HEC Montréal
École affiliée à l'Université de Montréal

Three Essays on Information Technology Sourcing: Decision, Strategy, and Outcome

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Résumé

Cette thèse de trois essais porte sur l'approvisionnement en services de technologies de l'information (TI), défini comme l'ensemble des processus (par ex., la prise de décision, l'attribution de contrats, le suivi) associés au choix de confier la prestation de services de TI à une fonction interne ou de l'impartir à un fournisseur. La thèse adopte deux axes conceptuels : celui de la théorie du coût de transaction (TCT), et celui des capacités dynamiques (DCP). Dans le premier essai, après évaluation des modèles d'impartition TI quant à leur usage de la TCT, les résultats montrent que ceux-ci n'appliquent pas la TCT en accord complet avec la théorie telle que conçue à l'origine, notamment quant à sa nature normative. L'étude suggère donc que la TCT resterait pertinente pour l'étude des décisions d'impartition TI et de leur issue, et ainsi contribuerait au développement d'une théorie endogène de l'impartition TI. Le second essai et le troisième adoptent la DCP afin d'examiner le rôle stratégique des capacités dynamiques de l'impartition TI. En s'appuyant sur les données qualitatives d'un cas extrême d'impartition TI, l'essai 2 propose un ensemble de capacités stratégiques TI pour soutenir l'ajustement TI et l'ajustement d'affaires. Les résultats suggèrent de combiner les capacités dynamiques de l'impartition TI et celles de l'architecture TI pour créer de nouveaux états d'ajustement TI/d'affaires. L'essai 3 cible les capacités dynamiques, opérationnelles et d'apprentissage de l'impartition TI, puis propose et teste un modèle de leur influence sur le succès de l'impartition TI. Les données sont fournies par une enquête menée auprès de 152 organisations de différentes industries, et elles sont analysées avec une méthode basée sur un modèle d'équations structurelles (SEM). Selon nos résultats, les capacités dynamiques influencent positivement la reconfiguration réussie de l'impartition TI (succès stratégique de l'impartition TI). Les résultats indiquent aussi que les capacités opérationnelles influencent positivement la réussite de la livraison (succès opérationnel). De plus, tant le succès opérationnel que le succès stratégique influencent positivement l'issue de l'impartition TI.

Mots-clés : Approvisionnement en services TI, axe du coût de transaction, axe des capacités dynamiques, capacités dynamiques de l'architecture TI, capacités dynamiques de l'impartition TI, capacités d'apprentissage de l'impartition TI, capacités opérationnelles de l'impartition TI.

Abstract

This three essay thesis pertains to IT sourcing, defined as all the processes (e.g., decision making process, contracting process, monitoring process) included in the delegation of IS functions to an internal service provider and/or an external vendor. The thesis adopts two conceptual perspectives: transaction cost theory (TCT) and the dynamic capabilities perspective (DCP). In the first essay, the assessment of how extant IT outsourcing models appropriated TCT shows that the extant models do not apply TCT totally in line with the original conceptualization of the theory, especially regarding its normative nature. The study therefore suggests that TCT could remain relevant to the study of ITO decisions and outcomes and therefore it could contribute to develop an endogenous theory of IT outsourcing. The second and third essays adopt DCP to examine the strategic role of IT outsourcing dynamic capabilities. Informed by qualitative data from a single extreme case of IT outsourcing, essay two proposes that a set of strategic IT capabilities supports IT and business alignment. The findings suggest that IT outsourcing dynamic capabilities (e.g., search and selection of vendors) combines with IT architecture dynamic capabilities (e.g., search and selection of IT solutions) to create new states of alignments between IT and business. Essay three focuses on IT outsourcing dynamic capabilities, operational capabilities, and learning capabilities and proposes and tests a model of their impact on IT outsourcing success. A cross-sectional survey of 152 organizations across different industries was conducted. The survey data are analyzed with a structural equation modeling (SEM) approach. The findings suggest that dynamic capabilities positively influence IT outsourcing successful reconfiguration (strategic success of IT outsourcing). Also, the findings suggest that operational capabilities positively influence successful delivery (operational success). Moreover, both operational success and strategic success positively influence IT outsourcing success.

Keywords: IT sourcing, Transaction cost perspective, dynamic capabilities perspective, IT architecture dynamic capabilities, IT outsourcing dynamic capabilities IT outsourcing learning capabilities, IT outsourcing operational capabilities.

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Chapitre I - Introduction[1]

Cette thèse de trois essais porte sur l'approvisionnement en services de technologies de l'information (TI), défini comme l'ensemble des processus (par ex., la prise de décision, l'attribution de contrats, le suivi) associés au choix de confier la prestation de services de TI à une fonction interne ou de l'impartir à un fournisseur. La thèse adopte deux axes conceptuels : celui de la théorie du coût de transaction (TCT), et celui des capacités dynamiques (DCP). Dans le premier essai, après évaluation des modèles d'impartition TI quant à leur usage de la TCT, les résultats montrent que ceux-ci n'appliquent pas la TCT en accord complet avec la théorie telle que conçue à l'origine, notamment quant à sa nature normative. Le second essai et le troisième adoptent la DCP afin d'examiner le rôle stratégique des capacités dynamiques de l'impartition TI. L'essai 2 propose un ensemble de capacités stratégiques TI pour soutenir l'ajustement TI et l'ajustement d'affaires. L'essai 3 cible les capacités dynamiques, opérationnelles et d'apprentissage de l'impartition TI, puis propose et teste un modèle de leur influence sur le succès de l'impartition TI.

Résumé de l'essai 1: Évaluation de l'usage de la théorie du coût de transaction en impartition de technologie de l'information

L'un des fondements théoriques centraux de l'explication des décisions d'impartition en TI et de leurs résultats est la Théorie du coût de transaction (TCT). Toutefois, la recherche en impartition TI basée sur la TCT a mené dans l'ensemble à des études aux résultats contradictoires et à des résultats inattendus dans certaines études.

Plusieurs explications ont été avancées quant à ces résultats mitigés. Dans une recension de la recherche en impartition TI (TIO) fondée sur la TCT, Lacity et al., (2011) trouvent chez les auteurs quatre types d'explications quant aux anomalies de

[1] An English translation of the "Chapitre I" is available in Appendix A1 at the end of the thesis.

leurs résultats : les méthodes de recherche, les conditions limites, le non-respect des hypothèses de la TCT, et les explications liées à d'autres théories. Les études du premier type d'explications attribuent surtout le peu de soutien de la TCT aux « problèmes de mesures » ou « à la difficulté inhérente à la mesure des construits TCE centraux » (p. 145). Les études du second type, sur les conditions limites, lient les résultats mitigés au « contexte distinct de l'impartition TI », à « des conditions de recherche distinctes » ou aux « attributs distincts des données colligées » (p. 146). Les études du troisième type ont trouvé soit des preuves que des hypothèses de conduite TCT – par exemple de l'opportunisme de limite rationnelle, ou que la transaction en tant qu'unité d'analyse – étaient enfreintes dans certains contextes de sous-traitance. Enfin, les études du quatrième type soutiennent que d'autres théories auraient des hypothèses plus adéquates au contexte de l'impartition TI, ou plus de portée que la TCT pour expliquer les résultats de ce domaine.

Dans cet article, nous ciblons délibérément l'une des explications, celle de la proportion selon laquelle les modèles d'impartition TI ont été fidèles aux concepts et aux préceptes de la TCT et à sa nature normative. En effet, tout en reconnaissant que d'autres explications valables existent, nous soutenons que celles-ci doivent être évaluées en fonction de l'explication que nous voulons fournir.

Évaluation des modèles existants de décision en impartition TI

Nous avons identifié 25 études empiriques à propos de décisions d'impartition fondées sur la TCT et de leurs résultats. Nous avons comparé leur conception et leur application des construits TCT avec les définitions originales de la théorie (Williamson 1979; 1981; 1985). Cette comparaison nous montre que certains construits TCT centraux ne sont pas pris en compte adéquatement par la recherche existante : une seule des 25 études inclut la notion de différence de coût entre production et transaction (Lacity and Willcocks 1995a). Le construit de fréquence est aussi absent de la plupart des études que nous avons analysées. Seules 4 études (16 %) incluent la fréquence parmi leurs modèles (Lacity and Willcocks 1995a;

Loebbecke and Huyskens 2006a; Miranda and Kim 2006; Wahrenburg et al. 2006). De plus, parmi les études (36 %) qui incluent l'incertitude comportementale, seules 4 (16 %) la conçoivent en termes de comportement opportuniste du fournisseur, conformes dès lors à la TCT (Dibbern and Heinzl 2009; Goo et al. 2007; Miranda and Kim 2006; Wang 2002). Ainsi, 3 des construits ciblés de la TCT ne sont pas considérés adéquatement par les modèles d'impartition TI (TIO) existants. Ces construits ne sont pas pris en compte par les modèles, ou quand c'est le cas, ils ne sont pas conçus en accord avec la TCT.

En outre, les liens entre les construits ne sont pas toujours posés comme hypothèse selon la TCT : pour les effets d'interaction, la recherche en impartition TI n'a pas tout à fait mis la TCT à l'épreuve. En effet, si la fréquence et l'incertitude jouent des rôles modérateurs pour la TCT, seuls 12 % des articles examinent le rôle modérateur de l'incertitude. Enfin, la nature normative de la théorie n'est pas toujours captée : notre analyse montre que la majorité des modèles existants prédisent des décisions d'impartition TI basées sur des attributs de transaction (64 %), assumant que la TCT a une nature prédictive/descriptive. Cela signifie que les modèles conçoivent les caractéristiques de transaction comme des antécédents causals de la décision d'impartition. Ils utilisent donc la TCT pour prédire, comme si les gestionnaires agissaient selon les prescriptions de la TCT, ce qui n'est pas toujours le cas. Selon les résultats de l'essai 1, nous concluons que la TCT reste pertinente pour la recherche en impartition TI et suggérons qu'elle contribue à la création d'une théorie endogène d'impartition TI.

Résumé de l'essai 2: Le rôle stratégique de d'approvisionnement en technologie de l'information: l'axe des capacités dynamiques

Cet essai perçoit l'impartition TI comme une partie intrinsèque de la stratégie SI d'une organisation. Ce point de vue s'apparente à celui de Henderson et Venkatraman (1999b), qui postulent que « la sélection et les mécanismes d'obtention des compétence TI requises » (p. 474) (i.e., l'approvisionnement en services TI) est

une composante de la stratégie SI, avec l'étendue de la technologie et les compétences systémiques. Adoptant ce point de vue, Hirschheim et Sabherwal (2001) considèrent les dispositions de l'approvisionnement en services TI comme l'une des trois dimensions de la stratégie SI, les autres étant le rôle et la structure SI.

Épousant ce point de vue et l'arrimant à l'axe des capacités dynamiques (Helfat et al. 2007; Teece et al. 1997), notre étude offre une conception des capacités stratégiques SI qui comprend deux ensembles de capacités dynamiques. Le premier ensemble est celui des capacités dynamiques de l'architecture TI de l'entreprise, que nous adaptons de la notion chez Ross (2003) de compétence d'architecture TI d'entreprise. Le second ensemble est celui des capacités dynamiques en impartition TI, que nous présentons et définissons selon l'axe des capacités dynamiques.

Ross (2003) définit une compétence dans l'architecture TI de l'entreprise comme sa capacité de « de créer un schéma renforcé mutuellement de capacités TI et de stratégie d'affaires évolutive et très ajustée » (Ross 2003, p. 32). Puisque pour créer un tel schéma d'ajustement, les stratégies d'affaires et les capacités TI doivent être définies, créées et modifiées, celui-ci correspond à la définition des capacités dynamiques [celles-ci sont définies comme « la capacité d'une organisation d'étendre, de créer, ou de modifier sa base de ressources dans un but précis » (Helfat et al. 2007, p.1)]. Ainsi, en citant les termes de la théorie des capacités dynamiques, nous définissons les capacités dynamiques de l'architecture TI de l'entreprise comme l'aptitude d'une organisation d'étendre, de créer ou de modifier ses solutions TI dans un but précis.

Nous soumettons que les capacités dynamiques d'impartition TI complètent celles de l'architecture TI de l'entreprise dans la création ou la modification des solutions TI. Nous définissons donc les capacités dynamiques en impartition TI comme l'aptitude d'une organisation d'étendre, de créer ou de modifier intentionnellement ses ressources de base afin de créer des solutions TI par le biais de dispositions d'impartition.

L'approche de recherche

Notre effort d'édification théorique est fondé sur un cas unique (et extrême) (Yin 2003). La firme décrite est Air Canada, qui constitue un cas poussé pour notre étude de par son impartition TI presque totale (95 % de ses activités TI sont confiées en sous-traitance à de nombreux vendeurs). Des données ont été colligées de sources multiples : entrevues, documents internes, documents publics, et observation. Les personnes rencontrées comprenaient des gestionnaires TI (par ex., le directeur de l'information, CIO), et des administrateurs séniors des unités TI de départements TI. Nous avons aussi interviewé des informateurs hors de cette firme (par ex., un gestionnaire sénior d'une entreprise de vente). Nous avons également parlé à des responsables de la gestion des contrats d'impartition TI avec deux fournisseurs différents. En tout, nous avons mené 14 entrevues avec 11 personnes. Comme le suggère Langley (1999), nous avons combiné plusieurs stratégies différentes pour analyser les données.

Une théorie d'ajustement fondée sur les capacités dynamiques en contexte d'impartition complète

Nous proposons une théorie du processus qui fasse avancer notre compréhension des capacités dynamiques en ce qu'elles soutiennent l'ajustement des TI et de l'entreprise. Nous prenons aussi en compte le rôle de la structure du département de soutien TI en nous basant sur les capacités dynamiques qui pourraient être exploitées. Nous expliquons la théorie en trois parties constituées des limites, des construits et des relations entre les construits. Un sommaire de la théorie suivra.

Le processus général débute avec l'état de l'ajustement entre les TI et l'entreprise (quand les solutions TI soutiennent les processus d'affaires) en tant qu'intrant. Un élément-déclencheur survient alors qui nuit à l'ajustement et crée un déséquilibre. Les déclencheurs sont : l'amélioration d'une solution, un changement dans le processus d'affaires, le temps, le dépistage, et l'initiative stratégique. Pour

rétablir l'équilibre, les capacités dynamiques agissent comme des mécanismes qui pourraient permettre un nouvel ajustement. Une bonne structure de département TI prépare et fournit le terrain de la possible exploitation des capacités dynamiques pour la création d'un nouvel état d'équilibre. Dans l'essai 2, nous comparons le modèle d'ajustement proposé avec les théories d'ajustement de la littérature.

Résumé de l'essai 3: Un succès d'impartition en technologie de l'information : un modèle de capacités dynamiques, opérationnelles et d'apprentissage

Cet essai adopte le point de vue selon lequel l'impartition TI offre des contributions à la fois stratégiques et opérationnelles. En accord avec cet angle, l'essai propose et met à l'épreuve un modèle où le succès d'ensemble de l'impartition TI – définie comme le degré selon lequel une organisation atteint ses objectifs en impartition TI – a deux antécédents clé : la reconfiguration des ressources TI et la livraison réussie de leurs services. Ancré dans le point de vue des capacités dynamiques (Eisenhardt and Martin 2000; Helfat et al. 2007; Teece et al. 1997), le modèle postule d'abord que les capacités dynamiques (incluant : détection, dépistage interne, sélection des vendeurs, instrumentalisation, mode de sélection de l'approvisionnement en services TI) mène à la reconfiguration réussie des ressources TI, qui est l'antécédent stratégique du succès d'impartition TI. Deuxièmement, le modèle postule que les capacités opérationnelles (gestion de contrat, gestion relationnelle, gestion des vendeurs) mènent à la livraison réussie de services TI, qui constitue l'antécédent opérationnel du succès de l'impartition TI. Alors que la recherche existante en impartition TI cible surtout sur ses capacités opérationnelles (par ex., la capacité de gestion des vendeurs, de gestion des contrats) (e.g., Han et al., 2008; Ranganathan et Balaji 2007), notre modèle offre des capacités dynamiques d'impartition TI et émet l'hypothèse de leur relation entre elles et les construits du succès. De plus, le modèle postule qu'un troisième type de capacités, celles de l'apprentissage en impartition TI, affecte le succès stratégique et opérationnel par le

biais des capacités dynamiques et opérationnelles. Les hypothèses principales de ces modèles sont :

H1: *La reconfiguration réussie des ressources TI par l'impartition TI sera associée positivement au succès de l'impartition TI.*

H2: *La livraison réussie de l'impartition TI sera associée positivement au succès de l'impartition TI.*

H3: *La proportion selon laquelle une firme possède des capacités dynamiques en impartition TI sera associée positivement à celle qu'elle aura réussi à atteindre dans la reconfiguration de ses ressources TI grâce à l'impartition TI.*

H4: *La proportion selon laquelle une firme possède des capacités opérationnelles d'impartition sera associée positivement à celle qu'elle aura réussi à atteindre dans la livraison réussie d'impartition TI.*

H5: *La proportion selon laquelle une firme possède des capacités d'apprentissage en impartition TI sera associée positivement à celle de ses capacités dynamiques d'impartition TI.*

H6: *La proportion selon laquelle une firme possède des capacités d'apprentissage en impartition TI sera associée positivement à celle de ses capacités opérationnelles d'impartition TI*

Méthode

Les données ont été colligées en utilisant la recension croisée de 152 organisations de différentes industries, et l'approche de modélisation par équation structurelle (PLS-SEM) a servi à leur analyse.

Des mesures de tous les construits de capacité, de succès en impartition TI, et de reconfiguration réussie ont été développées d'après les définitions conceptuelles et fondées sur le point de vue des capacités dynamiques (Eisenhardt and Martin 2000; Helfat et al. 2007; Teece et al. 1997; Zollo and Winter 2002). Les mesures de

livraison réussie ont été adaptées de Ho et al., (2003a) et de Poppo et Zenger (2002). Pour la formulation de ces mesures, nous avons eu recours à des études antérieures des capacités dynamiques et des organisations en apprentissage (e.g., Pavlou and El Sawy 2006). Le contenu de tous les éléments (nouveaux ou adaptés) a été validé par un comité de spécialistes (gestionnaires TI ou chef de l'information connaissant l'impartition TI). Les mesures ont été ensuite validées grâce à une technique de tri de cartes (Moore and Benbasat 1991). Nous avons effectué un pré-test (Churchill 1979) avant de mener le sondage.

Pour alléger la susceptibilité de variante commune de la méthode attribuable au schéma du répondant unique, nous avons appliqué quelques unes des suggestions de Sharma et al., (2009) et Podsakoff et al., (2003) (par ex., en utilisant différentes échelles pour différents construits, avec distanciation psychologique).

Résultats

Les résultats suggèrent que les capacités dynamiques (sauf pour un mode de sélection de l'approvisionnement en services TI sur cinq) influencent positivement la reconfiguration réussie de l'impartition TI (succès stratégique). Les résultats montrent aussi que les capacités opérationnelles (sauf une capacité sur trois : la gestion de contrat) influence positivement la livraison réussie (le succès opérationnel). De plus, et le succès opérationnel et le succès de la livraison influencent positivement celui de l'impartition TI. Les capacités d'apprentissage sont aussi montrées comme une influence positive et significative sur toutes les capacités opérationnelles et dynamiques. Le modèle montre également un indice élevé de pertinence prédictive. Les résultats suggèrent que le succès de l'impartition TI est déterminé à la fois par des antécédents stratégiques et opérationnels. Ils montrent aussi que les différents types de capacités mènent à différents antécédents de succès et dès lors influencent la réussite de l'impartition TI de différentes façons. L'étude offre un tableau plus complet des capacités de l'impartition TI et de leur influence sur son succès.

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Chapitre II - Article #1

An Assessment of the Use of Transaction Cost Theory in Information Technology Outsourcing[2]

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Abstract

Transaction cost theory (TCT) has been widely used in information technology outsourcing (ITO) research to explain and predict outsourcing decisions and outsourcing-related outcomes. This research, however, has led to mixed and unexpected results in terms of the effects of transaction attributes on outsourcing decisions and outcomes. This study assesses the empirical literature employing TCT-based ITO models in terms of its faithfulness to the precepts of TCT, and argues that one possible explanation for the mixed results is that the extant models do not capture all the essential elements of TCT. First, there are core TCT constructs that the extant models do not take into account; second, the linkages among constructs that the IT outsourcing models have hypothesized are not always in line with TCT precepts; and third, the normative nature of the theory is not always captured by the extant models. This paper, therefore, aims to provide one possible answer to the question: "Why have the appropriations made of TCT to study IT outsourcing produced mixed results?'"

Keywords

Transaction cost theory (TCT), IT outsourcing, literature review, normative theory

Introduction

Whether to make or buy is a fundamental issue that organizations must address with regards to a variety of products and services. When the issue concerns the firm's information technology (IT) services, several organizations opt for outsourcing, or a "situation in which part or all of the IT activities an organization needs are performed by one or more external suppliers" (De Looff 1995, p.282). Over the years, two main IT outsourcing (ITO) research streams have formed. The first examines the potential determinants or antecedents that can be used to explain and predict the IT outsourcing decision and/or outcome (e.g. Dedrick and Kraemer 2010; Nam et al. 1996; Thouin et al. 2009), and the second studies the post-outsourcing phase, examining how the outsourcing relationship is managed (e.g. Choudhury and Sabherwal 2003; Ho et al. 2003b; Kern and Willcocks 2000). This study falls into the first stream of research, as it is concerned with the antecedents and consequences of the IT outsourcing decision.

One of the key theoretical foundations for explaining ITO decisions and outcomes is Transaction Cost Theory (TCT) (Whitten and Wakefield 2006). Several conceptual and empirical IT outsourcing studies have used TCT as their theoretical foundation, either alone or in combination with other theories. This is because TCT explicitly addresses boundary decisions and is "based on an economic rationale" that provides an alternate view to that of social, political and institutional theories (Lacity and Hirschheim 1993). In its essence, TCT posits that there are several characteristics of a given transaction – or activity – that determine the appropriate type of governance structure for the transaction (Williamson 1979; Williamson 1981). These characteristics are asset specificity (second-best use of a transaction), frequency (repetitiveness of a transaction) and uncertainty surrounding the transaction. These characteristics impact the total transaction and production costs attributable to an activity (transaction) and these costs, in turn, determine the governance structure (e.g. outsourcing or internal organization) that is the most efficient for the activity. If the

right decision is made based on the transaction characteristics, then the transaction is likely to be conducted in a cost-efficient manner.

The TCT-based IT outsourcing research has led to contradictory results across studies and unexpected results within studies. For example, Aubert et al. (2004) found a positive influence of asset specificity on the IT outsourcing decision, while Poppo and Zenger (2002) found a negative influence. Miranda and Kim (2006) hypothesized a negative influence of uncertainty on the proportion of the IT budget being outsourced, but, contrary to their TCT-based hypothesis, they found a positive link.

Several explanations have been proposed for such mixed results. In a review of the TCT-based ITO research, Lacity et al. (2011) offer four categories of explanations that authors provide for the anomalies in their research results: research methods, boundary conditions, TCE assumption violation explanations, and alternate theory explanations. Studies of the first category mainly attribute the lack of support for TCT to "measurement problems" or the "inherent difficulty of measuring core TCT constructs" (p.9). Studies in this category also attribute the mixed results to how the models are tested and argue that, most of the time, one of the independent variables captures most of the variance. Studies in the second category, boundary conditions, attribute the mixed results to the "distinctive context of ITO," "distinctive research settings" or the "distinctive attributes of the collected data" (p.10). Studies of the third group either found evidence that some TCT behavioral assumptions – e.g., bounded rationality, opportunism, or the transaction as the unit of analysis – were violated in some IT outsourcing contexts. Finally, studies in the fourth category argue that alternate theories may have assumptions that better fit the IT outsourcing context, or have more power than TCT to explain ITO results.

From these explanations, Lacity et al. (2011) argue that researchers have to depart from TCT and build a theory that is endogenous to ITO, the foundations of which they lay in their article. Although the call by Lacity et al. (2011) for

endogenous ITO theories is appealing, we argue that for these foundations to be stable, they need to rest on firm ground. Pursuing the building analogy, we suggest that until we have evidence that entirely faithful appropriations of TCT in the context of ITO lead to results in directions opposite to those hypothesized by TCT, the foundations of a new model risk being set on unstable ground. We will illustrate this with an example from Lacity et al.'s (2011) framework, which is based on a review of the empirical ITO research from 1992 to 2010 (Lacity et al. 2010). As mentioned by Lacity et al. (2011), because ITO researchers have appropriated theories from reference disciplines, theoretical constructs from several reference disciplines are evident in the framework they propose. Because a number of the empirical studies from which the framework was built were TCT-based, the framework does indeed include TCT components – uncertainty and transaction costs under transaction attributes, in particular. We presume that these two components were included in the framework because they had received support from the reviewed studies, and that transaction attributes such as specificity and frequency were left aside because they had not been supported by empirical studies.

We argue here that it is possible that specificity – or frequency – should indeed be part of the framework rather than being abandoned for lack of empirical support. We posit that the reason ITO research has not produced consistent results for specificity may lie in its misappropriation of TCT. In sum, our position is that until we ensure that ITO studies that are completely faithful to TCT do indeed fail to find support for TCT hypotheses, our endogenous theories risk being laid on shaky ground.

We are not suggesting that research should wait for another round of TCT empirical tests that would be more faithful to TCT before undertaking to build an endogenous ITO theory. We would nevertheless suggest that TCT remains relevant to the study of ITO decisions and outcomes, whether we call this a real test of TCT or

we select some of its constructs to build other theories. We believe that the assessment presented in this paper could contribute to this endeavor.

We therefore seek to answer the question "Why have the appropriations made of TCT to study IT outsourcing produced mixed results?" by referring to the fundamental concepts and precepts of TCT as defined and conceptualized by Oliver Williamson and examining how TCT has been used to develop ITO models.

The next section reviews the key concepts and basic precepts of TCT. An assessment of the extant TCT-based IT outsourcing models will be presented, followed by the implications for research and practice.

Transaction Cost Theory

Because most of the IT outsourcing studies that have employed TCT are based on Williamson's work (Williamson 1979; Williamson 1981; Williamson 1985; Williamson 1996; Williamson 1998), the theoretical foundations reviewed in this section are also mainly based on this work. Williamson's seminal work on TCT is based on the fundamental premise that the "transaction cost approach…regards the transaction as the basic unit of analysis…transaction cost economizing is central to the study of organizations" (Williamson 1981, p.548). In other words, TCT is aimed at identifying the governance structures of different types of exchanges between parties in order to maximize the economies for a given organization. Williamson (1981) originally focused on transactions between the firm and the market. Completing a transaction usually involves a series of activities, such as searching for suppliers, negotiating contracts, monitoring and evaluating performance, and adjusting a contract by re-arranging transaction items.

TCT is also based on two important behavioral premises: bounded rationality and the opportunism of human agents. The former states that people are intendedly rational, but their rationality is limited by their capacity to "formulate and solve complex problems and to process information" (Williamson 1981, p.553).

Opportunism is defined as "self-interest seeking with guile" (Williamson 1981, p.554), meaning that the parties are willing to provide false or incomplete information in order to complete a transaction that will provide them with an advantage.

It is also important to note the normative nature of TCT. For Williamson, TCT both explains the choices that firms make – "describes what has been observed," in Williamson's (1981, p. 560) terms – and prescribes the choices that firms should make given a set of transaction characteristics: "the transaction cost arguments…are of a normative kind: what governance structure *should* be chosen" (Williamson 1981, p.560). That is, the theory posits that the organization has to align "transactions with governance structure so as to support a high performance result" (Williamson 1998, p.40).

At the heart of TCT are three key dimensions on which transactions differ: asset specificity, uncertainty and frequency. Although asset specificity is deemed the most important dimension, the other two dimensions also play significant roles (Williamson 1985, p.52). According to TCT, the effect of a dimension on the cost of conducting a given transaction has to be assessed in light of bounded rationality and opportunism. In essence, TCT posits that decision makers need to "align transactions (which differ in their attributes) with governance structures (the costs and competencies of which differ) in a discriminating (mainly, transaction cost economizing) way" (Williamson and Winter 1993, p.95). Each of these elements is presented in more detail below.

Asset Specificity

Asset specificity is defined as the "degree to which the assets used to conduct an activity can be redeployed to alternative uses and by alternative users without sacrifice of productive value" (Williamson 1996, p.105). A non-specific asset is one that can be easily re-used in other types of activity.

The term "specificity" is used in reference to three major categories of assets (Williamson 1981): *site specificity*, which is related to the geographical location of an investment (Williamson 1979); *physical asset specificity*, which is related to specialized equipment and tools (Williamson 1979); and *human asset specificity*, which is associated with employees' knowledge, expertise and learning by doing (Williamson 1979; Williamson 1981).

Opportunism plays a particularly important role in situations involving highly specific assets. In such cases, the supplier that invests in assets such as a unique location, proprietary technical and managerial procedures, or specific labor skills will have a cost advantage over other potential bidders at contract renewal time. The lock-in problem results from opportunism (Williamson 1985).

Uncertainty

Williamson acknowledges the existence of two key types of uncertainty: behavioral and environmental. For Williamson, behavioral uncertainty is paramount. It is defined as "strategic non-disclosure, disguise or distortion of information" (Williamson 1985, p.57) and is attributable to opportunism (Williamson 1985, p.58).

Environmental uncertainty refers to the fact that the "environment is characterized by uncertainty with respect to technology, demand, local factor supply conditions, inflation, and the like" (Williamson 1985, p.336). It may arise "from random acts of nature and unpredictable changes in consumers' preferences" (Koopmans 1957, p.162). Williamson also relates environmental uncertainty to bounded rationality when he explains the non-feasibility of creating strategies for all possibilities in advance (Williamson 1985) and the "computational inability to ascertain the structure of the environment" (Williamson 1975, p.23).

Frequency

Frequency is defined by Williamson as "the buyer activity in the market" (Williamson 1979, p.247): in other words, the level of recurrence of the activities needed by the firm for the transaction. Transactions can be one-time, occasional or recurrent. However, since few transactions have such a completely isolated and discrete character that they can be considered one-time transactions, no significant distinction is made between one-time and occasional transactions (Williamson 1979).

Cost Analysis

Based on the premises identified in the previous section, Williamson describes the outsourcing decision as follows. There are two types of costs: production costs and governance costs. Production costs (C) are the costs of making a product – or rendering a service – internally, or the price of acquiring the product or service in the market. Governance costs (G) are the costs of planning, negotiating, monitoring, and adjusting the transaction. Williamson uses the terms "governance costs" and "transaction costs" as synonyms. It follows that:

ΔC: Production cost difference (internal cost – market cost) (1)
ΔG: Governance cost difference (internal cost – market cost) (2)

Therefore:

If ΔC+ ΔG > 0, then use market activities (this means that the total production cost and governance cost of internal organization is greater than the total production cost and governance cost of sourcing through the market). (3)

If ΔC+ ΔG = 0, then there is indifference between market and internal organization (this means that the total production cost and governance cost of internal organization is equal to the total production cost and governance cost of sourcing through the market). (4)

If ΔC+ ΔG < 0, then use internal organization (this means that the total production cost and governance cost of internal organization is less than the total production cost and governance cost of sourcing through the market). (5)

Theoretical Associations Between TCT Attributes and Costs

Asset Specificity and Costs

Williamson's work (1981) addresses the relationship between asset specificity and costs. Asset specificity affects both the production cost difference, ΔC (internal vs. market), and the governance cost difference, ΔG (internal vs. market). As asset specificity increases, each cost difference decreases (ΔC and ΔG), and the total cost difference (ΔC + ΔG) will also decrease. This suggests an integrated curve, combining both costs (production and governance) in one line (Figure 2.1).

As the transaction's asset specificity increases, two things will happen. First, the cost of conducting the transaction internally falls relative to that of using the market. This is because economies of scale are lost when a specific asset needs to be produced and it cannot be standardized and used by many firms. The market option therefore presents higher production costs as compared to internal organization (lower ΔC). Second, conducting a more specific transaction through the market requires a more thorough selection and negotiation process and a more detailed and elaborate contract, such that the market presents higher transaction costs than internal organization (lower ΔG). In sum, as the asset specificity of a transaction increases, ΔC + ΔG will decrease. This makes internal organization more efficient than the market.

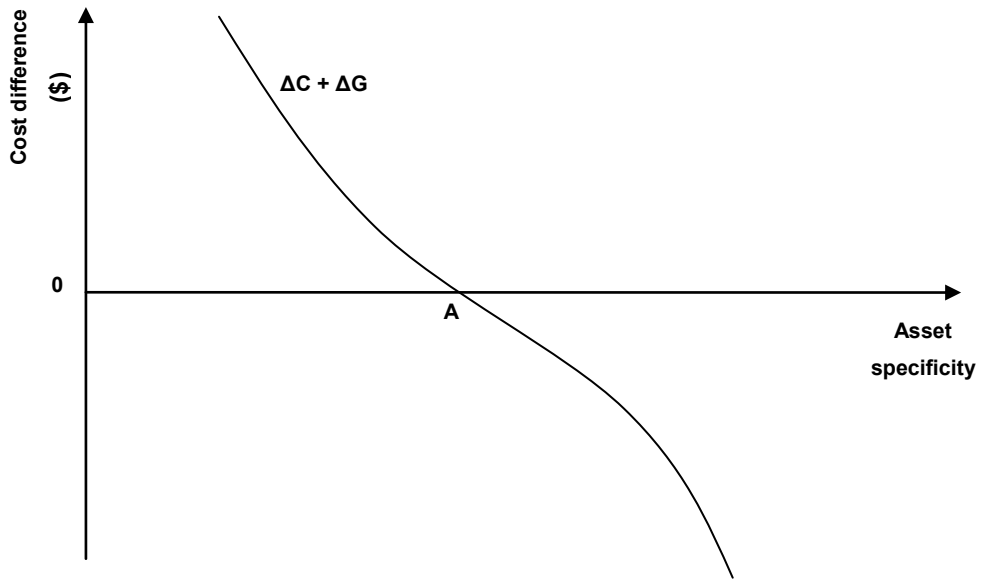

Figure 2.1. Relationship Between Asset Specificity and Cost Difference
(Adapted from Williamson (1981), p.560)

On the other hand, as the level of asset specificity decreases, the market can gain economies of scale by offering the same service to many clients, thereby gaining a cost advantage over internal organization (higher ΔC). In addition, non-specific activities can easily be arranged through the market without negotiating and drafting an elaborate and costly contract. This makes for lower governance costs for the market option (higher ΔG). In conclusion, an increase in the level of asset specificity results in an increase in overall costs (ΔC + ΔG).

