papers in these journals. This process reduced the dataset to 1148 papers. Second, we read the abstracts (and the text if necessary) of all the papers and manually removed

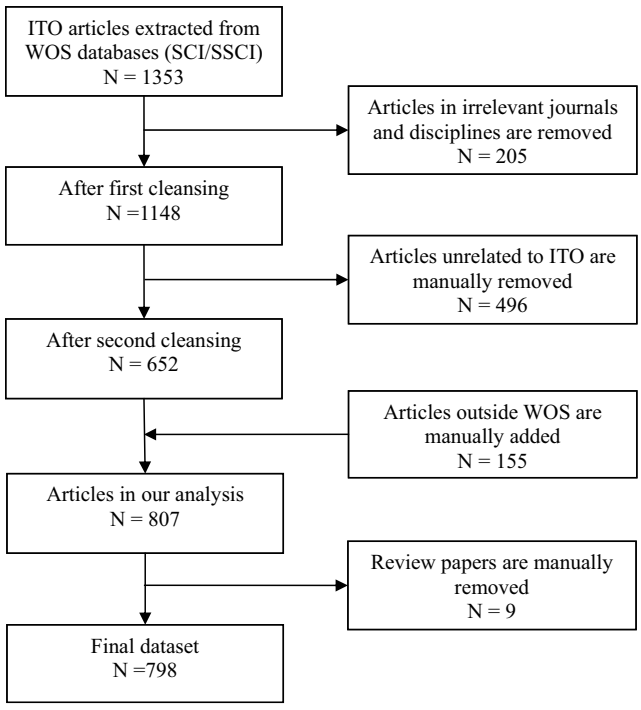


Fig. 2. Data collection process.

496 papers that contain the word "outsourcing" in the text but that do not study ITO-related topics. For example, a paper on supply chain sustainability mentions outsourcing, but its research question is unrelated to ITO. Another example is that for a paper on IT security management; its topic is partially related to ITO, and some arguments rely on ITO, but its main research question is unrelated to ITO. This further reduced the dataset to 652 papers.

In addition, we identified some highly cited articles not indexed in the WOS database. Specifically, we used all the articles cited by the 652 papers to create a citation network and selected articles with 5 or more citations in this network for our research dataset. This resulted in 57 additional papers. We also added ITO papers cited in any of the nine ITO reviews [52,35,91,72,92,4,63,84,24] but there were not in our dataset. A total of 98 additional papers were added based on these reviews. Thus, 155 papers outside WOS were manually added. Furthermore, we excluded nine review papers from the dataset because these papers address a wide range of ITO topics and cannot be classified into a specific research stream. The final dataset included 798 papers.[1] Although this dataset did not cover every ITO paper ever published, our rigorous data selection process helps to ensure that the dataset can reasonably represent the ITO field.

We configured all 798 papers into the WOS citation format and fed the data into Histcite [48], a bibliometric analysis software, to derive a .NET file that contains the citation relationships among the papers. Then, we used a self-developed C program to conduct main path analysis based on the .NET file and used Pajek [18] to visualize the output.

5. Results

Our analysis produced a global main path and multiple main paths for ITO research during the 1992–2013 period. All the figures of the citation networks and main paths are drawn using Pajek [18]. We discuss the results as follows.

[2] A list of the papers removed at each step of the data collection process are available from the authors on request.

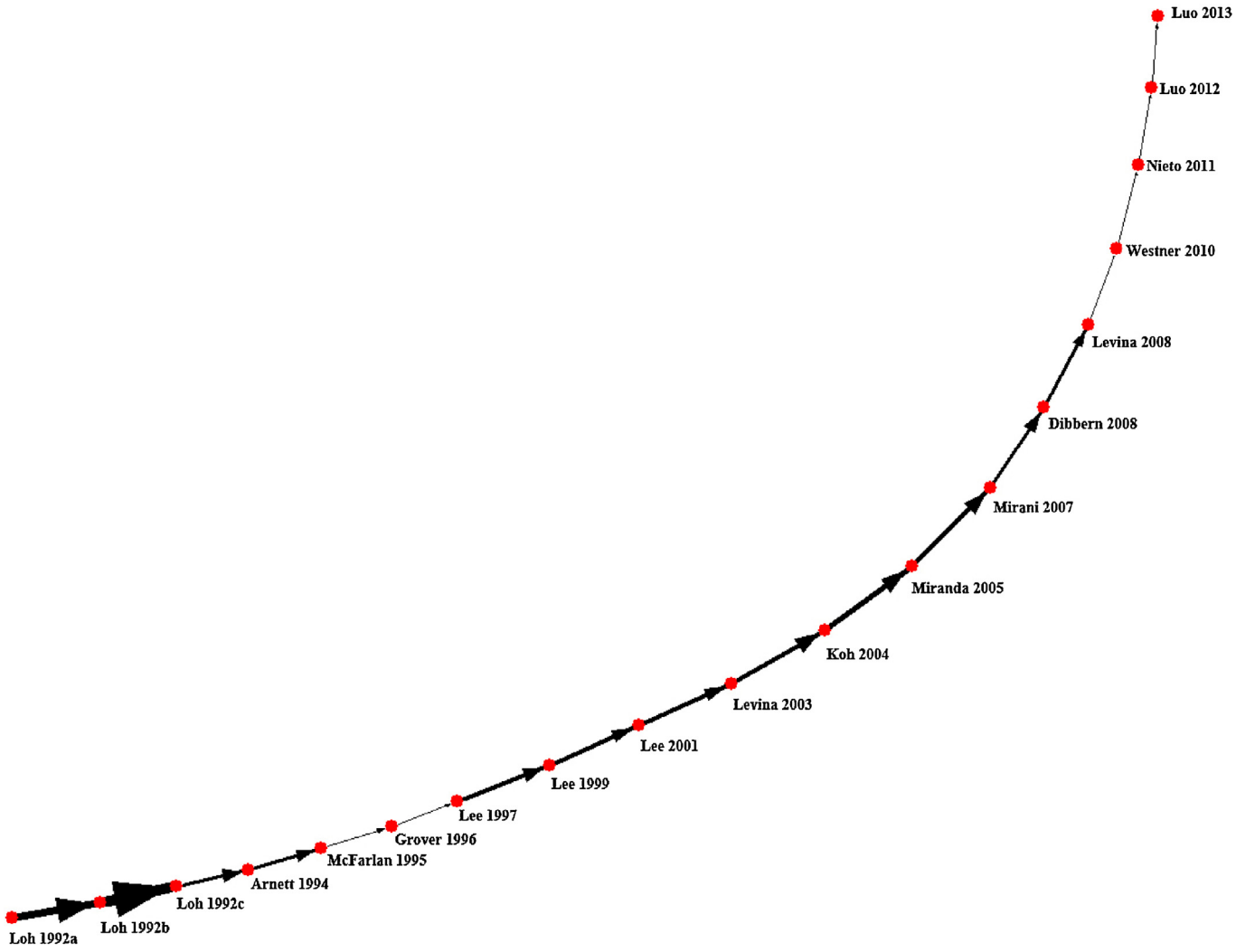


Fig. 3. Global main path of the ITO citation network.

5.1. Global main path

The global main path (Fig. 3) shows the most important knowledge flow of the ITO citation network [114]. Each node in the path denotes an article (see Appendix B for details). An arrow between two nodes indicates the direction of knowledge flow. The line thickness is determined by the SPC value.

The global main path suggests how knowledge evolves over time in ITO research. The global main path is essentially the citation path that has been traversed most frequently by ITO research. Therefore, the path suggests a general overview of a significant ITO knowledge flow. A visual inspection of Fig. 3 reveals two major themes based on the thickness of the sequence of adjacent links. The first theme, starting from Loh and Venkatraman [117] and ending at Arnett and Jones [8], is focused on motivation, adoption, and decision issues, and we label it as "ITO decisions." The second theme, starting from McFarlan and Nolan [124] and ending at Nieto and Rodriguez [137], examines a variety of issues regarding how to manage ITO relationships and activities to achieve ITO success, and we label it as "ITO management." The last two papers on the global main path [120,121] do not show a clear theme content wise.[2] Given that both papers address the business process offshoring context, they could be interpreted as belonging to the booming research on offshoring. The evolution of themes suggested by the global main path seems to be consistent with how Lacity et al. [92] categorize ITO research. They proposed that all ITO research basically addresses two important problems: ITO decisions and ITO outcomes. ITO management is closely related to ITO outcomes given that the purpose of ITO management is to achieve various ITO outcomes.

It is noticeable that a few scholars heavily influenced the ITO knowledge diffusion over time and whose work has repeatedly appeared on the global main path. In the early 1990s, Loh and Venkatraman [117,118] played an important role in studying motivations and determinants of ITO decisions. Later, Lee figured prominently in studying ITO relationships and ITO success by having two papers on the path [102,99]. Levina also heavily influenced ITO research by contributing two articles to the global main path [107,108]. Note that some highly cited papers might not appear on the global main path. However, it does not undermine the value of the global main path [111] nor does it devalue the highly cited papers. The goal of the global main path is to provide an alternative angle to overview the ITO research field; it is not meant to be complete. There are undoubtedly many important articles missing from this path, and this limitation can be overcome by constructing multiple main paths.

[3] Note that the "young" papers at the end of the main path are not as stable as the "old" papers in the front part of the main path. Although these "young" papers may stay on the main path in the future, they may also be replaced by other papers as their citation patterns change with time.

5.2. Multiple main paths

Based on the global main path, we developed multiple main paths to depict the ITO research field with more detailed information. We successively selected main paths with smaller overall SPC values. How many paths to select is an arbitrary decision and depends on how many details in which one is interested [114]. Because there are no formal rules regarding the number of paths to be selected, we estimated the number based on previous studies on main path analysis. Liu et al. [110] suggested selecting paths with SPC values within 20% of the largest SPC value, or the top one-fifth of the citation network. Based on this rule, they selected only 12 out of 421 articles (2.8%). To address the concern that too few articles would not reasonably represent the entire citation network, we increased the range to 33%, or the paths with top one-third of the SPC values. This represented exactly 120,000 main paths (or 2% of the 6.45 million main paths), consisting of 280 papers out of 798 (35%).

These 280 papers and their citation relationships form a condensed network of ITO research, which includes the most representative knowledge transferring routines. Although reducing 6.45 million paths to 120,000 paths is a significant downsizing, the network remains too complicated to show separable research themes (see Fig. 4). As explained earlier, we pruned this network to delete peripheral citation links. Two authors independently examined the title, keywords, abstract, and main text of the two papers of each citation link and determined the citation link's nature. The link was deleted if it was marked as peripheral by both authors. If the two authors disagreed on a specific citation link, a third author's opinion was obtained to resolve the disagreement. After pruning, the citation network revealed a tree pattern with several recognizable braches (see Fig. 5). Each branch represents a research stream of ITO. Fig. 5 shows that we identified 12 research streams along the global main path. Seven streams are related to specific issues in ITO, namely, ITO motivations, ITO decisions, ITO risks, debate around transaction cost theory, client–vendor relationship, the vendor's perspective, and psychological and formal contracts; and five are concerned with specific ITO types, namely, ASP, BPO, opensourcing and crowdsourcing, offshore outsourcing, and multisourcing. Because ITO success is a broad topic in ITO and because most papers are related to ITO success to some extent, we examine the 12 streams and discuss how ITO success research evolved over time. Table 1 shows the number of papers, start year, and a brief summary of the content of each stream. The 12 citation sub-networks of the research streams that show each paper's first author name and publication year can be found in Appendix C. Next, we will discuss each research stream in detail.