Uncertainty/Frequency and Costs

According to TCT, in the presence of a certain degree of asset specificity, greater uncertainty will reduce the cost difference (ΔC + ΔG). Uncertainty has an impact on the cost of conducting a transaction only in the presence of asset specificity; i.e. uncertainty has a moderating effect on the relationship between asset specificity and cost difference. Uncertainty does not affect the transaction costs of

assets with low levels of specificity, but with higher levels of asset specificity, uncertainty will increase the transaction costs associated with turning to the market and decrease the transaction costs associated with internal organization. This means that ΔG will decrease, making the total cost difference (ΔC + ΔG) decrease as well.

Frequency could be analyzed similarly. However, frequency can only affect the choice of governance mode when uncertainty is low to medium. In highly uncertain situations, the combination of specificity and uncertainty makes frequency irrelevant. Figure 2.2 illustrates the moderating effects of uncertainty and frequency, with the asset specificity and cost relationship curves shifting to the right as the level of uncertainty and/or frequency of the transaction decreases (the broken curve in the Figure 2.2).

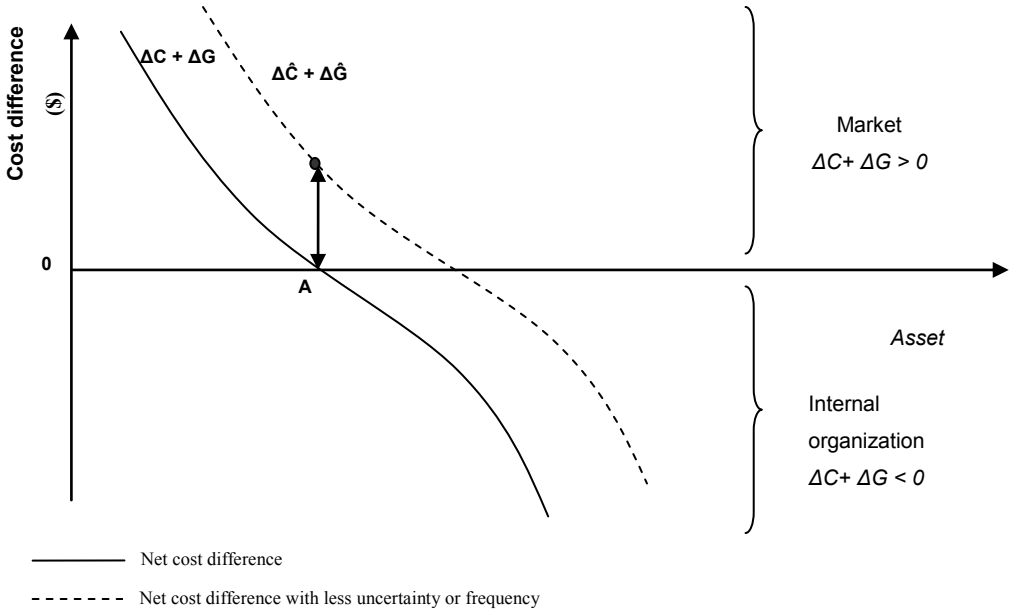

Figure 2.2. Moderating Effects of Uncertainty/Frequency

In other words, at the same level of asset specificity (point A), the solid curve shows indifference between the market option and internal organization. Whether the level of uncertainty or the frequency of the transaction decreases, the curve will shift

to the right (as shown by the broken curve) and make the market option preferable to internal organization at the same level of asset specificity. Equally, whether the level of uncertainty or the frequency of the transaction increases, the curve will shift to the left, and make internal organization preferable to the market option at the same level of asset specificity.

Theoretical Associations between TCT Attributes and Governance Modes

Although asset specificity is the most important dimension of a transaction, "it only takes on importance in conjunction with bounded rationality/opportunism and in the presence of uncertainty" (Williamson 1985, p.56). Indeed, as shown in Figure 2.3, non-specific assets call for the same governance mode – market –, irrespective of the level of frequency and uncertainty. This is because "without asset specificity, the rationale for vertical integration [internal organization] would simply not exist, as there would be no assets at risk and therefore in need of protection (by means of vertical integration) from possible opportunism" (Sutcliffe and Zaheer 1998, p.5). Moreover, when asset specificity is low, the provider's standard contracts can be used (i.e. purchasing from the market), since the assets are not at risk and therefore do not need to be protected through the use of elaborate, customized contracts.

On the other hand, for mixed assets – "incorporating standardized and customized elements" (McIvor 2009, p.47) – and highly specific assets (i.e. idiosyncratic assets), levels of uncertainty and frequency matter. In a situation with a high level of uncertainty, the appropriate governance choice for an idiosyncratic asset is "internal organization," irrespective of the frequency level. The same is true for mixed assets. Due to the opportunism assumption, with mixed and highly specific assets "both the cost and the possibilities of hold-up from opportunistic behavior are higher" (Sutcliffe and Zaheer 1998, p.5). "The joining of opportunism with transaction-specific investments is a leading factor in explaining decisions to vertically integrate" (Williamson 1979, p.234). Thus, keeping the transaction inside

the organization will protect it from the related risks. Moreover, because of the bounded rationality of decision makers, it is impossible to predict all the demand or technological changes of an uncertain environment in advance. This requires flexibility on the part of the provider. Therefore, for highly specific assets and an uncertain environment, internal organization would be the appropriate governance mode. In a situation of low uncertainty and mixed assets, the transaction can also be carried out through the market, irrespective of its frequency level (Figure 2.3). Indeed, in situations characterized by low uncertainty, the opportunism of providers and the bounded rationality of decision makers can be mitigated by using detailed, elaborate and customized contracts.

		Asset Specificity			Asset Specificity		
		Non-specific	Mixed	Idiosyncratic	Non-specific	Mixed	Idiosyncratic
Frequency	Occasional	Market (standard contracting)	Market (customized contracting)	Market (customized contracting)	Market (standard contracting)	Internal organization	Internal organization
	Recurrent	Market (standard contracting)	Market (customized contracting)	Internal organization	Market (standard contracting)	Internal organization	Internal organization
		(With low or medium uncertainty)			**(With high uncertainty)**		

Figure 2.3 Governance Choice (Adapted from Williamson (1979), P.253)

The only time that frequency should affect the governance choice is when uncertainty is low to medium and assets are idiosyncratic. In such a case, if the transaction is to be conducted only occasionally, then the market (through customized contracting) is the appropriate mode of governance. However, for a recurrent transaction with high level of specificity, internal organization is the appropriate

governance choice (Figure 2.3). Customized contracting and internal organization are both mechanisms that serve to protect specific assets from potential opportunistic behavior by providers and the inability of decision makers to predict all the contingencies and changes of the environment ex ante (due to the bounded rationality assumption).

In the next section we examine the constructs, hypotheses and results of extant TCT-based IT outsourcing research to determine how closely they follow TCT precepts.

Research Method

We examined extant TCT-based IT outsourcing models in terms of their findings and the extent to which they are faithful applications of TCT. We searched several databases – ABI/INFORM Global, Science Direct and JSTOR – using the keywords "information" OR "information system" OR "information technology" AND "outsourcing" OR "sourcing" AND "transaction cost" OR "TCT" OR "TCE" OR "specificity" OR "uncertainty" in citation and abstract. We then reviewed each article and kept those that met the following criteria: (1) the study proposed an IT outsourcing model, (2) the model was based on TCT and included transaction attributes, and (3) the model was tested empirically. We also searched the references of each article to ensure that no important articles had been missed. This process resulted in a sample of 25 papers spanning the years 1995 to 2011 and published in 19 different journals (listed in Appendix 2.1). Of this group, 24 articles present quantitative studies with variance models, and one is a qualitative investigation of 40 case studies.

Our list includes 23 articles used in Lacity et al. (2011), but the two lists differ as follows: Lacity et al.'s list includes 8 studies that did not meet our criterion of having explicitly formulated and tested TCT-based hypotheses, and our list includes 2

studies (Ang and Cummings, 1997; and Dibbern and Heinzl, 2009) that are not in their list because of the moderating and mediating effects of other non-TCT variables.

We further analyzed the studies as follows: first, we compared the findings of each study with its hypotheses and with the findings of other studies (Table 2-I); second, we compared the conceptualization and operationalization of the TCT constructs of each paper with Williamson's original definitions (Table 2-II); and third, we examined the relationships between the constructs of each study to determine whether or not they take into account the normative nature of the theory (Table 2-III). The results of this assessment are discussed below.

TCT Empirical Findings in IT Outsourcing Research

We identified three main types of contradiction in the results of the studies we analyzed. First, some studies do not formulate their hypotheses entirely in line with TCT. Second, some studies could not find support for their TCT-based hypotheses. And third, for some TCT-based hypotheses, different studies produced different results. We call the first two categories within-study contradictions and the third category across-study contradictions. A detailed discussion of each follows.

First, as shown in Table 2-I, some hypotheses are not completely in line with TCT. For example, while TCT posits that internal organization is a more efficient governance mode under conditions of high uncertainty, Diana (2009) hypothesized the opposite. He conceptualized uncertainty in terms of market competition, arguing that higher competition requires more flexibility, which can be provided by outsourcing. However, he did not find support for this positive link.

Another example is the relationship between frequency and outsourcing. TCT posits that internal organization is a more efficient governance mode for recurrent transactions, since it allows the firm to gain economies of scale that reduce production costs. However, Miranda and Kim (2006) took a different approach, hypothesizing that higher frequency brings economies of scale in contracting costs

(governance costs), making the market preferable to internal organization. They found support for this hypothesis.

The second type of within-study contradiction concerns studies that could not find support for their TCT-based hypotheses. For example, Aubert et al. (2004) and Miranda and Kim (2006) hypothesized, as per TCT, that uncertainty and specificity would negatively influence the level of IT outsourcing. However, they found significant positive results for both of the relationships.

The third type of contradiction is related to contradictory results across studies. For example, Ang and Cummings (1997) found that asset specificity has a negative effect, while Aubert et al. (2004) and Miranda and Kim (2006) found a positive effect. In some cases, uncertainty was found to positively influence the IT outsourcing decision (Aubert et al. 2004; Dibbern and Heinzl 2009; Miranda and Kim 2006), while elsewhere it had no effect (Wahrenburg et al., 2006). In terms of frequency, only one study found support for its hypothesis – a positive link between frequency and outsourcing (Miranda and Kim 2006), which, interestingly, is contrary to TCT. Yet other studies found that frequency does not have a significant effect on the outsourcing decision (Loebbecke and Huyskens 2006b; Wahrenburg et al. 2006). Table 2-I summarizes these mixed findings on the relationships between TCT attributes and the IT outsourcing decision or success.

These results are similar to those of Lacity et al. (2011). Our sample produced the same pattern for asset specificity, frequency and costs. Less than half of the studies (40%) found support for the hypotheses related to specificity, none found support for frequency, and all found support for costs. However, in terms of uncertainty, our results differ because we accepted two types of behavioral and environmental uncertainty, whereas Lacity et al. (2011) accepted only one.

Table 2-I Empirical Findings on Applications of TCT in IT Outsourcing Research					
	Influence on either outsourcing or outsourcing success as per TCT	**Number of articles that used the construct ^**	**Number of articles that hypothesized in line with TCT**	**Found support for TCT**	**Findings were contrary to TCT or not significant**
Asset specificity	(-)	23	23	9 (40%)	14 (60%)
Behavioral uncertainty	(-)	9	9	2 (22%)	7 (78%)
Environmental uncertainty	(-)	14	12*	5 (36%)	9 (64%)
Frequency	(-)	4	3**	0 (0%)	4 (100%)
Cost difference (cost advantage of market over internal organization)	(+)	9	9	9 (100%)	0 (0%)

^ The numbers in this column are same as the numerators (construct use) in the last column of Table 2-II.
* Two studies hypothesized a positive relationship, which is contrary to TCT.
** One study hypothesized a positive relationship, which is contrary to TCT.

Assessing Extant Models of IT Outsourcing

Constructs

Although most of the studies define and operationalize asset specificity and uncertainty as per TCT, only four studies take frequency into account, and nine others take cost into account, albeit somewhat differently from TCT's cost difference. Only one study considers all of TCT's constructs.

As shown in Table 2-II, almost all of the studies define asset specificity as per TCT. The IT outsourcing literature defines asset specificity as: the difference between the cost of the asset and the value of its second best use (e.g. Aubert et al. 2004; Miranda and Kim 2006), unique value (e.g. Ang and Cummings 1997), customization and dependency (e.g. Chen and Bharadwaj 2009; Loebbecke and Huyskens 2006b; Poppo and Zenger 1998), and durability of investments (Alvarez-Suescun 2010). Some studies (Barthelemy and Geyer 2005; Oh et al. 2006; Wholey et al. 2001) adopt a functional approach toward specificity, arguing that some IS functions (e.g. systems integration, new application development) are more specific than others (e.g. telecommunications networks, data center management). We believe that with respect to the specificity construct, the IT outsourcing literature and TCT converge.

The IT outsourcing literature conceptualizes environmental uncertainty in line with TCT as technological uncertainty (e.g. Ang and Cummings 1997; Poppo and Zenger 1998), demand uncertainty (Aubert et al. 2004), contract/requirement uncertainty (Kim and Chung 2003; Wang 2002), and the overall uncertainty in the external environment (Dibbern and Heinzl 2009; Wahrenburg et al. 2006). These uncertainties in both the TCT and the IT outsourcing literature refer to unforeseen changes in the environment that require changes in the contract and flexibility from the supplier's side (although this may not always be possible).

Our analysis, however, revealed two main issues regarding the behavioral uncertainty construct. First, only nine studies out of 25 (36%) conceptualize behavioral uncertainty, while most of the studies (14 out of 25, or 56%) conceptualize and operationalize environmental uncertainty, and only four studies (16%) conceptualize both types of uncertainty (Aubert et al. 2004; Lacity and Willcocks 1995b; Miranda and Kim 2006; Wang 2002). The omission of behavioral uncertainty is not in line with TCT, under which this type of uncertainty should play a significant role in decisions about the firm's boundary.

The second issue is how behavioral uncertainty is conceptualized. Among the nine studies that consider behavioral uncertainty, four conceptualize it in terms of opportunistic behavior on the part of the supplier (Dibbern and Heinzl 2009; Goo et al. 2007; Miranda and Kim 2006; Wang 2002), which is in line with TCT.

The other five studies use measurement problems (Aubert et al. 2004), measurement complexity (Loebbecke and Huyskens 2006b), measurement difficulties (Poppo and Zenger 2002), and lack of observability (Mayer and Salomon 2006) or verifiability (Alvarez-Suescun 2010) as proxies for behavioral uncertainty.

Table 2-II TCT Constructs: Use and Conceptualization in ITO Literature			
	TCT Definition	**IT Outsourcing Studies Definition**	**# of Studies Used the Construct**
Asset specificity	Degree to which the assets can be redeployed to alternative uses and by alternative users without sacrificing productive value (Williamson 1996), including physical, human, site, etc.	Difference between the cost of the asset and the value of its **second best use** (Aubert et al. 2004; Dibbern and Heinzl, 2009; Kim and Chung, 2003; Mayer and Salomon, 2006; Miranda and Kim, 2006; Nam et al. 1996; Poppo and Zenger, 1998, 2002; Stremersch et al., 2003; Tiwana and Bush, 2007; Wang, 2002), **unique value** (Ang and Cummings, 1997; Wahrenburg et al., 2006), and **customization and dependency** (Chen and Bharadwaj, 2009; Diana, 2009; Lacity and Willcocks, 1995; Loebbecke and Huyskens, 2006; Poppo and Zenger, 1998) **used but not defined** (Goo et al. 2007; Thouin et al. 2009); **durable investments** (Alvarez- Suescun, 2010); different IS functions have different degrees of specificity (Barthelemy and Geyer, 2005; Oh et al. 2006; Wholey et al. 2001)	23 out of 25
Behavioral uncertainty	"Uncertainty of a strategic kind," which is "attributable to opportunism": impossibility of characterizing "the general propensity of a population to behave opportunistically in advance" (Williamson, 1985, p.58)	**Opportunism** (Dibbern and Heinzl, 2009; Miranda and Kim, 2006; Wang, 2002), opportunistic behavior (Goo et al. 2007), lack of **observability** (Mayer and Salomon, 2006; Alvarez- Suescun, 2010); verifiability (Alvarez- Suescun, 2010). **Measurement problems** "are the difficulties encountered in the evaluation of an element of the exchange" (Aubert et al., 2004); measurement difficulty (Poppo and Zenger, 2002; Loebbecke and Huyskens, 2006)	9 out of 25

Environmental uncertainty	In chess, uncertainty is: "Computational inability to ascertain the structure of the environment" (Williamson, 1975, p.23). "…environment is characterized by uncertainty with respect to **technology**, **demand**, local factor supply conditions, **inflation**, and the like…" (Williamson, 1985, p.336)	**Technological uncertainty:** rapid and unpredictable changes in technology and technological complexity (Ang and Cummings, 1997; Miranda and Kim, 2006; Poppo and Zenger, 1998, 2002; Stremersch et al., 2003); **Demand uncertainty:** "when parties do not know ex ante the exact volume of product that will be required or ignore the form the service will take" (Aubert et al., 2004); "uncertainty as computational inability to ascertain the structure of the environment (Miranda and Kim, 2006); requirement uncertainty (Goo et al. 2007); **Uncertainty** of the external environment: the obstacles that obstruct potential changes (Dibbern and Heinzl, 2009; Nam et al. 1996; Wahrenburg et al., 2006) and the degree of competition (Diana, 2009); **Project uncertainty:** specifiability of requirements (Tiwana and Bush, 2007); **Contract uncertainty**: difficulties in setting: requirement specifications, delivery dates, costs (Kim and Chung, 2003; Wang, 2002)	14 out of 25
Frequency	The level of recurrence of the activitiess needed by the firm for the transaction Williamson (1979)	**Frequency**: the repetitiveness of a certain type of transaction (Miranda and Kim, 2006; Lacity and Willcocks, 1995; Loebbecke and Huyskens, 2006; Wahrenburg et al., 2006)	4 out of 25
Production cost difference (ΔC)	Production cost difference between internal organization and the market (Williamson, 1981)	**External production cost advantage:** the cost advantage of external IS provider over internal management (Ang and Cummings, 1997; Ang & Strub, 1998; Lacity and Willcocks, 1995; Tiwana and Bush, 2007); **Economies of scale** (Poppo and Zenger, 1998); IT costs (Wholey et al. 2001)	6 out of 25
Governance cost difference (ΔG)	Governance cost difference between internal organization and the market (Williamson, 1981)	**Transaction cost**: the effort, time, and costs incurred in searching, creating, negotiating, and enforcing a service contract between buyers and suppliers (Ang & Strub, 1998; Espino-Rodríguez, and Gil-Padilla, 2005); **Relative transaction cost:** Lacity and Willcocks, 1995	3 out of 25
Cost analysis (ΔC+ ΔG)	Sum of production and governance cost differences (between market and internal organization), which drives governance structure choice (Williamson, 1981)	**Partly by** Lacity and Willcocks, 1995	1 out of 25

Some studies conceptualize uncertainty and measurement problems as two separate constructs. For instance, Poppo and Zenger (1998) use measurement problems as an agency theory construct and technological uncertainty as a TCT construct. Based on the definitions and operationalization provided in studies that used measurement problems, the construct is related to task difficulty/complexity or an inability to measure the performance inherent to the task. Therefore, we argue that although a measurement problem may give way to behavioral uncertainty or exacerbate a situation that includes behavioral uncertainty, the construct differs conceptually from behavioral uncertainty. As Lacity et al. (2011) correctly note, measurement difficulties could be viewed as a fourth transaction attribute. In this paper, however, we only focus on the three key TCT transaction attributes of asset specificity, uncertainty and frequency.

The next construct, frequency, is absent from most of the studies we analyzed. The four studies that included frequency defined it as the repetitiveness or recurrence of the transaction (Lacity and Willcocks 1995b; Loebbecke and Huyskens 2006b; Miranda and Kim 2006; Wahrenburg et al. 2006). This corresponds to TCT's definition of frequency, since it refers to the level of recurrence of the transaction.

The last TCT construct to be examined is "cost difference." Six studies consider production costs, defined as either an external production cost advantage (production cost advantage of market over internal organization) (Ang and Cummings 1997; Ang and Straub 1998; Lacity and Willcocks 1995b; Poppo and Zenger 1998; Tiwana and Bush 2007) or overall IT costs (Wholey et al. 2001). This corresponds to TCT's concept of the production cost difference (ΔC). Only three studies include transaction costs, defining it as the cost of conducting a transaction through the market (Ang and Straub 1998; Espino-Rodríguez and Gil-Padilla 2005) and comparing the transaction costs of the under-the-market mode with internal organization (Lacity and Willcocks 1995b). This latter conceptualization relates to TCT's notion of transaction cost difference (ΔG).

This analysis shows that only one study (Lacity and Willcocks 1995b) considers both production cost difference and transaction cost difference. In this qualitative work, the notion of costs is employed to explain the unexpected results observed in the cases. For example, the notion of costs was used to explain a situation where outsourcing was expected due to the low specificity of a transaction, but a successful internal organization was nevertheless observed. Here, the firm could also gain economies of scale similar to the vendor (a ΔC of close to zero) but had lower transaction costs ($\Delta G < 0$). This gives a negative value for $\Delta C + \Delta G$, which, based on the formula, should lead to the use of internal organization. The firm made the right choice and succeeded.

Overall, in terms of costs, our analysis of the literature shows that few of the studies address costs. Those studies that do consider costs either use transaction and production costs separately or use them to explain the anomalies, rather than using them from the outset to derive the right decision.

Hypothesized Relationships: Interaction Effects

As described above, in the foundations of TCT and as illustrated in Figure 2.2, uncertainty and frequency both moderate the influence of asset specificity on costs. For example, while a transaction that is highly specific may still take place through the market if uncertainty is low, the same transaction should be kept internal if the uncertainty level is high. And as shown in Figure 2.3, for non-specific assets, irrespective of uncertainty and frequency levels, TCT says that the right governance mode is market. In the sample of studies that we analyzed, only two studies (Diana 2009; Stremersch et al. 2003) consider interaction effects. These two studies hypothesized a negative relationship between the influence of asset specificity and uncertainty on the outsourcing decision, which is in line with TCT. However, neither of these studies found support for their hypotheses. One explanation that we suggest for this result is that costs were not considered. Uncertainty multiplied by specificity

will decrease the cost difference ($\Delta C + \Delta G$), but the cost difference may still be greater than zero, which, according to Formula 3, calls for outsourcing.

Wholey et al. (2001) took a different approach to formulating the interactions of specificity and uncertainty. They argued that different types of IS functions (e.g. data center operations, development) are characterized by different amounts of uncertainty. Asset specificity will therefore have a different effect on the outsourcing of different IS functions. However, they did not find support for this interaction effect.

Overall, in terms of interaction effects, ITO research has not completely tested TCT. Indeed, while under TCT uncertainty and frequency play moderating roles, only 12% of our articles considered the moderating role of uncertainty, and none of the studies considered the moderating role of frequency.

Hypothesized Relationships: Normative vs. Predictive

The normative implications of TCT have been acknowledged in the literature. For instance, it has been argued that "transaction cost economics offers strategy a set of normative rules for choosing among alternative governance arrangements. To the extent that governance choices are an important determinant of firm performance, managers would be well advised to heed those rules and to factor transaction-cost concerns into their decision-making calculus" (Masten 1993, p.119). For Williamson, "Efficiency purposes are served by matching governance structures to the attributes of transactions in a discriminating way" (Williamson 1985, p.68).

Based on a review of 85 outsourcing contracts, Poppo and Lacity (2006) found that "IT managers enjoy higher performance when they use the prescriptions offered by TCE to determine what to outsource and how to structure the governance of the outsourced activities" (Poppo and Lacity 2006, p. 280). Moreover, they found that "managers realize higher satisfaction when they apply the TCE principle to

measure and benchmark outsourcing activities" (Poppo and Lacity 2006, p. 280). Furthermore, they found that managers learn from their mistakes, implying that managers do not intuitively apply TCT principles. All these findings emphasize the normative nature of the theory.

However, our analysis shows that the majority of extant models predict IT outsourcing decisions based on transaction attributes (64%), assuming a predictive nature for TCT. This means that the extant models conceptualize transaction characteristics as causal antecedents of the decision to outsource. A generic hypothesis of this conceptualization is that more of one characteristic will lead to more/less of the level/degree/budget for IT outsourcing.

TCT, however, does not posit that the transaction characteristics cause the decision; rather it posits that the transaction characteristics are antecedents of the cost differences. This means that should a transaction have one of these characteristics, or two or three of them in combination, one governance mode will be more efficient than the other in terms of the transaction's production costs and transaction costs.

In our analysis of TCT-based IT outsourcing models, we found few indications of the normative nature of TCT. Although Miranda and Kim (2006) acknowledge that TCT is a normative theory that posits what firms *should* do, they do not incorporate this normative nature into their hypotheses. Tiwana and Bush (2007) also refer to TCT as a normative theory, although they treat it in a predictive way. In another case, Aubert et al. (2004) argue that one reason they did not obtain the expected results in their study is that firms may not always make their decisions as per TCT precepts; firms might make decisions that are different from what TCT suggests.

A number of studies (36% of the studies in our sample) adopt the outsourcing outcome, such as successful outsourcing or firm performance, as the dependent variable of their study. For example, Poppo and Zenger (1998) posit that when the

governance mode does not match the transaction attributes, then performance will not be achieved. For example, in terms of asset specificity they hypothesize that "increases in the specificity of an activity may negatively affect the performance of governance through the market" (Poppo and Zenger 1998, p.857). Although this hypothesis is predictive, it does not predict the decision; rather, it predicts the outcome of the decision. Therefore, by linking the transaction attributes to the performance of a governance mode, they treat TCT normatively.

As shown in the Table 2-III, better support for TCT is found when outcome is the dependent variable. This finding is similar to that of Lacity et al. (2011), who found that when outcome is considered, slightly better results are obtained.

Table 2-III. Choice of Dependent Variable: Decision vs. Outcome of the Decision

	Found definitive* support for TCT	**Found either contrary to TCT or insignificant results ****	**Found partial*** support (some of the hypotheses)**	**Total**
Decision as dependent variable	5 (31%)	8 (50%)	3 (19%)	16 (100%)
Outcome of the decision as dependent variable (e.g. outsourcing success)	4 (45%)	3 (33%)	2 (22%)	9 (100 %)
Total	9 (36%)	11 (44%)	5 (20%)	25 (100%)

* Definitive support means that study found support for **all** of its TCT-based hypotheses.
** When study could not find support for **any** of its TCT-based hypotheses.
***Partial support means that study found support for **some** of its TCT-based hypotheses.

Although the qualitative study of our sample, Lacity and Willcocks (1995b), is not explicit in its proposition, it takes a normative approach to applying TCT. They examined 40 sourcing decisions and compared them with what is suggested by TCT. Where they found fit (between the TCT suggestion and the actual decision), they expected success, and where there was lack of fit they expected failure. Where they

did not find the expected pattern, they concluded that this was an anomaly to TCT. They therefore treat TCT in a normative way (Lacity and Willcocks 1995b).

Discussion and Conclusion

We set out to review the TCT-based ITO literature to understand why IT outsourcing studies that appropriate TCT have produced mixed results, focusing on how TCT has been used in ITO models. In the course of our study, we observed similar contradictory results in other domains where TCT has been applied and tested. In strategy research, for instance, where TCT has been used to examine the firm's boundary decisions, the results have been mixed, particularly with regards to the role of uncertainty (Carter and Hodgson 2006). Indeed, studies found either insignificant relationships or negative relationships between technological uncertainty and vertical integration, which runs counter to TCT. Another study, which reviewed TCT applications across several domains, including marketing, strategy, management science, and economics, shows that uncertainty yields the most inconsistent results, either alone or in interaction with asset specificity (David and Han 2004). They also found that frequency is the least used construct, that uncertainty is associated with inconsistent results, and that asset specificity is the most widely used construct. While in both of these reviews, asset specificity yields the most consistent results, our review shows that this construct is most often associated with inconsistent results (40% support for TCT).

Much like the present study, one of these two reviews led its authors to observe that the models proposed and tested in the literature are not always fully consistent with Williamson's framework. David and Han (2004) observe that in their sample of studies, some key propositions have been loosely interpreted and some key variables (e.g. performance) have received little attention. They also observed a significant amount of disagreement in how the constructs are operationalized. Overall, they observed both misappropriation of the theory and methodological issues

in their data set of studies. They therefore call for better appropriation of the theory's core constructs and key relationships and suggest paying more attention to operationalization and other methodological issues.

The other review (Carter and Hodgson 2006), however, came to another conclusion. They argue that rival theories could better explain boundary decisions. For example, they suggest that even specificity, which yields the most consistent result (they confirmed the pattern found by David and Han), could also be viewed from a capabilities perspective, especially in the case of human specificity.

Two reviews therefore call for different future steps: while David and Han (2004) call for a better appropriation of TCT in future studies, Carter and Hodgson (2006) call for a joint testing of rival theoretical perspectives.

Our review leads us to conclude that, in addition to explaining mixed results by the fact that some studies used hypotheses that do not follow TCT – mainly by not taking into account some of the constructs (e.g. frequency) or their interaction effects (frequency and asset specificity) or by hypothesizing a relationship in a different direction from that posited by the theory (e.g. a positive effect for uncertainty) –, another possible reason for such results is that the studies generally did not take the normative nature of the theory into consideration. This argument is similar to the justification for unexpected results provided in Aubert et al. (2004). Firms do not always make the right decision, and when they do make the right decision, they should achieve superior performance (in terms of efficiency). Therefore, in studies where performance is not reported, high performers, low performers, firms that have transaction cost minimizing behaviors and firms that do not are all pooled in the same sample. In such cases, the relationships between transaction characteristics and an appropriate governance mode in the high-performance group will be negated and lost due to the lack of such relationships in the low-performance group. We believe that this is one plausible reason for the mixed results of TCT-based ITO decision models.

Although other explanations provided by Lacity et al. (2011) suggest a departure from TCT, a closer look at these explanations leads us to advocate for more research using TCT. The first category of explanations, research method issues, as Lacity et al. (2011) also corroborate, is not contrary to TCT: "Overall, research method explanations argue that findings are not really counter to TCT logic but instead may be explained by faulty measures or consequences of specific methodological issues" (p.10). This category of explanations resembles David and Han's (2004) call for closer attention to measurement and methodological issues when using TCT.

The second and third categories, boundary conditions and assumption violation explanations, could serve as guides to carefully choosing study settings and the IT activities to be studied. We believe that IT is too broad a field to be considered a poor fit to TCT assumptions. The context of some IT activities might still be a good fit with TCT assumptions. For example, the assumption of vendor opportunism, which is questioned by some research, is not a constant in all types of IT activities. This is why, instead of keeping opportunism as a constant assumption, some research measures it through the opportunistic behavior of vendors (e.g. Goo et al. 2007; Miranda and Kim 2006). Finally, the last category, alternate theory explanations, which is also advocated by Carter and Hodgson (2006), could be even more viable when a rival theory is tested against TCT. To achieve these ends, we still need to be on stable ground and appropriate theories faithfully, both TCT and other rival theories.

Our conclusion and suggestions on the "what next" issue therefore complement the previous reviews and the Lacity et al. (2011) study in the following way. Our conclusion complements Lacity et al. (2011), since we believe that TCT may still contribute to ITO studies as input to an endogenous ITO theory. Our conclusion complements Carter and Hodgson (2006), since in order to jointly test TCT and rival theories, we need a better appropriation of TCT. Only then will we be

certain that the difference in explanations is not due to a misappropriation of the theory but rather to the explanatory power of the theories at hand. Our study converges with the conclusion reached by David and Han (2004), although our review has focused less on methodological issues.

This study has implications for research and the empirical measurement of IT outsourcing decision models. The moderating effects of uncertainty and frequency require paying special attention to how two transaction characteristics (i.e. frequency and uncertainty) are conceptualized and operationalized and how their roles are specified. It is critical that models relate their constructs in ways suggested by the underlying theory. When a model relates some of its constructs in ways that are not supported by the theory, a strong argument and full explanation should be provided (e.g. the context of the study imposes this change, or the theory is being extended). We did not find such explanations for the departures from TCT observed in extant TCT-based models (such as taking uncertainty and frequency as direct antecedents of the IT outsourcing decision rather than as moderators).

The normative nature of TCT has important implications for how models are specified. For example, when TCT is used normatively, the endogenous variables will be the cost difference between market and hierarchy and the performance of the ITO decision. In extant models, the endogenous variable is usually the decision to outsource. Like Lacity et al. (2011), we found that the studies that used outcome as the dependent variable obtained slightly better results. However, with few exceptions, the decision itself is implicit in the models of studies using outcome as the dependent variable. For example, studies refer to "outsourcing success." This means that outsourcing is already implicitly chosen as the governance mode and the transaction attributes are directly linked to the performance of the outsourcing. Although this approach yields better results than linking attributes directly to the decision, as noted by Lacity et al. (2011), the improvement is still piecemeal due to the absence of costs. We believe that if the models had taken a complete path, from attributes to costs to

decision to the performance of the decision, then TCT would have yielded more consistent results. However, as Lacity et al. (2011) suggest, "We may be asking too much of TCT" and "the IT phenomenon is more complex than can be accommodated by one decision-making theory" (p.13).

Our study also has an important implication for practitioners, inasmuch as they could make outsourcing decisions by evaluating the transaction attributes and the difference between the production and governance costs associated with conducting an IT activity (a transaction) internally versus through the market. This cost comparison may lead decision makers to entirely different conclusions about sourcing decisions. Decision makers may have assumed that outsourcing is more efficient than internal organization even before undertaking a cautious analysis of transaction characteristics and their impact on costs. But a proper cost analysis could have shown that internal organization is more efficient than outsourcing. Decision makers may also decide to re-analyze their already outsourced or in-sourced IT activities, discovering that they have not chosen the most efficient option.

In sum, this study contributes to IT outsourcing research by providing one answer to the question: "Why have the appropriations made of TCT to study IT outsourcing produced mixed results?" Our analysis of the empirical ITO models shows that not all the TCT concepts have been used as conceptualized in TCT (e.g. behavioral uncertainty) and not all the TCT relationships have been taken into account (e.g. the interactions of asset specificity and uncertainty). Most importantly, only a few studies took the normative nature of TCT into consideration. Therefore, we believe that one answer to the above question is suggested by the way that TCT has been used in ITO models. However, as we stated earlier in the paper, this represents only one answer to the question. Other possible explanations have been fully presented elsewhere (Lacity et al. 2011).

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Appendix 2.1 Empirical Studies Included in the Review

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Chapitre III - Article #2

The Strategic Role of Information Technology Outsourcing: A Dynamic Capabilities Perspective in a Total Outsourcing Context[3]

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Abstract

Grounded in the dynamic capabilities perspective, our study offers a conceptualization of IS strategy that comprises two sets of dynamic capabilities: enterprise IT architecture dynamic capability and IT sourcing dynamic capability. We borrow from extant IS literature and define enterprise IT architecture dynamic capability as the capacity of an organization to purposefully extend, create or modify its IT competencies; and we offer the concept of IT sourcing dynamic capability that we define as the capacity of an organization to purposefully extend, create or modify its IT resource base to support the creation or modification of IT competencies. We theorize on how these two sets of capabilities combine to help a firm respond to rapid changes in the environment or bring about changes in the business strategy, which may in turn provoke changes in the environment and thus provide a competitive advantage. Our theorizing is informed by study of an extreme single case facing rapid environmental change.

Keyword

Dynamic capabilities perspective, IT outsourcing dynamic capabilities, IT architecture dynamic capabilities, IT strategic alignment, Case study

Introduction

Information technology (IT) sourcing is defined as "the entire set of processes ranging from initiating and preparing the decision to provide an organization's IS function(s) in house or externally by a legally independent service provider (or some combination of the two)" (Hirschheim et al. 2008, p.125). Among this set of processes, the decision itself and its antecedents – whether in terms of transaction characteristics or institutional, political or strategic pressures – have been the main focus of research (Ang and Cummings 1997; Aubert et al. 2004; Lacity and Willcocks 1995b). Some researchers, however, have taken a more systemic approach to conceptualizing IT sourcing, portraying it as an intrinsic part of an organization's IS strategy. For example, Henderson and Venkatraman (1999b) suggest that "the selection and use of mechanisms (for example, joint ventures with vendors, strategic alliances, joint research and development for new IT capabilities) for obtaining the required IT competencies" (p. 474) (i.e. sourcing) is a component of IS strategy, along with technology scope and systemic competencies. They also propose that these three components will determine the positioning of the firm in the IT marketplace ("where [managers] obtain critical technological functionality that supports and shapes their business strategy") (Henderson and Venkatraman, 1999, p.474). Adopting this perspective, Hirschheim and Sabherwal (2001) consider IT sourcing arrangements as one of the three dimensions of IS strategy, along with IS role and IS structure. They conceptualize IT sourcing as a single decision about sourcing mode (in-sourcing, selective outsourcing, or outsourcing) that ideally should be aligned with the firm's type of business strategy (prospector, analyzer, or defender). Our literature review yielded only two other studies that focused on the role played by IT sourcing in the IS strategic set. One of these studies conceptualizes IT sourcing as a decision about the structure of the organization – meaning a decision about the firm's boundary – and suggested that IT sourcing should be aligned with business strategy (Aubert et al. 2008). Another study proposed the concept of IT

outsourcing strategy, defined as the "logic visible in a firm's portfolio of IT outsourcing decisions"(Lee et al. 2004, p.112). IT outsourcing strategy has been operationalized as scope (minimal, selective, or comprehensive), contract type (detailed, buy-in, or unspecified) and contract duration (short-term, medium-term, or long-term) (Lee et al. 2004).

Espousing the view of IT outsourcing as a component of IS strategy and grounded in dynamic capabilities perspective (Helfat et al. 2007; Teece et al. 1997), our study offers a conceptualization of IS strategic capabilities that comprises two sets of dynamic capabilities. The first set is enterprise IT architecture dynamic capability, which we adapt from Ross's (2003) notion of enterprise IT architecture competency. The second set is that of IT outsourcing dynamic capability, which we introduce and define based on dynamic capabilities perspective. We theorize on how these two sets of capabilities either help a firm respond to rapid changes in the environment or make changes to its business strategy, which may in turn provoke changes in the environment and thus give the firm a competitive advantage.

We choose an extreme case for our study, a firm with near total IT outsourcing (extreme IT outsourcing context) which also faces rapid environmental changes. This case selection has several advantages. First, since the case operates in a turbulent environment, there is a higher probability to observe IT architecture dynamic capabilities. Also, since the firm outsourced near total (95%) of its IT functions with almost two decades of IT outsourcing experience, IT outsourcing dynamic capabilities are more probable to be observed.

Conceptualizing IS strategy from a dynamic capabilities perspective has two main benefits. First, although extant literature supports the idea that IS strategy has to be closely aligned with business strategy in order to contribute to firm performance, dynamic capabilities perspective proposes explanations on *how* this goal is achieved. Second, it highlights the importance of investing in building capabilities by senior IT

executives (Ranganathan and Balaji 2007) in order to achieve such alignment and consequently performance.

In this paper, we begin by reviewing the main tenets of dynamic capabilities perspective. Then we introduce our preliminary concepts of IT architecture dynamic capability and IT outsourcing dynamic capability. The research methodology along with the case description follows. We then present our dynamic capabilities based theory of alignment in a total IT outsourced context. Discussion and conclusion follow.

Theoretical Background: Dynamic Capabilities

Dynamic capabilities have been conceptualized as a complement to the resource-based view of the firm (RBV), which focuses on firms' resources that are valuable, rare, inimitable and non substitutable (Barney 1991). Under this approach, a firm can gain sustained competitive advantage when it has resources with the aforementioned characteristics. These resources may be physical (e.g. capital), human (e.g. employees' skills) or organizational (e.g. formal and informal planning). This theoretical view links a firm's resources directly to its performance (competitive advantage). Therefore, under RBV the very existence of such resources is enough to gain a competitive advantage. While this direct link could be established in a relatively stable environment, it has been argued that in a turbulent environment, the sustainability of such a competitive advantage can be quickly eroded (Wade and Hulland 2004). Moreover, how the firm develops and uses such resources is not a concern under RBV (Wade and Hulland 2004). The environmental factors (i.e. rapid change and turbulence) and the way that firm uses its resources are the main focus of dynamic capabilities perspective. It has been argued that dynamic capabilities enable a firm to adjust its resources, thereby maintaining the sustainability of its competitive advantage in a rapidly changing environment (Eisenhardt and Martin 2000). The

dynamic capabilities perspective also seeks to understand why firms in the same industry perform differently (Zott 2003).

Dynamic capabilities initially appeared in the work of Teece, Pisano and Shuen (1997) as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al. 1997, p.516). Although several definitions of dynamic capabilities exist, they all focus on the ability of a firm to reconfigure its resources. For example, dynamic capabilities have been defined as a firm's ability to reconfigure in order to address environment changes (Teece et al. 1997) or the processes by which it reconfigures its resources to respond to or create market change (Eisenhardt and Martin 2000). We adopt the definition provided by Helfat et al. (2007), since it encompasses elements common to most of the definitions provided in the literature and, at the same time, focuses on the heart of dynamic capabilities: resource reconfiguration. A dynamic capability is defined as "the capacity of an organization to purposefully extend, create, or modify its resource base" (Helfat et al. 2007, p.1).

Relational capabilities are one instance of dynamic capabilities, and were defined and conceptualized by Helfat et al. (2007) to illustrate the role played by joint ventures, alliances and mergers/acquisitions in the development of new products or services. Relational capabilities are defined as the "capacity to purposefully create, extend or modify the firm's resource base, augmented to include the resources of its partners" (Helfat et al. 2007, p.66). Acquisition-based capability and alliance-based capability are two types of relational capabilities. When a firm does not possess the required resources to perform an activity or implement a strategy, it may achieve this either with the help of its alliance partners (using alliance-based capability) or by acquiring another firm (using acquisition-based capability).The notion of dynamic capabilities has also been applied to new product development (NPD) (Pavlou and El Sawy 2006). This capability enables firms to select the right product concept and then reconfigure its resources to produce it. NPD capability should result in a product that

has a reasonable cost/quality ratio and also respond to the requirements of the market in order for the firm to be able to survive in its competitive environment. Other capabilities have also been the subject of research, including manufacturing capabilities (Banker et al. 2006), learning capabilities (Bhatt and Grover 2005; Butler and Murphy 2008), and marketing-related capabilities (Song et al. 2005).

Dynamic Capabilities as Managerial and Organizational Processes

Dynamic capabilities consist of processes that use resources (Eisenhardt and Martin 2000).“[W]hen we observe a dynamic capability in use, we are observing its underlying processes” (Helfat et al. 2007, p.31). While dynamic capabilities can involve many types of processes, it has been suggested that all dynamic capabilities have two key processes in common: search and selection, and orchestration, which are considered the building blocks of any dynamic capability (Helfat et al. 2007, p.4)

Search and selection include “all processes and activities concerned with searching for and identifying alternative solutions to a problem and sharing them among the members of an organization” (Zott 2003, P.104). “Selection” is also defined as “the organizational activities involved in identifying a preferred alternative for organizational change such as evaluation of alternatives” (Zott 2003, p.104). For example, an acquisition-based or alliance-based relational capability involves search and selection of firms as candidates for an acquisition or alliance. A new product development capability involves searching for and selecting potential new products (Helfat et al. 2007).

Orchestration involves envisioning how to implement a change (Helfat et al. 2007; Teece 2007; Zott 2003), including how to alter the resource base of the firm. For example, in the context of acquisition-based capability, orchestration refers to the capacity to reshape the resources of the firm (the acquiring firm) and of the partner (the acquired firm) (Helfat et al. 2007, p.82). In the context of new product development, the orchestration process involves changing and reshaping existing

resources in order to produce the selected new product(s) (Helfat et al. 2007; Pavlou and El Sawy 2006), and "managing dependencies among resources and tasks" (Pavlou and El Sawy 2006, p.202).

These two processes – search and selection and orchestration – are not necessarily the only ones used. Others may be added, depending on the context. For example, because in the context of an alliance-based capability, capacity of firms to absorb knowledge from partners is vital, knowledge management processes represent a dimension that supports the effective execution of an alliance-based capability (Helfat et al. 2007).

Strategic Dynamic Capabilities in Information Systems

Based on dynamic capabilities perspective, we conceptualize IS strategic capabilities of a firm as a set of interrelated and interacting dynamic capabilities which create, extend or modify IT resource base of a firm to be aligned with business strategy. Based on Henderson and Venkatraman's (1999b) conceptualization of IS strategy – comprising IT scope (choosing specific information technologies), IT competencies (choosing the attributes of those specific IT) and IT sourcing (choosing how to acquire the IT), We propose that the two dynamic capabilities of enterprise IT architecture and IT outsourcing correspond to these three components as follows (Shown in Figure 3.1). Enterprise IT architecture dynamic capability entails scope and competencies (since IT architecture dynamic capability creates or modifies specific IT products and services along with their features that we refer to as IT solutions). IT outsourcing dynamic capability covers the component that concerns how to acquire needed resources to create or modify IT solutions.

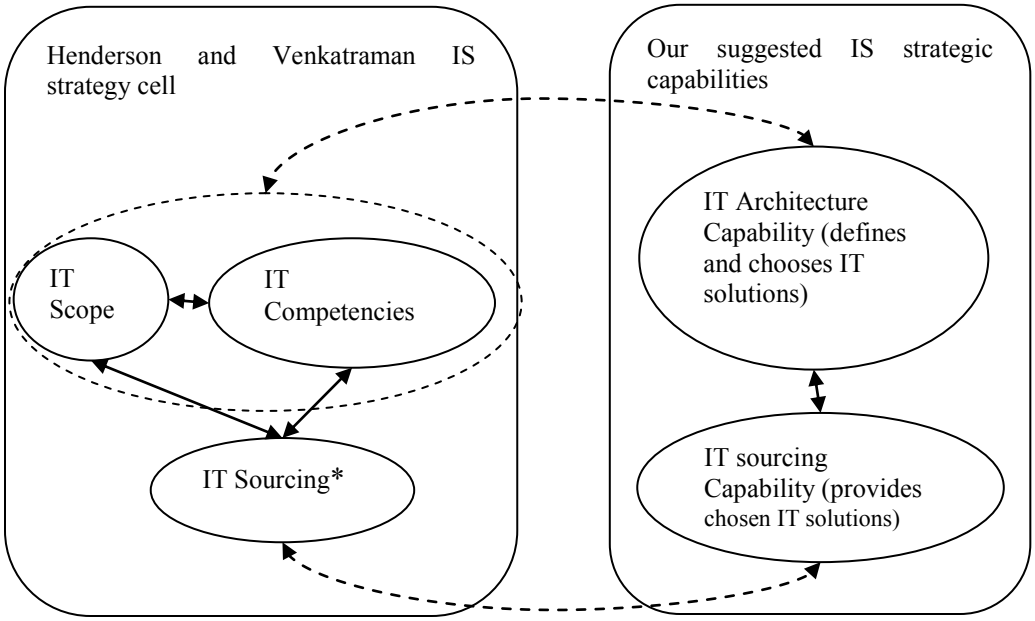

Figure 3.1 Mapping of Henderson and Venkatraman Alignment Framework (IS Strategy Cell) with the Two Dynamic Capabilities of IT Architecture and IT Sourcing

*In the original framework, sourcing referred to as governance. We avoid the term governance since it could be confused with the governance term defined by Ross and Weill (2004).

Enterprise IT Architecture Dynamic Capability

Ross (2003) defines a competency in the enterprise IT architecture as the firms' capacity "to create a mutually reinforcing pattern of evolving, tightly aligned business strategy and IT capabilities" (p. 32). Since in order to create such pattern of alignment, business strategies and IT capabilities need to be defined, created or modified, we believe that Ross's definition corresponds to the definition of a dynamic capability. Therefore, we define the *enterprise IT architecture dynamic capability* using the language of dynamic capabilities perspective, as *the capacity of an organization to purposefully extend, create or modify its IT solutions.* Although IT

competencies that we use in our definition is not exactly equivalent of IT capabilities used by Ross, we believe that avoiding the word capability and or competency in defining a dynamic capability is helpful for not being tautological. Moreover, we deem to make this change because IT capabilities as defined by Ross are *objectives* and not *resources:* "These [IT] capabilities are the objectives of the IT architecture, specifying what the architecture enables the business to do" (Ross 2003, p. 32). However, IT solutions are IT resources that support specific business strategies or processes.

The main difference between Ross's definitions and ours is that she includes the consequence (i.e. tight alignment) of the capability in the definition. However, in line with dynamic capabilities perspective we make a distinction between a dynamic capability and its success. Therefore, success of enterprise IT architecture capability is defined as *the alignment between provided IT solutions and the firm's business strategy to support/initiate current/future changes in the business or to enable a firm to capitalize on a current/future opportunity.*

The search and selection process of an enterprise IT architecture dynamic capability requires the capacity to identify and define IT solutions. Its orchestration dimension refers to the firm's capacity to envision that how the new solution is going to be integrated with other solutions and applications and also to envision the dependencies and complexities of the new IT solution.

IT Outsourcing Dynamic Capability

In a total IT outsourced context, we propose that IT outsourcing dynamic capability complements enterprise IT architecture dynamic capability in creating or modifying IT solutions. We therefore define IT outsourcing dynamic capability as *the capacity of an organization to purposefully extend, create or modify its IT resource base to create IT solutions through outsourcing arrangements.* The success of IT outsourcing dynamic capability is the *support that it provides in*

creation/modification of IT solutions in order to achieve alignment with business strategy so as to support/initiate current/future changes in the business or enable a firm to capture a current/future opportunity.

Firms that possess IT outsourcing dynamic capability are able to determine how to acquire IT solutions identified by IT architecture dynamic capability through market mechanism. Through search and selection a firm identifies the alternative outsourcing modes (e.g. buying a ready to use product or co-develop with suppliers). Through search and selection also the firms identifies alternative suppliers and chooses among them. Through orchestration a firm determines how the outsourcing will work. Once a supplier has been selected, through orchestration firm decides on how the new supplier will work with the current suppliers (how the work of suppliers will be coordinated) and how standards and polices of the firm and of the new supplier will be managed.

Research Methodology

We adopted a theory building approach from case study proposed by Eisenhardt (1989) and Eisenhardt and Graebner (2007). As per their recommendation we defined an initial research question: *How do organizations use their combined enterprise IT architecture dynamic capability and IT sourcing dynamic capability, the basis of their IS strategic capabilities, to define and provide IT (solutions and services) that either support their business strategy in responding to rapid changes in the environment or in making changes in the environment (shaping the environment)?* This question is based on dynamic capabilities perspective. Therefore, our research question is theory-driven as it "is tightly scoped within the context of an existing theory" (Eisenhardt and Graebner 2007, p.26).

To our knowledge, there is no DCP based theory on IS strategic capabilities based on which we could answer our research question. Therefore, our objective is to

use qualitative data to build a theory that extends DCP and explains the complex organizational processes underlying dynamic capabilities.

Having dynamic capabilities perspective as our guiding theory, we then derived two a priori concepts of IT architecture dynamic capability and IT sourcing dynamic capability along with their dimensions (search and selection, and orchestration). We use the definitions of these two concepts to guide our theory building effort. However, we try not to make any relations between these concepts and therefore be close to the "ideal of a clean theoretical slate" (Eisenhardt 1989, p.1115) as much as possible. The definitions of our a priori concepts and even their existence may be challenged in the final theory.

Case Selection

Our theory building effort is based on a single-case design (Yin 2003). The rationale for one case is the case being unique or extreme (Yin 2003). The case was selected on the basis of three criteria. First, it should operate in an industry with rapid changes (e.g., technological, regulatory, changes in customer demands) and tough competition. This is because we aim to study dynamic capabilities, which are more relevant to firms that operate in a turbulent environment and face fierce competition. Second, the case should have an IT outsourcing relationship with an external provider (to see IT sourcing capability). Third, regarding the IT architecture, the firm should have standard technology and platforms, shared databases (the existing applications use a single database) and core processes which are identified, integrated and optimized (core processes are IT enabled and use a single shared data base). According to Ross (2003), a firm with these characteristics has a mature IT architecture or is in the third stage of IT architecture maturity (Ross 2003). We set this criterion because IT architecture maturity increases the probability of observing an IT architecture dynamic capability. As Ross (2003) suggests, firms at this stage

have learned to indentify the strategic support/opportunities that IT Solutions can provide and also learned how to define IT Solutions in support of business strategy.

Based on the above criteria, we chose a case of AIR CANADA, the main Canadian airline. The firm is an extreme case because 95% of IT activities are outsourced to multiple vendors. The case has all of the above mentioned criteria. First, Air Canada operates in a turbulent environment and competitive market. The change in the fuel price is one of the biggest external challenges with which Air Canada has to cope. Furthermore, unpredictable environmental disasters such as SARS, Volcano eruptions, terrorism threats, and wars make a turbulent external environment for the airline. Air Canada operates in a highly competitive market since it has to compete against strong and growing airlines in the domestic market, the U.S. market, and the international market, in particular it has to compete against low-cost carriers. Second, the firm has a long experience with IT outsourcing with multiple vendors, which makes it suitable for studying IT outsourcing dynamic capabilities. Third, the firm has established corporate IT standards and policies and has maintained a solid IT infrastructure upon which other applications are built in support of a business strategy/initiative. Therefore, the site is also suitable for studying IT architecture dynamic capabilities.

Data Collection

Data were collected from multiple sources: interviews, internal documents, public documents, and observation. In order to specify a point in time in the history of the firm to which we should go back for data collection, we considered one main issue. The point in time should start a period in which all elements of the IS strategic capabilities (i.e., both capabilities) could be observed. Based on this criterion we specify this point in time the date in which the first major IT outsourcing contract of the firm was signed, which is year 1994. Therefore, the timeline of the case starts in 1994 and ends in 2011.

Interviewees are several people in the firm, including top executives (e.g., the CIO), and senior directors of IT units within IT department. We also interviewed informants from outside of the firm (i.e., a senior manager who is equivalent of CIO in one of the vendors firm). We also interviewed two people responsible for IT outsourcing contracts of the firm with two different suppliers. In total we conducted 14 interview sessions with 11 individuals. We interviewed one of the senior directors (senior director of Sourcing Unit) three times.

For each informant a different interview protocol was used (Please see a general interview guide in appendix 3.2). We recorded the interviews (except for one) and had them transcribed. They yielded about one hundred and seventy single-spaced pages. Interviews lasted half an hour to one and half hour. All the interviews were conducted face-to-face except for one that was conducted over the phone (the phone interview was also recorded).

To reach our informants, we first contacted the CIO of the firm and she referred us to a contact person whose position is director of IT sourcing unit. She arranged a session in which she explained the organizational chart of IT department. Also she gave general information about AIR CANADA and how IT department of the airline is supporting the business needs. Interviews with several other senior directors have been conducted including: Transformation IT Unit, IT Customer Solution and Innovation Unit, and Marketing and Customer Experience Unit.

Moreover, annual reports, industry magazines and trade journals have been consulted. Overall, more than three hundred pages of public documents were consulted. Some internal documents (e.g., one IT outsourcing contract) of the firm have been also reviewed at the site. To keep all the gathered data in a format reusable for future access and use, a case study database have been created.

Data Analysis

As suggested by Langley (1999), we used a combination of different strategies to analyze the data. The first one is the narrative strategy. This strategy is appropriate as we have one case which needs to be described in depth and details. Therefore, through narrative we present the contextual details of the case, we provide the most important and crucial quotes from informants, and we set the scene for other sense-making strategies.

Since we have a single case design, the most important sense making strategy has been triangulation of different data sources. Therefore, a similar approach to a within case and cross case analysis is dividing data by different data sources, analyzing the data based on each data source and then comparing data acquired from one source with the data acquired from other sources. This tactic permits deriving insight from different data sources that further validates the findings where similar patterns are found.

We started the data analysis by preparing a list of codes driven from dynamic capabilities perspective. These codes corresponded to the general concepts of the theory. The 5 initial codes were IT architecture search and selection, IT sourcing search and selection, IT architecture orchestration and IT sourcing orchestration, and alignment. By reading the interviews of each IT senior manager and coding the excerpts of the interview, the codes started to find meaning and specific examples. Through several iterations, the codes started to expand in order to include the specific processes or capabilities mentioned by the managers. For example, we started by IT architecture search and selection capability defined as the ability to look for and select new IT solutions. This code later changed to two codes: External Scanning of IT solutions and Search and selection of IT solutions. The reason was that managers at Air Canada specified two different capabilities: one the ability to be aware of the market, and trends referred to as 'technology watch' without any intention to acquire

a solution, and the other the ability to look for and actually select an IT solution for a specific need. For the full list of codes, their definition, and their data driven operationalization please see Appendix 3.1.

The site: Air Canada

Founded in 1937, Air Canada is Canada's largest airline, serving over 32 million customers annually. In 1989, Air Canada became completely privatized. It acquired its main rival, Canadian Airlines, in 2001. In 2011, it offered customers more than 170 destinations and was the world's 15th largest commercial airline. In 1997, Air Canada was a founding member of Star Alliance. Fourteen years later, the strategic partnership had 27 partners, making it the world's most inclusive air transportation network.

Air Canada's mission is "connecting Canada and the world."[4] To accomplish this mission and because of the ethnic diversity of Canada, which contributes to the high and growing demand for international travel, Air Canada pursues an international growth strategy. In 2010 Air Canada entered into two major partnerships with Lufthansa and United/Continental, which also significantly helps its growth strategy and connect mission. However, Air Canada has to compete against strong and growing airlines in the domestic market (e.g., WestJet), the U.S. market (e.g., Delta) and the international market (e.g., Air France-KLM and British Airways).

Air Canada's vision is to build loyalty through passion and innovation.[5] In pursuit of this vision, Air Canada follows a differentiation strategy that involves "engaging with customers with a focus on premium passengers and premium products."[6] However, cost reduction is still a very important issue for the firm. Since the number one cost at Air Canada is fuel and the company cannot control fuel costs,

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4 From Air Canada website: http://www.aircanada.com/en/about/index.html
5. From Air Canada website: http://www.aircanada.com/en/about/index.html
6. Air Canada, Annual Report 2010, p. 8

cost reduction in other parts of the business is crucial. To this end, Air Canada initiated a Cost Transformation Program (CTP) in 2010 to modify its cost structure and reduce costs across the company. CTP allows Air Canada "to compete more effectively on multiple levels against the low-pricing structures offered by low-cost carriers."[7] It focuses on three main areas: operational process improvements, supplier contract renegotiations and revenue productivity gains.[8]

Information Technology at Air Canada

In 2011, Air Canada's IT department comprised seven functional units supported by a project management office (PMO). Each unit was managed by a senior director who reported to the CIO. Three of the units – IT Operations, IT Customer Service and IT Commercials (Commercial Information Systems) – were created during the recent reorganization of the IT department.

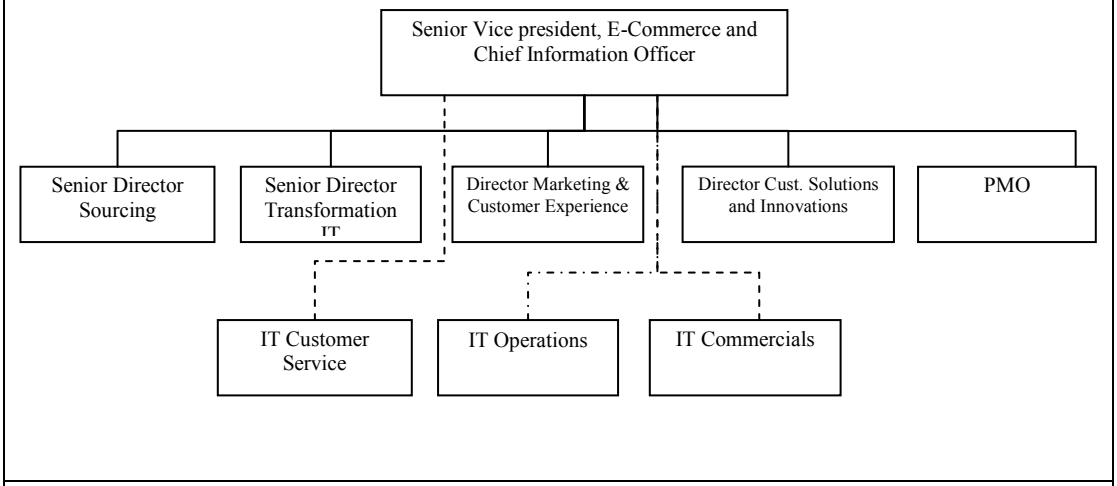

Figure 3.2 Organizational Chart of Air Canada IT Department

7. Air Canada, Annual Information Form 2009, p.18
8. Air Canada, Annual Report 2010, p.5

The IT applications portfolio at Air Canada comprises recent applications (i.e., front-end applications) and legacy systems (back-end applications). For example, the passenger processing system[9] is part of Air Canada's legacy systems and has been maintained as a very solid platform. The new technologies and interfaces (e.g., web check-in, iPhone and Blackberry applications) are built around the legacy systems. The IT department ensures that the modern interfaces and the legacy back-end can co-exist and work together.

The IT Sourcing unit is responsible for the formulation and management of contracts between Air Canada and its IT suppliers. The Transformation IT unit comprises three main teams –Architecture, Operations, and Innovation. The Architecture team is responsible for maintaining a solid and robust IT infrastructure for the company and for modernizing the front-end applications (i.e., new technologies or interfaces). The Architecture team is also in charge of preparing an IT roadmap for Air Canada that includes the long-term strategies and vision of IT within Air Canada. This roadmap includes all strategic IT initiatives that Air Canada should be looking at in next five years. The Operations team is in charge of evaluating vendors' performance. The Operations team also runs the operational excellence program, in which the team constantly evaluates and tries to improve the performance of the three main critical vendors. The Innovation team focuses on bringing innovation to Air Canada. A recent example is a new tool and application for the people who work "below the wing," placing new, real-time technology into the hands of the people who load the bags.

The Customer Solutions and Innovations unit manages 20 applications at Air Canada. The main applications are aircanada.com, the check-in system, the reservation system, and all of the self-service suites such as kiosks, web and mobile check-in. In the unit, 12 people are responsible for innovation, which is mostly

9. The system includes processes such as ticketing, checking in, dropping baggage, and boarding passengers.

related to customers (i.e., external or above-the-wing innovation). The Marketing and Customer Experience unit is responsible for tracking and facilitating customer experience on the Air Canada website. The unit is also in charge of receiving customers' feedback and sending emails to customers. Marketing and Customer Experience is responsible for the front end, or web page design for the Air Canada website.

In 2010, three new units – IT Operations, IT Customer Service and IT Commercials – were created. While these Directors report to the CIO, they also report to the Vice-President of the corresponding business unit. Each of these three units has separate responsibilities, but they have one common goal, which is build and strengthen links between business and IT. The three units also work closely together to coordinate needs in the business branches. The three units are responsible for developing a holistic view of business needs and requirements, translating the needs into IT solutions (with assistance from the other four IT units), and passing them along to vendors for implementation. The solutions should add value to the business, be in line with corporate IT standards, and have the potential to contribute to overall cost savings. All three units are looking to recruit people who speak both the language of the business and the language of the technology.

IT Outsourcing at Air Canada

Air Canada signed its first IT outsourcing contract in 1994. Air Canada was among the first airlines to outsource its IT services. Now, in 2011, close to 95% of the Air Canada's IT activities are outsourced to multiple vendors. Since 1994, Air Canada has entered into new contracts and also changed its IT sourcing strategy. These changes are presented below as different periods of IT sourcing at Air Canada (Figure 3.3)

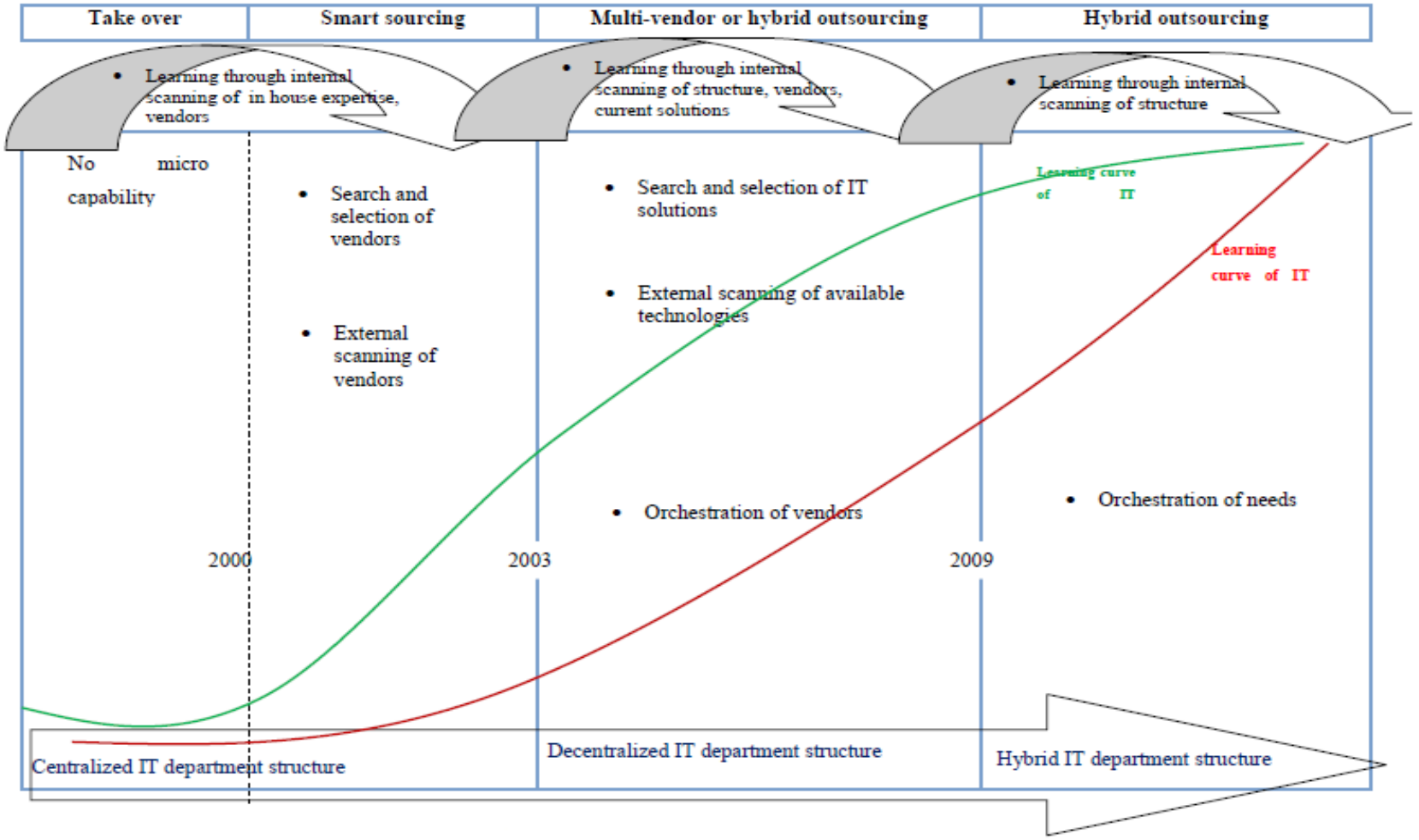

Figure 3.3 An Evolutionary Path of IT Outsourcing and IT Structure at Air Canada

Period 1: A Takeover

Takeover was the first period of IT outsourcing at Air Canada, in which the company outsourced most of its IT activities to IBM. In 1994, Air Canada signed its first IT outsourcing contract with IBM for a seven-year period. The contract signed in 1994 represents the beginning of the takeover period, during which IBM managed all Air Canada's systems and applications, bought certain equipment and computers assets and started running them on Air Canada's behalf.

At this time Air Canada was outsourcing its IT services mainly to reduce costs but also to focus on its core competencies. Since the whole IT outsourcing concept was relatively new, IT outsourcing at Air Canada was also immature at the time. Therefore, neither Air Canada nor its vendor knew fully what they needed to have in the contracts:

> In 1994 outsourcing was very, very new. And we didn't know about some of the obligations that you put in a contract. I think it was very much a typical first generation outsourcing strategy. And at that time, IBM ***took over*** the people, the processes, the computer equipment and then ran it all on behalf of Air Canada. So that was probably typical for the time. (Senior Director – IT Sourcing)

As a result of not knowing exactly what should be included in an IT outsourcing contract, the service level agreements (SLAs) were not detailed:

> The reason why I wanted to show this to you is that when we drafted the contract in 1994, for the SLAs I probably had 5-10 pages, order of magnitude. Now, this what my SLAs look like today. This is now a document which is a centimeter and a half thick. So in 1994, I don't think anyone would have had a lot of SLAs. The industry simply matured. IBM matured, we matured. We realized in 2000 that we could not just have the simple view that we had in the past, that we needed to measure many more services. (Senior Director – IT Sourcing)

Period 2: Smart Outsourcing

We call the second period of IT outsourcing at Air Canada the period of smart outsourcing. In this period Air Canada had an outsourcing strategy that included

shaping clear outsourcing objectives and finding a tier-one vendor that could meet those objectives. Also, in this period Air Canada brought back in-house some of the IT activities that proved to be strategic to the company. There are three undertakings in this period (partnering for innovation, cutting the pie, and finding a separate telecom provider) that represent the hallmarks of developing an outsourcing strategy at Air Canada.