5.2.1. ITO motivations

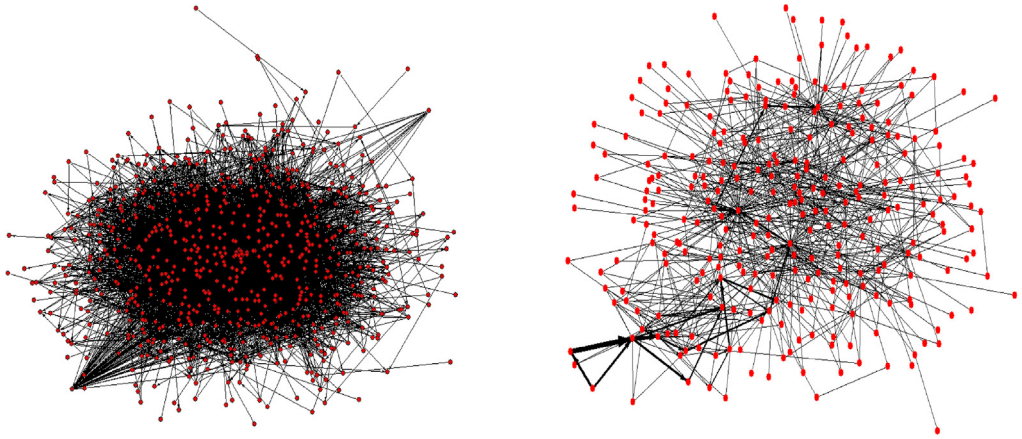
The works of Loh and Venkatraman [117,118] stimulated many studies on the determinants of ITO. Scholars studied this research question from economic, technological, strategic, organizational and political perspectives and found that a plethora of complex, interrelated motives drove firms to adopt ITO [65,14]. In the early 1990s, companies jumped onto the ITO bandwagon with little mindful thinking because they believed that they could achieve cost reductions and access to high-quality IT services and skills via ITO [117,125,7]. Some companies outsourced their IT functions for strategic reasons even if their internal IS department could provide similar results as outsourcing vendors [66]. ITO may also occur in firms that considered IT as core competencies [125,150].

Many motivating factors for ITO have been identified from the organizational level such as mimetic influences among organizations [5,118,73]. Organizations can eliminate the burden of internal IT functions and accelerate reengineering through ITO. In addition, some companies outsource for political reasons, such as to bypass political barriers that prevented the IS department from obtaining cost savings [86], or to solve internal conflicts [14]. Over time, the business environment has changed, and some motivating factors gradually lost relevance. For example, cost saving is no longer the primary reason to outsource for some companies [54,55]. Clients are searching for more added-value and higher quality services from ITO vendors [54].

5.2.2. ITO decisions

Articles in this stream are focused on issues surrounding the decision-making process of ITO. Three subtopics emerged under this branch: to outsource or not, how to outsource, and re-outsourcing decisions.

(1) *To outsource or not*. Studies on this topic have attempted to explain whether a firm should adopt ITO from several perspectives such as the evaluation practices approach comparing vendor bids and in-house costs [181,183], the strategic perspective focusing on how to use the IT market to leverage business advantages [182], and the economic perspective intending to find a balance between benefits and risks [78]. Once companies are determined to become involved in ITO, the follow-up question is "how to outsource?"
(2) *How to outsource?* Three prominent concepts emerged from our analysis regarding how to outsource – flexible outsourcing,



a. The network of 798 papers with 6.45 million paths b. The network of 280 papers with 120,000 paths

Fig. 4. Citation networks of ITO papers from 1992 to 2013.

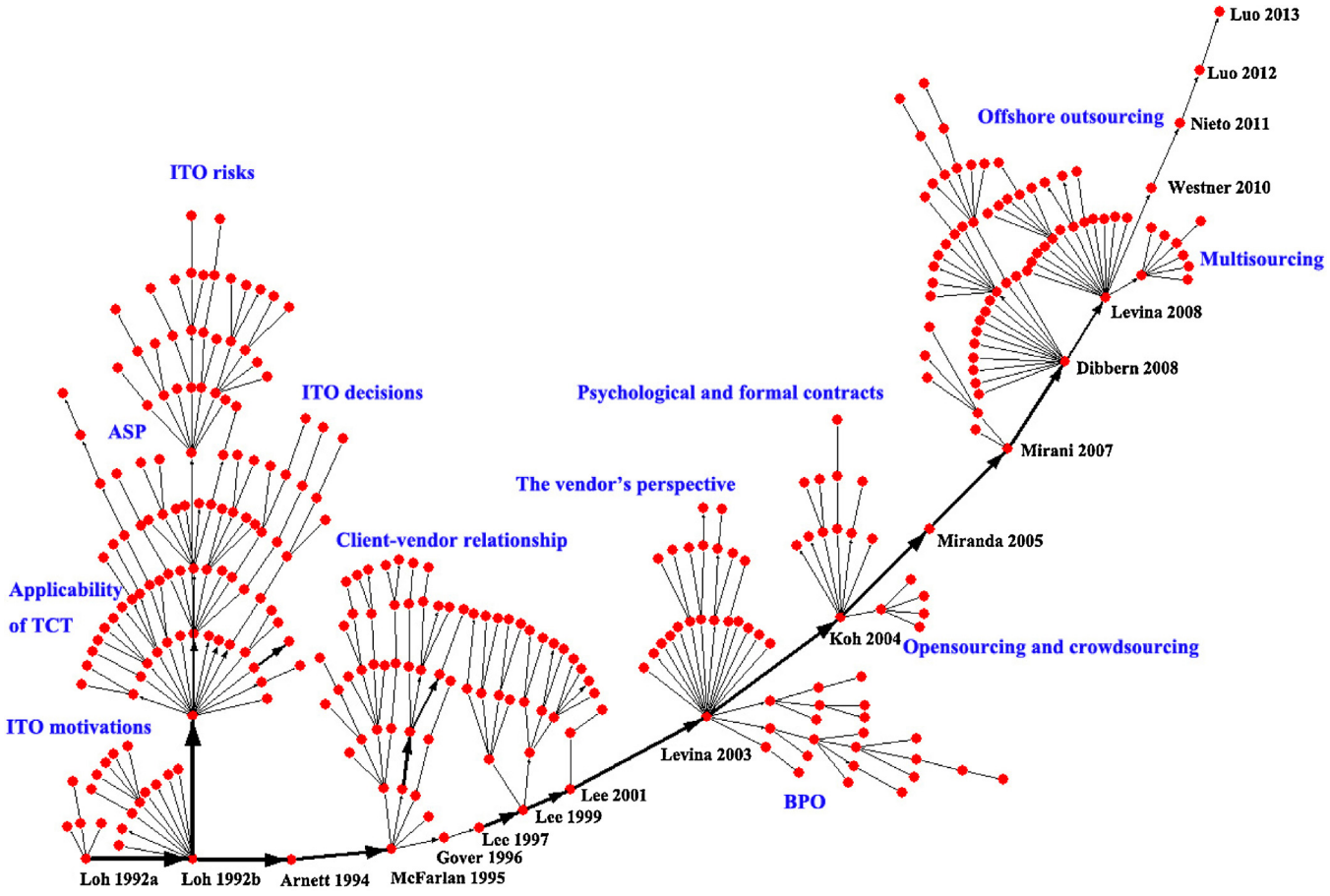


Fig. 5. Multiple main paths of the ITO citation network.

selective outsourcing and selecting a suitable vendor. First, as an important approach to outsourcing, flexible sourcing is found to be strategically imperative in a dynamic business environment [166] and can contribute to the success of outsourcing [156]. Second, as another important outsourcing approach, selective sourcing has been applied by firms to decide which parts of IT functions should be outsourced and which should remain in-house [89,88]. Different quantitative

Table 1
Summary of the 12 ITO research streams.

Research stream	Start year	Number of papers	Content
ITO motivations	1992	19	ITO motivations from economic, technological, strategic, organizational and political perspectives; many complex, interrelated motives drove firms to adopt ITO.
ITO decisions	1993	45	1. To outsource or not; 2. how to outsource: type and vendor; 3. re-outsourcing decisions: determinants of re-outsourcing decisions.
ITO risks	1996	32	Domestic ITO risks, offshore risks, BPO risks, and ASP risks, risks related to vendors and for vendors
Applicability of transaction cost theory	1995	22	The integration of TCT and other theories; debate on the applicability of TCT in ITO research. Develop endogenous ITO theory.
Client–vendor relationship	1995	66	1. Relationship characteristics: mainly trust and control. 2. Client–vendor relationship and ITO success: the complementary nature of relational governance and contractual governance.
Vendor's perspective	2003	23	Vendor's perspective in: project management methodology, ITO risks, BPO, Offshoring, ITO relationship and contractual governance
Psychological and formal contracts	2004	13	Formal contract and ITO outcome; psychological contract and ITO outcome; formal and psychological contracts are complementary
ASP	2001	8	Determinants, risks, success, the client–vendor relationship; netsourcing: determinants and decision problems
BPO	2006	22	Motivations of BPO; BPO risks; BPO decision problem; BPO relationship; BPO success; the vendor's perspective
Opensourcing	2008	5	Characteristics of opensourcing; opensourcing success.
Offshoring	2007	63	Five perspectives from which offshoring were studied: costs, cultural distance, innovation, knowledge transfer and boundary spanning
Multisourcing	2008	8	Decision problems of multisourcing; quantitative methods
Total		326[a]	

[a] Some papers could be categorized into more than one stream because they cover several topics. We resolved this issue by counting the papers in each relevant stream. As a result, the total count (326) is greater than that actual number of papers (280).

methods have been employed to develop decision models for selective sourcing, including the analytic hierarchy process (AHP) method [189,174] and the group decision-making approach [135]. Third, researchers have developed methods to help firms select appropriate vendors by evaluating vendor characteristics [69] and capabilities [109,42]. One popular method is the two-stage contract approach, which uses a pilot project to test the vendor capabilities before signing a formal contract. Several quantitative models, such as a game theory model [157], combinatorial optimization model [22], and fuzzy VIKOR model [28], have been employed to examine the selection decision under this two-stage framework. The AHP method has also been employed to assist small- and medium-sized enterprises in selecting vendors [25].

(3) *Re-outsourcing decisions.* Many companies face re-outsourcing decisions when their current outsourcing contracts have to be renegotiated or terminated due to dissatisfactory outcomes or changed organizational and business environments. Research related to this topic has focused on understanding why firms continue with the current vendor or switch to a new vendor. The re-outsourcing decision has been found to be affected by various factors such as the strategic impact of outsourced activities and vendor substitutability [133], switching costs [178], prior relationships with vendors [29], negative previous ITO outcomes, loss of control and the degradation of IS services [61]. If clients decide to discontinue the current ITO relationship, they may resort to backsourcing. Veltri et al. [170] found a set of internal and external factors, such as organizational change and industry change, that contribute to the decision to backsource. Whitten and Leidner [177] found that product quality, service quality, relationship quality, and switching costs are related to the decision of backsourcing. Recently, Chu et al. [31] developed some guidelines concerning vendor transition based on threat theory for clients.