– **Partnering for Innovation**

In 2000 (i.e. one year before the end of Air Canada's first IT outsourcing contract), the company changed its IT outsourcing objective from cost reduction to innovating with IT. Therefore, Air Canada prepared a request for proposal (RFP)[10] to find the right, tier-one IT vendor with whom it could develop a partnership for innovation. The reason for preparing an RFP and possibly changing its IT vendor was not that Air Canada was dissatisfied with IBM's services, but that its corporate policies did not allow for contract renewal without going to the market. Also, Air Canada usually sends RFPs out early enough (12-18 months before the end of the contract, which in this case was in 2000) to send a signal to the market (i.e., potential IT suppliers) that it is ready to change its IT vendor. Indeed, an RFP is not written simply to obtain a better price from an existing vendor. Following this RFP and after examining proposals from several potential suppliers, Air Canada selected IBM's proposal. The whole process took over a year to complete:

> So in 2000 we published an RFP that was about three inches thick. It went to multiple vendors and we went through an RFP process, we down selected and negotiated with two vendors, and in the end, IBM won the business. We didn't simply give the business to IBM. We were much more demanding in this contract. (Senior Director – IT Sourcing)

10. Air Canada has a corporate group called 'Strategic Procurement' with which IT department works closely when going to the marketplace with an RFP.

At this time Air Canada was not outsourcing simply to reduce costs or focus on core competencies. The focus and objective were clear: innovation. Consequently, in the contract signed in 2000, Air Canada partnered with IBM to include the innovation concept. This would establish a governance around innovation which went beyond the IBM borders when IBM itself did not have such products ready for use by Air Canada:

> And in fact, some of the words we put in the contract spoke to IBM acting as if it was part of Air Canada's IT group; bringing the innovation to Air Canada just as if they were Air Canada employees. So the RFP process revealed to us that, in fact, IBM was a good partner for us, and then we created a contract with innovation obligations and with key people obligations tied to innovation. (Senior Director – IT Sourcing)

So in this period Air Canada partnered with IBM to innovate with IT. They introduced several innovations, Kiosk[11] being one of the first. Although Kiosk had begun before the new partnership was established with IBM in 1998, it had not been incorporated into business processes and routines. Under the new partnership contract with IBM, Kiosk was reborn and Air Canada integrated it with other, existing technologies, choosing its platform in such way that other, future technologies (e.g. mobile applications) could also be integrated into it, taking full advantage of the innovation to adjust the staffing models at airports and incorporating it into the company's business processes and routines.

> Let me give you a perfect example. I think Air Canada would give you the same example. Air Canada is one of the leaders, I think in the world, in various areas, but one of them was the kiosk, the self-serve type of environment. They were one of the first ones to be so successful in implementing it. The self-serve was an initiative that we worked on with Air Canada. It was a partnership that started I think in the early 2000s, when IBM and Air Canada worked in a partnership-type approach on delivering a new service. So you get to understand how the operation works, the Air Canada operation, how we can adapt, how we can bring services to them that would facilitate that change. And as I believe, the Air Canada operation is more and more

11. Kiosk is an interactive computer terminal at airports that allows customers to complete activities such as checking in, printing their boarding passes, changing their seats and checking their flight information.

> successful as they move more and more towards those self-serve type of deals. And it provides them with an ability to adjust to flows of ups and downs. (Portfolio Project Executive, IBM)

– **Cutting the Pie**

Another major undertaking that took place during the period of smart IT outsourcing at Air Canada was the decision to bring parts of its IT functions and expertise back in house. In 2001, Air Canada changed its sourcing strategy from outsourcing everything to bringing a small but strategic portion of activities and expertise back in house.

> What was key in our sourcing strategy was determining what skills were strategic and that we had to keep in-house. So it usually has to do with ***how you cut the pie***, what you retain, and what you let yourself give away. So things that we saw as strategic skills – this was part of our strategy – we kept in house. (Senior Director – IT Sourcing)

Also, another IT expertise that Air Canada decided to continue retaining was the IT architect skills. IT architect skills were strategic to Air Canada, so it decided to keep and fully develop this expertise in house:

> So we have telecom architects, we have general architects, we have a lead architect. The architecture, which sets the vision and the direction, we retained as in-house expertise, and we worked with IBM and other vendors to fulfill the set direction. So that was an example of, as part of our sourcing strategy, what we wanted to keep in house and what were we prepared to allow vendors to do for us. So I think part of it is *which* vendors, the other part is what is the *scope* that you're going to give. (Senior Director – IT Sourcing)

The Architecture team is responsible for maintaining a solid and robust IT infrastructure for Air Canada and for modernizing the front-end applications (i.e., new technologies or interfaces). The main challenge for the team is to ensure that the two sides– the modern front end and the legacy back end– can work together. The Architecture team is in charge of preparing an IT roadmap for the company that includes long-term strategies and its vision of IT. This roadmap includes all strategic IT initiatives that Air Canada should be looking at in next five years. It does not

include small, local applications in each business department. Rather, it focuses on the types of technologies that could transform the company's business processes:

> We're not sitting here with our little team trying to understand all those 400, 500 specific applications. The big stuff, yes. There is a roadmap that incorporates the big transformational projects, like bringing the [Boeing] 787 in, replacing our whole big maintenance system, upgrading our reservation/departure system. Those are, I'd say, strategic initiatives, strategic applications. For business unit applications like single business unit type applications, …we support the integration of the application, but we're not telling them when they should be in or out of that application. (Senior Director – Transformation IT)

Moreover, in 2001 one of the airline's critical activities was brought back in house. This activity is related to customer experience (i.e., email content management, all ECRM activities including the design of screens and navigation flow on Air Canada's website, receiving and analyzing customer feedback, and sending emails to customers). Air Canada needed to make very quick updates to its website. Also, having people who know the airline create and maintain web pages, could make the web site more user-friendly and appealing to customers. The Marketing and Customer Experience unit was therefore formed as the result of these activities being brought back in house:

> For some activities, especially on the web where you need to be able to react very quickly, having one less intermediary is much better. If, for example, they [the Commercials branch] want to launch a special offer to match a competitor's price – if a competitor just announced a low price on a particular route and we want to match it– between the time that marketing decides to go ahead with the offer and the time it goes live, there's a very short time span. If you do it in house, it can be done very quickly. If you outsource, it is additional steps, additional layers and it could take longer, so it's not as good. So, for the web or I think for anything that you have to do extremely quickly, it is cost efficient to do it in-house. (Director Marketing and Customer Experience)

- **Finding a True Network Provider**

The third major undertaking in the period of smart IT outsourcing at Air Canada was finding a network supplier that could provide the company's telecommunications services. In 2000 Air Canada realized that it needed a vendor

specialized in telecommunications. It chose Telecom as its telecommunications provider:

> Telecom is very much network-oriented. IBM is not in the traditional network business anymore. While in 2000, we gave IBM everything to do with the application, the mainframes, and the servers, we contracted the network to Telecom. We wanted that service from a provider for whom network was its core expertise. (Senior Director – IT Sourcing).

Therefore, Air Canada started to manage more than one vendor for its IT services: one for telecommunications services and the other (IBM) for the rest of the services (management of databases, operations, infrastructure and application development). However, in 2001 Air Canada was still pursuing a single-vendor outsourcing strategy for system acquisition and applications. This strategy started to change in Period 3.

Period 3: Hybrid Outsourcing: Partnering and Best-of-breed Applications

In 2003, the firm started to move to a multiple-vendor or hybrid outsourcing strategy so that Air Canada could benefit from specialized, best-of-breed airline products in the market, quickly and less expensively:

> We've recognized that we're not that special, and, in running an airline, there are many things that every airline has to do. So you need a departure control system, you need an inventory management system, and you can buy that. There are very smart companies that have invested a lot of money in developing these kinds of applications, and they can serve our purpose very well (Senior Director – IT Sourcing).

Air Canada needed a capable supplier that knew how to deal with large airlines. It did not want to choose a vendor that would need to be "educated" on the demands of managing and running a large airline. Air Canada finally selected Operation SYS, a European company that offered several applications that suited its needs:

> Operation SYS wasn't the only choice, but they were a big vendor proven in the marketplace, a very healthy company, a company that continued to invest in its products through research and development (Senior Director – IT Sourcing)

Having multiple vendors brings its unique challenges. Therefore, Air Canada assigned its IT partner, IBM, to act as integrator. New applications offered by an existing or new vendor need to be integrated with what is already in place, and that is IBM's role. To be able to integrate newly acquired systems with existing ones, IBM needs to know Air Canada's IT policies and standards. Therefore IBM acts as keeper and guardian of the company's corporate IT standards. Being the integrator, IBM has visibility of the different systems and their operations. IBM has a problem management team and a process to identify the problem areas / vendors:

> When you have a major incident (MI), a problem, something breaks, depending on how many vendors have a piece, it becomes very complicated to know what has broken. You know, it could be the network, it could be an application server, it could be the application and sometimes that's three or four vendors who need to be on the phone saying okay, my network looks good. Who's the server person? Okay, my server is up. Okay, application person, what do you see? Or is it the person's workstation? (Senior Director – IT Sourcing)

In 2011, Air Canada was still pursuing a hybrid outsourcing strategy and IBM was still responsible for integrating any new system or technology. Air Canada currently has three main and critical IT vendors without which the airline would shut down: IBM, Telecom and Operation SYS. In addition to being the integrator, IBM is in charge of the infrastructure, databases, legacy applications and reservation system. Depending on the type of service or application, IBM provides IT services to Air Canada partly from onshore sites and partly from offshore sites (in countries such as Brazil and India).

Telecom is responsible for all Air Canada's telecommunications and network services. Operation SYS provides many applications specific to the airline industry without which aircraft could not fly. For instance, some of these applications are

systems that check the weight and balance of an aircraft before it leaves the ground, while others calculate the optimum routes to support flight planning.

In addition to these three main critical vendors, Air Canada now uses the services of other IT suppliers. For instance, one vendor is used for the financial and human resource management applications. The e-commerce applications – solutions for online sales – are outsourced to other vendors. Although important, these services are nevertheless less critical, since an interruption in these applications will not shut down the airline.

Periods of IT Department Structure

The structure of Air Canada's IT department has undergone significant changes through the years, from a centralized structure to a decentralized structure and then to a hybrid form.

Period 1: Centralized IT Department

Prior to 2003, a centralized IT department was responsible for providing IT services to all business branches. Each business department had its own business analysts and there were also a number of IT business analysts in the IT department. The business analysts of each department defined their IT requirements and passed them on to the analysts in the IT department. Then the IT business analysts defined IT solutions that would meet the requirements and passed them on to the IT vendor for implementation. The same procedure was required, no matter whether the IT requirements (e.g., development of a new system) were local (a small system specifically for the needs of one department) or spanned across branches (e.g., an email system for all the branches). Therefore, IT was perceived as a bottleneck that was working too slowly and not responding quickly enough to local business needs:

> And what happened at that time is that we were viewed and perceived as being the bottleneck and not responsive or fast and nimble enough for the business, and the

> main consumers of IT, our customer service branch, commercial branch and operations branch (Senior Director – Commercial Information Systems)

The centralized structure of IT department was unable to provide the quick changes required by business and by changes in the business environment.

Period 2: Decentralized IT Department

Consequently, in 2003 the decision to decentralize the IT department was finalized to resolve this issue. The IT business analysts (called IT representatives) were transferred from the IT department to the business departments where they could be closer to the business and more aware of the business departments' needs. Moreover, these representatives were allowed to deal directly with the vendors. The infrastructure and reservation system and any other system that spanned across branches remained at the Corporate IT department, since they were core and affected all business branches. Corporate IT also remained responsible for IT policies and standards.

> What was decided was that we would decentralize IT. Where it made sense, the business unit – the department if you will – business unit reps for IT were taken out of IT and sent into the business to be closer, to work side by side with the business to have a better understanding of their needs and coordinate their IT functions or needs. (Senior Director – Commercial Information Systems)

However, there were challenges with a decentralized IT structure as well. Depending on the representative responsible for the IT needs of a department, the department could be served very well or be dissatisfied with its IT services. Since some departments did not even know their representatives, they would approach the IT department directly. Each department tended to develop applications that satisfied their local needs without being aware that another department might need the same application. Moreover, many departments would initiate applications that could affect other departments. The absence of communications between department

representatives led to suboptimal prioritization and coordination, which resulted in inefficiencies.

Moreover, since every new IT initiative had to be checked against corporate IT policies and standards, departments had to approach Corporate IT to confirm whether their developments met corporate IT standards. However, some departments were approaching Corporate IT very late in the development process. By that time, if they were violating corporate IT standards, they had to redesign or adjust their project potentially impacting their desired implementation dates or exceptions were justified and permitted.

Period 3: Hybrid Structure

In 2010, the IT department organization was further modified. In the new structure, instead of having an IT representative for each business department, there would be an IT representative for each of the three main branches: Customer Service, Commercials and Operations. For example, instead of having a representative for each of the departments within Customer Service – e.g., call center, airports, etc. – all the departments within the unit would have a single senior representative, the IT Customer Service unit. The head of the unit would be a Senior Director of IT Customer Service who manages all the business analysts of the IT Customer Service unit.

The difference between the new structure and the centralized structure is that now the representatives (business analysts and the senior director leading them) reside in the business branches they represent reporting both to the CIO and their respective business vice-presidents. The difference between the structures is that in the new structure all the departments in one branch have a single senior representative supported by the business analysts (one unit), whereas in the decentralized structure, each department had its own representative.

Capabilities Developed in Each Period

Evolutionary and co-evolutionary paths mold organizational processes and therefore help explain the essence of the firm's dynamic capabilities and its competitive advantage (Teece et al. 1997). At Air Canada, the IT department did not begin with a clear vision of IT outsourcing and how IT should respond to business needs. However, the IT department took an evolutionary path, allowing it to build IT outsourcing capabilities and also IT architecture capabilities by providing IT solutions as business needs arose. As Shown in Figure 3.3, during each period of this evolutionary path the IT department developed a different set of dynamic capabilities. Appendix 3.1 shows the dynamic capabilities for IT sourcing and IT architecture that emerged from the data, their grounded definitions and sample quotes from the data. We describe the capabilities developed in each period below. The capabilities that were developed in each period are referred to as *micro capabilities*. In each period Air Canada also learned of a need for change. The capabilities that triggered a shift in sourcing strategy or a change in the IT department structure are referred to as *macro capabilities*.

Period of No Micro Capabilities

In the first period of IT outsourcing at Air Canada (an overlap of takeover and centralized structure), we found little traces of IT outsourcing dynamic capabilities or IT architecture dynamic capabilities. Air Canada delegated the main IT functions – including reservation systems, databases, network and other applications for airline operations, commercial applications and customer service applications – to IBM using a relatively short and loosely-coupled contract. Also, when business needed an application, it turned to the IT department, which asked the vendor (IBM) to provide it. Therefore, Air Canada did not show capabilities in search and selection and orchestration.

Macro Learning

Although in this period the company did not demonstrate any search and selection and orchestration capabilities, it did show self-evaluation and learning capabilities. We refer to these capabilities as *internal scanning of resource base* and *internal scanning of vendors*.

Internal scanning of resource base refers to evaluating the firm's existing systems, infrastructure, skills and IT department structure. This evaluation reveals whether what is already in place can respond to the company's business needs, and if what is already in place can support system growth and applications in the future. An internal scanning capability only began to be developed in this period, maturing over time. During the last period (hybrid sourcing and hybrid structure), Air Canada's internal scanning capability is apparent in the form of the preparation of an IT roadmap, which incorporates the company's architecture and platforms and the future state of the architecture and platforms. The IT roadmap could answer questions such as "whether or not IT at Air Canada will be able to respond to business needs in the future" (whether IT could handle the business growth and the growth in IT solutions and applications) and "what Air Canada's architecture and platform will look like in the future." Therefore, overall, this capability answers the following questions: who are we, and where we are going in terms of our IT infrastructure and applications?

Internal scans of the resource base during this period (take over and centralized structure) mainly revealed that activities related to customer experience need to be performed more quickly (with as few intermediary levels as possible). For example, updating the company's website, or announcing a flight cancelation needs to be done instantly.

Internal scanning of vendors refers to evaluating existing vendors' performance. In 2000, Air Canada was preparing for the second round of IT outsourcing, potentially with a new vendor. It also realized that one vendor cannot be

specialized in all IT fields (e.g. although IBM is a capable vendor, telecommunications is not its expertise). It should be noted that the evaluation of vendors that takes place through internal scanning of vendors differs from performance evaluations of vendors based on SLAs. Internal scans of vendors reveal whether vendors generally are able to provide quality IT services. They also reveal the business's general satisfaction with the vendors.

Therefore IT management at Air Canada learned several things in this period. First, that much more needs to be included in an outsourcing contract and that their contract with IBM was not detailed enough and not a reflection of their demand of IBM. Second, that although IBM was a capable vendor, it did not have the required expertise in each IT field (e.g. telecommunications). Third, that although the company needed cost reductions through IT, innovation was key to its success. Fourth, that some IT functions (e.g. designing and maintaining AC website) are strategic to Air Canada and should be performed in-house. Therefore, the IT department at Air Canada started preparing for a new contract.

Key Micro Capabilities Developed in the Period of Smart Outsourcing

In this period two micro capabilities started to be developed at Air Canada: search and selection of vendors, and external scanning of vendors.

As the IT department started to prepare for its second major IT outsourcing contract in 2000, Air Canada had already learned that it needed to partner with a tier-one vendor for innovation. The decision to undertake the RFP process was not made because Air Canada was dissatisfied with IBM (in the 1994-2001 contract), but simply because the IT outsourcing objective changed from cost reduction to innovation and Air Canada did not know whether IBM could be a partner for innovation. Therefore, it started looking at other vendors in the market to determine what they could bring in terms of innovation:

> In 2000 we published an RFP that was about three inches thick. It went to multiple vendors and we went through an RFP process, we down selected and negotiated with two vendors, and in the end, IBM won the business.(Senior Director – IT Sourcing)

Through the process of search and selection, Air Canada started to develop a clear vision of the vendor type it needed to bring IT services and IT innovation to the company:

> And that's why in the RFP in 2000 it was important for us to find someone who would be able to support the roles of the airline business, not just someone who knew how to run mainframes and mid range. (Senior Director – IT Sourcing)

Therefore, based on the DCP and grounded in our data, we define *search and selection of vendors* as activities related to identifying potential vendors, preparing and sending requests for proposals (RFPs), evaluating RFPs and narrowing down the list of potential vendors, and, finally, choosing a vendor. The ability to find the right vendor for a partnership is a key success factor in IT outsourcing. Failure to do so may negatively impact the vendor management ability of a firm down the road. At Air Canada, search and selection of vendors is important in terms of not selecting a vendor that is going to learn at the company's expense. For Air Canada, it is essential to select a vendor that is capable of working with a large company. The capability to search and select vendors matured over time, extending to other types of vendor selection such as interactive sessions with existing vendors in order to find a vendor to source a solution. A more detailed description of the interactive sessions is presented below.

External scanning of vendors and of applications: in this period Air Canada started to develop a capability to look into the market for potential vendors and available technologies. Having almost a decade of outsourcing history (1994-2003) gave them the confidence to begin looking beyond the two vendors that they already had (IBM and Telecom). Air Canada learned that IBM is a very capable partner and that Telecom is specialized in networks, but neither was specialized in complex

airline industry products and packages. IBM was ready to develop new technology for Air Canada and then sell it to other airline (IBM and Air Canada had previously developed Kiosk in a joint venture). Air Canada began to search the market, learning about companies that make investments in airline-specific products. For example, they learned of several companies that are becoming major players in the market for airline-specific products. Also, Air Canada began to search the market for available technologies that it could adopt. For example, looking at the retailing industry, Air Canada learned that 2D barcodes could be adapted to the airline industry, so it adopted this technology and introduced the electronic boarding pass.

It should be noted that although search and selection and external scanning have often been used interchangeably in the literature on dynamic capabilities, in the context of our case they refer to two distinct processes. In the literature, search/selection, external scanning, and exploration all refer to the ability or processes that include finding new courses of action or acquiring new knowledge (Sambamurthy et al. 2003; Teece 2007). In new product development they refer to searching the market (i.e. for new product concepts) and picking the right product concept (Helfat et al. 2007; Pavlou and El Sawy 2006). For example, for acquisition-based capabilities, both labels (search/selection and external scanning) refer to finding a list of potential firms for acquisition and choosing one of them. However, at Air Canada, we found evidence that search/selection and scanning refer to two different types of activities.

At Air Canada we found that external scanning is a process of checking or searching the market for either products or vendors and being aware of new technologies or trends, with no intention to choose. “Technology watch” is the term used by senior IT directors for scanning available technologies in the market and scanning technology adoption rates in other industries, by both competitors and allies. External scanning at Air Canada also applies to vendors, with senior directors observing the market for emerging potential vendors.

On the other hand, search and select refers to the more formal process of identifying new products or vendors, narrowing down the list of potential products or vendors, and, finally, making a selection. While the external scanning process may have no crisp end state, the end state of search and selection is identifying a vendor for a contract or identifying an IT solution to be acquired.

Macro Learning

At this stage, Air Canada learned that although it is a large business and not all vendors in the market can work with it, as a large airline it has needs that are similar to all other large airlines. Therefore, it realized that it could benefit from best-of-breed applications developed by existing smart and healthy companies in the market that are specialized in airline industry products. Air Canada also learned through internal scanning of vendors that, although its current partner was ready to invest in industry-specific products, the development time would be too long. Air Canada needed airline-specific products that could be acquired and deployed quickly enough to respond to its business needs.

Internal scanning of the IT resource base (here the IT department structure) also revealed that a centralized IT structure was preventing IT from responding quickly to business needs. Air Canada needed an IT structure that could adapt and change as quickly as business strategies and objectives. Therefore, it shifted the structure of its IT department to a decentralized form in which IT business analysts could be very close to the business departments and quickly learn of their needs and respond accordingly.

Key Capabilities Developed in Period 3 (Multi-vendor or Hybrid Outsourcing)

External scanning of available technologies, search and selection of IT solutions, orchestration of vendors: Also in this period, the company began to develop search and selection of IT solutions. Search and selection of IT solutions

refers to the process of a systematic search to find (i.e. define) an IT solution that can meet a business need or enable a specific business strategy. External scanning and search and selection are similar, but they are two distinct processes. Through scanning, firms become aware of available technologies without an explicit desire to choose one. However, search and selection leads to the selection of an IT solution (based on available technologies) in response to a need from business. So the main difference is that search and selection of an IT solution is directly linked to business (either to meet a need or enable a strategy), but even though external scanning of available technologies requires business acumen, it takes place independent of the business. Although scanning and search and selection are two different processes, one facilitates the other (scanning facilitates search and selection). Scanning of available technologies speeds up the process of search and selection and makes it more efficient. At Air Canada, scanning enables IT senior directors to make agile and nimble decisions in order to quickly meet business needs.

Capability to orchestrate vendors: In 2003, by introducing new vendors in order to acquire applications, Air Canada started to develop a capability to orchestrate vendors. This capability refers to the ability of an IT department to assign the right pieces of a project (an ongoing service or a onetime development) to the right vendors in such way that, in the end, a smooth and seamless flow of service may be obtained through the integrated work of different vendors. Orchestration of vendors also enables the IT department to integrate newly acquired solutions and services with what is already in place. While the IT department at Air Canada is responsible for coordination at the strategic level (in terms of defining what is desired from the coordinated work of different vendors), IBM is responsible for this integration. Therefore, when Air Canada purchases a new application or enhances an existing solution, IBM's role is to ensure smooth and seamless integration of the newly acquired piece of the puzzle with other systems and applications.

Macro Learning

In this period, as a result of internal scanning of the IT department's structure, Air Canada learned that a decentralized IT department is not as efficient and does not provide a strong foundation for exploiting other capabilities. Therefore, it began to prepare another change to the structure of the IT department. With this major shift in the structure of the IT department, the company began to shape its ultimate dynamic capability: orchestration of needs.

Key Capabilities Developed after Restructuring the IT Department: Orchestration of Needs

In addition to the orchestration of vendors capability that was developed in the period of hybrid outsourcing (period 3), another critical capability was developed in the same period that of orchestration of needs. This capability was not conceptualized a priori based on the dynamic capabilities perspective; rather it emerged from the case. Capability to orchestrate needs refers to an ability to coordinate and develop a global view of business requirements from IT. Air Canada began developing this capability when it implemented a major change to the structure of the IT department. From 2001 to 2009, its IT department developed IT outsourcing capabilities, including how to select and evaluate the right vendors. However, Air Canada still had problems defining IT needs emerging from the business branches. The company's decentralized IT structure prevented the IT department from having a global view of business needs and the IT solutions that could support them. Business branches were allowed to choose their own IT solutions without communicating them with the IT department. As a result, needs and requirements were not always coordinated, and priorities were unclear. To resolve the issue, the IT department was restructured from a decentralized form to a hybrid form. Three units were added that report to both the CIO and the business branches they represent. These units are responsible for coordinating the IT needs and requirements across three main business branches that

are also main consumers of IT services. They are responsible for gathering all the needs and requirements of different branches, prioritizing them, translating them into IT solutions that will respond to the needs and then communicating the needs and solutions to vendors and the other units of the IT department. The creation of these three units allowed the IT department to jointly source and define solutions with the business branches. While the business branches and departments had previously defined their IT requirements in isolation, with the new structure business branches approach the IT department to define solutions jointly with the IT department. It should be noted that without the introduction of a hybrid structure for the IT department, the development of such capability (i.e., orchestration of needs) was either not possible or very hard to achieve. While the new structure facilitated most of the capabilities that were developed throughout the years, it laid the ground for this new capability.

In the next section, we present our theory on the relationship between these different kinds of capabilities, and we propose how these capabilities act as the aligning mechanism between IT and the business.

A Dynamic Capability-based Process Theory of IT and Business Alignment in a Near Total Outsourced Context

We propose a process theory that advances our understanding of dynamic capabilities in terms of how they sustain aligning of IT and the business. Also we take into account the role of a supporting IT department structure based on which dynamic capabilities could be exploited. We explain the theory in three parts of boundaries, constructs, and relationship between constructs.

Theory Boundaries

Our theory has several boundary conditions. The first condition is that the theory should work or be tested in context of a firm that operates in a turbulent

environment. This condition has adopted from dynamic capabilities perspective and we believe that it should be kept for other theories based on DCP including the one presented in this study. The reason is that dynamic capabilities are argued to be best observed and exploited in firms that operate in turbulent environments. Firms that operate in stable environments could gain and sustain their competitive advantage and alignment not through constant change of their processes and systems (via dynamic capabilities) but through efficiency of their routines and fairly stable processes (via operational capabilities).

The second condition is regarding IT role in the firm. We set the condition of *integrated role of IT in the business* (Grover et al. 1994). Firms with integrated role of IT have IT enabled business strategies. For these firms role of IT is beyond automation and decision support. This condition allows for observing IT architecture capabilities. If the business is not dependent upon IT for its strategies to be realized, and or the firm's strategies are not IT enabled then the firm is less probable to invest in search and selection capabilities as the aligning mechanisms of its IT and the business.

The third set of conditions pertains to the IT outsourcing context of a firm to be able to observe IT outsourcing capabilities. We set the condition that the theory be applied/ tested in context of a firm that is experienced in IT outsourcing (and therefore not to be a trial and error phase of IT outsourcing). Also, the firm needs to be an extreme IT outsourcer (this condition is set due to the extreme context of our case). Finally the firm needs to have multiple vendors so that capability of orchestration of vendors could be observed.

Constructs

Constructs of our theory could be categorized into three groups: dynamic capabilities, IT department structure and alignment. The conceptual definitions for all constructs are shown in Appendix 3.2 along with the instances from the data. The

dynamic capabilities are search and selection of vendors, search and selection of IT solutions, external scanning of vendors, external scanning of technologies, internal scanning of resource base, internal scanning of vendors, orchestration of business needs and orchestration of vendors. The IT department structure is a hybrid structure in which IT standards and policies, and systems that span across the firm are managed centrally, while business is authorized to define its own IT solutions (via three new units that are IT oriented and report both to the CIO and to their business VPs). Alignment is defined in terms of: Responding to business needs with the right IT solutions that are provided at the right time using the right sourcing model.

Relationships among Constructs

In this section we explain how internal/external scanning, search and selection, and orchestration enable IT to be aligned with the business. The general process (as shown in figure 3.4) starts with a state of alignment between IT and the business (when IT solutions in place support business processes) as the input. Then a trigger happens that ruins the alignment and creates a state of misalignment. To resolve the misalignment dynamic capabilities come to work. Through orchestration of needs the state of misalignment will be evaluated in all business branches, and one coordinated view will be created on what is needed to resolve the misalignment. Then, search/selection of IT solutions and search/selection of vendors come to play to provide the solutions. We found that Senior IT directors do not perform an independent search of IT solutions without considering the type of vendors that are able to provide that solutions for them. The simultaneous process of search/selection of solutions and search/selection of vendors shorten the response time of IT to the business. After selecting an IT solution and a vendor to provide that solution, then orchestration of vendors initiates. Due to presence of multiple vendors (for applications, network, and infrastructure) services of a new vendor or modification to services of a current vendor need to be coordinated and integrated with the rest of the

vendors. Therefore, through orchestration of vendors a smooth and seamless response to the business will be provided which consequently makes a new state of alignment between IT and business. Proper IT department structure facilitates and provides the ground based on which the dynamic capabilities could be exploited to create alignment. If the structure for example impedes the effective communication of IT and business, then orchestration of needs will be impeded and consequently the rest of the processes (e.g. search and selection) could be impaired (e.g. the chosen solution only respond to part of the business needs or the solution makes conflicts in business processes of different departments). Also, internal and external scanning of solutions and vendors could feed and support all other dynamic capabilities. For example, external scanning of available technologies gives senior directors an idea of the type of technologies that could be adopted and consequently the process of search/selection of solutions will be shortened. Scanning capabilities even could act as a trigger. For example, scanning of technology trend over the years suggest that a firm needs to deviate from certain platforms (e.g. mainframes). Consequently an initiative could be introduced to move some or all of the application that are based on mainframe to other types of platforms. This triggers a misalignment in IT and business and initiates process of finding solutions to come to a new state of alignment.

As stated earlier, the process explained above is a general explanation that how dynamic capabilities create a chain of aligning mechanisms between IT and business. However, each trigger of misalignment could initiate a different type of aligning processes. Below we explain each trigger along with the process that it initiates.

Trigger 1: Enhancement/Modification of IT Solutions/Services

The first and perhaps the most often trigger to happen is an enhancement or a modification that should be done to the current IT solutions or services (e.g. adding

preferred seats option to the online booking system). This need for enhancement/modification could be initiated from business side (e.g. commercial), from IT side or as a result of a joint deliberation between business and IT. In either case a need to do an enhancement/modification to a current solution needs to be coordinated and orchestrated across business branches and departments (e.g. customer service branch also asks that the same option for preferred seats should be added to the Kiosks at the airports). At the site, the three units that were added in the restructuring of IT department are responsible to make this coordination and orchestration of needs across business branches. These units inspect that how an enhancement or modification in a system will affect different business branches and departments.

If the requirement to change a system is coming from one of the business departments, through orchestration process, senior directors enquire other departments that if they have anything to add to the list of modifications or they are fine with the changes that are going to be implemented. After a coordinated view and coordinated requirement resulted from orchestration process then search/selection processes initiates. When a modification/enhancement is going to be done, the current vendor for that application will be chosen to do the enhancement. Therefore the search/selection of vendor happens almost at no time. Then through interactive sessions with that vendor the options to do the enhancement/modification will be evaluated and finally an option will be chosen to be implemented.

Although the selected vendor to make the modifications is a current vendor, still the changes to be implemented need to be coordinated and integrated with the services of other current vendors. This will happen through orchestration of vendors. Consequently, a coordinated and integrated implementation of selected enhancement options will create a new state of alignment between IT and the business.

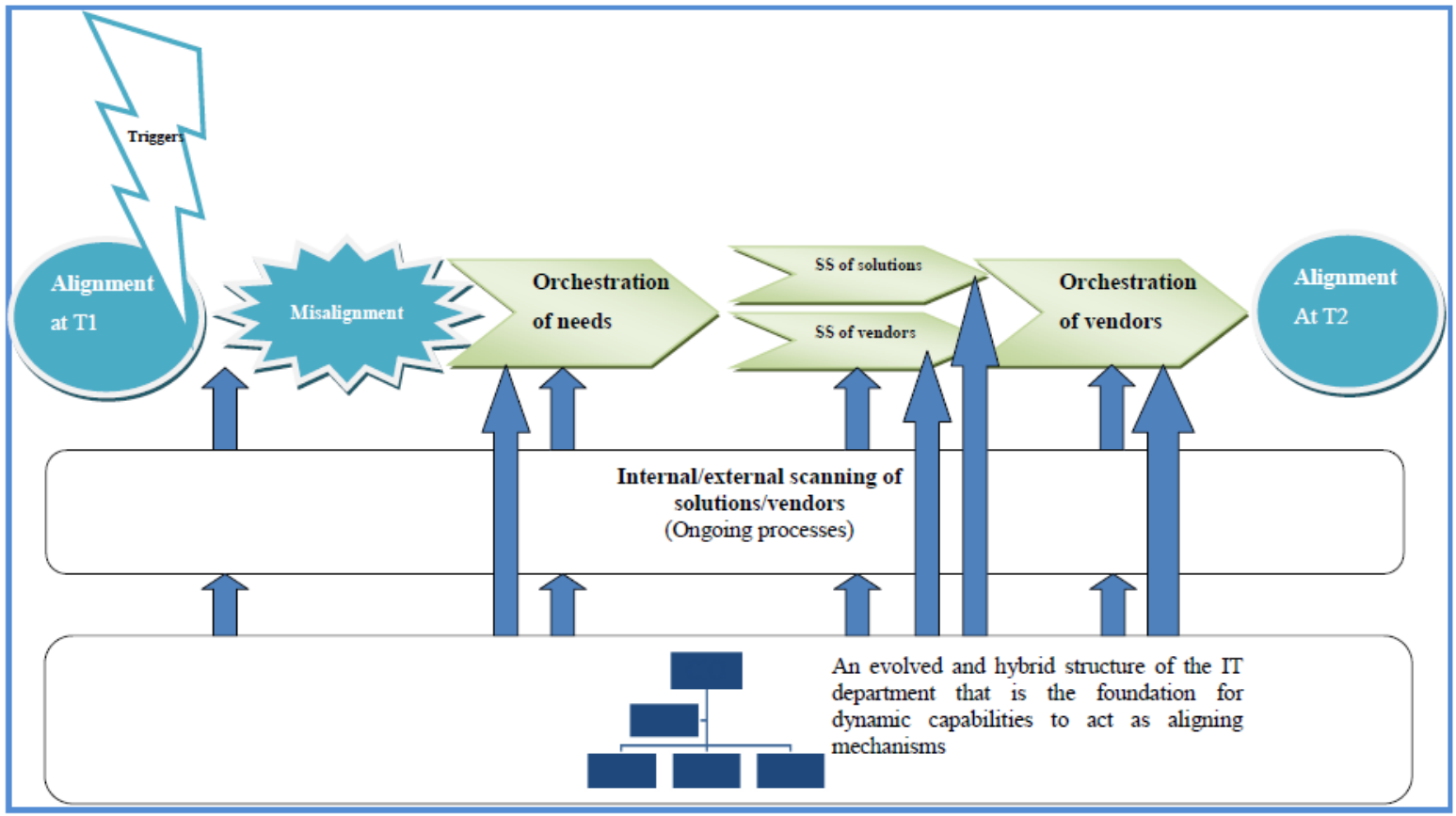

Figure 3.4 A Dynamic Capabilities-based Process Model of IT and Business Alignment

The hybrid structure of IT department makes it possible that the three units (that both report to business VPs and to the CIO) orchestrate the needs of the business and also interact with vendors to make the changes required. Prior to the restructuring of the IT department the needs were scattered all over the business departments and it was not known that how a change a one system could affect other business departments. Scanning capabilities also plays a role in facilitating other capabilities. Internal scanning of resource base mainly feed into search and selection of solutions. The ongoing process of internal scanning may reveal that other changes are also necessary to be made to improve a system that is required to be enhanced or modified. Therefore, while a requirement comes from the business side to modify a system, internal scanning (a constant evaluation of systems and services) that is being in place in the IT department may complement the required modification by adding other changes.