5.2.3. ITO risks

The articles in this branch mainly address four types of ITO risks: domestic ITO risks, offshore risks, BPO risks, and ASP risks. For domestic ITO risks, some conceptual papers identified lists of risks, or developed risks models, and proposed measures to mitigate ITO risks [40,15]. Empirical works have confirmed the existence of ITO risks and have evaluated risk management strategies via case studies [180,184]. For example, long-term, large-scale, total ITO is a high-risk strategy because it can lead to a series of risks such as power asymmetry being developed in favor of the vendor [51]. Willcocks et al. [184] suggested that this type of ITO could be successful if a series of measures, such as careful delineation of outsourcing type and scope and strict vendor selection criteria and processes, are taken in a timely manner. Risks from offshoring are more complicated. Nakatsu and Iacovou [132] conducted a Delphi study to explore risk factors in both domestic and offshore outsourced software projects and found that the offshore context not only was more vulnerable to traditional project management risks than the domestic context but also suffered from unique risks not found in the domestic context. High risks in offshore outsourcing may be associated with the difficulty to maintain control over long distances in addition to different cultures, norms, laws, and languages. Because most BPO projects are non-core activities [154], they were thought to have fewer risks. However, there remain some risks that are unique to BPO. For example, Shi [154] identified different types of risks in BPO, and the findings suggested that clients may face risks in areas of customer services, operational costs, information security, business continuity, and short-term market performance. Researchers have also found risks in ASP. Kern et al. [83] developed a risk-assessment and risk-mitigation framework for ASP and found that many risks in ASP are the same as in ITO but emerged with different patterns.

Many ITO risks are related to vendors. Gonzalez et al. [54] found that in large Spanish firms, ITO risks mainly arise from their providers. Bahli and Rivard [13] also found that the transaction, client and supplier are three major sources of risk factors in ITO. Lacity et al. [91] identified 34 risks in ITO projects, and a number of risks on their list are related to the vendors' power, trust, capability, and experience. Vendors not only are a major source of ITO risks [55,13] but also face risks themselves. Only a few studies have studied ITO risks from the vendor's perspective [168,113]. For example, Taylor [168] found that Hong Kong vendors are faced with not only typical risks that threaten project outcome success but also location-specific risks. Liu et al. [113] explored the moderating effects of project uncertainty on the relationship between risk management and IS development project performance from the vendor's perspective.

5.2.4. Applicability of transaction cost theory

Transaction Cost Theory (TCT) is the dominant theoretical framework for the study of ITO [94] and has been employed to explain many ITO practices [136,173]. However, as the ITO practices kept developing and became more complicated, concerns over the applicability of TCT were raised. For example, Lacity and Willcocks [87] found that language ambiguities and the unit of analysis are two major obstacles to the applicability of TCT in ITO decision research. To extend its applicability, TCT has been integrated with other theories to explain ITO decisions, including comparative economic theories and incomplete contracts theories [7,12,9], resource-based theory and resource dependency theory [153,175], and social exchange theory [178]. Researchers have also investigated ITO phenomena from both economic- and knowledge-based perspectives [153,155,169].

Recent years have witnessed a heated debate on the applicability of TCT in ITO research. Previous studies based on TCT have generated mixed or contradictory findings, and ITO scholars have derived drastically different conclusions from this observation. Alaghehband et al. [3] argued that the mixed results were caused by misapplication of TCT and contended that TCT should be more faithfully applied in the ITO context. However, Lacity et al. [94] insisted that the ITO phenomenon is too complex to be interpreted by TCT and that "*ITO research has matured to the point that we could and should be building on ITO-specific research findings and developing what we have defined as indigenous ITO theory rather than continuing to rely over-heavily on reference discipline theories*" (p. 139). Lacity and her coauthors also urged researchers to develop endogenous ITO theory in two review papers [92,93]. However, it takes time for new theories to develop; until then, TCT continues to be applied as the theoretical foundation for studying ITO decisions [10].

5.2.5. ASP

Application service provision (ASP) is a sourcing model that promises to deliver best-of-breed, scalable and flexible business applications to customer desktops. Studies on ASP have been concentrated on traditional themes such as determinants of ASP [153], risks in ASP [83], ASP success [83,162,105], and the client–vendor relationship in ASP [165]. Recently, netsourcing, an innovative form of traditional ASP, has attracted much attention. Netsourcing refers to a stack of various ASP service types such as storage service providers, managed service providers, full-service providers, and business service providers [83]. In contrast to ASP's one-to-many business model, netsourcing incorporates a one-to-one customization business model, in which customers can receive customized services [83]. Research on netsourcing is limited, therein addressing problems such as determinants of netsourcing [115] and netsourcing decisions [116].

5.2.6. Client–vendor relationship

Fig. 5 shows that the client–vendor relationship research stream started with McFarlan and Nolan [124], who suggested that the fast-changing IT environment makes it desirable for clients and their suppliers to form strategic alliances. Thereafter, a large number of ITO papers focusing on inter-organizational relationships emerged. These papers mostly examine client–vendor relationship characteristics and the impact of client–vendor relationship on ITO success.

Research in this stream collectively shows that the client–vendor relationship is a social exchange relationship characterized by the tension between trust and control [99,122]. The ITO clients and vendors are both contractually and socially related to each other, and therefore, their relationship has economic, contractual, and social characteristics [79,81,82]. Stakeholder management and norm building are important to successful client–vendor relationships [63,80,62]. Sabherwal [149] identified four types of trust in client–supplier relationships. Later research building on Sabherwal's work examined determinants of trust, how to build the trust mechanism and maintaining trust [122,11,97]. Both initial trust and ongoing trust were found to be important [106,100]. Information sharing, communication quality, and inter-firm adaptation are found to significantly affect trust building between clients and vendors [122].

Clients and vendors need not only to trust each other to achieve efficient cooperation but also control mechanisms to monitor ITO performance. Various controls that clients use to regulate ITO outcomes have been investigated. Choudhury and Sabherwal [30] found that outcome-based control is dominant in ITO contracts, especially in the early stages of projects, and behavior control and clan control are often added when the project encounters problems. Rustagi et al. [148] suggested that when both parties have strong trust, clients use formal control mechanisms to a lesser extent and that when task uncertainty is high, clients are likely to use formal controls. Mao et al. [122] found that both trust and control can significantly affect ITO success. Gefen et al. [49] demonstrated that business familiarity can imply trust and thus reduce adverse selection and moral hazard risks between clients and vendors.

There is a general consensus among ITO researchers that the client–vendor relationship plays an important role in determining ITO success [92,104]. Research on the impact of ITO relationships on ITO success takes two approaches. One approach attempts to identify ITO relationship characteristics that predict ITO success, and the other is focused on the complementary nature of relational governance and contractual governance. First, regarding predictors of ITO success, Grover et al. [67] found a strong association between partnership dimensions such as trust, communication, and cooperation and ITO success. Subsequent research shows that partnership quality is a key predictor of outsourcing success [102,101] and that it can mediate the impact of knowledge sharing on ITO success [99]. Factors that contribute to high-quality partnerships, such as mutual benefits and commitment, have also been found to better predict ITO success than need-based factors [103]. Researchers have also explored the impact of trust on ITO success from an evolution process perspective (e.g., [106,100]). Qi and Chau [141] found that interpersonal trust has a stronger effect on ITO success than does interorganizational trust and that its effect is mediated by knowledge sharing.

In the second approach, the client–vendor relationship has been investigated under a different label – relational governance, and it is often studied vis-à-vis contractual governance. Most studies in this area are built on the work by Sabherwal [149], who found that the balance between trust (relational governance) and structure control (contractual governance) is likely to lead to better ITO performance. Recent studies confirmed that formal contracts and relational governance function as complements rather than substitutes [59,140]. In addition, Goo et al. [58] found that commitment can moderate the impact of service-level agreements, a form of contractual governance, on outsourcing success. Goo and Huang [57] studied the dynamics of interactions between formal control and relational governance and found that certain contractual elements could enhance trust and relational commitment between outsourcing partners. A recent study revealed that the interacting effect of formal contracts and relational governance may not provide symmetric benefits to all parties but rather benefit the partner who faces greater risk in the ITO exchange [60].

Our main path analysis shows that client–vendor relationship remained a popular topic in recent ITO research. Some studies were conducted on emerging economies (e.g., [146,110]), and culture-specific factors such as guanxi and mianzi have been considered [39]. Researchers have started to emphasize both the clients' and vendors' perspectives simultaneously when studying their relationships [106,100,71]. Some studies have been conducted to examine ITO relationship quality in the context of public sectors, which has largely been ignored in the past [130,164].

5.2.7. The vendor's perspective

To achieve ITO success, both parties involved must be able to reap benefits from the arrangements. Most researchers solely focused on the interest of clients before Levina and Ross [107], and the suppliers' concerns have rarely been explored. Levina and Ross [107] first proposed ITO value proposition from the vendor's perspective, thereby drawing much attention from ITO scholars. The vendor's perspective has been taken to investigate a number of ITO problems such as project management methodology (e.g., [129]), ITO risks (e.g., [168,113]), BPO (e.g., [95,96]), offshoring (e.g., [122,77]), ITO relationship (e.g., [95,34]), and contractual governance (e.g., [141]).

Research from the vendor's perspective will continue as long as vendors are treated as an important part of the ITO phenomenon [90]. As more ITO vendors in emerging economies enter the outsourcing competition, they need to gain management insights from ITO research to guide their strategies. Researchers have performed much research on offshoring from Western clients to Indian vendors (e.g., [95,96]) and have paid relatively less attention to outsourcing vendors in other countries.

5.2.8. BPO

This research stream is concerned with various issues of business process outsourcing (BPO). The advanced IT and telecommunication skills make it possible to outsource standard processes. Economic and strategic benefits such as cost advantages, focusing on core competencies, access to specialized resources and quality improvements have spurred many organizations to outsource some business processes to service providers [50]. However, facing risks such as low service performance, unexpected payment, potential loss of critical resources and capabilities, and managers' job security concerns [50], companies are cautious to adopt BPO. A multiple-perspective approach integrating the transaction and both the organization and its context is useful for firms when deciding whether BPO is appropriate [21]. Tanriverdi et al. [167] found that low modular business processes detachable from their supporting IT infrastructure tend to be offshored, whereas high modular processes tightly coupled with IT infrastructure tend to be outsourced domestically.

Partnership quality is consistently found to be a significant predictor of BPO success [95,41]. Bharadwaj et al. [20] found that BPO clients pay more attention on how to build successful relationships with the vendor rather than on the vendor's competencies. Business understanding, commitment, communication and top management support positively influence partnership

quality [41]. In addition to partnership quality, the balance between relational and contractual governance can also have a significant effect on BPO success. For example, Rai et al. [144] found that a hybrid relational-contractual governance mechanism has a positive correlation with BPO satisfaction. Wullenweber et al. [188] showed that process standardization directly impacts BPO success due to production cost economies and that it indirectly impacts BPO success via relational and contractual governance. Narayanan et al. [134] discovered that the antecedents of process integration such as task complexity, task security, end customer orientation of the client, and IT capability of the BPO can influence BPO success. In addition, some studies have suggested that vendors' resources and capabilities jointly influence BPO outcomes [95,96].

5.2.9. Psychological and formal contracts

Contracts represent the formal mechanism that legally connects clients and vendors in the ITO relationship. ITO scholars have not only studied issues related to the formal contract but also found that psychological contracts are another effective way of engaging vendors. Papers in this research stream address both psychological and formal contracts.

When examining formal ITO contracts, economics theories, including incomplete contract theory [49,163,161], transaction cost economics, and agency theory [27], are mostly applied. Social theories such as relational exchange theory are sometimes employed [27]. Some papers have studied antecedents of clients' contract choice and found that business familiarity, prior experience, and process interdependence influence how the client selects formal contracts [49,27]. Efforts have also been made to understand contract extension and termination. Susarla et al. [163] found that non-price contractual provisions, contract duration, and extendibility terms give firms an option to extend the contract and thus to limit the likelihood of holdup. The deficiency of the long-term contracts in ITO such as lack of sufficient flexibility and completeness may lead to several contract cancellations midway, and various method of contract improvement based on renegotiation ex post are explored [161]. In addition, ITO performance measures are examined in the context of formal contracts. Fitoussi and Gurbaxani [46] found that firms find it challenging to achieve multiple objectives through formal contractual governance because the objectives are often interrelated and that the increased number of performance metrics specified in the contract often lead to unsatisfactory outcomes. It is interesting to note that many papers in ITO contract governance focus on offshoring software development projects (OSDPs). This may be because OSDPs represent a leading business sector in the global IT marketplace [123], and OSDPs often produce more risks than simple IT service outsourcing [171].

ITO partnerships involve both formal contracts and informal mechanisms such as psychological contracts for managing relationships. The psychological contract perspective has been applied to examine various IT sourcing varietals, thereby providing an important theoretical lens for ITO researchers [2]. Koh et al. [85] showed that psychological contracts can enhance the perceived mutual obligations of ITO clients and suppliers and better predict ITO success than can formal contract characteristics. Miranda and Kavan [127] explained that ITO has two governance options or moments, namely, the formal contract governance and the post-contractual psychological contract, and choices concerning formal contracts and psychological contracts can interact with each other to influence ITO outcomes. This is consistent with the results of Srivastava and Teo [158], who found that formal and informal controls function as both substitutes and complements in affecting ITO success.

5.2.10. Opensourcing

Opensourcing is a method in which commercial companies collaborate with open-source communities to develop products of commercial interest to the company, providing ample opportunities for companies to recruit excellent developers world-wide [2]. Researchers have investigated the motivations for and benefits and challenges of opensourcing [2,112]. The motivations for opensourcing include cost savings, reduced software development cycles, modularized and distributed development work, access to advanced technology, and innovation [2]. Simultaneously, opensourcing faces many challenges, especially in the areas of in-house staffing and project sustainability [112]. Researchers have also examined the outcomes of opensourcing. Agerfalk and Fitzgerald [2] suggested that companies and open-source communities must build an overall opensourcing ecosystem based on a trusted partnership of shared responsibility to achieve success. Daniel et al. [32] examined the role of diversity in open-source project success and found that three types of diversity, namely, separation, variety, and disparity, have significant influence on a project's community engagement and market success.

Crowdsourcing is a new method of outsourcing and is similar to opensourcing. Only one paper on crowdsourcing was found on our multiple main paths [139]. This paper compared the ideas generated by a firm's professionals with ideas that were proposed by potential users of a firm's new product design and found that user ideas scored higher in novelty and customer benefit but lower in feasibility, suggesting that ideas generated via crowdsourcing should be complemented with professional opinions during new product design.

5.2.11. Offshore outsourcing

The common theme of this stream is offshore outsourcing. The papers address a variety of issues surrounding offshore outsourcing in light of specific cultures, norms, laws, and languages involved in the offshore context [132]. Specifically, we identified five perspectives from which offshoring was studied: costs, cultural distance, innovation, knowledge transfer and boundary spanning.

(1) *Cost*. Different types of costs, such as general transaction costs, extra costs and hidden costs, are associated with offshore outsourcing projects [151,36,98]. Transaction costs include pre-contractual costs and contract-based costs. Company size and the maturity level of the firm's offshore sourcing activities can affect the firms' transaction cost mitigation tactics [151]. Extra costs include all costs spent by the client beyond contract-based costs, which often offset cost advantages of offshoring such as low labor costs of the vendor. The extra costs emanated from requirement specification and design, knowledge transfer, scale of services, control, and coordination can be reduced by the extent of client-specific knowledge and absorptive capacity of the vendor and increased by the employee turnover rate and geographic and cultural distance between the client and the vendor [36,70]. Hidden costs refer to the unanticipated costs of implementation that arise during strategic decision-making processes [70]. Clients often fail to accurately estimate costs in offshoring projects because they omit hidden costs. Larsen et al. [98] attributed this error to increased configuration and task complexity in offshoring.
(2) *Cultural distance*. Compared to domestic outsourcing, cultural distance (or cultural difference) is a more salient issue in offshoring. Decreased cultural distance has been found to provide many benefits to firms in offshoring [68]. Existing studies have attempted to clarify what factors effect cultural distance [68,186,6], how they impact offshoring success [39,68,186,64,160] and how to manage cultural differences to achieve offshoring success [186]. Winkler et al. [186] found that

differences in power distance, IS designer values and communication styles can affect relationship quality and offshoring success and that these cultural distances can be reduced by a clear definition of roles and mechanisms, strong leadership and culture management. Hahn and Bunyaratavej [68] showed that host countries with low uncertainty avoidance, high individualism, and high power distance represent ideal locations for service offshoring. Mao et al. [122] found that cultural blending can increase clients' control over vendors. Beck and Schott [19] found that the interaction between formal and informal control mechanisms and interorganizational learning help to mitigate cultural differences in offshoring. In addition, Gregory et al. [64] found that cultural intelligence can improve trust-based interpersonal relationships, shared understanding, and the effective resolution of conflicts in offshoring projects.

(3) *Innovation*. Offshoring can potentially improve a company's innovativeness by altering its knowledge base. It has been suggested that offshoring can enhance firms' innovation ability in two aspects: minimizing the risk associated with innovation and increasing the probability of accessing new and diverse ideas from different markets and cultural perspectives [131]. However, the relationship between offshoring and innovativeness is not simplistically linear. Mihalache et al. [126] found that the relationship between the extent of the primary functions of offshoring and innovativeness is an inverted U-shaped curve: when firms offshore from low to intermediate levels, they can utilize the location-specific advantages and competencies of foreign countries to gain innovativeness, but when the extent of offshoring exceeds a threshold, the benefits will diminish and can even negatively affect innovativeness. Furthermore, researchers have studied moderating factors that can influence the firms' innovation ability in offshoring. Nieto and Rodriguez [137] indicated that R&D offshoring has different impacts on innovation performance depending on the innovation types (product or process innovations) and governance models (captive offshoring or offshore outsourcing) considered. Mihalache et al. [126] found that informational diversity and a shared vision of top management teams moderate the relationship between offshoring and innovativeness.

(4) *Knowledge transfer*. Knowledge transfer is an important antecedent of offshoring success [185,33]. In offshoring, the knowledge transferred from clients to vendors involves both codified declarative knowledge and complex tacit knowledge [185]. Given communication barriers, cultural and institutional distances, lack of equivalence in individual competences, and lack of common rules, effective knowledge transfer is difficult to achieve [75]. Research shows that procedural coordination strategies [128], formal training and embedment within the client [185] and bridge system engineers [75] help to improve the mutual understanding between clients and vendors. The knowledge flowing between the client and vendor is a bidirectional process. Cha et al. [23] argued that long-term projects may disrupt the knowledge supply chain of clients and that the client must exploit learning-by-doing production knowledge from the vendor's large, scale-driven repository. Westner and Strahringer [176] found that knowledge transfer, along with project suitability and liaison quality, is a significant determinant of offshoring success.

(5) *Boundary spanning*. Boundary spanning is an important issue in ITO, especially in the offshoring context because diverse organizational and national contexts often disturb the collaboration between onshore and offshore participants [108,1,38]. Levina and Vaast [108] studied how country and organizational factors impact boundaries and associated status differences and found that some middle managers were able to alleviate status differences and help others renegotiate boundaries based on their positions and resources. Du and Pan [38] attempted to understand how vendors span boundaries with clients rather than how clients span boundaries with vendors by examining two key boundary-spanning elements, namely, boundary spanners and boundary-spanning strategies, and found that vendor boundary spanning occurs by design, with rational deliberation and planning, rather than by emergence. For example, a Bridge System Engineer can use their IT background and communication skills to promote effective communication and therefore facilitate knowledge transfer and improve the business relationships between clients and vendors [75]. In addition, Luo et al. [120] showed that multinational firms' projects to integrate internally distributed processes should be aligned with task traits and task interdependence. Luo et al. [121] also found that business process offshoring is determined by both task traits and the needed process integration when firms attempt to expand the boundaries of their processes internationally.

5.2.12. Multisourcing

Multisourcing is a strategy firms utilize to expand their supply network with more than one service provider around the world. A similar strategy has been extensively studied in the manufacturing field but rarely in the IT offshoring field. Integrating related research from manufacturing into IT service outsourcing, Su and Levina [159] found that the breadth and depth of a firm's multisourcing have different effects on outsourcing outcomes such as cost, risk, flexibility, innovation, service quality, and delivery speed. Researchers have paid close attention to multisourcing decision problems, especially in terms of how many suppliers should be selected. Although prior ITO and supply chain management research strongly advised focusing on a small number of strategic partners, Levina and Vaast [108] argued that this strategy may lead to fewer opportunities to discover new suppliers or supply regions and suggested that client needs to engage in a more intensive multisourcing for services. In their case study, Su and Levina [159] found that global financial service firms have adopted a multisourcing pendulum strategy by experimenting with different configurations to explore the optimal supply base for a given function. When internal or external business environments changed, a firm swings between single sourcing and extreme multisourcing strategies. Researchers have also applied quantitative methods such as the NP-hard multi-objective model and bi-objective 0-1 linear programming model to solve supplier selection problems in multisourcing [44,43].

5.2.13. ITO success

Almost every paper in ITO attempts to answer questions or solve problems with the ultimate goal of achieving success in ITO. Thus, ITO success is the most important dependent variable in ITO research. We examine papers that directly address ITO success and summarize the conceptualization of ITO success from papers that explicitly define ITO success. As expected, the measurement of ITO success evolves with the development of the ITO. At the beginning stage of ITO, companies mainly look for economic and technological benefits from ITO; therefore, ITO success is measured by expected cost savings [88] or by economic and technological terms [89]. Later, when companies realize that they can achieve strategic advantages from ITO, strategic items are incorporated into ITO success measurements [37,99,67]. After ITO relationships were recognized as a key dimension of ITO success, they were also incorporated into measuring ITO success [150,85]. For example, Saunders et al. [150] measured ITO success from the contract, IS

role and ITO relationship perspectives along four dimensions: economic, technological, strategic and overall satisfaction with contract.

As ITO practices became increasingly mature and more sophisticated, additional measurements were added to ITO success to address broader strategic concerns [58]. For example, ITO success can be conceptualized as having four dimensions: economic, technological, strategic and service quality [102,103]. When studying the interaction between service-level agreements and commitment, ITO success can be measured as having functional, strategic, and technological dimensions [58]. Most ITO researchers agree that the ITO success construct should include strategic, economic and technological dimensions [106,58]. Research on offshore IS projects has continued the traditional ITO success dimensions; however, benefits at the project level have been added. For example, Westner and Strahringer [176] interpreted ITO success as perceived satisfaction with the final outcome of offshore IS projects, including schedule, budget, functionality, and quality dimensions. Offshore IS project success in Rai et al. [143] incorporated two indicators: project cost overruns and client satisfaction with the final product. Given that Lacity et al. [91] has reviewed ITO outcomes in detail, we will not spend much time on this topic. The point we intend to make is that ITO success is a construct whose definition and operationalization evolves with time [152].