Trigger 2: Change in Business Processes

The second trigger is change in the business processes initiating from business side (e.g. changes in the security processes due to the underwear bomber incident). When business make changes in its processes then current IT solutions need to be modified or new IT solutions need to be introduced that could accommodate the changes in the business processes. Therefore, changes in the business processes create a misalignment between IT and business that should be resolved and come to a new state of alignment. Process changes in the business could happen as a response to changes in the business strategy, changes in the environment or to make processes more efficient. In either case the current IT solutions that are in place to support the current processes may not support the new set of processes. This triggers a misalignment between IT and the business. Process changes in the business require extensive orchestration of needs in the business side. Again the three newly hybrid units are responsible to orchestrate and coordinate the process changes. The

orchestration of needs is key for IT to obtain a global view of what is happening in the business side. Without the orchestration at the outset, complexities and conflicts may hinder selecting a right solution. After gaining a clear vision that how business processes are going to change, search and selection of solutions and search and selection of vendors initiate. Depending on amount of change required current solutions might be modified to accommodate changes in the business process. Therefore, the rest of the process will be similar to the enhancement/modification of current IT solutions.

However, if the changes in the business processes are extensive, then probably new IT solutions are required to support those processes. There are two ways to introduce new IT solutions. One is through RFP process and the other is interactive sessions with current vendors. First, interactive sessions will be set since it is quicker to find a solution. Therefore, instead of going too far with an initial idea or design of a solution (e.g. as required in a RFP processing), a preliminary draft of the solution needed will be presented to some of the existing vendors whom are believed to be capable of providing that solution. Those vendors offer what they could do to provide the solution, how the design could be improved and how it could be complemented. Then IT department evaluates these offerings and finally chooses a vendor to provide the new solution. The interactive search and selection of vendors and technologies are facilitated by internal scanning of vendors. The scanning of vendors reveals the capabilities each vendor possesses and also reveals that if a vendor could provide a specific solution. External scanning of available technologies also facilitates the process of search and selection since through external scanning IT department (senior director) become aware of possibilities and technologies based on which a new solution could be built. If IT department could not choose from existing vendors for a new IT solution, then RFP will be done. Also, sometimes the internal scanning of vendors reveals that none of the existing vendors is able to provide a new solution and therefore IT department choose to do RFP from the outset. If RFP is chosen,

external scanning of vendors and available technologies facilitates the search and selection of IT solutions and search and selection of vendors. After choosing a new solution either to be done by a current or a new vendor, the new solution needs to be integrated with other systems and services of the current vendors. Therefore, orchestration of vendors again is needed to make sure that the new solution is well integrated within what is already in place. This will bring IT and the business to a new state of alignment.

Trigger 3: Time

The third trigger is time. When a contract is going to be over in 12-18 months, current vendor of that contract could potentially be replaced and the services will be modified (improved or totally changed). Therefore, preparing RFP, negotiating a new contract, and a possible transition from one vendor to another create a period of misalignment between IT and the business.

When time (near end of a contract) is the trigger of the misalignment, orchestration of needs initiate across all business branches and departments to make a clear vision of how the new contract should look like (i.e. what are the new set of services that could serve business best). For example in case of ending a telecommunication contract, business departments and branches start to vision that how the future telecommunication services are going to look like. For example are they going to move away from land lines and make everything wireless or they retain a mixture of both. The orchestration of needs will significantly help the RFP process. Without the orchestration of needs items included in the RFP might serve a business branch very well while another business branch might not be satisfied with those set of services. Search and selection of solutions partly takes place in preparing RFP and partly in evaluating proposals of the vendors. Search and selection of vendors takes place based on vendors' capability in one special area. In our example of telecommunication, IT department starts search and selection of capable

telecommunication companies that could meet telecommunication needs. Therefore, the prepared RFP will go a selected number of vendors (which also include the current vendor) that are proved to be capable. The received proposals will be evaluated and final choice will be made (to finalize search and selection solutions and vendors). If the contract is going to be renewed with the current vendor, the orchestration of vendors (i.e. the transition) will be shorter and smoother. If a new vendor is selected then orchestration of vendors will be more extensive to make sure that the services of the new vendor could be well integrated with the rest of services of other vendors. Consequently a new state of alignment will be reached between IT and the business.

Again scanning capabilities facilitate the duration of all the processes mentioned above. Internal scanning of resources (e.g. assessing the existing network: age, ability to respond to business needs) gives IT department a clear vision of what they need to ask from a vendor. IT roadmap prepared by IT department also helps doing the internal scanning. IT roadmap shows that for example how the network should look like in future. Also, based on the external scanning of vendors, capable players in the market in the telecom field are identified. Therefore, when times come for RFP process, IT department knows the list of potential vendors that RFP goes to. External scanning of technologies makes IT department aware of available technologies and trends in the market in telecom field for example. Internal scanning of vendors (evaluating their performance) makes it possible to know how the future SLAs should look like and if the current telecom vendor could bid in the next RFP process or not (in the case that the current vendor is not capable to provide their future needs then they will not allow the vendor to bid in the new RFP process). The hybrid structure of IT department provide a ground for extensive communication of IT and the business based on which orchestration of needs happen. The hybrid structure allows for collaboration of IT and the business in preparing RFPs.

Therefore, when a RFP is prepared and finalized, it is already approved by business since business collaborated in preparing it through orchestration of needs.

Trigger 4: Scanning

The fourth trigger is scanning. Internal scanning of IT resource base (e.g. outdated platforms) and vendors (e.g. business is not satisfied with services of a specific vendor) and external scanning of technologies (e.g. iphone is becoming dominant) and market of vendors (vendor X is becoming a big player in the market) could initiate misalignment. When a need to change IT solutions/ services or vendors or a need to introduce new IT solutions/services or new vendors are recognized based on scanning processes then business processes need to change accordingly. The introduction of changes in the business processes is a delicate issue to be considered. IT department does not intent to impose any system that brings change to the processes. Here the role of three new units is critical. Since they report to the CIO and they are part of the IT department, the possible changes are communicated with them. These three units may be the triggers of change themselves base on their own scanning. Therefore, they start communicating the triggers (the reasons to create a change/misalignment) with their respective business branches. Therefore, through orchestration of needs, they communicate the need to change and then they coordinate the changes across all the business branches. The rest of the process is similar to what is already explained above. If the change is only an enhancement then the process will be similar to when the trigger is an enhancement. If the change will be introduction of a new solution then the process will be similar to when the trigger is changes in the business processes. Here scanning not only support the capabilities of search and select and orchestrate, it also acts as a trigger of misalignment. And the hybrid structure as explained above plays a critical role in communication of changes and improvements in the IT solutions. Without facilitating role of these three units,

changes in the solutions coming from IT department could be viewed imposing and dictating and could potentially be resisted.

Trigger 5: Introduction of IT Strategic Initiatives

The last and perhaps the most significant trigger is the introduction of IT strategic initiatives. These initiatives are either result of a joint effort between business and IT (e.g. change in the pilots' bidding system) or result of changes in the environment (e.g. arrival of a new aircraft). As the consequence of these initiatives business need to change it processes and IT need to introduce new IT solutions, new IT services and potentially new vendors. This makes a misalignment between IT and business. To resolve the misalignment, business and IT start a co-aligning process through which IT and business come to a new state of alignment. The orchestration of needs is a critical process through which a clear vision of future processes will be created. Through the orchestration of needs every business department and branch mentions what these changes mean to them. For example, with the introduction of the new aircraft (Boeing 787), business branches and department state that how the arrival of this aircraft change their processes (e.g. changes in the process of assigning planes to routes or changes in the maintaining process of aircrafts). Therefore, orchestration of needs plays a critical role in coordinating these process changes and creating a global view of these process changes. On the IT side, IT department starts evaluating that how the arrival of the new aircraft could change IT solutions and services and what are the possibilities and challenges that the new aircraft initiates (e.g. putting iPads in the hands of pilots). These two efforts merge and join each other in the three hybrid units. The three hybrid units are responsible for translating business needs into IT solutions and also communicate the solutions found by IT department with the business so they could adjust their vision of new processes. After the orchestration of needs (i.e. where an understating/vision of what is required has been made) then it comes to search and selection of solutions and vendors who could

provide those solutions. Here the search and selection process includes several solutions and probably several vendors. This is because big strategic initiatives usually involve change in current solutions and introduction of several new solutions. Therefore, knowing interdependencies and complexities of business processes and IT solutions in advance (through orchestration of needs) is critical to the right choices of new solutions and right choices of vendors to provide them. Likewise, the orchestration of vendors could be a challenging process again due to complexities and interdependencies coming from making changes in several systems and adding several solutions. While with the first four triggers Air Canada quickly arrives at implementation mode mainly using interactive selection (e.g. via agile methodology and mock up sessions), with the last trigger an extensive analysis of processes and systems will be done before coming to the implementation mode. This last trigger makes IT and business to co-align with each other and come to a new state of alignment that also includes transformation of business processes. The whole process is extensively facilitated by the hybrid type of structure which allows for co-aligning of business and IT. Also scanning capabilities facilitate orchestration and search/select processes. External scanning of available technologies and technology trends shows the type of technologies that are best to be adopted. External scanning of vendors gives ideas about what type of vendors are in the market capable of doing desired solutions. Internal scanning of vendors reveals that if the current vendors are capable of providing the extensive changes required by the strategic initiatives. Internal scanning of IT resource bases reveals that if the current infrastructure and systems has the capacity to absorb all the required changes coming from the strategic initiatives.

Role of Dynamic Capabilities

As we explained, the dynamic capabilities of orchestration, search and selection and scanning are mechanism through which the firm creates a new state of

alignment between IT and the business. The new state of alignment takes place if the result of these capabilities would be 'right IT solutions' and also integration of the new IT solutions in such a way that satisfies the business. Dynamic capabilities enable firms that operate in turbulent environment in which periods of alignment shatter often due to the rapid changes in the environment. Therefore, dynamic capabilities are fully exploited when they could be used to quickly resolve the period of misalignment and reach a new state of alignment. In turbulent environment timing is crucial. If IT department is not enabled to introduce right solutions to the business problems at the right time then most probably it will not be perceived as aligned with the business. All the dynamic capabilities explained in this study are enabling the quickness with which IT department could provide solutions for the business. Search and selection capability for example shorten the RFP process and negotiation time with vendors. Scanning capabilities facilitate and shorten the search and selection since through scanning IT department become aware of available technologies and vendors, so solutions and vendors could be chosen rapidly. Orchestration capabilities prevent complexities that potentially become obstacles that requiring rework (i.e. modifying or abandoning a system). Therefore dynamic capabilities are mechanisms to reach new states of alignment when misalignment occurs. Also, IT department use dynamic capabilities to restore alignment quick enough to be nimble in responding to the business needs, enabling business to respond to its environment with agility, so as to ultimately gain and sustain competitive advantage.

Discussion

Following Eisenhardt's theory building approach (1989), we started the data collection phase with a priori set of concepts driven form DCP. However, we did not theorize on the relationship between them. Also, their existence in the final theory was not guaranteed at the outset. The first concept that was not carried on up to the end is IT architecture orchestration capability. We previously defined this capability as the integration of a new solution with existing solutions. We also defined IT

sourcing orchestration capability as the coordination of the vendors. However, in a near total outsourcing environment, such as Air Canada, solutions are changed, modified, and integrated by vendors. Therefore, the integration of solutions and the coordination of vendors occur simultaneously through the orchestration of vendors. Therefore, the two a priori set concepts merged into one.

However, entering the field, collecting the data, and analyzing the data made it possible for another concept to emerge that of orchestration of needs. This new emerged capability refers to the ability of a firm to orchestrate its needs and requirements from IT. Orchestration of needs is a critical capability which makes it possible for Air Canada to know the impact of a specific IT solution on different business branches and departments. While we set a priori the concept of orchestration of vendors, at Air Canada the process of IT and business alignment is not possible without orchestration of needs. It supports developing a global view of business requirements from IT and a global of view of IT's impact on different business branches. While orchestration of needs creates one coordinated requirement (e.g. once single coordinated voice) coming from the business side, orchestration of vendors creates one seamless, smooth service in response to that requirement. The other concepts emerged were internal and external scanning of solutions and vendors. They support all other processes by making the firm aware of inadequacies, opportunities, and possible solutions to the requirements.

Comparison with Other Theories

The presented theory has similarities and differences with the extant theories and models in the literature. The first theory for comparison is Punctuated Equilibrium Theory of IT and Business Alignment (Sabherwal et al. 2001). The Punctuated Equilibrium (PE) view of alignment focuses on how alignment evolves over time. It suggests that firms go through long periods with a certain pattern of alignment with no change or changes in some dimensions of alignment. Revolutions

however change most or all of alignment dimensions resulting in a totally new pattern of alignment. The evolutionary path that we derived from our case study (figure 3.3) could be mapped with long periods of evolution (in which micro capabilities were developed) and punctuated peaks of revolution (in which macro capabilities of learning triggered change). Our process model of alignment (figure 3.4) however focuses on the day to day activities and processes through which IT solutions became aligned with the business processes and needs. Therefore while in the PE based model the ideal patterns of alignment are predefined (e.g. strategic alignment #1: defender business strategy and centralized business structure), in DC based model the alignment patterns are emergent (i.e. right solutions that are provided at the right time with the right provider). The other main difference of the DC based theory of alignment and the PE based theory of alignment lies in the mechanisms through which alignment could be achieved. In PE based view the alignment would be achieved through incremental or radical changes in the deep structures of the alignment in order to create new patterns of alignment. In DC based view the alignment would be achieved through processes of search and selection, scanning and orchestration that align IT solutions with the business needs. Another difference is the role of environment. Dynamic capabilities enable firms to gain alignment in a turbulent environment. In the PE model triggers that drive both types of changes (incremental or radical) could happen in different environmental conditions. Therefore, the PE based theory of alignment could also be generalized to firms that operate in relatively stable type of environment.

The second extant theory for comparison is Coevolutionary theory of IS alignment (Benbya and McKelvey 2006). This theory considers three levels of alignment at the strategic level, at the operational level, and at the individual level. The main argument is that at the strategic level IS and business strategy co-evolve together, at the operational level business departments co-evolve with IT department and the individual level users and IT infrastructure co-evolve together. While the

general framework of co-evolution is in congruence with what we introduced in DC based theory of alignment, the difference between these two theories lies in the mechanisms of alignment. The coevolutionary theory of IS alignment emphasizes that alignment should be perused in three different levels and that communication of IT department (IS domain) and business departments (business domain) is key to build a shared understanding to gain alignment. The DC based theory of alignment introduces the mechanisms (i.e. dynamic capabilities and a supporting structure) through which IT and business come to build this shared understanding and finally the alignment.

Finally we map our process model of alignment with the framework of IS strategy suggested by Chen et al. (2010). The framework suggests that there are three conceptions for IS strategy in the literature: IS strategy to support business strategy, IS strategy as a master plan of the IS function and IS strategy as a shared view in the organization. Each conception holds a specific assumption about IT and business alignment respectively a priori alignment (i.e. business strategy derives IS strategy and therefore IT is aligned with the business from the beginning), ex post alignment (IS function and business units work in isolation and therefore any effort to align IT and business is after the fact) and dynamic alignment (i.e. business strategies are IT enabled and IT and business go through a journey of aligning together). The process model of alignment presented in this study falls within the third type that embraces dynamic alignment. The notion of dynamic alignment refers to the assumption that alignment cannot be tightly planned and be set a priori. In turbulent environments such as of our case context, alignment probably has no true state. Therefore in congruence with the IS strategy framework our model suggests a constant and dynamic process of aligning (i.e. co evolving) between IT and the business. Based on the framework driven from the literature, Chen et al. (2010) also proposes a typology of IS strategy for firms: IS innovators, IS conservative and IS undefined. The typology suggests that since IT innovators (i.e. IT leaders in the business) need to

constantly explore their environment for new opportunities, their alignment patterns cannot be set a priori. Also, since IT innovators enable the business to innovate with IT, their alignment is not ex post either. Therefore they fall into the category with a dynamic alignment. The firm that we chose as the case corroborates this proposition.

Future Research Avenue

The present study focuses on the development of a number of dynamic capabilities and how these capabilities act as aligning mechanism of IT and the business. Another possible perspective to take in order to theorize on the development of these capabilities is to focus on individual capabilities and their individual lifecycle. Helfat and Peteraf (2003) introduce the concept of capability lifecycle (CLC) including founding stage, development stage, and maturity stage. While in the founding stage a group of individuals initiate the creation of a capability, in developing stage the group searches and assesses the alternatives for the capability development, and finally in the maturity stage the capability starts being exercised. We believe that each of the identified capabilities in this study could be potentially revisited in the light of CLC, and an individual lifecycle could be created for each standalone capability irrespective of their relationship with other capabilities. These individual lifecycles could then be compared for differences and similarities in terms of the duration needed for development, points in which they reached maturity (if they ever reach it), and also how they branch into different paths (Helfat and Peteraf 2003).

Limitations

In this study, we used a single case of extreme IT outsourcing and therefore the proposed process model might be only generalizable to the settings with an exact match to our case. We therefore suggest that future research refine and improve the proposed theory here using other contexts such as selective and minimal outsourcing.

Using a single case also limits cross case analysis and the triangulation of data across different cases. To overcome this limitation, we have collected data from different sources within the case (interviews, observation, archival and public documents) and triangulated data across these sources.

Concluding Remarks

This study makes several contributions to the theory and practice. First it opens the black box of IT and business alignment focusing on how alignment could be achieved. Although extant literature supports the idea that IS strategy has to be closely aligned with business strategy in order to contribute to firm performance, little research has been done on how this alignment could be achieved. This study is among the few to tackle the issue by proposing a process through which alignment is achieved and sustained. Also, conceptualizing IT outsourcing as part of overall IS strategy of a firm enriches its conceptualization and portrays it as an aligning mechanism between IT and the business.

The study also suggests IT managers that alignment of IT with business departments does not happen once a year and only at the strategic planning level in executives committees. Alignment should be pursued on a daily basis and states of misalignment could be resolved as quick as possible using different sets of capabilities. Also, the study depicts some of the possible triggers that could create state of misalignment between IT and the business. Therefore, this study suggest managers that they become aware of different internal and external triggers that could misalign IT with the business and invest in proper sets of capabilities to be able to respond quickly and bring back the state of alignment. Finally, the study suggests that IT outsourcing is not only a means to reduce cost or to focus on the core competencies, however it is a strategic tool for managers that could be used to bring back the state of alignment.

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Appendix 3.1 Dynamic Capabilities Emerged from Air Canada Case

List of all capabilities	Definition	Operationalization	Sample quotes
External scanning of vendors	Search the market for potential vendors and emerging players in the market	Being aware of niche players in the market Being aware of vendors to other alliance members Attending industry meetings and conferences	You need to know who you are, and when you know what your business requirements are, then you can map to the right vendor who has the same kind of offering. So I think it's knowing who you are from your requirements, and then knowing the marketplace. And then you start evaluating a subset of the products that are available in the marketplace; you don't have to look at everything. ***(Senior Director – IT Sourcing)***
External scanning of technologies	Capability to search the market for available technologies, trends in the technology, and technologies that can be adopted from other industries	Technology watch Attending industry meetings and conferences Many ways to be inspired Looking at other industries	Well we try to, to see – for example, last year we did the iPhone application but we started to look at this 2 years ago. We were able to quickly identify that Apple would be a new… they would be very successful, and the adoption rate would be faster than Blackberry and others. So we started to look at this and then we just jumped and did it. So that's why we say we're a bit ahead of the game because we're doing a lot of technology watch . ***(Director – Customer Solutions and Innovations)***
Internal scanning of resource base	Evaluation of the IT department's existing systems (i.e. applications), infrastructure, and skills and the IT department structure.	Who we are and where we want to go Preparing an IT roadmap Taking care of the plumbing Ensuring that the platform is solid Ensuring that the platform	That may force us to look into new applications or revise applications and infrastructure with the network as well. So the technology roadmap really is about 'Where's the technology going? Where are we vulnerable from a, I'll say, high availability stability? What do we need to make that? What types of things are coming?' ***(Senior Director – Information Technology - Transformation Solutions)***

List of all capabilities	Definition	Operationalization	Sample quotes
		is flexible Ensuring that the platform can absorb growth Whether current IT solutions are aligned with business needs (assess the need to change or enhance an IT solution) Whether the current IT department structure is right for other capabilities to be exploited	
Internal scanning of vendors	Evaluation of existing vendors' performance (the internal scanning of vendors reveals whether vendors are able to provide quality IT service to Air Canada. Also, it reveals the general satisfaction of the business with the vendors)	Evaluating the performance of vendors Assessing the general satisfaction with a vendor Assessing a vendor's general capability to work with the airline	We'll let the business do the testing and make sure their business requirements are well written. We'll be involved in the governance that says, "Ok, you're soon going to finish your project mode and now you're into steady state. And we need to know on a monthly basis did you perform, did you meet your SLAs. If you didn't meet your SLAs, what is your mitigation plan? How are you going to fix what is not working? Is the customer satisfied?" So we'll be involved in putting in place the governance and then keeping it going. ***(Senior Director – IT Sourcing)*** If you've met director of Customer Solution and Innovation who works on E-commerce, he's just … he's IT, but he's a business unit in the sense that he consumes from the contracts. So if he's dissatisfied with a vendor's performance, he will let me know. ***(Senior Director – IT Sourcing)***

List of all capabilities	Definition	Operationalization	Sample quotes
Search and selection of vendors	Formal process of identifying potential vendors, process of preparing and sending requests for proposals (RFPs), evaluating RFPs and narrowing down the list of potential vendors and, finally, choosing from among vendors. Also, the interactive process of selecting a vendor from among existing vendors by using an RFP.	RFP process Interactive process with existing vendors	We do work with them [strategic purchasing]. They have the discipline of real procurement process, so issuing an RFP, preparing the grids to evaluate the RFPs, and with a team making the down select and the final selection. When there is an IT component we are part of that process. So again we'll be influencing who it goes to based on our vendor experience. If we have developed with certain vendors, master service agreements, so general sourcing, or legal frameworks it's obviously easier to get another service from the same vendor. Or it could be that it's going to need something completely different. But when we have master service agreements and we're negotiating with those vendors, we will want to include this new service under the same agreement. That means much less negotiating and negotiating the things that are legally difficult. The terms and conditions, liability insurance, indemnification, and all those things that the lawyers focus on … ***(Senior Director – IT Sourcing)***
Search and selection of IT solutions	Refers to the process of a systematic search to find (i.e. define) an IT solution that can respond to a business need or enable a specific business strategy.	Define a solution Complement a solution Enhance a solution Translate it into an IT solution	They had this idea and they wanted to do it on the kiosk, but we said, you know what, it's a bit complicated, we should basically, we should first start with the web check-in, do a pop-up, measure how many say yes or no, see if it's successful and then after we will put it on the kiosk because to push it everywhere is more complicated than just doing it on the web. So this is – so they came up with the idea, we supplemented their idea, and refined it by saying, okay, here's what we should do, here's the pop-up, how it looks. They said, that's great,

List of all capabilities	Definition	Operationalization	Sample quotes
			that's what we want. So, quickly we put it into production and saw that it was a great hit and everything, and then we put it in the kiosk. That's how it was in North America, now we're going to do it internationally. So this is an example of what we're doing. . ***(Director – Customer Solutions and Innovations)***
Orchestration of needs	Refers to the ability to coordinate and take a global view of business requirements from IT	Coordinate needs Have a global view of needs Have a holistic view of needs	That avoids a lot of the conflicts between departments because you're bringing everyone to the table at the beginning of the process. But if there are conflicts, it's very easy to bring to people's attention and have them talk it out. We're not at a later point in the life cycle of the process where the code is being written and then you realize there's a conflict because then it becomes even more, I'll say, intense. The level of frustration would be extremely intense, as opposed to when you get it at the very beginning, it's easier to resolve. ***(Senior Director – Commercial Information Systems)*** When I started that role a year and a half ago, it allowed us through developing a relationship with some of those branches to understand what they were doing, understand their requirements, and suggested that there might be different ways to do that, to achieve the same thing. ***(Senior Director – Operations IT)*** The benefits of the organization is that it keeps us really close to our user teams, which I think you need in order to provide, value added solutions. ***(Senior Director – Customer Service Information Systems)***
Orchestration of	Refers to the ability of an	Cascade right SLAs	We also have to listen to the business, explain their

List of all capabilities	Definition	Operationalization	Sample quotes
vendors	IT department to assign the right pieces of a project (a constant service or a onetime development) to the right vendors in such way that, at the end, a smooth and seamless flow of service can be obtained by integrating work by different vendors.	Coordinate vendors Integrate new IT solutions with what is already in place Assign the right task to the right vendor	requirements and say I need a cool app. I don't know what the uptake is, give me the right-sized solution to deliver this. And then we have to take that request and distil it into different pieces we need to put in, and which vendors do we need to bring on board because it's going to require a piece of this and a piece of that, and then coordinating that and putting it in the right technical terms and scope, delineating scope, you know who's going to be doing what, making sure the SLAs are consistent across the board. ***(Senior Director – Information Technology - Transformation Solutions)***
Alignment	Responding to business needs with the right IT solutions that are provided at the right time using the right sourcing model	Focus on the right things Be ahead of the curve Be on our toes Respond to business quickly Be nimble and agile Choose the right sourcing model (it is frustrating for business to work with offshore vendors on applications that require prototyping and or an agile development methodology)	If we're not meeting the internal requirements that comes from the business, we're not going anywhere as a company. ***(Director – Customer Solutions and Innovations)*** We work closely with them [business] to understand what their needs are today, and what their direction is tomorrow. If I'm not aligned with the business I'm negotiating a contract in a void. I may be buying the wrong things. I may be focusing on the wrong item. One has to make certain that one is well aligned with the business to reflect the business interests when we actually negotiate and manage the contract with a vendor. ***(Senior Director – IT Sourcing)***

Appendix 3.2 General Interview Guide

Interview Guide Questions
• Would you please tell me more specifically about your role?
• What are the main challenges of this role? How are these challenges met?
• What do you think are the key skills (i.e., personal capabilities) for someone who occupies this position at Air Canada? How they could be acquired?
• Describe the environment that you operate in: how would you describe the rate of change in your environment?
• Can you describe some of the major shifts that happened in the recent past? How did the firm react to those changes? How did IT react to these changes?
• How are decisions regarding IT are being made?
• What are the activities/processes inside this unit?
• What are the goals associated to each process?
• What are the success measures for these processes?
• How do these processes/activities relate to a vendor?
• How do you evaluate that the activity is being executed appropriately?
• How do you evaluate the vendor's performance?
• What are the components of success? E.g. do you recall any instance that from technical point of view the performance was good but the final output could not meet your needs?
• How do you benchmark? How often you do this (is it a day to day process for you)? Do you engage in benchmarking?
• Does it influence success? How and why? Examples?
• With a vendor, how do you start a new project /relationship?
• Under which circumstances do you try to find a new supplier? Or when do you consider outsourcing a new activity?
• Do you think that some of the outsourced activities could be done internally? Why? Examples?
• Do you think that for some activities it is better to change the supplier? Why? Examples?
• How would you describe your unit's relationship with other IT units? For example with IT with innovation, with transformation?
• Do you think that sourcing unit is responding to needs of other IT units? How?
• How do you describe your interactions within sourcing unit? Formal or informal communications? Staff meeting?
• How much they influence the success?
• On what basis do you assess the extent to which your unit has accomplished its mission?
• Do you think that sourcing unit is responding to business needs? How?

Chapitre IV - Article #3

Information Technology Outsourcing Success: A Model of Dynamic, Operational, and Learning Capabilities[12]

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Abstract

Grounded in dynamic capabilities perspective, our study offers a model of ITO success. We distinguish between three sets of IT outsourcing capabilities. We first define IT outsourcing dynamic capabilities as the ability of an organization to purposefully extend, create or modify its information technology resources through an outsourcing arrangement. We define ITO operational capabilities as the ability of the client firm to manage/execute IT outsourcing arrangements. ITO learning capabilities are defined as the capacity to acquire external knowledge on IT outsourcing and accumulate experience. We theorize on the relationships between these capabilities and propose a model of their impact on IT outsourcing success. A cross-sectional survey of 152 organizations across different industries is provided the data and a structural equation modeling (SEM) approach is used to analyze the data. The findings suggest that dynamic capabilities positively influence ITO successful reconfiguration (strategic success)-defined as the degree to which a client firm successfully created/modified/extended its IT resources through IT outsourcing arrangements. Also, the findings suggest that operational capabilities positively influence successful delivery (operational success) - defined as the degree to which the terms of the contract between client and suppliers have been met. Moreover, both operational and strategic success positively influence IT outsourcing success- defined as the degree to which a client firm has achieved its predefined and or emergent ITO objectives.

Keywords

Dynamic capabilities perspective, IT outsourcing success, IT outsourcing dynamic capabilities, IT outsourcing operational capabilities, IT outsourcing learning capabilities

Introduction

Information technology outsourcing (ITO) has become an inevitable part of the modern enterprise (Bapna et al. 2010) and is predicted to grow at an average rate of 4.4% from 2010 to 2015 (Gartner 2011). Over the years, two main ITO research streams have formed. The first examines the determinants of ITO decisions, such as transaction characteristics (e.g., Karimi-Alaghehband et al. 2011), and institutional, political or strategic pressures (Ang and Cummings 1997; Aubert et al. 2004; Lacity and Willcocks 1995b), while the second focuses on the management of outsourcing relationships (e.g., Choudhury and Sabherwal 2003; Ho et al. 2003a; Kern and Willcocks 2000). The present study falls into the second stream of research, as it is concerned with the antecedents of ITO success.

Extant literature that belongs to this stream of research has mainly focused on antecedents of ITO success that are operational in nature. For instance, studies have found that that ITO success is influenced by contract characteristics such as contract duration (short-term, medium-term, or long-term), contract level of details (detailed, buy-in, or unspecified) (e.g., Lee et al. 2004), level of trust, commitment and partnership quality (e.g., Han et al. 2008), degree of knowledge sharing (Lee 2001), and the extent or scope (i.e. minimal, selective, total) of IT outsourcing (e.g., Grover et al. 1996; Lacity and Willcocks 1998; Lee et al. 2004). A number of studies, however, have emphasized the strategic role of IT outsourcing and portrayed it as an essential component of information systems (IS) strategy (e.g., Henderson and Venkatraman 1999b; Hirschheim and Sabherwal 2001). For instance, IT sourcing has been studied as a decision about the organizations' boundary (i.e., structure of the organization), which ideally should be aligned with business strategy (Aubert et al. 2008). It has also been portrayed as a means 'to progress from managing costs to making strategic IT investments' (Ross and Beath 2006, p.182) and as a means of transition between different stages of enterprise IT architecture maturity (Ross and Beath 2006). This literature also refers to strategic benefits of IT outsourcing (e.g.,

entering new markets, focusing on core competencies, making business transitions), either via business process improvement and business transformation (Lacity et al. 2009; Lacity and Willcocks 2001) or via its alignment with business strategy (Lee 2006).

The present study adopts the perspective that IT outsourcing has both strategic and operational contributions, and therefore aims to differentiate among strategic success, operational success, and overall IT outsourcing success. In line with this, it proposes a conceptual model wherein overall ITO success – defined as the degree to which an organization achieves its IT outsourcing related goals – has two key antecedents: successful reconfiguration of IT resources (i.e., strategic success) and successful delivery of IT services (i.e., operational success). Anchored in the dynamic capabilities perspective (Eisenhardt and Martin 2000; Helfat et al. 2007; Teece et al. 1997), the model first posits that dynamic capabilities will lead to successful reconfiguration of IT resources, which is the strategic antecedent of ITO success. Second, the model posits that operational capabilities will lead to successful delivery of IT services, which is the operational antecedent of ITO success. While extant ITO research mainly focuses on ITO operational capabilities (e.g., vendor management capability, contract management capability) (e.g., Han et al. 2008, Ranganathan and Balaji, 2007), and their impact on IT outsourcing success, our model conceptualizes dynamic ITO capabilities and hypothesizes on the relationship between them and success constructs. Moreover, the model posits that a third type of capabilities, ITO learning capabilities, affect strategic and operational success through dynamic and operational capabilities.

Espousing IT outsourcing as a strategic undertaking and grounded in the theory of dynamic capabilities, the present study conceptualizes a set of dynamic capabilities which client firms could leverage to act upon IT resources and therefore create a winning configuration of IT resources that are effective in supporting business initiatives. Therefore, the study not only adopts the perspective that IT

outsourcing could contribute strategically to the organization, but also it conceptualizes this strategic contribution by introducing 'IT outsourcing successful reconfiguration'. Moreover, the study complements this perspective by conceptualizing IT outsourcing operational capabilities which client firm could leverage to achieve an operational/contractual success. Therefore, the study contributes to the ITO literature by enriching the conceptualization of IT outsourcing success and by offering a more comprehensive explanation of how ITO success is achieved.