5.2.14. Comparison with other reviews

In this section, we compare our findings with prior ITO literature reviews to highlight our contributions. We examined nine previous ITO literature reviews: Dibbern et al. [35], Gonzalez et al. [52], Gonzalez et al. [53], Lacity et al. [91], Chadee and Raman [24], Lacity et al. [92], Lacity et al. [93], Gantman [47], and Gonzalez et al. [56]. Some of these reviews exhibit substantial differences in research focus with the current review. For example, Chadee and Raman [24] focused on empirical studies on the international outsourcing of IT Services (ITS), and Lacity et al. [93] reviewed studies in the BPO field. Because the purpose of this paper is to map the field of ITO research, in particular, to identify main research streams in ITO, we select four reviews with comparable components: Dibbern et al. [35], Gonzalez et al. [52], Lacity et al. [91] and Lacity et al. [92]. Table 2 summarizes these four reviews.

The comparative analysis shows that our review includes both findings that are consistent with the previous reviews and findings that are unique. First, our review shares many similar findings with the previous reviews. Table 3 shows that ITO motivations, ITO decisions, and client–vendor relationships have been discussed in detail by all four reviews. ITO risks have been recognized as an important topic for ITO practice by Lacity et al. [91] and as an influencing factor for ITO decisions [92]. The vendor's perspective has been noticed by Gonzalez et al. [52], and its importance is also reflected in Lacity et al.'s [91,92] discussion on how vendor capabilities affect ITO outcomes. Lacity et al. [91] identified ASP, BPO, and offshoring as important sourcing varietals that will attract more future research. Finally, the psychological and formal contracts stream partially overlaps with the work by Lacity et al. [92], who mentioned that contractual governance strongly influences ITO outcomes. These commonalities suggest that the main path analysis is able to generate findings consistent with the previous reviews, thus confirming the validity of our review.

Second, the main path analysis we employed provides an objective basis for more comprehensively reviewing a large number of ITO papers. We not only identified research streams consistent with previous reviews but also found research streams that were previously overlooked and streams that are just emerging. For example, the debate around transaction cost theory has not been noticed by previous reviews, although the applicability of TCT has been questioned, and the development of new theories indigenous to ITO research has been called for [92,93]. In the stream concerning psychological and formal contracts, we found that the psychological contract perspective played an important role in understanding ITO relationships. However, previous reviews only emphasized contractual governance and did not provide sufficient credit to this perspective. In addition to ASP, BPO, and offshoring, our review discovered that studies began to concentrate around other sourcing varietals, including opensourcing and multisourcing. Due to their novelty and small numbers of papers, these topics were not identified by previous reviews.

Table 2
Comparison of the current review with previous reviews.

Authors	Study period	Sample size	Journal	Analysis
Dibbern et al. [35]	1992–2000	84	The Data Base for Advances in Information Systems	The authors looked at the research objectives, methods used and theoretical foundations of the ITO papers and mainly discussed questions concerning why outsource, what to outsource, which decision process to use, how to implement the sourcing decision, and what is the outcome of the sourcing decision.
Gonzalez et al. [53]	1988–2005	131	Information and Management	The authors identified the main topics, the methodologies most often applied and the authors and countries that have contributed most to the area of IS outsourcing. The following five main topics, based on different perspective, were identified: outsourcing from the perspective of the client, the provider, the relationship, and economic theories. The last topic is a mixture of various issues in ITO.
Lacity et al. [91]	1990–2008	191	Journal of Strategic Information Systems	The authors extracted insights for practice for six key ITO topics relevant to practitioners: determinants of ITO, ITO strategy, ITO risk mitigation, determinants of ITO success, client capabilities, and supplier capabilities. They noted that studies have been recently conducted on offshore outsourcing, BPO and ASP.
Lacity et al. [92]	1992–2010	164	Journal of Information Technology	Lacity et al. [92] summarized 164 empirical ITO studies and extracted the best evidence to develop two research models: ITO decision models and ITO outcome models. The paper also proposed a series of future research paths.
This review	1992–2013	798	n/a	We employed the main path analysis to map the entire field of ITO and identified 12 main research streams: motivations for ITO, ITO decisions, ITO risks, transaction cost economics, client–vendor relationship, vendor's perspective, psychological and formal contracts, ASP, BPO, offshore outsourcing, opensourcing, and multisourcing.

Table 3
Similar research streams identified by this review and previous reviews.

This review	Previous reviews
ITO motivations	Why outsource? [35] Outsourcing from the client's perspective [52] Determinants of ITO [91] Determinants of ITO decisions [92]
ITO decisions	What to outsource? How to implement ITO decisions? [35] Outsourcing from the client's perspective [52] ITO strategy [91] Determinants of ITO decisions [92]
ITO risks	ITO risks [91] Determinants of ITO outcomes [92]
Applicability of transaction cost theory	None
ASP	Sourcing varietals [91]
Client–vendor relationship	How to implement ITO decisions? [35] Outsourcing from the relationship's perspective [52] Relationship governance [91] Relationship characteristics [92]
Vendor perspective	Outsourcing from the vendor's perspective [52] Vendor capabilities [91,92]
BPO	Sourcing varietals [91]
Psychological and formal contracts	Contractual governance [92]
Opensourcing and crowdsourcing	None
Offshoring	Sourcing varietals [91]
Multisourcing	None

Third, even in our findings that are consistent with previous reviews, we are able to complement previous reviews by providing additional insights. For example, from Fig. 5, we observe that ITO decision problems used to be a very hot topic. Research on ITO decisions has matured after 20 years' worth of evolution. Our analysis shows that two decision issues remain noteworthy. One is re-outsourcing decisions and the other is how to make decision in relatively novel sourcing varietals such as multisourcing, open-sourcing and crowdsourcing. These two issues did not receive much attention from previous reviews.

6. Trends and future directions of ITO research

Baskerville and Myers [16] found that IS research and practice is characterized by fashions. Our study suggests that fashion waves also emerge and dissipate in the ITO field. Each of the major research themes we identified can be seen as a fashion – they emerge at a specific point in time and fade away as knowledge in an area becomes relatively complete. For example, the traditional ITO motivation problem is seemingly fading away because researchers' focus was switched to post-decision phases. Although the motivation problem will be revisited when new sourcing varietals emerge, the amount of such research has significantly decreased because the stream has become saturated with consensus. In contrast, research interest on offshoring has been booming in recent years. To illustrate the evolution of research themes over time, we analyzed the number of articles published in each stream over time. We created two figures to reveal possible trends based on data from 1992 to 2012 (the 2013 data were not included because we only have nine months' worth of data from 2013).

Fig. 6 shows the trends of the seven themes related to specific ITO issues. Note that ITO motivations and ITO decisions were the most popular topics in the 1990s but lost popularity in the late 1990s and early 2000s. These topics picked up some momentum after 2006 most likely because the emergence of new outsourcing varietals spurred researchers to question whether the previous knowledge can be applied to the new settings. In the late 1990s, client–vendor relationship started to attract research attention and have become a sustaining hot topic to present day. They have become particularly popular since 2008, possibly because new outsourcing types such as offshoring and multisourcing create new challenges for relationship management. Similarly, ITO risks gained much attention after 2008, most likely also due to new sourcing types such as offshoring and BPO that poses greater risks than traditional ITO. The vendor's perspective seems to have also become a popular theme after 2005.

Fig. 7 shows the trends of the five themes related to specific ITO varietals. Clearly, research works on these new sourcing types are all recent developments. ASP has the longest stream; however, its popularity has remained consistently low over the years. Off-shoring has been the most dominant theme since 2008. BPO has also attracted much attention, although it is not as popular as offshoring. Studies on multisourcing, opensourcing and crowd-sourcing only emerged since 2008. Although few articles have focused on these new sourcing types, the fact that they appear on multiple main paths suggests that they have caught the attention of ITO researchers.

Based on the main path analysis results, our review of the articles in the identified major themes, and our understanding of the ITO research field, we predict that the following six areas will likely attract more attention from ITO researchers.

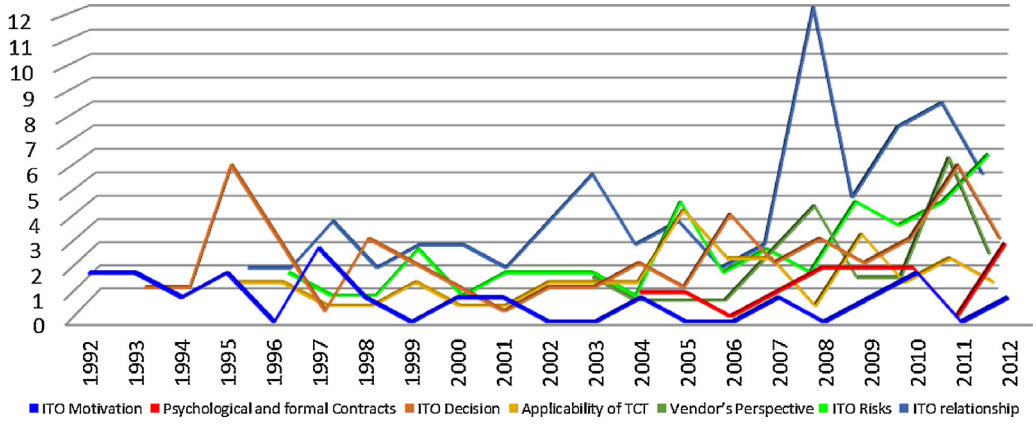


Fig. 6. Number of publications in seven ITO research themes from 1992 to 2012.

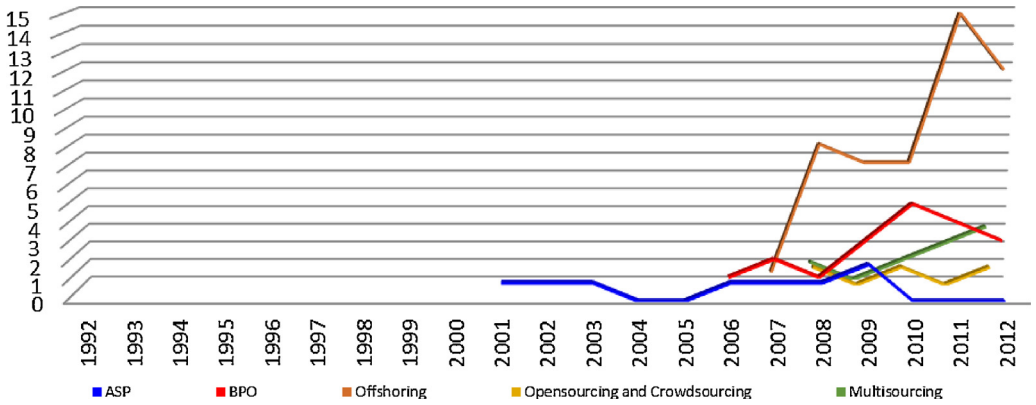


Fig. 7. Number of publications in five ITO research themes from 1992 to 2012.