The rest of the manuscript is organized as follows. The next section introduces the dynamic capabilities perspective. We then present our model, along with our conceptualization of the constructs. The method and results sections are presented next. The paper concludes with a section on discussion of the results and concluding remarks.

Dynamic Capabilities Perspective

The conceptualization of dynamic capabilities aimed at complementing the resource based view of the firm (RBV). RBV concentrates on firms' resources which are valuable, rare, inimitable and non substitutable (Barney 1991). A firm can gain sustained competitive advantage possessing resources with the aforementioned characteristics. The resources can be physical (e.g. capital), human (e.g. employees' skills) and organizational (e.g. formal and informal planning). This theoretical view links a firm's resources directly to its performance (competitive advantage). Therefore, for RBV existence of such resources is enough to gain competitive advantage.

While this direct link may be established in a relatively stable environment, in a turbulent environment the sustainability of such competitive advantage can be quickly eroded (Wade and Hulland 2004). This is because RBV is said to not consider the factors surrounding the resources. For example how the firm develops

those resources and uses them is not the RBV's concern (Wade and Hulland 2004). Here, the dynamic capabilities come to play. These are capabilities which enable a firm to adjust its resources and therefore to maintain the sustainability of its competitive advantage in a rapidly changing environment (Eisenhardt and Martin 2000).

Dynamic capabilities initially appeared in the work of Teece, Pisano and Shuen (1997) as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environment" (Teece et al. 1997, p.516). Although several definitions exist for dynamic capabilities, they all focus on the ability of a firm to reconfigure its resources (Table 4-I).

Table 4.I Definitions of Dynamic Capabilities

Definitions	Reference
The firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environment;	Teece (1997)
The firm's processes that use resources-specifically the processes to integrate, reconfigure, gain and release resources-to match and even create market change;	Eisenhardt and Martin (2000)
A learned and stable pattern of collective activity through which the organization systemically generates and modifies its operating routines in pursuit of improved effectiveness;	Zollo and Winter (2002)
Capacity to sense and shape opportunities and threats, seize opportunities, and reconfiguring assets;	Teece (2007)
The capacity of an organization to purposefully extend, create, or modify its resource base;	Helfat et al. (2007)
The ability to sense and then seize new opportunities, and to reconfigure and protect knowledge assets, competencies, and complementary assets with the aim of achieving a sustained competitive advantage;	Augier and Teece (2009)

For example, dynamic capabilities have been defined as the reconfiguration ability of a firm to address environment changes (Teece et al. 1997) or processes by which a firm reconfigures its resources to respond to or create market change (Eisenhardt and Martin 2000). We adopt the definition provided by Helfat et al. (2007) for dynamic capabilities because it encompasses the commonalities among

most of the definitions and at the same time it focuses on the heart of dynamic capabilities which is resource reconfiguration. Dynamic capabilities therefore is defined as "the capacity of an organization to purposefully extend, create, or modify its resource base" (Helfat et al. 2007, p.1).

To better illustrate the theory of dynamic capabilities we present some examples provided by extant research on dynamic capabilities. The first example, relational capabilities, are introduced and defined as "the capacity to purposefully create, extend or modify the firm's resource base augmented to include the resources of its partners" (Helfat et al. 2007). Acquisition-based capabilities and alliance-based capabilities are two types of relational capabilities. When a firm does not possess the required resources to perform an activity or implement a strategy, it could either do it with the help of its alliance partners (alliance-based capabilities) or by acquiring another firm (acquisition-based capabilities). The relational capabilities notion as conceptualized by Helfat et al. (2007) is pertinent to joint ventures, alliances and mergers/acquisitions to develop and market new products/ services.

The second example is New Product Development (NPD) dynamic capability which is defined and measured by Pavlou and El Sawy (2006). This capability enables firms to select a right product concept and reconfigure the resources to be able to produce it. Both the selection and configuration should result in a product which responds the requirements of the environment.

Underlying Processes of Dynamic Capabilities

Dynamic capabilities are processes that act upon resources (Eisenhardt and Martin 2000). While dynamic capabilities can involve several types of organizational processes, it has been suggested that all dynamic capabilities entail the following: sensing, search and selection, and orchestration (Helfat et al. 2007; Teece 2007). Sensing capability refers to the ability to explore the external environment and identify new opportunities. Through "constant surveillance of markets and

technologies" (Teece et al. 1997, p.520), firms can detect new business opportunities. Search and selection includes "all processes and activities concerned with searching for and identifying alternative solutions to a problem and sharing them among the members of an organization" (Zott 2003, P.104). Orchestration involves envisioning how to implement a change (Helfat et al. 2007; Teece 2007; Zott 2003), including how to alter and coordinate the resources of the firm. Operational capabilities "enable firms to perform their ongoing tasks of making a living"; they "pertain to the current operations of an organization" (Helfat et al. 2007, p.82). Unlike dynamic capabilities, which have common underlying processes, operational capabilities are context-dependent. Finally, learning capabilities, which refer to mechanisms or processes through which firms accumulate experience, are said to enable firms to perform their activities better and more quickly (Teece et al. 1997). Firms learn and modify their processes through two mechanisms: learning by doing and deliberate learning through knowledge management (Zollo and Winter 2002).

A DCP-based Model of ITO Success and ITO Capabilities

Figure 4.1 illustrates the proposed research model. The model posits that ITO success has two antecedents: successful reconfiguration of IT resources (strategic success) and successful ITO delivery (operational success).

ITO success at the firm level has often been conceptualized as the level of satisfaction with economic, strategic and technological benefits from outsourcing part or all of the IT activities of a firm (Grover et al. 1996; Saunders et al. 1997). While this study's conceptualization of ITO success is also at the firm level, it pertains to the overall realization of the objectives rather than focusing on the three dimensions (economic, strategic and technological). Therefore, ITO success is defined here as *the degree to which an organization achieves its predefined and/or emergent goals from its IT outsourcing arrangements*, irrespective of the nature of the goals.

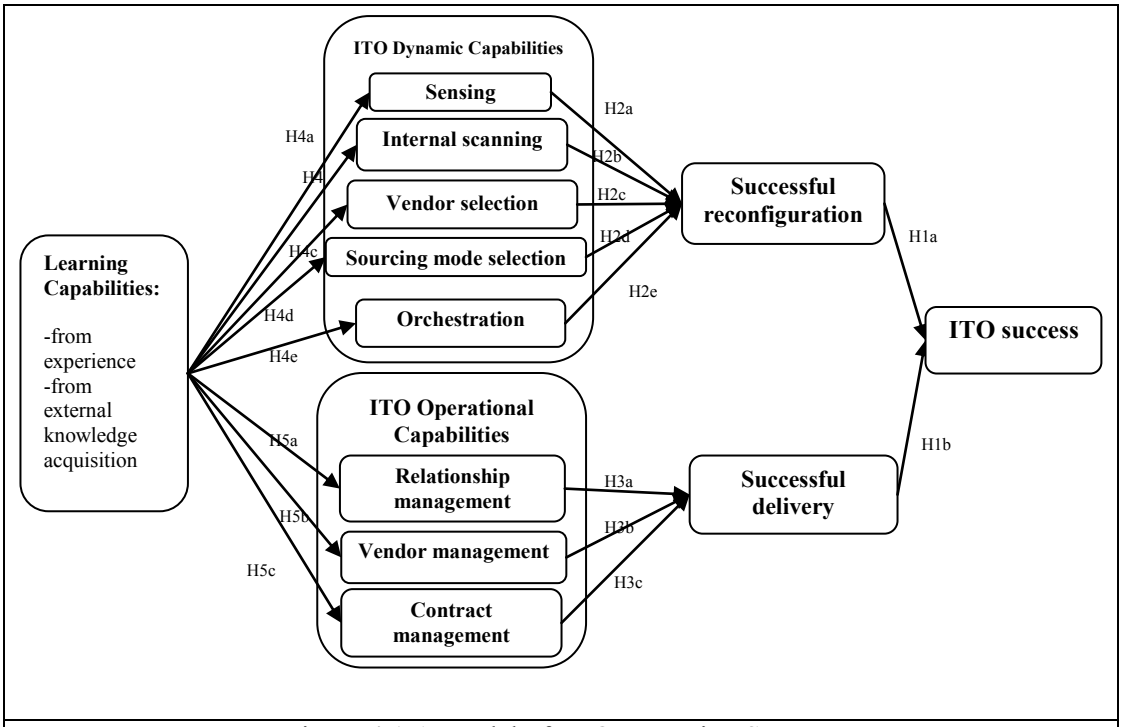

Figure 4.1 A Model of IT Outsourcing Success

The model posits that firms that make effective changes in their portfolio of IT resources – i.e., achieve successful reconfiguration, defined as *the extent to which an organization has effectively extended, modified, and created its IT resources through IT outsourcing arrangements* – are more likely to reach their ITO objectives. Successful reconfiguration therefore is not an end in itself; rather, it is a means to reach overall ITO goals. Moreover, the model hypothesizes that firms that have their terms of contracts met (e.g., receive timely and on budget services) or in other words achieve successful delivery- defined as *the degree to which the terms of the contracts between a firm and its suppliers are met*- are more likely to achieve their objectives from IT outsourcing. Yet again, successful delivery is not an end in itself; rather it contributes to reach a range of different ITO goals. Therefore, we propose that both operational and strategic aspect of IT outsourcing should be carried out successfully for IT outsourcing objectives to be realized (i.e., ITO success achieved). Therefore:

H1a: *Successful reconfiguration of IT resources through IT outsourcing will be positively associated with IT outsourcing success.*

H1b: *Successful IT outsourcing delivery will be positively associated with IT outsourcing success*.

Successful reconfiguration is the extent to which the new profile of IT resources (e.g., IT services/offerings) is effective and satisfactory. As Eisenhardt and Martin (2000) note, success will be achieved if dynamic capabilities indeed create a winning configuration of resources. In alliance-based capabilities (where a firm creates a joint venture with a partner), a successful reconfiguration entails creating an idiosyncratic combination of resources of the firm and its partner that could serve as the basis for a competitive advantage (Helfat et al. 2007). In acquisition-based capabilities (where a firm acquires another firm), successful reconfiguration refers to an effective combination and the deletion of the resources within the target and the acquiring firms to create a new profile of resources (Helfat et al. 2007). The IS literature suggests that the choice of IT governance mechanisms used to obtain IT competencies that support or initiate business strategies (Henderson and Venkatraman 1999a) helps align IT resources with business strategy. Therefore, by acquiring new IT competencies (i.e., resources) firms can reconfigure current IT resources to align them with their business initiatives. To the extent that this new portfolio is effective (i.e., strategic success or successful reconfiguration has been achieved), the ITO arrangements will be deemed successful.

We propose the second antecedent of ITO success as successful delivery. The ITO literature makes extensive use of this conceptualization as a dependent variable at the contract level: perception of the performance of new contractors regarding service level agreements (SLAs) (Ho et al. 2003a); level of satisfaction with: (1) the overall cost, (2) the quality of the output and service, and (3) responsiveness to

problems and inquiries (Poppo and Zenger 2002); satisfaction with vendor performance (Koh et al. 2004; Saunders et al. 1997); and the quality of the vendors' services and deliverables (Aubert et al. 1996; Domberger et al. 2000). Although the ITO literature has examined contract performance at the project (i.e., contract) level, we conceptualize successful delivery at the firm level and from the clients' perspective (all other constructs of the model are also at the firm level and from the clients' perspective). This is in line with DCP, under which patterns of performance are not accidental; rather, they are the product of routines, practices and adaptations (Zollo and Winter 2002). Hence, to the extent that most of a firm's SLAs across different contracts are completed on time and within budget or in other words operational success has been achieved, it is more likely that firms perceive their ITO arrangements as successful.

IT Outsourcing Dynamic Capabilities

We define ITO dynamic capabilities as *the ability of an organization to purposefully extend, create or modify its IT resources through outsourcing arrangements.* Dynamic capabilities include key processes: sensing, search/selection, and orchestration (Helfat et al, 2007). In the ITO context, a specific conceptualization of search/selection capability calls for differentiating between sourcing mode search/selection, and vendor search/selection. Also, when referring to relational capabilities (i.e., alliance-based and acquisition based capabilities), DCP includes an additional capability, that of assessing current internal resources and compare them to the desired level of resources. We call this capability "internal scanning".

Therefore, in order to take into account the specificity of the ITO context, we have expanded the original number of dynamic capabilities (3 capabilities) introduced in the literature (Helfat et al. 2007; Teece et al. 1997) to 5 dynamic capabilities. Therefore, our proposed model posits that the ability of a firm to reconfigure its IT resources depends on the extent to which it possesses these capabilities (here in ITO

context: sensing, internal scanning, vendor selection, sourcing mode selection, and orchestration).

These five capabilities are categorized as dynamic since they make a change in the current pattern of IT resources of a firm. In other words, the decision making involved in these capabilities, or the knowledge they provide, relate to the strategic resource positioning of a firm (Helfat et al., 2007). For example, sensing capability enables a firm to be aware of possible new vendors or opportunities in the market. Market vigilance and awareness shape the pattern of IT resources. Internal scanning reveals the need for change due to inadequacy of the extant IT resources. Vendor selection capability deals with searching for and selecting new vendors for acquiring IT solutions/resources. Sourcing mode selection capability enables a firm to determine an appropriate sourcing mode for a given IT activity/resource. And orchestration capability coordinates and positions the changes in IT resources that are about to happen. Therefore, these capabilities are related to the IT resources of a firm. They are dynamic since they shape (i.e., extend, create, modify) a new pattern for the firm's IT resources.

Sensing Capability

H2a: *The extent to which a firm possesses IT outsourcing sensing capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

Sensing includes exploring activities regarding "information about what's going on in the business ecosystem" (Teece 2007; p.1324), and external scanning of the environment to detect/identify new business opportunities (Helfat et al. 2007). In the ITO literature, the "investigate" phase of ITO (Cullen et al. 2005) includes activities that pertain to sensing (e.g., collecting intelligence on market conditions and suppliers). Sensing has also been conceptualized in terms of the client's "proactive

efforts" to learn about the ITO market (Sia et al. 2008, p.418). Proactive sensing has been defined as "maintaining vigilance by constantly scanning the environment to anticipate the need to create or generate new capabilities" (Tan and Sia 2006 ,pp. 193-194). We therefore define sensing capability as *the extent to which a client organization is able to scan – or has developed routines for scanning – the environment to identify new outsourcing opportunities, and to become vigilant of the ITO market conditions.* Based on DCP, sensing enables a firm to gain and sustain a competitive advantage. Firms need to be aware of their environment in order to be informed about market changes (e.g., changes in customers' preferences). In an ITO context, firms that are able to scan the market to be aware of IT suppliers, the type of activities that are outsourced in similar and different industries, and other types of intelligence related to ITO are well informed about how to use ITO to make changes to their IT resources. Therefore when the need arises (e.g., when the current portfolio of IT resources cannot respond to business needs), these firms are vigilant about market opportunities and offerings and, therefore, more likely to successfully make effective changes in their portfolio of IT resources.

Internal Scanning Capability

H2b: *The extent to which a firm possesses IT outsourcing internal scanning capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

This capability refers to "the ability to assess a firm's existing resource base relative to desired new resources and capabilities" (Helfat et al. 2007, p.81). In the ITO literature, it has been suggested that any external acquisition should occur after extensive evaluation of the firm's existing IT resources (Grover et al. 1996). Teng et al. (1995) found that the high levels of discrepancy in the performance of IT resources positively influences the ITO decision. It has also been found that the level of perceived discrepancies between actual and desired IT resources (Cheon et al.

1995; Teng et al. 1995) and poor levels of IT performance (Barthelemy and Geyer 2004; Loh and Venkatraman 1992) positively influence the decision to outsource. We therefore define the internal scanning capability as *the extent to which a client organization is able to evaluate – or has developed routines for evaluating – the adequacy of its IT resources.* Firms that possess this capability can identify whether their current IT resources are adequate (could respond to their business needs). Therefore, these firms make informed decisions about what they can acquire from the market to compensate for the inadequacy of their internal resources. Consequently, firms with an internal scanning capability are more likely to effectively change their portfolio of IT resources through ITO arrangements.

Search and Selection of Vendors Capability

H2c: *The extent to which a firm possesses IT outsourcing vendor selection capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

Based on DCP, in alliance-based or acquisition-based capabilities the search/selection refers to identifying a list of potential firms and choosing a firm for the creation of an alliance or a merger (Helfat et al. 2007). In ITO literature, the vendor selection process has been studied as one of the measures comprising the vendor management capability (Han et al. 2008; Lee et al. 2009a). We therefore define search and selection of vendor capability as *the extent to which a client organization is able to search for and select – or has developed routines for searching for and selecting – ITO vendors.* In the ITO literature, vendor selection has been studied as a process that influences ITO success (Lacity et al. 2010; Michell and Fitzgerald 1997). Also, in order for firms to succeed in their IT offshoring relationships they should invest in vendor selection processes, such as scans of offshore market vendors and evaluations and assessments of vendors (Ranganathan and Balaji 2007). Dutta et al. (2011) argue that only a carefully selected vendor with a

set of resources complementary to the client's can help the client compensate for the inadequacy of its own IT resources. This is in line with DCP, which suggests a firm's ability to search for and select partner firms whose resources complement the firm's resources will lead to the creation of the desired portfolio of resources. Therefore, firms with the ability to search for and select IT vendors are more likely to effectively reconfigure their IT resources.

Sourcing Mode Selection Capability

H2d: *The extent to which a firm possesses IT outsourcing sourcing mode selection capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

The search and selection capability refers to being able to look for and find new solutions to organizational problems (Zollo and Winter 2002). In acquisition-based capabilities, search and selection refers to first assessing whether the acquisition is the right sourcing mode and, second, detecting and evaluating target firms for acquisition (Helfat et al. 2007). In an ITO context, the selection of the sourcing mode has been conceptualized as achieving a fit between the sourcing mode and the type of IT activity at hand (Karimi-Alaghehband et al. 2011; Schwarz et al. 2009). IT activities that are strategic to the firm are found to be outsourced less often than IT activities that are considered commodities (Aubert et al. 2004). We therefore define sourcing mode selection capability as *the extent to which a client organization is able to determine – or has developed routines for determining – an appropriate sourcing mode for a given IT activity.* As per DCP, the ability to choose the right mechanism for obtaining the required resources will enable firms to create the desired portfolio of resources. Firms that possess this capability are able to assess whether a given IT activity should be kept in-house, outsourced, offshored, or performed using a combination of different modes. Choosing an appropriate sourcing mode for a given IT activity makes it more probable that a firm will make the desired changes to the

type of resources it uses. For example, development of a new application could be both outsourced and offshored. Offshoring the development of an application that requires constant communication between users and developers may result in an application that has little resemblance to users' needs. Therefore, firms that possess the sourcing mode selection capability are more likely to change their IT resources in a way that meets the business's needs.

Orchestration Capability

H2e: *The extent to which a firm possesses IT outsourcing orchestration capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

This capability entails having the managerial processes required to coordinate resources to carry out a change. (Helfat et al. 2007; Sharma and Shanks 2011). In alliance-based capabilities, orchestration includes synchronizing the tasks/resources of the firm with those of the partner (Helfat et al. 2007). In an ITO context, it refers to integrating newly acquired IT resources (e.g., the services/activities of an IT supplier) with current IT resources (e.g., the systems/services of the IT department). Especially in a multi-vendor context, this integration occurs through the coordination of work by different vendors (Bapna et al. 2010; Lee et al. 2009b; Levina and Su 2008). As Bapna et al. (2010) note, although multi-sourcing is becoming representative of modern organizations, the ability to reap its potential benefits remains a challenge for client firms. If a client firm has a single vendor, the ability to coordinate/integrate the resources and activities of that vendor with internal IT functions remains a challenge (Lacity et al. 2010; Ranganathan and Balaji 2007). We therefore define orchestration capability as *the extent to which a client organization is able to coordinate – or has developed routines for coordinating – the work of one or more vendors and integrating their resources and activities with the current IT department's resources and activities.* As DCP suggests, firms that possess an orchestration capability could

reconfigure their resources using the resources of their partner firms in order to create a winning combination of their own resources and that of their partners. In the ITO context, firms that possess an orchestration capability are able to plan the coordination of the activities of vendor(s) with the internal IT function's activities and plan the integration of the resources of vendor(s) with the internal IT function's resources. Consequently, firms that possess an orchestration capability are more likely to reach the desired portfolio of IT resources and activities.

IT Outsourcing Operational Capabilities

Operational capabilities "enable firms to perform their ongoing tasks of making a living" and therefore "pertain to the current operations of an organization" (Helfat et al. 2007, p.82). We define ITO operational capabilities as *the ability of the client firm to manage/execute ITO arrangements*. Because operational capabilities are context-specific, they should be identified either based on the literature of the context of interest or on practitioners' opinions, or both. Based on our review of the ITO literature, our consultation with two experienced ITO practitioners and an in-depth case study of a firm heavily involved in ITO, we introduce three operational capabilities: relationship management capability, vendor management capability, and contract management capability.

ITO operational capabilities relate to a firm's current IT outsourcing arrangements. Unlike dynamic capabilities, the processes and decision making involved in these capabilities do not pertain to strategic resource positioning of the firm. In other words they do not create, extend or modify the firms' IT resources. Rather they are related to managing the day to day IT outsourcing activities (e.g., managing the relationships with vendors).

Relationship Management Capability

H3a: *The extent to which a firm possesses IT outsourcing relationship management capabilities will be positively associated with the extent to which ITO delivery is successful.*

This capability involves communicating with vendors and solving problems collaboratively with vendors (Cullen et al. 2005; Dibbern et al. 2004). Collaborative work with vendors have been found to be important aspects of managing software development outsourcing arrangements (Poston et al. 2010). We define relationship management capability as *the extent to which a client organization is able to manage – or has developed routines for managing – its relationships with IT vendors.* IT outsourcing literature has extensively studied partnership quality (e.g. Grover et al., 1996; Lee and Kim 1999) as an antecedent of IT outsourcing success. Partnership quality from clients' perspective has dimensions of trust, business understanding, risk and benefit share and commitment (Lee and Kim 1999), which all could be consequences of relationship management processes. Therefore, we deem that relationship management and partnership quality are two different but related concepts. Since we offer a capability based model in the present study we focus on relationship management capability and we do not include partnership quality in our model[13]. Firms that possess relationship management capability invest in effective communication channels and mechanisms with their IT vendors, try to solve problems with the vendors, and motivate vendors to perform better and improve. As a consequence these firms are more likely to perceive the deliverables of their vendors satisfactory.

13. We however measure partnership quality in our survey to test that the two constructs could empirically be differentiated.

Vendor Management Capability

H3b: *The extent to which a firm possesses IT outsourcing vendor management capabilities will be positively associated with the extent to which ITO delivery is successful.*

Vendor management is also one of the core IS capabilities suggested in order to receive added value from IT suppliers (Willcocks et al. 2007). Firms that are effective in carrying out their IT offshoring arrangements have been found to invest in their governance structures and monitoring routines, while ineffective firms failed to invest in such routines and structures (Ranganathan and Balaji 2007). Moreover, vendor management capability, which refers to monitoring and evaluating vendor performance, was found to positively affect one of the main determinants of ITO success: partnership quality (Han et al. 2008; Lee and Kim 1999). Lee et al. (2009a) found that vendor management capability not only directly and positively influences ITO success, but also has a moderated effect on ITO success through the vendor's capabilities. We define vendor management capability as *the extent to which a client organization is able to implement – or has developed routines for implementing – ITO contracts and monitoring the activities of IT vendors.* Firms that possess vendor management capability monitor and evaluate the performance of vendors, both regarding SLAs and business satisfaction. Therefore, these firms actively engage in their ITO arrangements and take corrective action before problems escalate. Consequently they are more likely to be satisfied with their vendors' performance/ deliverables.

Contract Management Capability

H3c: *The extent to which a firm possesses IT outsourcing contract management capabilities will be positively associated with the extent to which ITO delivery is successful.*

This capability includes the processes through which firms operationalize requirements in the form of detailed service descriptions and SLAs and negotiate the price of the IT solutions/services to be acquired (Ranganathan and Balaji 2007). Contract preparation and negotiation have been found to be one of the main building blocks of the ITO lifecycle (Cullen et al. 2005) and one of the core IS capabilities (Willcocks et al. 2007). Characteristics of ITO contracts (duration and type) are also found to impact different outcomes of IT outsourcing (Lee et al. 2004). An inability to design and negotiate desired contracts leaves the client with a deal that has little resemblance to the one it expected (Cullen et al. 2005; Ranganathan and Balaji 2007). By preparing drafts of SLAs and of the price framework in advance (i.e., designing what the firm needs), firms can protect themselves from accepting vendors' standard contracts as a result of limited negotiation time and fast-approaching deadlines (Cullen et al. 2005). Argyres and Mayer (2007) argue that contracting is a managerial (i.e., organizational) capability through which managers assign roles and responsibilities to the parties and decide how parties should communicate. We therefore define contract management capability as *the extent to which a client organization is able to write and negotiate – or has developed routines for writing and negotiating – contracts with vendors.* Firms that are able to write clear service descriptions, specify SLAs that reflect their business needs, and negotiate the desired SLAs and their pricing with vendor(s) create solid ground for monitoring and measuring the performance of their vendors, and are therefore more likely to be satisfied with the performance and deliverables of the vendors.

IT Outsourcing Learning Capabilities

In DCP, learning capabilities have been conceptualized as mechanisms through which firms accumulate experience and therefore perform their activities better and faster (Teece et al. 1997). In alliance-based capabilities, effective knowledge management processes enable a firm to learn from its partner and

consequently manage an effective alliance (Helfat et al. 2007). Through learning capabilities, firms also correct and modify other processes and capabilities, including their dynamic and operational capabilities (Zollo and Winter 2002). ITO research has examined the influence of knowledge sharing on ITO success (Lee 2001; Lee and Kim 1999) and on the decision to continue offshoring (Dedrick et al. 2011). Learning from the external environment (e.g., gathering insight from experts) is also considered an important task in the ITO lifecycle (Cullen et al. 2005). From a learning-by-doing perspective, the client firm's experience with IT outsourcing (i.e., learning how to manage future ITOs) has been found to be an important factor in ITO success (Gopal et al. 2003; Lacity et al. 2010). Learning is conceptualized as the assimilation of feedback and the realization of a need to create new capabilities (Sia et al. 2008; Tan and Sia 2006). Also, as firms gain experience working with suppliers, they learn how to more clearly define responsibilities and expectations in contracts and how to better plan for contingencies (Mayer and Argyres 2004).

Therefore, we define learning capability as: *the extent to which a client organization is able to acquire – or has developed routines for acquiring – external knowledge on how to carry out IT outsourcing as well as for accumulating and employing experience from prior IT outsourcing relationships.* We also propose the following:

H4 a *to* e: *The extent to which a firm possesses IT outsourcing learning capabilities will be positively associated with the extent of its IT outsourcing dynamic capabilities (including: sensing, internal scanning, vendor selection, sourcing mode selection, and orchestration).*

H5 a *to* c: *The extent to which a firm possesses IT outsourcing learning capabilities will be positively associated with the extent of its IT outsourcing operational*

capabilities (including: relationship management, vendor management, and contract management).

Firms with ITO learning capability are able to accumulate experience and knowledge and use it as they carry out new ITO arrangements. For example, through its learning capability (from its own experience) a firm might realize that improvements are needed to its vendor evaluation process and then, using the expertise of a consultant, actually improve the process. Therefore, firms with learning capabilities are able to improve their other processes (e.g., vendor selection capabilities), which suggests a mediated effect on reconfiguration through dynamic capabilities. This is also in line with DCP where dynamic capabilities occur or arise from prior learning and experience (Helfat et al., 2007; Zollo and Winter, 2002). Also, learning capabilities could lead to more efficient execution of ITO operational capabilities (e.g., contract management) and therefore lead to successful delivery.

Methodology

Measures

Each of the constructs of our model was measured with questionnaire items (indicators). Although most of the items were developed from the conceptual definitions (See Appendix 4.2 (B). Complete list of measures), existing measures from prior research were adopted and consulted wherever possible. For the wording of the measures, we used previous studies on dynamic capabilities and learning organizations (e.g.,Pavlou and El Sawy 2006).

The Success Measures- Measures of successful reconfiguration were developed from conceptual definition and based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002). Four measures of successful reconfiguration capture the change made

in IT resources/services/offerings. Measures of the Successful delivery construct (4 items), which capture the operational success of IT outsourcing (whether SLAs and deadlines are met, cost and quality of the services acquired are as agreed upon) were adapted from Ho et al. (2003a) and Poppo and Zenger (2002). ITO success is measured using 3 items that capture the overall realization of ITO objectives (Grover et al 1996; Saunders et al. 1997).

Dynamic Capabilities Measures- All the measures for different dynamic capabilities constructs were newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002). Sensing capability was measured using 4 items that capture reviewing and scanning of the IT outsourcing market. Sourcing mode selection capability was measured using 4 items capturing the ability to find an appropriate sourcing model for a certain IT activity. Four items were used to measure vendor selection capability, which capture the ability to identify, evaluate, and select an IT supplier. Internal Scanning capability was measured using 3 items capturing the adequacy of the internal IT resources/ services. Finally, orchestration capability was measured using 4 items capturing the coordination and synchronization among different activities and vendors.

Operational Capabilities Measures- The measures for contract management capability (5 items) were developed based on Ranganathan and Balaji 2007, Cullen et al. 2005; Argyres and Mayer (2007). These items capture the ability to negotiate and write IT outsourcing contracts. Vendor management capability was measured using 3 items that capture monitoring and evaluating vendors' performance (Han et al. 2008; Lacity et al. 2010). Relationship management capability was measured using 4 newly developed items that capture the ability to motivate and communicate with vendors.

Learning Capabilities Measures- this construct was measured using 3 items to capture learning from experience dimension and 4 items to capture the learning from external knowledge dimension. The measures were developed based on

dynamic capabilities perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002).

Control Variables – The following variables were measured so that their effects on IT outsourcing success are controlled: size (number of employees in 5 categories of 500-1000, 1000-5000, 5000-10,000, 10,000-20,000, and greater than 20,000), contract duration (duration of the longest IT outsourcing contract), number of current vendors (one, two, or more than two vendors), IT outsourcing scope (minimal, comprehensive, selective).

Validating the Instrument

In order to ensure the content and face validity as well as readability of the measures, we asked four managers experienced in IT outsourcing to read the measures along with the conceptual definitions. They advised whether all items were clear and could be answered by the intended group of respondents, and if the measures indeed corresponded to the constructs, if there was any item missing for a constructs. We modified some of the measures based on the feedback of these four managers. The measures were further validated using a card sorting technique (Moore and Benbasat 1991). The items first were presented to 2 Ph.D. candidates. Based on their sorting and comments some changes were made to the wordings of the items. For the second round, due to large number of measures we split the constructs into two groups and presented each group to 5 Ph.D. candidates in the IS field. We provided the raters with the name of the constructs and asked them to categorize each item under one construct. However, they were free to express any comment if they believed an item belongs to more than one construct or that an item cannot be categorized at all. For the first group of constructs (including: sensing, internal scanning, learning, orchestration, and sourcing mode selection capabilities) the weighted Fleiss' Kappa was 0.93 and for the second group of constructs (including: ITO success, successful reconfiguration, successful delivery, vendor management

capability, relationship management capability, and vendor selection capability) the weighted Fleiss' Kappa was 0.88. Since the agreement was high for both groups (greater than 0.65) (Moore and Benbasat 1991) we did not perform another round of card sorting. Four items were deleted after the card sorting, since all of the raters mentioned them as ambiguous. We further validated the instrument by conducting a pre-test with 46 senior IT managers from the same population. The pre-test results (convergent, discriminant and reliability tests) led us to modify the wordings of some of the items, delete some items, and add some items. We modified the measures both based on the statistical results and in light of the comments we had received in the card sorting round. We gathered another round of pre-test data from the same population (n=54) to assess whether the changes made were effective. Based on the results of the second pre-test we distributed the survey with no further changes.

All of the items were formulated in a reflective mode and were asked at the organizational level. To alleviate the common method variance susceptibility caused by method-method pairing before data collection, some of the suggestions (procedural remedies) made by Sharma et al., (2009) and Podsakoff et al., (2003) were applied. The first one is using different scales for items of different constructs. Therefore, the constructs were measured using three different scales: five-point Likert scale ranging from 'strongly agree' to 'strongly disagree' with "neither agree nor disagree" as a mid-point, seven-point Likert scale ranging from 'highly inaccurate' to 'highly accurate' with 'Neither Accurate Nor Inaccurate' as a mid-point, and semantic differential approach ranging from '1-Never' to '5- very frequently' without providing the labels (i.e. rarely, sometimes, often) in between the two extreme points (items of the same constructs had similar anchoring). Also, a psychological separation was made among constructs. To create a psychological separation between questions of different constructs, measures of IS strategy (innovative, conservative, no strategy) (Chen et al. 2010), work experience, and education were used. IS strategy items are related to the IT domain at the organizational level, however they

are not related to IT outsourcing; therefore they are suitable for providing a psychological separation especially between the questions of independent variables and dependent variables (Podsakoff et al. 2003).

Data

Large US-based firms (number of employees greater than 500) across different industries (excluding Governmental organizations and social services/ Public Administration) that have outsourced some or all of their IT activities were chosen. Following the literature on dynamic capabilities (Capron and Mitchell 2009; Lichtenthaler 2009), our target population was IT senior managers (e.g., CIOs). IT senior managers are better informed about ITO capabilities that lead to success and about ITO success itself. Data was gathered via an online questionnaire survey. The link to the survey was sent from a Panel company with access to IT managers of different industries. Although the original target population was set as senior IT managers, the survey included an extensive set of screening questions to make sure to get suitable respondents for our survey.

- ***Response Rate***

The panel company sent 2359 invitations. Overall, 918 managers clicked on the survey link giving the hit rate of 39%. Out of 918 respondents 640 continued to take the survey giving the rate of 27%. Only 556 respondents[14] started the survey giving the rate of %24 (556/2359). Three hundred and thirty six respondents were screened out at the first level of screening due to one or combination of the following reasons: not being in IT field, not having an ITO contract, and firms of less than 500 employees. At the second level of screening 66 respondents were screened out due to one or combination of the following reasons: not being personally involved in ITO

[14] Eighty four respondents could not further continue to the survey since we had set in the survey system (i.e., Qualtrics) a priori number of completed surveys (i.e., sample size) to be 150 (based on a regression power of 0.8).

decision making or managing ITO contract, having ITO contracts for less than a year, not having a managerial position, being in governmental or social services or public administration industries, and not having outsourced one or combination of the following IS functions: IT operations, Data center management, Facilities management, Telecommunications & telephony management and maintenance, Application development, IT Planning/management activities. Therefore, 154 respondents could continue to the main questions of the survey. Two of the respondents were terminated in the middle of the survey due to giving wrong response to quality control questions ('if you are still paying attention to this survey, please select number 2 for this answer'). Therefore, we were left with 152 usable responses for the data analysis. This number satisfies the minimum required power indicated in the regression power tables which is 0.8 (Cohen 1992, p. 158). Also, our data analysis approach (i.e. PLS) requires sample size of "at least 10 times the number of items in the most complex construct" (Gefen et al. 2000, p.9). Since the most complex construct of our model has 5 items (and therefore the minimum required number is 50) our pre-determined sample size (i.e. our usable data points) surpasses this rule of thumb.

Data Analysis Approach

Data analysis was conducted with Smart-PLS (2.0) (Ringle, Wende, and Will, 2005). Partial least squares (PLS) regression was used to analyze the data mainly due to two reasons. First, the data points of this study do not follow a normal distribution [Shapiro-Wilk test for all the observed variables was significant (P-value was smaller than alpha level of 0.05 and therefore null hypothesis that population is normally distributed should be rejected)]. Unlike Covariance-based SEM, PLS does not assume a multivariate normal distribution (Chin 2010). Second, our model has an exploratory nature and therefore more appropriate to be tested with a PLS approach (Gefen et al. 2000).

Results

Descriptive Statistics

The data were gathered from client firms operating in a wide range of industries, with IT outsourcing contracts lasting from a year to 30 years, with IT outsourcing scope of minimal to total. Tables 4-II (a), 4-II (b) and 4-II (c) show the descriptive characteristics of our respondents. The descriptive statistics of the variables is shown in appendix 4.1.

Table 4.II (a)		
Number of Employees	**Frequency**	**%**
500-999	31	20.4
1000-4999	54	35.5
5000-9999	26	17.1
10000-19999	19	12.5
= > 20000	22	14.5
Total	152	100.0
Renewal Times	**Frequency**	**%**
Never renewed	11	7.2
Renewed once	64	42.1
Renewed more than once	77	50.7
Total	152	100.0
Respondent's Title	**Frequency**	**%**
CIO	32	21.1
CTO	16	10.5
VP IT/IS	17	11.2
Senior IT/IS Manager	31	20.4
IT/IS Manager	37	24.3
Senior IT/IS Director	10	6.6
IT/IS Director	9	5.9
Total	152	100.0

Table 4.II (b)		
Industry	**Frequency**	**%**
Banking, Finance, Insurance	25	16.4
Personal Services, Real Estate	22	14.5
Construction / Mining	8	5.3
Engineering & Management	13	8.6
Health	22	14.5
Hotel/ Recreational /Amusement	4	2.6
Legal	1	0.7
Manufacturing	30	9.7
Retail, Wholesale / Distribution	13	8.6
Transport	8	5.3
Other	6	3.9
Total	152	100.0
Duration of Longest Contract (in years)	**Frequency**	**%**
2	26	17.1
3	30	19.7
4	19	12.5
5	37	24.3
6	3	2.0
7	6	3.9
8	11	7.2
9	2	1.3
10	9	5.9
12	2	1.3
15	3	2.0
20	3	2.0
30	1	0.7
Total	152	100.0

Table 4.II (c)		
Scope of ITO	**Frequency**	**%**
Comprehensive	21	13.8
Selective	112	73.7
Minimal	19	12.5
Total	152	100.0
Number of Vendors	**Frequency**	**%**
One vendor	22	14.5
Two vendors	65	42.8
More than two vendors	65	42.8
Total	152	100.0

Results of Model Testing

- ***Measurement Model: Reliability and Validity***

  - **Reliability**

To assess the reliability of the each block of constructs, we have used the composite reliability index from PLS report. This reliability measure does not assume equivalence among the measures (i.e. parallelity: where each measure is assumed to be equally important in defining a construct), and therefore is argued to be a better measure of reliability (Chin 1998). Appendix 4.3 (C) shows that all of the constructs have composite reliability of greater than 0.8 which is above the suggested minimum (0.7) (Vinzi et al., 2010).

  - **Validity of the Items and the Constructs**

We assessed the validity of each item by checking if each of the item loadings is greater than 0.7 and the T-test of each loading is significant [bootstrap procedure with 500 resamples was used to test for loading's significance (Chin, 1998)]. As shown in Appendix 4.3 (C) (Validity at the item level), this holds for all of the items. Also, each item should not highly and significantly load on the other constructs (i.e. non existence of high cross loadings). Appendix 4.3 (B) shows that all the loadings

on the intended constructs are higher than loadings on other constructs, which indicates discriminate validity at the item level.

We assessed the validity of the constructs by checking whether average variance extracted (AVE) of each construct is greater than 0.5. Appendix 4.3 (C) (Measurement model- Validity and reliability) shows that this holds for all the constructs (smallest AVE is 0.54). Also, to assess discriminant validity at the construct level, we compared the Square root of AVE of a construct with the correlations of that construct with all other constructs. If Square root of AVE is greater than all the correlations there is indication that discriminate validity at the constructs level exists. Appendix 4.3 (A) shows that this holds for all the constructs.

- **Method Bias**

Since we collected data from single respondents both for the independent and dependent variables, common method variance could be a threat by posing "a rival explanation for the correlation observed between the measures." (Podsakoff et al. 2003, p.879). Therefore, we performed several tests to rule out common method bias as a factor in the study.

First we performed Harman's one-factor test (Podsakoff et al. 2003). To perform this test, all items are loaded into an un-rotated exploratory factor analysis to test whether a single factor emerges or accounts for the most of the variance in the items. In our study, 20 factors emerged, the largest of which accounted for %30 of the variance, which indicates common method variance is probably not an issue.

The second test is to examine the correlations between all the constructs of the model. If any of the constructs are highly correlated with each other (corr>0.9) then common method bias could be a threat (Pavlou and El Sawy 2006; Siponen and Vance 2010) . In our study, the greatest correlation between two constructs is 0.73, which is another indication that common method variance is not an issue.

Third, we used a marker variable test suggested by Podsakoff et al. (2003) and used by Pavlou and El Sawy (2006). In our study, we included items of IS strategy survey from Chen et al. (2010) to create a psychological distance to reduce method bias. We used the same construct to test for existence of method bias. If method bias would be a threat in the study, a variable which theoretically is not linked to the focal constructs of the study (i.e. marker variable: here IS strategy) should correlate high with the focal constructs of the study. In our study, the highest correlation of the strategy constructs with the rest of focal constructs is 0.28 showing very low correlation between IS strategy and the rest of focal constructs.

Fourth, we performed a further analysis for determining method bias by introducing a method factor (i.e. construct) and determine if the variance in the indicators are result of the substantive (focal) constructs or the method construct. For the complete guideline on how to perform the test please see Podsakoff et al. (2003) and Siponen and Vance (2010). Performing the procedure, we could see that variance of indicators due to substantive constructs is considerably greater than the variance due to the method construct (Appendix 4.4). The average variance explained by substantive constructs is %63 versus % 1 for the method construct.

These results indicate that the influence of method factor was significantly smaller than influence of substantial factors. Also the loadings of the method factor were mostly insignificant. Taking all these tests into account, we could conclude that common method bias is not a concern in this study.

- ***Structural Model***

To test the structural model (Figure 4.2) we ran three analyses using PLS: PLS algorithm, bootstrapping (PLS settings: individual sign changes, number of cases 152, number of samples 5000), and blindfolding (omission distance 7: the sample size divided by omission distance should not be an integer) (Hair et al. 2012).

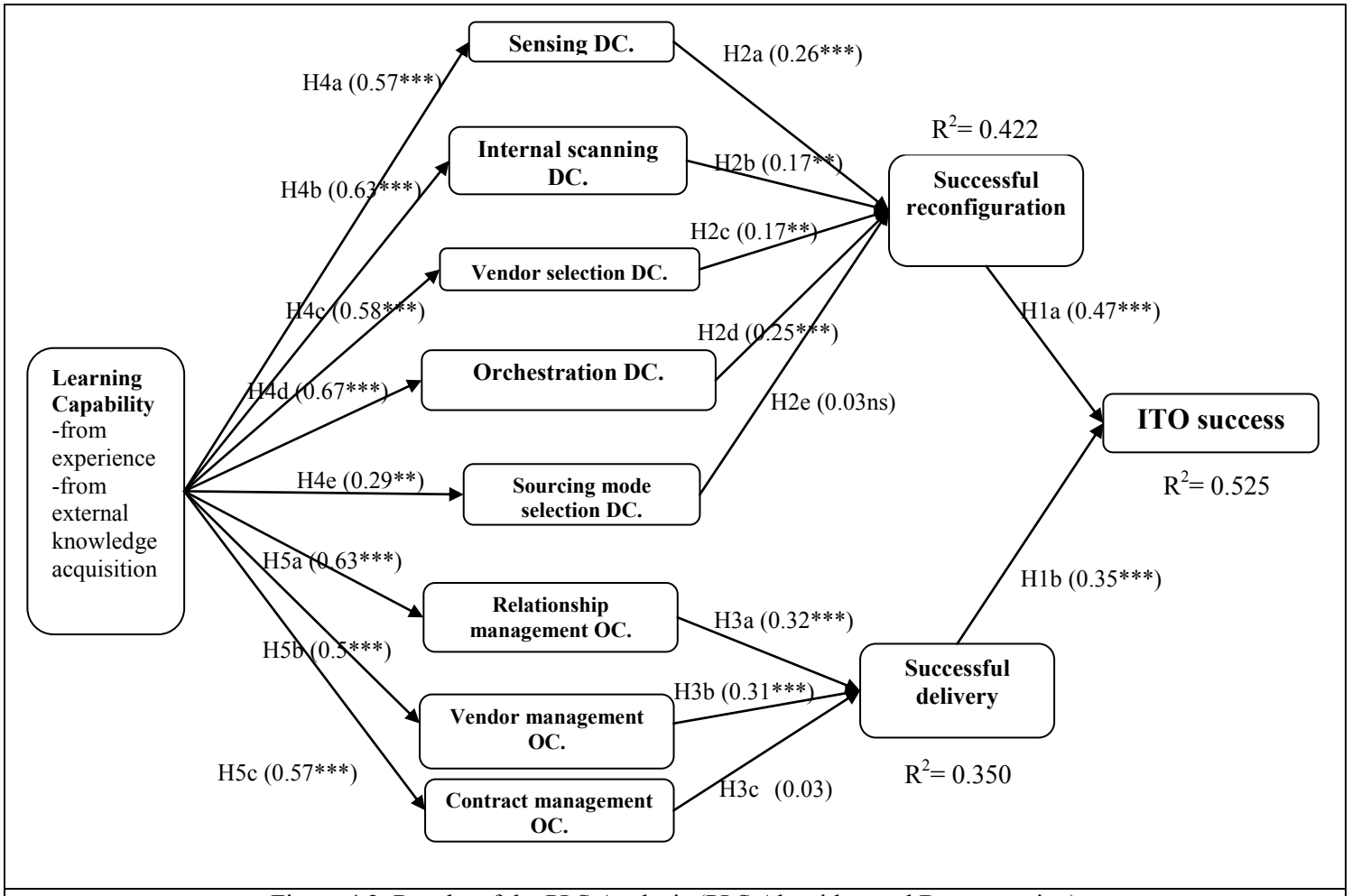

Figure 4.2. Results of the PLS Analysis (PLS Algorithm and Bootstrapping)

The result of PLS algorithm and bootstrapping procedures (estimates of the magnitude of the standardized parameters and their corresponding t-values) are shown in Appendix 4.5 (A). The results show that all the paths of the model are significant except for two: the path from sourcing mode selection to successful reconfiguration, and from contract management capability to successful delivery (t-tests are 0.59 and 0.61 respectively). Therefore, hypotheses H2d and H3c are not supported. The results also show that successful reconfiguration and successful delivery explain more than half of the variance of IT outsourcing success (R^2= 0.525). Dynamic capabilities explain about 40% of the variance in successful reconfiguration (R^2= 0.422), and operational capabilities explain about 35% of the variance in successful delivery (R^2= 0.350).

We also calculated the effect size of the predictor variables (successful reconfiguration and successful delivery) [Cohen's (1988) f^2] on ITO success. The formula to calculate the effect size is shown in the equation below:

$$f^2 = (R^2_{included} - R^2_{excluded})/(1 - R^2_{included})$$

Replacing the values once for successful reconfiguration and once for successful delivery we obtained $f^2 = 0.34$ and $f^2 = 0.2$ respectively:

$$successful\ reconfiguration \qquad f^2 = \frac{0.525 - 0.365}{1 - 0.525} = 0.34$$

$$successful\ delivery \qquad f^2 = \frac{0.525 - 0.432}{1 - 0.525} = 0.2$$

Henseler et al. (2009, p. 303) suggest "values of 0.02, 0.15, and 0.35 can be viewed as a gauge for whether a predictor latent variable has a weak, medium, or large effect at the structural level". Therefore, our results suggest that successful

reconfiguration has a large effect and successful delivery has a medium effect on IT outsourcing success.

- **Evaluation of the Model**

We performed a blindfolding procedure using Smart-PLS (2.0) to obtain cross-validated redundancy measures for each construct in order to test for predictive relevance of the model (Hair et al. 2011). Based on Hair et al.'s (2011) recommendation the omission distance in the blindfolding procedure should be between 5 and 10 (we set the omission distance equal to 7). Also, dividing the number of valid observations by the omission distance should not result in an integer (152/7=21.7 which is not an integer) (Hair et al. 2011, 2012). For the three endogenous variables of the model: ITO success, successful reconfiguration and successful delivery, Q^2 (Stone-Geisser's Q^2) were greater than zero (0.32, 0.30 and 0.18 respectively) indicating "that the exogenous constructs have predictive relevance for the endogenous construct under consideration" (Hair et al. 2011, p.145).

To evaluate the relative predictive relevance of successful reconfiguration and successful delivery, we calculated their respective q^2 using the formula below:

$$q^2 = (Q^2_{included} - Q^2_{excluded})/(1 - Q^2_{included})$$

Successful reconfiguration	q2 = (0.32-.206) / (1-0.32) = 0.17
Successful delivery	q2 = (0.32-.279) / (1-0.32) = 0.1

For successful reconfiguration we obtained q2=0.17 and for successful delivery we obtained q2=0.1 which both could be considered as medium (values of 0.02, 0.15, and 0.35 show a small, medium, or large predictive relevance of a latent variable). Therefore, we could conclude that successful reconfiguration has slightly larger predictive relevance than successful delivery in explaining IT outsourcing success.

Also, we calculated a geometric mean of the average communality index and the average R^2 value called goodness of fit (GoF=0.484) from the formula below (Henseler and Sarstedt 2012):

$$GOF = \sqrt{\emptyset com * \emptyset R^2_{inner.}}$$

Due to some limitations mentioned for GoF, a relative goodness of fit index has been proposed as below (Esposito Vinzi et al., 2010):

$$GoF_{rel} = \sqrt{\emptyset \frac{Com_{pls}}{Com_{PCA}} * \emptyset \frac{R^2_{PLS}}{R^2_{CanCor}}}$$

"GoF_{rel} contrasts the communalities obtained from PLS with the communalities obtained from a principal component analysis, and the R^2 values obtained from PLS with the R^2 values obtained from a canonical correlation analysis" (Henseler and Sarstedt, 2012). The relative GoF of our model is **0.96** which is above the suggested point (GoF values above 0.9 'clearly speaks in favor of the model') (Esposito Vinzi et al. 2010, p.59)[15]. The columns based on which we calculated both GoF and relative GoF could be found in the Appendix 4.6.

- **Control Variables**

A t-test was performed to control for the effect of size, duration of contracts, scope of IT outsourcing and number of vendors. Since the research model has more than one endogenous variable, the effect of these variables on each endogenous

15. "Owing to the different meanings of fit [in CBSEM and PLS-SEM], there may be instances in which the CBSEM fit statistics indicate a perfect fit, but the GoF signals the absence of fit" (Henseler and Sarstedt, 2012; p.8).

variable was tested separately. To control for the effect of these variables on IT outsourcing success, successful reconfiguration and successful delivery along with the four control variables were used as antecedents of ITO success. The effects of successful reconfiguration and successful delivery on ITO success remained significant (t-tests 4.85 and 6.53 respectively). Therefore adding the variables of scope, number of vendors, duration, and size as antecedents of IT outsourcing success did not make the effect of successful reconfiguration and successful delivery non-significant. We repeated the same procedure for all endogenous variables of the model. All the links from exogenous variables to endogenous variables remained significant after addition of the 4 control variables. The only place that addition of control variables did make a change was the link between sensing capability and successful reconfiguration. Adding IT outsourcing scope variable (minimal, selective, and comprehensive), as an antecedent of successful reconfiguration, made the effect of sensing on successful reconfiguration non-significant (t-test= 1.53). To investigate more on the effect of IT outsourcing scope, we split the data into three categories and performed another regression analysis only for the effect of sensing on successful reconfiguration. The results show that sensing positively and significantly influence successful reconfiguration both in comprehensive and selective outsourcing groups (t-tests 2.1 and 4.78 respectively) but not in the minimal outsourcing group (t-test 1.02). Since the number of data points is not enough to conduct a multi-group analysis for the whole model, we suggest future studies gather more data for each categories of comprehensive, selective, and minimal IT outsourcing scope and compare the model fit and other coefficients amongst the three groups.

Discussion

The objective of the study was to test a capability-based model that posits dynamic and operational capabilities influence different aspects of ITO success, and that IT outsourcing success is explained by both strategic and operational determinants. The results support the hypotheses related to this objective.

First, all hypotheses (H2a, H2b, H2c, and H2e) except for one (H2d) linking dynamic capabilities to successful reconfiguration (strategic success) were supported. Amongst the five dynamic capabilities, we found that orchestration capability and sensing capability have the strongest effects on successful reconfiguration (strategic success). While the influence of vendor selection capability and internal scanning capability are significant, they are not as strong as sensing capability and orchestration capability. Moreover, the influence of sourcing mode selection capability on successful reconfiguration is not significant (H2d not supported; we will discuss the possible reasons later in the discussion section). These results are indeed interesting because they support the core capabilities introduced in DCP, which are sensing and orchestrating (coordinating). Although the rest of dynamic capabilities were also discussed in DCP in the context of relational capabilities (e.g. selection of the acquiring mode), sensing and orchestrating were introduced as the main building blocks of dynamic capabilities across different conceptualizations of the perspective (Teece et al., 1997; Eisenhardt and Martin, 2000; Helfat et al 2007). Our findings support this premises.

Second, all hypotheses (H3a and H3b) except for one (H3c) linking operational capabilities to successful delivery (operational success) were supported. Regarding the influence of operational capabilities on successful delivery, it was found that vendor management and relationship management capabilities have the same strengths in influencing successful delivery. This finding suggests that, at least in the context of this study, relationship aspects of managing IT suppliers (motivating suppliers, collaborating with suppliers to solve problems) are as important in determining operational success as monitoring and evaluating suppliers' performance against contracts and agreed upon SLAs. A non-significant path was also found from contract management capability to successful delivery (H3c not supported; we will discuss the possible reasons later in the discussion section).

Third, the results of the study indicates that successful reconfiguration (strategic success) and successful delivery (operational success) both positively and significantly influence ITO success (H1a and H1b both supported) and together they explain more than half of the variance in IT outsourcing success (R^2= .525). This finding support the premises that IT outsourcing plays a strategic role (by modifying or enhancing the type of IT resources and IT services and therefore by making a change in portfolio of IT resources), as well as an operational role (receiving quality IT services in time and within budget) in organizations. Therefore, the results supports the importance of both strategic and operational success in determining the overall success of IT outsourcing.

Finally, the findings suggest that learning capabilities positively and significantly influence both dynamic and operational capabilities (hypotheses H4a to H4e, and H5a to H5c are supported). While previous studies conceptualized learning capabilities as part of dynamic capabilities (e.g. Pavlou and ElSawy, 2006) this study conceptualized learning capabilities separately and hypothesized their influence on both dynamic and operational capabilities. In the context of our study, and in line with Zollo and Winter (2003) and Teece et al.'s (1997) conceptualization, learning capabilities play a role in improving and modification of other processes and routines (dynamic and operational capabilities).

Discussion of Non-supported Links

The results did not support the effect of sourcing mode selection capability on successful reconfiguration. We argue several reasons for this finding: 1) operationalization of the construct: we have measured this construct using the items that ask whether the firm has the expertise/skills in determining if a certain IT activity should be outsourced or kept in-house. Since there are many other sourcing modes available to firms, the dichotomy that we used for operationalization of the sourcing-mode-selection capability construct might not be able to capture this capability

appropriately. 2) Although the dynamic capabilities perspective emphasizes the role of sourcing mode selection (in alliance and acquisition based capabilities), in the context of IT outsourcing this capability might not be as prominent. In alliance-based and acquisition-based capabilities, a joint venture or a merger is about to happen. Therefore, the decision to create the alliance or to buy another firm would be a very significant and vital decision for firms. 3) The context of our study: it also might be possible that this path is non-significant in our data set, but significant in another context. For example, we collected data from companies with more than 500 employees (large companies). It could be possible that the effect of the capability on successful reconfiguration becomes prominent for medium size/small companies (SMEs).

The results did not support the effect of contract management capability on successful delivery. While again the operationalization of the construct might be a possible reason, it also might be the prominence of the construct in the context of our study. We have operationalized contract management capability as the ability to negotiate and to write different aspects of a contract. Looking at the descriptive statistics for this construct, we could see that the mean is very high (6.009). Therefore, it could be possible that in large organizations that we have surveyed, the ability to write and negotiate contracts is so high for all the firms that it could not differentiate between different levels of delivery. We believe that more data from different contexts could shed more light on these non-significant relationships. Also, successful delivery is largely explained by vendor management and relationship management capabilities. Presence of these two constructs leads to a non significant influence of contract management.

Limitations

Relying on a single informant to evaluate the firm IT outsourcing capabilities and IT outsourcing success calls for addressing the issue of common method bias. In

this study, several techniques were used to reduce the extent of common method bias. First, the questionnaire design ensures that each antecedent was separated from its hypothesized consequence by another constructs. Also, a psychological separation was created between capability constructs and outcome constructs by adding questions that were relevant to the general context of the research but not directly related to the focal constructs of the study (e.g., IT strategy). After data collection, multiple tests were performed (i.e., Harman's one-factor test, correlation analysis, marker variable analysis, and method factor analysis) and confirmed that common method bias is not a threat to the results.

We used a cross-sectional design to capture the influence of ITO capabilities on ITO outcomes. The design might be a limitation to capturing the causal effects of capabilities on success. To overcome this potential limitation, several variables were controlled for to make sure that the increase in success variables are indeed determined by the capabilities and not by contextual factors. Future research could use a longitudinal design to test for causal influence of ITO capabilities on ITO success.

The results of the study might not be generalizable to other context. Future research therefore could test the model in different types of context. In this study we surveyed US-based firms. The model also could be tested in other geographical regions (e.g., Europe, Asia and Australia). Also, we surveyed large companies (number of employees greater than 500). The model also could be tested for small to medium size companies.

Implications and Conclusion

Notwithstanding these limitations this study offers a number of contributions to theory and practice.

Implications for Research

The study offers an explanatory path from different IT outsourcing capabilities to IT outsourcing success. While previous research studied the effect of some of IT outsourcing capabilities on IT outsourcing success, the understanding on how the capabilities lead to success was limited.

By opening the black box of 'IT outsourcing being strategic', this study aimed to answer why dynamic capabilities lead to IT outsourcing success. While previous research emphasized the strategic role of IT outsourcing (e.g., ITO helps a firm to make strategic investments, helps the firm to enter to new markets), it was not clear *how* IT outsourcing could play this strategic role: for example how it could help the firm to enter new markets. Taking a dynamic capabilities perspective that focuses on 'resource reconfiguration', this study introduced the notion of ITO successful reconfiguration to shed light on why and how IT outsourcing could be strategic: being strategic means changing the pattern and portfolio of IT resources, which support business strategies/initiatives. If the new pattern supports the business strategies/initiatives then IT outsourcing will deem successful.

Notwithstanding the importance of successful reconfiguration in determining the overall ITO success, operational antecedents also matter. Operational capabilities will lead to overall ITO success by determining the contractual success of IT outsourcing. To the extent to which terms and conditions of contracts are met (within time and budget projects along with receiving quality services), IT outsourcing will be perceived to be successful. However, as the results suggest, in the context of our study, strategic success explains more of overall IT success than operational success. This finding implies that IT outsourcing indeed plays a strategic role in client organizations and that future research should focus on other ways of conceptualization of ITO strategic contributions.

We believe that the study is one of the first attempts to create an endogenous theory of IT outsourcing as encouraged and called for by Lacity et al., (2010). Although the model is grounded in the dynamic capabilities perspective, the constructs and their measurements are fully developed for the context of IT outsourcing. Therefore, the study makes a contribution to IT outsourcing research by conceptualizing and operationalizing IT outsourcing capabilities and by testing their effect on different measures of ITO success. While previous ITO research has studied part of these capabilities (operational ones in particular), to our knowledge no study has theoretically and systematically conceptualize and differentiate between different categories of capabilities and differentiate their effects on different success measures. Moreover, by theoretically differentiating between different types of success, the model provides a better understanding of why these capabilities lead to success.

Moreover, previous ITO research mostly has focused on operational or contractual success of IT outsourcing and also on overall perception of ITO success, and less on the strategic success of IT outsourcing. While as a dimension of overall success, ability to focus on core competencies (as a strategic type of success) was studied in the literature, in our conceptualizations, IT outsourcing does not play the role of an activity that helps firms to dispose of their IT activities in order to be able to focus on more important set of activities; however it takes the perspective that IT outsourcing could be strategic to firms in itself by providing the necessary changes to the IT resources and therefore support business needs and initiatives.

Also, previous ITO research focused mainly on partnership quality as the antecedent of success, which is a characteristic of the relationship between client and the vendors. Taking the clients' capabilities perspective, this study focuses on the internal antecedents of IT outsourcing success (vendor management and relationship management capabilities), which could replace partnership quality in an ITO success model. However, the advantage of such capability perspective is that it provides a better understanding on how (i.e., through what processes) success could be achieved.

We do not aim to undermine the importance of partnership quality or a partnership based model. However, we aim to provide a fresh perspective in explaining success that also could readily help managers in their decisions and investments regarding IT outsourcing processes and routines.

Implications for Practice

This study also has practical implications. First, the study suggests that managers should redefine IT outsourcing performance metrics in order to correctly assess the success of their IT outsourcing arrangements. Defining performance metrics only in terms of operational success (receiving quality services that are within time /budget) that neglects business departments' needs will impair a just evaluation of ITO strategic contribution to the organization. Also, the study implies that focusing on capabilities that are operational in nature (vendor management, relationship management, and contract management) will only lead to operational success. In order to achieve strategic success or in other words to support business requirements, a new set of capabilities –dynamic capabilities - is needed. Therefore, the study suggests managers to invest on different sets of capabilities in order to achieve both strategic and operational success. The results show specifically the importance of sensing and orchestration processes in making strategic changes in the pattern of IT resources. While the analysis of the data shows that ITO sensing capability might not be an influential factor in a minimal outsourcing context, in a comprehensive and selective ITO context, sensing is an influential determinant of strategic success. Therefore, we suggest that IT managers in organizations with more than 20% of IT budget outsourced should pay particular attention to invest in processes and mechanisms that make them aware and vigilant of the ITO market. Without this awareness, IT senior managers will be impaired to make decision that could make a strategic change in their IT resources and the way these IT resources respond to the strategic business needs.

Moreover, orchestration remains relevant and prominent in all contexts. Therefore, we suggest that in order to achieve ITO strategic success IT managers invest in processes and activities that coordinate vendors and vendors with IT department. Without a clear coordination plan and knowing that how different pieces of vendors' works are linked to one another and ultimately how they are linked to the work of the internal IT department, the strategic change in the pattern of IT resources will not happen even with the most competent vendors hired.

Finally, the study suggests that relationship management and vendor management capabilities could compensate for contract management capabilities. Therefore, we suggest that if managers inherited non-efficient contracts to deal with, they can still reach operational success by effective and empathetic vendor and relationship management. This part of the results shows the importance of the client organization to be involved in an outsourcing relationship in order to achieve the contractual success. If managers distance themselves from vendors work (by not investing in effective monitoring and evaluating mechanism) and the relationship (by not investing in communication channels and motivating mechanism), they make it less probable to achieve the contracts terms and ultimately the desired objectives from IT outsourcing.

To summarize, this study conceptualized, operationalized, and measured IT outsourcing dynamic, operational and learning capabilities as three distinct sets of IT outsourcing capabilities. The study proposed and tested a model of these ITO capabilities on successful reconfiguration and successful delivery, and ultimately on ITO success. The model was supported by the empirical data gathered from 152 senior IT managers of US-based companies. We believe that future test and refinement of this model could help to keep only the constructs and the paths that are the most prominent and confirmed across different ITO context. Also, future tests of the model in different organizational contexts could introduce new moderating variables and therefore improve and refine this theory of IT outsourcing.

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Appendix 4.1 Descriptive Analysis

Descriptive Statistics for Latent Variables					
	N	Minimum	Maximum	Mean	Std. Deviation
Successful Reconfiguration	152	1.50	7.00	5.4474	1.10972
Contract Management	152	3.20	7.00	6.0092	.67041
Successful Delivery	152	2.00	7.00	5.4589	.84984
Learning (from experience)	152	2.67	7.00	5.7259	.84319
Internal Scanning	152	2.67	5.00	4.2325	.52184
ITO Success	152	2.00	5.00	4.1075	.66843
Learning (from external knowledge)	152	2.75	7.00	5.7878	.78730
Orchestration	151	2.25	7.00	5.9437	.71947
Partnership	152	2.00	5.00	4.1754	.59486
Relationship Management	152	2.50	7.00	5.9424	.73041
Sensing	152	2.50	5.00	4.0373	.61610
Sourcing-mode-Selection	152	1.00	7.00	6.0016	.83512
Vendor Management	152	3.67	7.00	6.1283	.63486
Vendor Selection	152	3.75	7.00	6.0395	.65490

Appendix 4.2 (A) Measures

Validation Process- Pilot Test and Card Sorting		
Construct/Item	**Result**	**Reason**
Contract Management Capability		
We have the expertise required to write the statement of work (SOW) for our IT outsourcing contracts.	Added	In the context of IT outsourcing, ability to write and negotiate SLAs is very important. However, SLAs are not the only terms that need negotiation and careful crafting. Statement of Work as well is an important aspect of ITO contracts.
We have the expertise required to write termination/exit clauses into our IT outsourcing contracts.	Added	In the context of IT outsourcing, ability to write and negotiate SLAs is very important. However, SLAs are not the only terms that need negotiation and careful crafting. Writing and termination clauses as well is an important aspect of ITO contracts.
Internal Scanning Capability		
We frequently assess whether IT outsourcing could help us to expand our business (i.e., enter new markets) with an outsourcing partner.	Removed	The sorters believed that these two items could tap both the internal scanning as well as sensing capabilities. They believed that for example for a firm to be able to evaluate 'capacity peaks and valleys of the industry', a firm should be able to sense the environment.
We frequently assess whether IT outsourcing could help us to address the capacity peaks and valleys of our industry.	Removed	
Vendor Management Capability		
It is our policy to help suppliers perform up to the agreed upon performance when the need arises.	Removed	It was suggested by managers that this item is not clear and also is not relevant to vendor management. They believed that performing up to the agreed upon performance is the responsibility of the suppliers. Also it is not clear what is meant by helping the suppliers in reaching the performance

We have clear criteria for evaluating the performance of each of our vendors.	Added	Developing clear criteria for performance evaluation believed to be an important aspect of vendor management capability.
Vendor Selection Capability		
We have the processes to certify vendors.	Removed	This item was very confusing for sorters. They could not sort it under vendor selection capability. They were not sure if the process of certifying happens before selection a vendor or after working with a vendor.
Learning -experience accumulation		
We benchmark our IT outsourcing contracts against other IT contracts in our industry.	Removed	This item was not very easy/clear for sorters since it seems to be learning from existing/previous practice, but may also be assessing/evaluating own situation/capability.
Sensing capability		
A consulting firm helps us scan the IT outsourcing market.	Removed	The sorters could not put this item only under Sensing capability. They could also sort it under learning capability.