New forms of ITO decisions. Although research on ITO decisions has matured after 20 years' worth of evolution, our analysis shows its resurgence. Future research is likely to focus on two new forms of ITO decision issues. The first form is re-outsourcing decisions. A survey found that among 160 ITO projects, only 70 projects continued and 90 projects terminated their current contracts either by switching vendors or by turning to backsourcing [177]. Therefore, re-outsourcing decision problems have substantial practical and academic significance. Future research can also examine the re-outsourcing success problem, which concerns how companies draw lessons from failure experiences and achieve success in new ITO contracts. Additionally, the contract renegotiation design problem in this process represents another research direction. The second issue concerns how to make decisions in new sourcing varietals, such as multisourcing, opensourcing or crowdsourcing, which are very new to both practitioners and researchers. For example, the modularity of business processes in BPO decisions [167], site selection in offshoring decisions [68], and the selection and combination of various service vendors in multisourcing [108,43] represent emerging research questions for ITO researchers. These two issues have not received sufficient attention from previous reviews.

ITO relationships from new angles. Client–vendor relationships have been extensively studied by ITO researchers, and substantial knowledge has been accumulated in this area [92]. Based on our review, we predict that relational governance will continue to attract academic attention, particularly for outsourcing contracts involving vendors from emerging economies and thus risking cultural clashes. As ITO relationships become increasingly complex, it is difficult for formal contracts alone to ensure ITO success [59]. The psychological contract perspective will provide a useful angle for examining how to effectively manage complex client–vendor relationships. Although most prior research addresses the relationship between a single client and a single vendor, in multi-sourcing, a client firm could be addressing several vendors. This one-to-many relationship poses new challenges to both the client and vendors and presents interesting problems that deserve research. For instance, how do a firm's existing vendors influence the firm's selection of other vendors? How should a firm manage multiple vendors so that they can efficiently cooperate with each other? From the vendors' perspective, a vendor not only collaborates with but also competes against other vendors when they work with the same client. It is important to find a balance between collaboration and competition to achieve success for the overall outsourcing arrangement. These relationships, the vendor-vendor relationship in particular, have rarely been studied and represent a fruitful path for future ITO research.

ITO risks. A number of risks and risk-mitigating strategies for general and specific types of outsourcing have been studied [91]. As new sourcing varietals emerge and new practices in arranging sourcing activities diffuse, firms will face unprecedented risks that must be addressed. For example, as more firms adopt offshoring, the risks originating from differences in cultural, regulatory, and institutional environments will become particularly prominent. As firms work with cloud computing service providers, data security, privacy, and interoperability issues will also surface. These risks arising from ITO practices will serve as a strong impetus for academic researchers to understand how the risks affect ITO outcomes and to seek effective measures to mitigate such risks. Therefore, although much attention has already been paid to ITO risks (e.g., [54,98,68]), we predict that ITO risks will remain a popular topic in the future.

Development of ITO theories. Our review shows that there has always been a debate regarding whether and how appropriate TCT is for explaining ITO phenomena. This debate is more of an academic matter and has less practical relevance. We agree with Lacity et al. [92,93] that indigenous ITO theories are necessary to generate an in-depth understanding of ITO issues and to advance the ITO field toward maturation. However, we are conservative regarding the argument that ITO issues are too complicated to be sufficiently explained by TCT and other theories. As Alaghehband et al. [3] contended, there is no undisputable evidence that shows that the mixed findings from ITO studies based on TCT are due to the innate weakness of TCT; rather, they are most likely caused by misuse of TCT. We predict that the debate over TCT and the quest to develop indigenous ITO theories will continue. Attempts to develop ITO theories will be made; however, the process will be slow because theory development takes time, and only a small number of scholars will be devoted to this challenging task.

Offshoring. Fig. 7 shows that offshoring is clearly the most popular ITO research stream. Given its short history, many research questions related to offshoring remain open and warrant further investigation. Based on our review, we argue that the most unique characteristic of offshoring is the distance between the client environment and the vendor environment, including cultures, norms, regulations, and standards. These distances dynamically interact with firms' actions to influence offshoring decisions and outcomes, and more research is needed to unravel the complex underlying mechanisms. Other researchers have also called for more research on applying theory-driven approaches to understanding offshoring contexts and for paying particular attention to the pre-implementation stage of offshoring [179]. In addition, beyond its traditional objective of cost saving, offshoring has been treated as a strategic choice to enhance innovation by leveraging vendors' capabilities [137,131,126].

However, limited efforts have been spent on examining how to effectively achieve innovation through offshoring. Research in this specific area will provide a significant contribution to the ITO literature.

Emerging ITO varietals. Our review has identified a limited number of publications on new ITO varietals such as multi-sourcing, crowdsourcing, and opensourcing. Each new ITO varietal will present unique benefits and risks and motivate researchers to question whether the knowledge drawn from previous ITO varietals can be readily applied to explain issues related to new varietals. Studies will be conducted by taking the unique characteristics of the new sourcing varietals into account to answer fundamental questions such as why a firm adopts a varietal and what factors influence or impede the success of a varietal. According to Baskerville and Myers' (2009) observation, a new and popular ITO practice will lead to a fashion wave in ITO research. For example, the recent development of cloud computing is likely to trigger a wave of studies on issues related to outsourcing to cloud providers.

7. Discussion and conclusions

The ITO industry has rapidly evolved since Eastman Kodak's outsourcing practice. A rich and diverse body of ITO research has accumulated over the past 22 years. However, the continuing expansion of the ITO field makes it enormously difficult for researchers to complete a global assessment of the existing literature. In this paper, we trace the ITO literature development process using main path analysis. The method is quantitative and citation based. It is used to find a series of important articles that map the main knowledge flows and subareas of ITO studies. The global main path is the most important knowledge diffusion route over time, and the multiple main paths are a collection of main paths with smaller overall SPC values. The global main path and multiple main paths provide complementary perspectives for depicting the ITO research field.

This paper makes several contributions to the ITO literature. First, it is one of the first studies to rely on citation analysis techniques to objectively map the field of ITO research. Compared with traditional reviews entirely based on researchers' subjective interpretations, our review integrates an objective methodology, and the findings can reflect the actual state of the ITO field by precisely assessing the citation relationships among articles. This type of review can reduce potential biases due to human subjectivity and provide a useful complementary perspective to our knowledge extracted from previous reviews. Second, the global main path concisely describes the major knowledge flow in the evolution of ITO research, and the multiple main paths identify twelve major ITO research streams. These results help researchers quickly obtain a clear understanding of the rich body of ITO research. Third, our research can be used to predict trends of ITO research in the near future. Although prior studies have recommended a number of potential topics for future research, based on our findings, we suggest six future ITO research directions: new forms of ITO decisions, ITO relationships from new angles, ITO risks, development of ITO theories, offshoring, and emerging ITO varietals. Finally, the main path analysis method used in our study can be instrumental in assisting IS researchers in general. In addition to the ITO field, this method can be used to conduct comprehensive reviews of other important fields to identify major streams within the fields. In addition, based on multiple main paths, articles belonging to a specific stream can be easily identified. Such categorization is based on citation patterns, which are expected to produce more accurate results than keyword search and be more efficient than reading the articles.

This study has a few limitations. First, two factors may influence the accuracy of our main path analysis. One is the citation motivation of researchers. Some researchers may cite papers remotely related to their work simply to increase the size of their citation section or to make their research appear grounded in prior seminal works [114]. This type of citation motivation makes the main path analysis vulnerable because this method assumes that the citation relationship between two papers indicates the knowledge flow from a cited work to the citing document [111]. The direct consequence of this problem is the difficulty in explaining the juncture of two articles that have a low degree relevancy in the main path. The application of the SPC value, which indicates the importance of each citation relationship, can avoid this situation to a certain extent. In addition, we conducted pruning by manually removing the link between two unrelated papers after comparing their content. Another factor is a reference that is missing between two articles that have a high degree relevancy in terms of research themes or methods. This may be due to limitations concerning researchers' knowledge stock when they were conducting their research. Thus, the main paths lacked the continuity and coherence of the research themes or methods. However, the tactics of considering multiple main paths, which take more useful main paths and more influential works of ITO into consideration, enable us to classify these works into different subareas according to their research themes. Therefore, some papers can still belong to the same subarea despite a lack of direct citation relationship. Second, we assume that the ITO articles that we retrieved from WOS can reasonably represent the ITO field. However, the retrieval conditions and data sources cannot guarantee the coverage of all possible ITO publications. We made great efforts to find ITO papers not indexed in the WOS database and integrated them into our dataset. As a result, the missing papers are likely to account for only a small percentage of the ITO literature. Third, when analyzing the 280 representative papers, we focused on their citation links but did not look into the specific theories applied in those studies and their detailed findings. A future study that summarizes the theories and findings can be conducted to examine whether new patterns can emerge beyond what we have found in this review. Finally, we focused on journal publications and did not include major IS conferences such as the International Conference on Information Systems, American Conference on Information Systems, and European Conference on Information Systems (except for the Hawaii International Conference on Information Systems, which is included in the WOS database). This is because when we collected data from WOS, these conferences were not indexed by WOS. We do not expect this omission to have a significant impact on the main path analysis because most high-quality conference papers are eventually published in journals.

In future research, the main path analysis can be improved. The current methodology treats all citations as equal but ignores the relevancy of articles. One way to improve this method is to integrate text-mining techniques with main path analysis, as proposed by Liu and Lu [111]. Another method is the integration of document co-citation analysis (DCA) and main path analysis. The DCA can scale the relevancies between any citing-cited pair of documents [145]. Developing algorithms to integrate DCA and main path analysis would represent a significant improvement to the methodology.

In summary, this paper employs the main path analysis method to review the field of ITO research. The global main path based on 798 papers and 6.45 million citation paths reveals two major themes in ITO research–ITO decisions and ITO management. Further multiple main path analysis based on 280 papers' 120,000 citation paths shows that 12 ITO research streams can be identified–ITO motivations, ITO decisions, ITO

risks, debate around transaction cost theory, client–vendor relationship, the vendor's perspective, psychological and formal contracts, ASP, BPO, opensourcing and crowdsourcing, offshore outsourcing, and multisourcing. These findings not only confirm previous reviews but also provide new information that helps to better understand the current state and future trends of ITO research.

Acknowledgments

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Appendix A. Example of pruning multiple main paths

We use an example to illustrate how to prune multiple main paths. In the citation network, an article is typically cited by a number of other articles. For example, Lee et al. [106] is cited by eight articles, as shown in Fig. A1. The eight citation paths could be either substantial or peripheral, and the purpose of pruning is to remove peripheral paths so that the connected articles share semantic similarities. We examined how Lee et al. [106] was cited by each of the articles by locating the specific sections where Lee et al. [106] was cited and by reading the full texts to understand the rationale behind the citation. If Lee et al. [106] was cited to support the research question, theoretical foundation, or hypothesis development, the path was labeled as substantial. In contrast, if Lee et al. [106] was cited to provide background information or support a specific logical argument or because its scale for a construct or its data analysis method was adopted, we labeled the path as peripheral. Table A1 shows that after careful examination, we found four citation paths to be peripheral and the remaining four to be substantial. Specifically, Westner and Strahringer [176], Moon et al. [130], Lee and Choi [100], and Qi and Chau [141] draw heavily from the substantial knowledge of Lee et al. [106] to develop their own studies, whereas the remaining four papers cited Lee et al. [106] only for peripheral purposes such as providing background information ([54]; [69])), supporting an argument [76], and justifying the appropriateness of a theory [140]. After removing the four peripheral paths, the citation network surrounding Lee et al. [106] was greatly simplified (see Fig. A2).

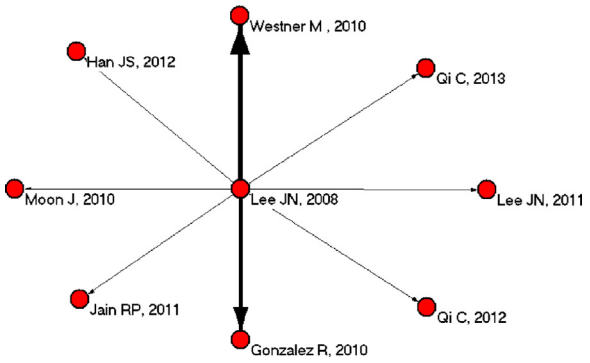


Fig. A1. Citation paths to Lee et al. [106] before pruning

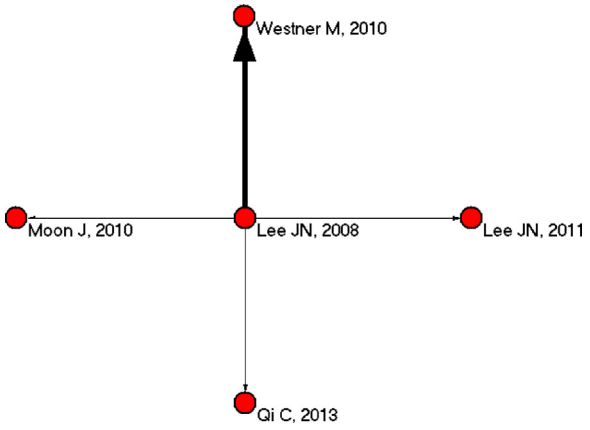


Fig. A2. Citation paths to Lee et al. [106] after pruning

Table A1
Analysis of the nature of citing [106].

Citing paper	Nature of citation	Type of citation
Westner and Strahringer [176]	Following Lee et al. [106], who found that trust and knowledge sharing possibly impact ITO success, this paper studied the direct effect of offshoring expertise and trust on offshoring success and the indirect effect mediated by project suitability, knowledge transfer, and liaison quality.	Substantial
Gonzalez, Gasco and Llopis [54]	This paper cited Lee et al. [106] simply to demonstrate that one of the reasons firms are involved in ITO is to access high-quality IT services and knowledge. The paper did not draw from Lee et al. [106] in terms of the influence of trust or ITO relationship on ITO success.	Peripheral
Moon, Swar, Choe, Chung and Jung [130]	This paper extended Lee et al.'s [106] study, which focused on the private sector, by identifying best practices in ITO relationships in the public sector.	Substantial
Lee and Choi [100]	Lee et al. [106] studied the role of mutual trust, which includes initial trust and initial distrust, and its impact on ITO success. Lee and Choi [100] extended Lee et al.'s [106] work by distinguishing ongoing trust and distrust from initial trust and distrust in ITO and how these elements interacted with each other to affect ITO success.	Substantial
Jain, Simon and Poston [76]	This paper cited Lee et al. [106] simply to support a logical argument suggesting that vendor-side cultural adaptation can mitigate vendor silence.	Peripheral
Han and Lee [69]	This paper used Lee et al. [106] to explain that "the major driver for IT outsourcing during the 1990s was cost-effective access to IT resources. . ." This major content of Lee et al. [106] concerning trust and ITO relationship was not mentioned.	Peripheral
Qi and Chau [140]	Although this paper studied the effect of relationship and contract on ITO success, it did not draw much knowledge from Lee et al. [106]. The citation was simply used to confirm that the inter-organizational relationship in ITO can be explained by relational exchange theory.	Peripheral
Qi and Chau [141]	Lee et al.'s [106] model of trust is considered as a major reference of this paper because it specifies knowledge sharing as a consequence of trust in the ITO context. Based on Lee et al.'s [106] work, knowledge sharing, the outcome of mutual trust, is regarded as a significant mediator between trust and IT outsourcing success in this paper.	Substantial

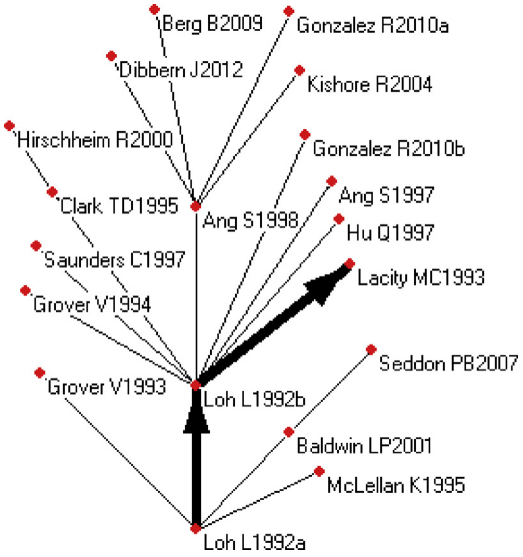
Appendix B. Papers on the global main path

Paper	WOS citations	Google scholar citations	Description
Loh and Venkatraman [117]	–	722	This paper studied motivations of ITO from the firm level based on the neoclassical economic perspective. It is one of the first major articles to study the determinants of ITO [91]. It integrated both business and IT perspectives to study ITO determinants.
Loh and Venkatraman [118]	–	595	This paper studied ITO from a macro-organization level and found that the ITO motivations could be well explained by imitative behavior.
Arnett and Jones [8]	37	137	This paper found that the different characteristics and roles of CEOs influence the outsourcing decisions
McFarlan and Nolan [124]	117	761	This paper suggested that companies involved in ITO should view outsourcing agreements as a strategic alliance and manage them as such.
Grover, Cheon, and Teng [66]	–	789	This paper found that both the service quality of the vendor and the partnership are important factors in ITO success.
Lee and Kim [101]	15	48	This paper studied the ITO strategies of affiliated firms in Korea and found that the fitness between a firm's current outsourcing strategy and the recommended strategy is positively related to user satisfaction.
Lee and Kim [102]	–	838	This paper identified the partnership-related variables and found that partnership quality is a key predictor of ITO success.
Lee [99]	146	545	This paper indicated that knowledge sharing is a main factor of ITO success, organizational knowledge absorptive capacity is the key predictor of successful knowledge sharing, and partnership can mediate the relationship between knowledge sharing and ITO success.
Levina and Ross [107]	152	489	Contrary to traditional wisdom that only focuses on the interest of clients, this study examined the IT vendors' value proposition from the vendor's perspective.
Koh, Ang, and Straub [85]	100	293	Based on psychological contract theory, Koh et al. [85] studied ITO success from both the customer's and supplier's perspectives.
Miranda and Kavan [127]	15	58	This paper clarified what specific governance options are available at each moment of governance and found that formal contracts and psychological contracts can influence each other and that such interactions influence ITO outcomes.
Mirani [128]	15	34	This paper indicated that the interdependence between the onshore and offshore teams in offshored software tasks can be addressed through procedural coordination.
Dibbern, Winkler and Heinzl [36]	56	254	This paper indicated that there are a number of extra costs for the client, and these extra costs can be influenced by three types of factors: the nature of the knowledge work being offshored, absorptive capacity of the vendor, and geographic distance and cultural distance between the client and the vendor.
Levina and Vaast [108]	64	253	This paper indicated that different national and organizational contexts can lead to boundaries and associated status differences in offshore application development projects. In addition, they can be solved by some key onshore managers who are able to alleviate status differences and facilitate effective collaboration.
Westner and Strahringer [176]	5	13	This paper found that offshoring expertise and trust not only directly effect IS offshoring projects success but also have indirect effects that were mediated by project suitability, knowledge transfer, and liaison quality.
Nieto and Rodriguez [137]	7	30	This paper indicated that offshore outsourcing has a positive impact on innovation performance, with a greater effect on product than on process innovations, and that the captive offshoring has a greater effect on innovation outcomes than offshore outsourcing.
Luo et al. [120]	1	4	This paper found that the fitness between process integration and business process offshoring task characteristics and task interdependence are necessary to international disaggregated process integration and that this alignment can be moderated by the task context. Additionally, process integration was found to have a positive but curvilinear relationship with the providers' economic returns.
Luo et al. [121]	0	0	This paper found four factors, including task features, needed process integration, horizontally between departments and units within the provider and vertically between the provider and its global client and its local subcontractor, can determine the business process offshoring governance mode.

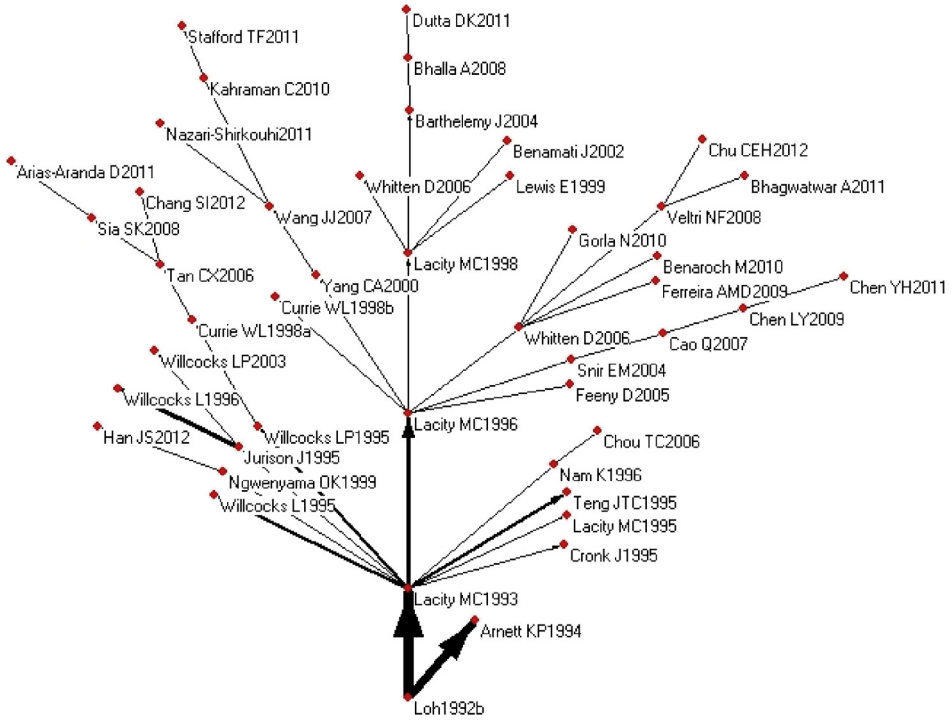
Note: Numbers of citations were retrieved on January 6, 2014.

Appendix C. Citation sub-networks of the 12 ITO research streams

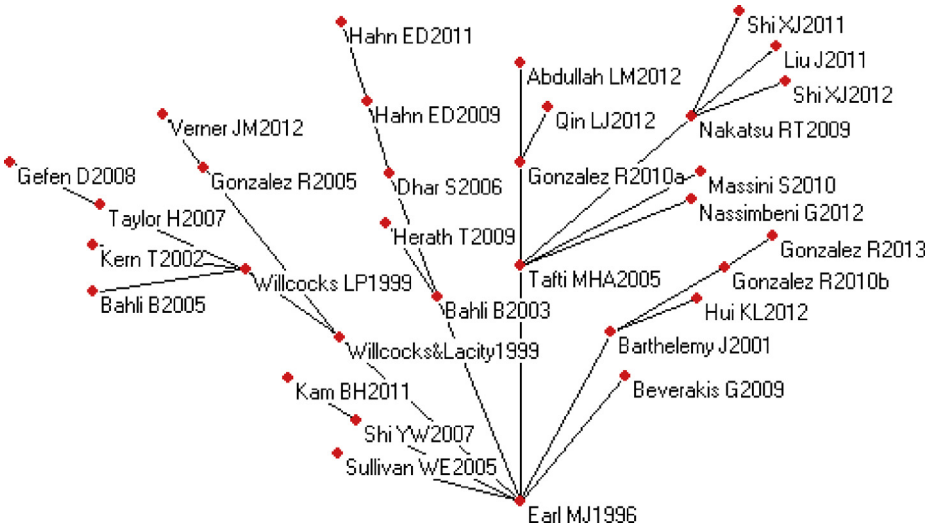
1. ITO motivation



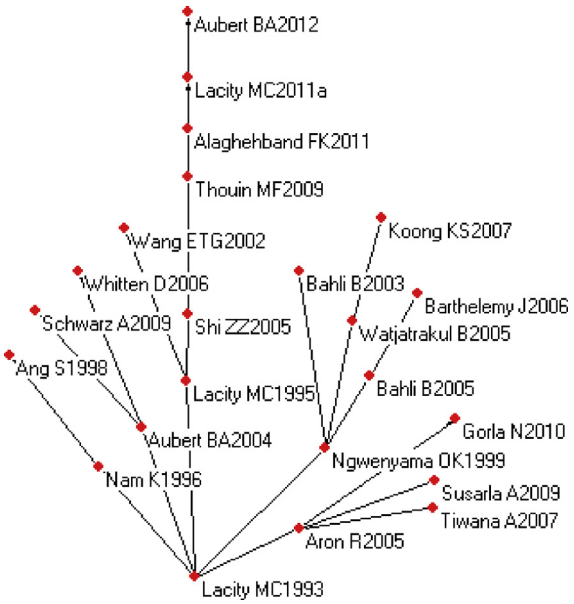
2. ITO decisions



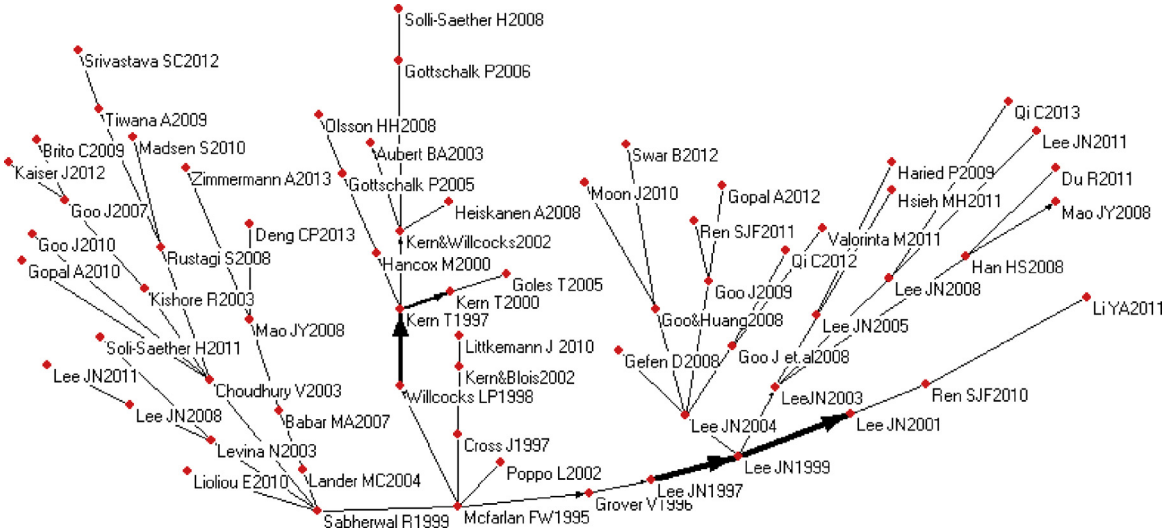
3. ITO risks



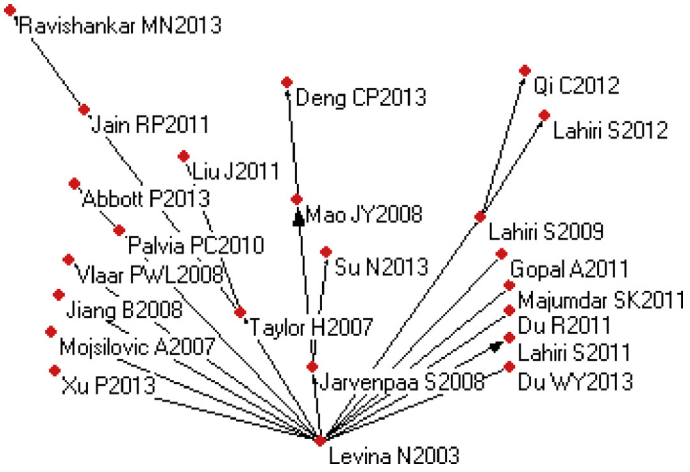
4. Applicability of TCT



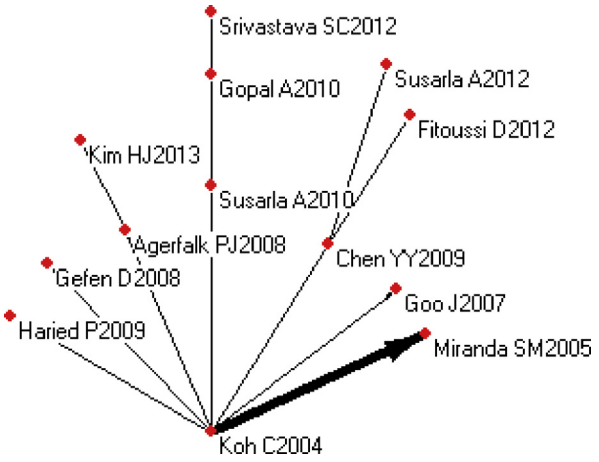
5. Client–vendor relationship



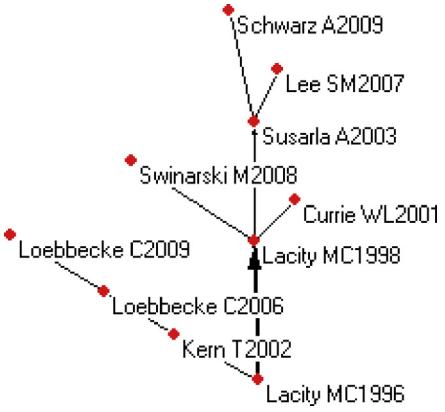
6. The vendor's perspective



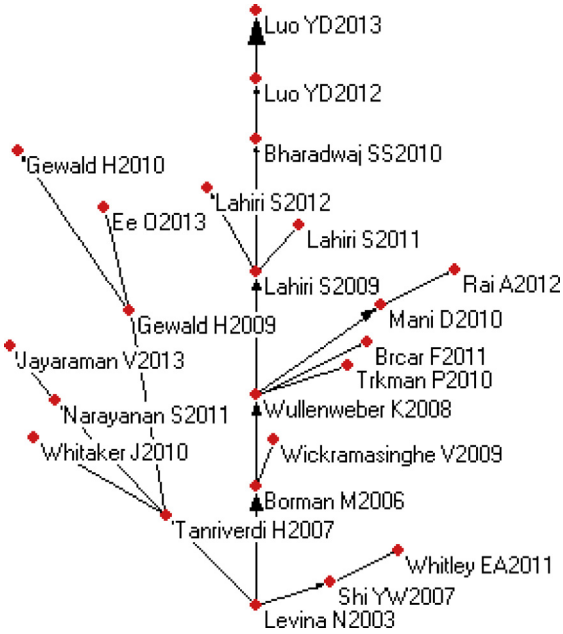
7. Psychological and formal contracts



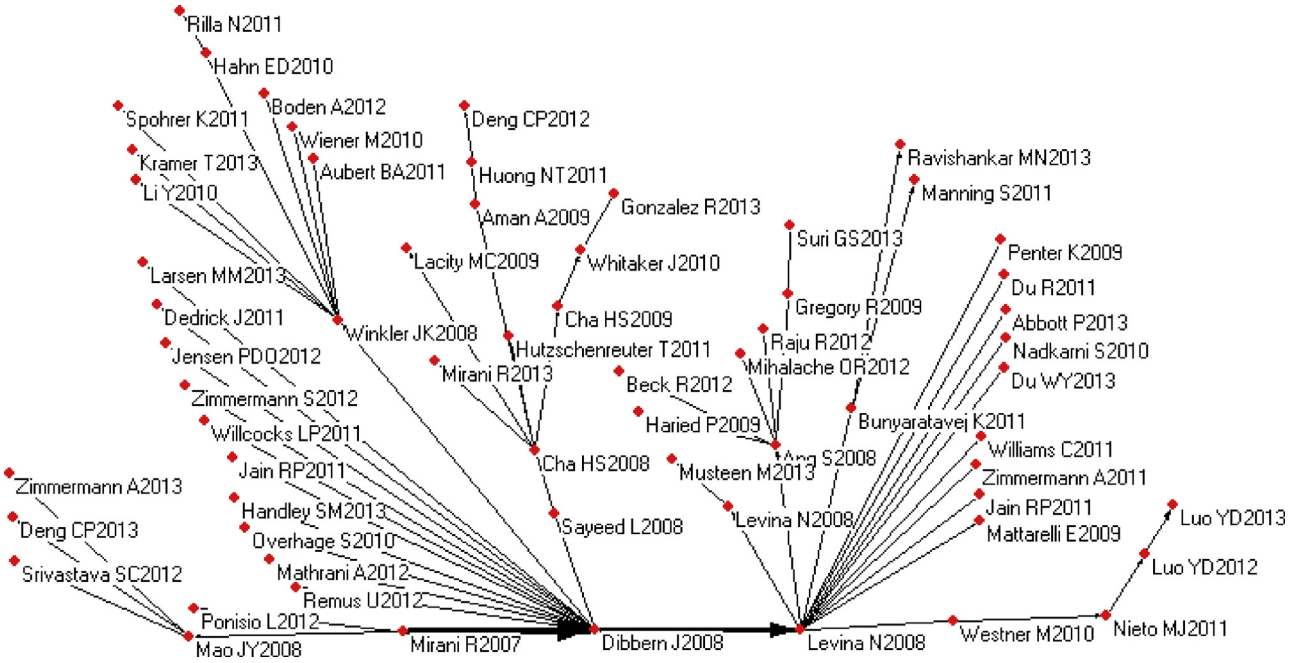
8. ASP



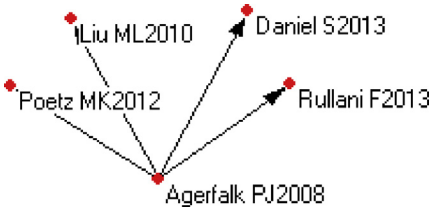
9. BPO



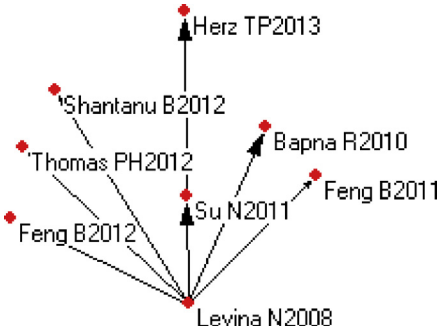
10. Offshoring



11. Opensourcing and crowdsourcing



12. Multisourcing



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