Appendix 4.2 (b) Complete List of Measures

(The items in *italic* were deleted during pre-test analysis)

	Sourcing-mode-selection Capability	
1	*We have established criteria for determining a sourcing mode (e.g. in-house, outsource, offshore) for any given IT activity.*	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
2	*We have the expertise to determine the most appropriate sourcing mode (e.g. in-house, outsource, offshore) for any given IT activity.*	
3	*We have the expertise for determining whether we need to outsource Data center management and operation or keep them in-house.*	
4	We have the expertise for determining whether we need to outsource Facilities management or keep them in-house.	
5	We have the expertise for determining whether we need to outsource Telecommunications & telephony management and maintenance or keep them in-house.	
6	We have the expertise for determining whether we need to outsource Application development or keep them in-house.	
7	We have the expertise for determining whether we need to outsource Planning/management activities or keep them in-house.	
	Sensing Capability	
1	Some people in our department devote time to scanning the environment for new IT outsourcing opportunities.	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
2	*On a regular basis, we review the types of IT services that are being outsourced in our industry.*	
3	We regularly review the IT vendors with whom our competitors work.	
4	On a regular basis, we review the types of IT services that are being outsourced in other industries.	
5	*We regularly review the IT vendors with whom our business partners work.*	

6	*We regularly review the IT vendors in the market.*	
7	On a regular basis, we review the type of IT outsourcing agreements made in our industry.	
	Successful Delivery	
1	The Service Level Agreements (SLAs) that we have in our contracts have been met.	Newly developed based on Ho et al. (2003a) and Poppo and Zenger (2002)
2	The deadlines specified in our IT contracts are met.	
3	*Our IT vendors are responsive to problems or inquiries.*	
4	The costs of the services we receive are as - and sometimes lower than - the costs agreed upon in our IT outsourcing contracts.	
5	The quality of the IT services we receive is at - or sometimes exceeds - the level specified in our IT outsourcing contracts.	
	Contract Management Capability	
1	We have the skills required to negotiate Service Level Agreements (SLAs) for our IT outsourcing contracts.	Newly developed based on Ranganathan and Balaji 2007, Cullen et al. 2005; Argyres and Mayer (2007)
2	*We have the expertise required to write termination/exit clauses into our IT outsourcing contracts.*	
3	We have people in charge of negotiating the financial aspects of our IT outsourcing contracts.	
4	We have the expertise required to write the statement of work (SOW) for our IT outsourcing contracts.	
5	We frequently assess whether Service Level Agreements (SLAs) reflects our business needs.	
6	We have the expertise required to write service descriptions into our IT outsourcing contracts.	
	Partnership	
1	Our IT vendors let our firm know as soon as possible of any unexpected problems.	Adopted from Grover et

2	Based upon our past and present experience, our organization has a high level of trust in its working relationship with IT vendor(s).	al. 1996
3	Our organization and IT vendor(s) help each other out in whatever ways possible when asked.	
4	Our organization's working relationship with IT vendor(s) has been a happy one.	
	Vendor Selection Capability	
1	If we decide to outsource an IT activity We know how to identify the potential IT vendors.	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
2	If we decide to outsource an IT activity We have clear criteria for evaluating the proposals of potential IT vendors	
3	If we decide to outsource an IT activity We have the expertise required to select among potential IT vendors.	
4	If we decide to outsource an IT activity Our firm has established criteria to determine which IT vendors will be invited to submit a proposal	
	Learning from Experience Capability	
1	We regularly reflect on what outsourcing of IT activities teaches us.	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002) AND (Pavlou and ElSawy 2006, Garvin et al. 2008)
2	Each IT outsourcing relationship we have teaches us something new.	
3	*We use the knowledge acquired from our past IT outsourcing experiences before engaging in new IT outsourcing relationships.*	
4	Our past IT outsourcing experiences prevent us from making similar mistakes in our current IT outsourcing relationships.	
	Learning from External Knowledge Capability	
1	We systematically collect information on how to carry out IT outsourcing relationships from business partners.	Newly developed based on Dynamic Capabilities

2	We systematically collect information on how to carry out IT outsourcing relationships from industry conferences.	Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
3	We systematically collect information on how to carry out IT outsourcing relationships from external expertise.	
4	We systematically collect information on how to carry out IT outsourcing relationships from formal training.	
	Relationship Management Capability	
1	We have established mechanisms to motivate our IT vendors.	Newly developed
2	We have clear communication channels with our IT vendors.	
3	We hold regular review meetings with our IT vendors.	
4	We have people in charge of managing relationships with our IT vendors.	
	Vendor Management Capability	
1	We have mechanisms in place to ensure that our vendors respect the terms of their contracts.	Newly developed based on Han et al. 2008; Lacity et al. 2010
2	We closely monitor the performance of our IT vendors.	
3	We have clear criteria for evaluating the performance of each of our IT vendors.	
4	*We regularly review our vendors' performance based on Service Level Agreements (SLAs).*	
5	*On a regular basis, we evaluate our firm's satisfaction with the performance of our IT vendors.*	
	Internal Scanning	
1	We frequently assess whether our IT service level needs improvement.	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and
2	We often assess whether there are gaps in our IT resources	
3	*We often assess whether our IT skill-set needs improvement.*	
4	*We frequently assess whether we could innovate better with IT.*	

5	We often assess whether our IT offerings (types of service) to the firm and/or clients could be expanded.	Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
	Orchestration	
1	We have the processes in place to coordinate the activities outsourced to multiple IT vendors	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
2	We have people in charge of planning how the newly outsourced services will be integrated with other internal services.	
3	We have the skills to synchronize newly outsourced activities with currently outsourced activities.	
4	We have people in charge of coordinating the resources of our IT vendors with the resources of our IT department	
5	*We know how to plan the integration of newly outsourced services with other outsourced services.*	
	ITO Success	
1	Our IT outsourcing objectives have been realized.	Newly developed based on Grover et al 1996; Saunders et al. 1997;
2	*We are satisfied with the overall benefits we receive from IT outsourcing.*	
3	We achieved what we wanted from outsourcing IT activities/services.	
4	Our IT outsourcing achievements have exceeded our expectations.	
	Successful Reconfiguration	
1	Since we first started to outsource IT, we have created new IT services/offerings.	Newly developed based on Dynamic Capabilities Perspective (Helfat et al. 2007; Eisenhardt and Martin, 2000; Teece et al., 1997; Zollo and Winter, 2002)
2	Since we first started to outsource IT, we have made necessary modifications to our IT services/offerings.	
3	ITO has allowed us to create a portfolio of IT resources (including ours and those of our IT vendors) that well support our business strategic initiatives.	
4	Since we started to outsource IT, we have made effective changes to our IT resources.	

Appendix 4.3 (A) Convergent and Discriminant Validity at the Construct Level

Correlation of the Latent Variable Scores with the Square Root of AVE														
	IntScan	ITOS	SMS	S	VS	Sconf	CM	**SD**	L-E	L-kn	O	Prt	RM	VM
Internal Scanning Capability	**0.76**													
IT Outsourcing Success (ITOS)	0.49	**0.82**												
Sourcing Mode Selection	0.27	0.32	**0.79**											
Sensing Capability (S)	0.66	0.53	0.19	**0.73**										
Vendor selection Capability (VS)	0.36	0.41	0.51	0.25	**0.80**									
Successful configuration (S-conf)	0.52	0.66	0.27	0.51	0.43	**0.88**								
Contract management Capability	0.48	0.41	0.50	0.35	0.62	0.37	**0.75**							
Successful Delivery (SD)	0.43	0.60	0.34	0.43	0.47	0.52	0.39	**0.74**						
Learning (from experience) (L-	0.49	0.49	0.21	0.51	0.52	0.54	0.50	0.42	**0.78**					
Learning (Knowledge	0.62	0.58	0.30	0.52	0.48	0.58	0.54	0.51	0.67	**0.75**				
Orchestration Capability (O)	0.50	0.56	0.33	0.43	0.52	0.53	0.57	0.54	0.59	0.61	**0.79**			
Partnership (Prt)	0.55	0.64	0.35	0.44	0.52	0.57	0.44	0.71	0.56	0.64	0.61	**0.80**		
Relationship Management	0.48	0.51	0.39	0.37	0.60	0.45	0.53	0.52	0.52	0.61	0.51	0.52	**0.75**	
Vendor Management Capability	0.43	0.40	0.42	0.26	0.63	0.46	0.60	0.53	0.45	0.45	0.52	0.54	0.61	**0.80**

Appendix 4.3 (B) Validity at the Item Level

Cross Loadings of Measurement Items to Latent Constructs															
Construct	**Item**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Orchestration Capability (1)	O1	**0.83**	0.42	0.41	0.58	0.23	0.46	0.41	0.39	0.41	0.47	0.48	0.43	0.46	0.46
	O2	**0.75**	0.35	0.41	0.40	0.28	0.41	0.34	0.29	0.38	0.47	0.44	0.43	0.38	0.46
	O3	**0.81**	0.38	0.43	0.36	0.20	0.40	0.36	0.30	0.38	0.43	0.48	0.41	0.38	0.40
	O4	**0.75**	0.48	0.43	0.49	0.32	0.51	0.45	0.37	0.46	0.52	0.36	0.34	0.41	0.56
Successful Reconfiguration (2)	Config1	0.52	**0.88**	0.43	0.53	0.17	0.24	0.45	0.47	0.34	0.54	0.59	0.44	0.32	0.45
	Config2	0.41	**0.87**	0.44	0.44	0.21	0.34	0.48	0.44	0.37	0.49	0.48	0.38	0.41	0.50
	Config3	0.57	**0.90**	0.50	0.48	0.31	0.39	0.48	0.46	0.44	0.54	0.63	0.39	0.48	0.57
	Config4	0.34	**0.86**	0.45	0.44	0.24	0.31	0.40	0.42	0.37	0.46	0.60	0.39	0.41	0.46
Successful Delivery (3)	Delivery_1	0.32	0.29	**0.72**	0.31	0.34	0.32	0.25	0.31	0.37	0.26	0.35	0.29	0.32	0.46
	Delivery_2	0.37	0.33	**0.74**	0.33	0.24	0.37	0.36	0.37	0.34	0.44	0.37	0.46	0.46	0.49
	Delivery_4	0.44	0.39	**0.65**	0.24	0.15	0.15	0.33	0.31	0.16	0.27	0.45	0.19	0.30	0.46
	Delivery_5	0.46	0.51	**0.84**	0.36	0.29	0.31	0.35	0.30	0.48	0.50	0.59	0.55	0.46	0.67
Learning from experience (4)	L1	0.51	0.47	0.36	**0.86**	0.14	0.39	0.51	0.52	0.34	0.60	0.48	0.46	0.27	0.44
	L2	0.46	0.42	0.27	**0.78**	0.17	0.49	0.32	0.37	0.43	0.51	0.28	0.44	0.42	0.42
	L4	0.41	0.37	0.37	**0.70**	0.18	0.28	0.32	0.30	0.46	0.46	0.39	0.31	0.37	0.45
Sourcing Mode Selection Capability (5)	SMS_4	0.27	0.20	0.30	0.17	**0.82**	0.38	0.28	0.17	0.40	0.32	0.29	0.40	0.34	0.25
	SMS_5	0.21	0.16	0.26	0.13	**0.76**	0.38	0.12	0.12	0.34	0.23	0.20	0.24	0.26	0.27
	SMS_6	0.28	0.17	0.19	0.13	**0.77**	0.41	0.15	0.11	0.41	0.11	0.18	0.24	0.32	0.18
	SMS_7	0.29	0.29	0.31	0.20	**0.83**	0.43	0.27	0.18	0.47	0.25	0.29	0.32	0.41	0.37
Contract Management Capability (6)	CM1	0.56	0.32	0.42	0.38	0.36	**0.76**	0.43	0.26	0.52	0.37	0.31	0.39	0.54	0.44
	CM3	0.41	0.33	0.24	0.47	0.35	**0.74**	0.35	0.37	0.41	0.45	0.28	0.32	0.38	0.32

	CM4	0.51	0.27	0.29	0.41	0.40	**0.84**	0.38	0.25	0.49	0.46	0.34	0.43	0.52	0.37
	CM5	0.26	0.25	0.33	0.33	0.31	**0.72**	0.38	0.27	0.40	0.45	0.34	0.46	0.43	0.22
	CM6	0.45	0.23	0.40	0.33	0.52	**0.79**	0.29	0.19	0.59	0.34	0.32	0.44	0.45	0.34
Internal Scanning Capability (7)	IS1	0.45	0.47	0.27	0.46	0.19	0.40	**0.81**	0.58	0.26	0.51	0.42	0.40	0.28	0.43
	IS2	0.38	0.34	0.44	0.34	0.27	0.40	**0.73**	0.44	0.34	0.47	0.39	0.43	0.34	0.40
	IS5	0.31	0.35	0.25	0.31	0.17	0.30	**0.74**	0.48	0.22	0.43	0.31	0.25	0.38	0.42
Sensing Capability (8)	S1	0.40	0.51	0.26	0.41	0.08	0.22	0.56	**0.77**	0.18	0.44	0.48	0.34	0.20	0.37
	S3	0.23	0.38	0.27	0.35	0.26	0.35	0.42	**0.73**	0.20	0.32	0.35	0.30	0.24	0.22
	S4	0.31	0.27	0.26	0.38	0.16	0.27	0.55	**0.72**	0.19	0.40	0.43	0.24	0.14	0.34
	S7	0.32	0.30	0.30	0.35	0.07	0.20	0.38	**0.71**	0.17	0.36	0.26	0.18	0.18	0.36
Vendor Selection Capability (9)	VS1	0.44	0.36	0.33	0.50	0.42	0.49	0.29	0.23	**0.84**	0.42	0.32	0.53	0.49	0.46
	VS2	0.39	0.27	0.33	0.39	0.35	0.51	0.28	0.16	**0.81**	0.32	0.23	0.42	0.50	0.32
	VS3	0.39	0.30	0.35	0.38	0.36	0.44	0.24	0.10	**0.71**	0.32	0.36	0.49	0.55	0.32
	VS4	0.45	0.44	0.48	0.37	0.49	0.54	0.32	0.29	**0.83**	0.45	0.38	0.46	0.49	0.53
Learning Capability-Knowledge acquisition (10)	L5	0.44	0.52	0.44	0.51	0.15	0.39	0.42	0.41	0.30	**0.76**	0.51	0.51	0.34	0.44
	L6	0.52	0.40	0.33	0.53	0.29	0.46	0.51	0.41	0.44	**0.75**	0.37	0.51	0.37	0.49
	L7	0.44	0.36	0.35	0.48	0.16	0.35	0.44	0.36	0.37	**0.74**	0.43	0.35	0.31	0.55
	L8	0.41	0.45	0.41	0.49	0.29	0.40	0.48	0.40	0.32	**0.76**	0.45	0.46	0.31	0.47
IT Outsourcing Success (11)	ITOS1	0.46	0.56	0.50	0.42	0.31	0.47	0.49	0.45	0.41	0.52	**0.84**	0.49	0.40	0.52
	ITOS3	0.50	0.43	0.44	0.41	0.22	0.29	0.33	0.29	0.30	0.44	**0.75**	0.36	0.34	0.55
	ITOS4	0.43	0.61	0.54	0.39	0.25	0.27	0.38	0.53	0.29	0.48	**0.88**	0.41	0.26	0.52
Relationship Management Capability (12)	RM_1	0.52	0.43	0.46	0.45	0.29	0.37	0.49	0.39	0.39	0.57	0.50	**0.78**	0.38	0.47
	RM_2	0.40	0.32	0.44	0.38	0.29	0.43	0.35	0.24	0.54	0.42	0.34	**0.75**	0.54	0.45
	RM_3	0.27	0.25	0.32	0.29	0.24	0.37	0.30	0.19	0.33	0.37	0.36	**0.74**	0.47	0.31

	RM_4	0.28	0.32	0.31	0.41	0.36	0.41	0.25	0.24	0.53	0.42	0.31	**0.72**	0.46	0.28
Vendor Management Capability (13)	VM_5	0.42	0.34	0.41	0.40	0.32	0.53	0.35	0.15	0.49	0.38	0.33	0.48	**0.78**	0.45
	VM_6	0.41	0.39	0.40	0.34	0.42	0.48	0.40	0.28	0.51	0.34	0.32	0.49	**0.83**	0.42
	VM_7	0.43	0.39	0.46	0.33	0.29	0.44	0.28	0.20	0.51	0.35	0.32	0.48	**0.80**	0.43
Partnership Quality (14)	Partner_1	0.57	0.48	0.67	0.55	0.32	0.41	0.49	0.42	0.42	0.57	0.57	0.55	0.45	**0.87**
	Partner_2	0.44	0.44	0.50	0.43	0.35	0.38	0.42	0.34	0.51	0.50	0.46	0.39	0.46	**0.81**
	Partner_3	0.49	0.48	0.53	0.42	0.22	0.36	0.46	0.37	0.39	0.53	0.52	0.39	0.43	**0.80**
	Partner_4	0.43	0.43	0.56	0.37	0.23	0.25	0.38	0.29	0.35	0.47	0.50	0.32	0.38	**0.74**

Appendix 4.3 (C) Validity and Reliability of the Measures

Validity and Reliability of Items and Constructs (final sample of n=152)					
Construct	**Item**	**Loading**	**t-test***	**AVE**	**Composite Reliability**
Orchestration Capability (1)	O1	**0.83**	**19.49**	**0.62**	**0.87**
	O2	**0.75**	**11.73**		
	O3	**0.81**	**13.75**		
	O4	**0.75**	**14.02**		
Successful Reconfiguration (2)	Config1	**0.88**	**32.45**	**0.77**	**0.93**
	Config2	**0.87**	**27.23**		
	Config3	**0.90**	**44.21**		
	Config4	**0.86**	**19.66**		
Successful Delivery (3)	Delivery_1	**0.74**	**12.43**	**0.55**	**0.83**
	Delivery_2	**0.79**	**11.97**		
	Delivery_4	**0.66**[a]	**7.01**		
	Delivery_5	**0.87**	**25.76**		
Learning from experience (4)	L1	**0.86**	**29.15**	**0.61**	**0.83**
	L2	**0.78**	**12.88**		
	L4	**0.70**	**9.79**		
Sourcing Mode Selection Capability (5)	SMS_4	**0.82**	**8.86**	**0.63**	**0.87**
	SMS_5	**0.76**	**6.59**		
	SMS_6	**0.77**	**6.05**		
	SMS_7	**0.83**	**8.64**		
Contract Management Capability (6)	CM1	**0.76**	**12.18**	**0.60**	**0.88**
	CM3	**0.74**	**9.40**		
	CM4	**0.84**	**23.44**		

	CM5	**0.72**	**11.13**		
	CM6	**0.79**	**12.63**		
Internal Scanning Capability (7)	IS1	**0.81**	**19.22**	**0.58**	**0.81**
	IS2	**0.73**	**13.14**		
	IS5	**0.74**	**13.74**		
Sensing Capability (8)	S1	**0.77**	**16.71**	**0.54**	**0.82**
	S3	**0.73**	**10.79**		
	S4	**0.72**	**11.70**		
	S7	**0.71**	**7.55**		
Vendor Selection Capability (9)	VS1	**0.84**	**25.84**	**0.64**	**0.88**
	VS2	**0.81**	**16.85**		
	VS3	**0.71**	**9.20**		
	VS4	**0.83**	**23.48**		
Learning Capability- Knowledge acquisition (10)	L5	**0.76**	**11.74**	**0.57**	**0.84**
	L6	**0.75**	**14.98**		
	L7	**0.74**	**10.33**		
	L8	**0.76**	**14.73**		
IT Outsourcing Success (11)	ITOS1	**0.84**	**22.63**	**0.68**	**0.86**
	ITOS3	**0.75**	**12.56**		
	ITOS4	**0.88**	**37.48**		
Relationship Management Capability (12)	RM_1	**0.78**	**14.31**	**0.56**	**0.83**
	RM_2	**0.75**	**12.47**		
	RM_3	**0.74**	**8.47**		
	RM_4	**0.72**	**8.32**		

Vendor Management Capability (13)	VM_5	**0.78**	**12.67**	**0.65**	**0.84**
	VM_6	**0.83**	**17.11**		
	VM_7	**0.80**	**13.73**		
Partnership Quality (14)	Partner_1	**0.87**	**37.61**	**0.65**	**0.88**
	Partner_2	**0.81**	**17.07**		
	Partner_3	**0.80**	**17.75**		
	Partner_4	**0.74**	**12.40**		

Appendix 4.4

Common Method Bias Analysis					
Construct	**Indicator**	**Substantive Factor Loading (λ)**	**Variance explained (λ2)**	**Method Factor Loading (λm)**	**Variance explained by method construct (λm2)**
Orchestration Capability	O1	0.82	0.68	0.00	0.00
	O2	0.79	0.62	-0.03	0.00
	O3	0.96	0.91	-0.17	0.03
	O4	0.57	0.32	0.20	0.04
Successful Reconfiguration	Config1	0.91	0.82	-0.03	0.00
	Config2	0.90	0.81	-0.04	0.00
	Config3	0.81	0.66	0.12	0.01
	Config4	0.91	0.83	-0.06	0.00
Successful Delivery	Delivery_1	0.84	0.70	-0.12	0.01
	Delivery_2	0.83	0.69	-0.03	0.00
	Delivery_4	0.70	0.49	-0.07	0.04
	Delivery_5	0.74	0.55	0.06	0.00
Learning from experience	L1	0.89	0.80	-0.04	0.00
	L2	0.73	0.53	0.04	0.00
	L4	0.71	0.51	0.01	0.00
Sourcing Mode Selection	SMS_4	0.78	0.60	0.04	0.00

Capability	SMS_5	0.80	0.63	-0.05	0.00
	SMS_6	0.86	0.73	-0.09	0.01
	SMS_7	0.77	0.59	0.09	0.01
Contract Management Capability	CM1	0.67	0.45	0.12	0.01
	CM3	0.69	0.47	0.04	0.00
	CM4	0.87	0.76	-0.04	0.00
	CM5	0.76	0.58	-0.05	0.00
	CM6	0.86	0.73	-0.06	0.00
Internal Scanning Capability	IS1	0.75	0.57	0.05	0.00
	IS2	0.70	0.50	0.05	0.00
	IS5	0.84	0.70	-0.11	0.01
Sensing Capability	S1	0.67	0.44	0.11	0.01
	S3	0.76	0.58	-0.02	0.00
	S4	0.73	0.54	0.00	0.00
	S7	0.79	0.62	-0.09	0.01
Vendor Selection Capability	VS1	0.81	0.65	0.02	0.00
	VS2	0.95	0.90	-0.16	0.03
	VS3	0.70	0.49	0.02	0.00
	VS4	0.74	0.55	0.11	0.01

Learning Capability-Knowledge acquisition	L5	0.75	0.56	0.01	0.00
	L6	0.62	0.38	0.14	0.02
	L7	0.85	0.73	-0.12	0.01
	L8	0.80	0.64	-0.03	0.00
IT Outsourcing Success	ITOS1	0.73	0.54	0.13	0.02
	ITOS3	0.80	0.65	-0.04	0.00
	ITOS4	0.93	0.87	-0.08	0.01
Relationship Management Capability	RM_1	0.58	0.33	0.21	0.04
	RM_2	0.72	0.52	0.05	0.00
	RM_3	0.95	0.90	-0.23	0.05
	RM_4	0.74	0.55	-0.02	0.00
Vendor Management Capability	VM_5	0.69	0.48	0.07	0.01
	VM_6	0.87	0.76	-0.03	0.00
	VM_7	0.84	0.70	-0.03	0.00
Partnership Quality	Partner_1	0.77	0.60	0.10	0.01
	Partner_2	0.82	0.68	-0.01	0.00
	Partner_3	0.84	0.70	-0.03	0.00
	Partner_4	0.79	0.63	-0.07	0.00
Average		**0.77**	**0.67**	**-0.003**	**0.01**

Appendix 4.5 (A) Test for Structural Paths of the Model

PLS and Bootstrapping Results for Structural Model				
Structural Paths	**Path coefficient**	**t- test**	**Confidence Interval**	**Result for the hypotheses**
Successful configuration ⇨ ITO success	0.47***	7.67	[0.348, 0.587]	**Supported**
Successful delivery ⇨ ITO success	0.35***	4.69	[0.203, 0.496]	**Supported**
Sensing ⇨ Successful configuration	0.26***	3.02	[0.082, 0.425]	**Supported**
Internal Scanning ⇨ Successful configuration	0.17**	1.99	[0.001, 0.34]	**supported**
Vendor Selection ⇨ Successful configuration	0.17**	2.03	[0.014, 0.337]	**supported**
Sourcing mode selection ⇨ Successful configuration	0.03[ns]	0.59	**[-0.10, 0.098**]	**not supported[b]**
Orchestration ⇨ Successful configuration	0.25***	3.21	[0.098, 0.400]	**Supported**
Relationship management ⇨ Successful delivery	0.32***	3.09	[0.114, 0.515]	**Supported**
Vendor management ⇨ Successful delivery	0.31***	3.05	[0.108, 0.510]	**Supported**
Contract management ⇨ Successful delivery	0.03 [ns]	0.61	**[-0.120, 0.0964**]	**not Supported[b]**
Learning ⇨ Sensing	0.57***	9.68	[0.447, 0.679]	**Supported**
Learning ⇨ Internal Scanning	0.63***	13.38	[0.530, 0.716]	**Supported**
Learning ⇨ Vendor Selection	0.58***	9.76	[0.457, 0.689]	**Supported**
Learning ⇨ Sourcing mode selection	0.29**	2.45	[0.028, 0.499]	**Supported**
Learning ⇨ Orchestration	0.67***	10.99	[0.546, 0.785]	**Supported**
Learning ⇨ Relationship management	0.63***	11.43	[0.512, 0.730]	**Supported**
Learning ⇨ Vendor management	0.50***	6.94	[0.352, 0.633]	**Supported**
Learning ⇨ Contract management	0.57***	8.44	[0.432, 0.699]	**Supported**

*** P value <0.01 [a] confidence interval calculated for 0.01/2 = .005 ** P value <.05 ns: non significant

Appendix 4.5 (B) Predictive Relevance of the Model (Estimation of Q2)

Blindfolding Results for Structural Model			
Endogenous constructs	**SSO**	**SSE**	**1-SSE/SSO = Q2**
ITO success	456.00	312.08	**0.32**
Successful configuration	608.00	423.90	**0.30**
Successful delivery	608.00	495.75	**0.18**

Q^2>0 for endogenous variables of the model is an indication of predictive relevance.

APPENDIX 4.6

Commonalities and Correlations Needed to Calculate Goodness of Fit Index (GoF and GoF $_{rel}$)				
Constructs	**Commonalities from PLS**	**Commonalities from principal component analysis (SPSS)**	**R^2 from PLS**	**R^2 from Canonical correlations**
Internal Scanning	0.58	.725	0.38	0.37
ITO success	0.68	.748	0.52	0.53
Sourcing mode selection	0.63	.593	0.08	0.10
Sensing	0.54	.597	0.32	0.33
Vendor selection	0.64	.589	0.29	0.31
Successful reconfiguration	0.77	.477	0.42	0.43
Contract Management	0.60	.636	0.32	0.34
Successful delivery	0.55	.573	0.35	0.38
Learning (from experience)	0.61	.659	-	-
Learning (from external knowledge)	0.57	.581	-	-
Learning (Second order of experience and knowledge)	0.49	.614	1.00	1.00
Orchestration	0.62	.604	0.43	0.42
Relationship management	0.56	.684	0.39	0.41
Vendor Management	0.65	.837	0.24	0.25

Appendix A- Chapter 1- Introduction- English

This three essay thesis pertains to IT sourcing, defined as all the processes (e.g., decision making process, contracting process, monitoring process) included in the delegation of IS functions to an internal service provider and/or an external vendor. The thesis adopts two conceptual perspectives: transaction cost theory (TCT) and the dynamic capabilities perspective (DCP). In the first essay, the assessment of how extant IT outsourcing models appropriated TCT shows that the extant models do not apply TCT totally in line with the original conceptualization of the theory, especially regarding its normative nature. The second and third essays adopt DCP to examine the strategic role of IT outsourcing dynamic capabilities. Informed by qualitative data from a single extreme case of IT outsourcing, essay two proposes that a set of strategic IT capabilities supports IT and business alignment. Essay three focuses on IT outsourcing dynamic capabilities, operational capabilities, and learning capabilities and proposes and tests a model of their impact on IT outsourcing success.

Summary of Essay 1: An Assessment of the Use of Transaction Cost Theory in Information Technology Outsourcing

One of the key theoretical foundations for explaining IT outsourcing decisions and outcomes is Transaction Cost Theory (TCT). However, the TCT-based IT outsourcing research has led to contradictory results across studies and unexpected results within studies.

Several explanations have been proposed for obtaining such mixed results. In a review of the TCT-based ITO research, Lacity et al. (2011) offer four categories of explanations that authors provide for the anomalies in their research results: research methods, boundary conditions, TCE assumption violation explanations, and alternate theory explanations. Studies of the first category mainly attribute the lack of support for TCT to ‘‘measurement problems’’ or the ‘‘inherent difficulty of measuring core

TCE constructs'' (p. 145). Studies in the second category, boundary conditions, attribute the mixed results to the ''distinctive context of ITO,'' ''distinctive research settings'' or the ''distinctive attributes of the collected data'' (p. 146). Studies of the third group either found evidence that some TCT behavioral assumptions – e.g., bounded rationality, opportunism, or the transaction as the unit of analysis – were violated in some IT outsourcing contexts. Finally, studies in the fourth category argue that alternate theories may have assumptions that better fit the IT outsourcing context, or have more power than TCT to explain ITO results.

In this paper, we deliberately focus on one explanation, that of the extent to which IT outsourcing models have been faithful to the concepts and precepts of TCT and to its normative nature. Indeed, although we acknowledge that alternate valuable explanations exist for the paradoxical results obtained, we reckon that such alternate explanations have to be assessed in light of the explanation we aim to provide.

Assessment of Extant Models of the IT Outsourcing Decision

We identified 25 empirical studies on TCT-based IT outsourcing decision and outcome. We compared their conceptualization and operationalization of TCT constructs with TCT's original definitions (Williamson 1979; 1981; 1985). From this comparison, we found that some core TCT constructs are not adequately taken into account in the extant research: only one study out of 25 considers the notion of costs difference between production and transaction cost (Lacity and Willcocks 1995a). The frequency construct is also absent from most of the studies we analyzed. Only 4 studies (16%) included frequency in their models (Lacity and Willcocks 1995a; Loebbecke and Huyskens 2006a; Miranda and Kim 2006; Wahrenburg et al. 2006). Moreover, among the nine studies (36%) that consider behavioral uncertainty, only 4 (16%) conceptualize it in terms of opportunistic behavior on the part of the supplier, and therefore are in line with TCT (Dibbern and Heinzl 2009; Goo et al. 2007; Miranda and Kim 2006; Wang 2002). Therefore, there are 3 focal constructs of TCT

that are not taken into account adequately by the extant ITO models. These constructs are either not taken into account by the models or where they are considered, they are not conceptualized according to TCT.

Also, the linkages among constructs are not always hypothesized in line with TCT: in terms of interaction effects, ITO research has not completely tested TCT. Indeed, while under TCT uncertainty and frequency play moderating roles, only 12% of the articles considered the moderating role of uncertainty, and none of the studies considered the moderating role of frequency. Finally, the normative nature of the theory is not always captured: our analysis shows that the majority of extant models predict IT outsourcing decisions based on transaction attributes (64%), assuming a predictive/descriptive nature for TCT. This means that the extant models conceptualize transaction characteristics as causal antecedents of the decision to outsource. This means the extant models used TCT in a predictive manner assuming that managers behave according to TCT prescriptions, which is not the case all the time. Based on the results of essay 1, we conclude and suggest that TCT could remain relevant to IT outsourcing research and could contribute to create an endogenous theory of IT outsourcing.

Summary of Essay 2: The Strategic Role of Information Technology Sourcing: A Dynamic Capabilities Perspective

This essay adopts the view that IT outsourcing is an intrinsic part of an organization's IS strategy. This view is akin to that of Henderson and Venkatraman (1999b) who posit that "the selection and use of mechanisms for obtaining the required IT competencies" (p. 474) (i.e., sourcing) is a component of IS strategy, along with technology scope and systemic competencies. Adopting this perspective, Hirschheim and Sabherwal (2001) consider IT sourcing arrangements as one of the three dimensions of IS strategy, along with IS role and IS structure.

Espousing this view and grounded in dynamic capabilities perspective (Helfat et al. 2007; Teece et al. 1997), our study offers a conceptualization of IS strategic capabilities that comprises two sets of dynamic capabilities. The first set is enterprise IT architecture dynamic capabilities, which we adapt from Ross's (2003) notion of enterprise IT architecture competency. The second set is that of ITO dynamic capabilities, which we introduce and define based on dynamic capabilities perspective.

Ross (2003) defines a competency in the enterprise IT architecture as the firms capacity "to create a mutually reinforcing pattern of evolving, tightly aligned business strategy and IT capabilities" (Ross 2003, p. 32). Since in order to create such pattern of alignment, business strategies and IT capabilities need to be defined, created or modified, it corresponds to the definition of dynamic capabilities [dynamic capabilities are defined as "the capacity of an organization to purposefully extend, create, or modify its resource base" (Helfat et al. 2007, p.1)] . Therefore, we define the enterprise IT architecture dynamic capabilities using the language of dynamic capabilities perspective, as the capacity of an organization to purposefully extend, create or modify its IT solutions.

We propose that ITO dynamic capabilities complements enterprise IT architecture dynamic capabilities in creating or modifying IT solutions. We therefore define ITO dynamic capabilities as the capacity of an organization to purposefully extend, create or modify its IT resource base to create IT solutions through outsourcing arrangements.

Research Approach

Our theory building efforts are based on a unique (extreme) single case (Yin 2003). The firm is Air Canada which is an extreme case for our study due to its near total IT outsourcing setting (95 percent of IT activities are outsourced to multiple vendors). Data has been collected from multiple sources: interviews, internal

documents, public documents, and observation. Interviewees were IT executives (e.g. the CIO), and senior directors of IT units within IT department. We also interviewed informants from outside of the firm (i.e. a senior manager in a vendor firm). We also interviewed two people responsible for managing ITO contracts of the firm with two different suppliers. In total we conducted 14 interview sessions with 11 individuals. As suggested by Langley (1999), we used a combination of different strategies to analyze the data.

A Dynamic Capabilities-based Theory of Alignment in a Total Outsourced Context

We propose a process theory that advances our understanding of dynamic capabilities in terms of how they sustain aligning of IT and the business. Also we take into account the role of a supporting IT department structure based on which dynamic capabilities could be exploited. We explain the theory in three parts of boundaries, constructs and relationship between constructs. A summary of the theory follows.

The general process starts with a state of alignment between IT and the business (when IT solutions in place support business processes) as the input. Then a trigger happens that ruins the alignment and creates a state of misalignment. The triggers are: enhancement to a solution, business process change, time, scanning, and strategic initiative. To resolve the misalignment, dynamic capabilities act as mechanisms through which a new state of alignment could be achieved. Proper IT department structure facilitates and provides the ground based on which the dynamic capabilities could be exploited to create the new state of alignment. In essay 2, we compare the proposed model of alignment with the extant theories of alignment in the literature.

Summary of Essay 3: Information Technology Outsourcing Success: A Model of Dynamic, Operational, and Learning Capabilities

This essay adopts the perspective that IT outsourcing has both strategic and operational contributions. In line with this, it proposes and tests a model wherein overall ITO success – defined as the degree to which an organization achieves its IT outsourcing related goals – has two key antecedents: successful reconfiguration of IT resources and successful delivery of IT services. Anchored in the dynamic capabilities perspective (Eisenhardt and Martin 2000; Helfat et al. 2007; Teece et al. 1997), the model first posits that dynamic capabilities (including: sensing, internal scanning, vendor selection, orchestration, sourcing mode selection) lead to successful reconfiguration of IT resources, which is the strategic antecedent of ITO success. Second, the model posits that operational capabilities (contract management, relationship management, vendor management) lead to successful delivery of IT services, which is the operational antecedent of ITO success. While extant ITO research mainly focuses on ITO operational capabilities (e.g., vendor management capability, contract management capability) (e.g., Han et al. 2008; Ranganathan and Balaji 2007), our model offers dynamic ITO capabilities and hypothesizes on the relationship between them and success constructs. Moreover, the model posits that a third type of capabilities, ITO learning capabilities, affect strategic and operational success through dynamic and operational capabilities. The main hypotheses of the model are:

H1: *Successful reconfiguration of IT resources through IT outsourcing will be positively associated with IT outsourcing success.*

H2: *Successful IT outsourcing delivery will be positively associated with IT outsourcing success.*

H3: *The extent to which a firm possesses IT outsourcing dynamic capabilities will be positively associated with the extent to which the firm has successfully reconfigured its IT resources through IT outsourcing.*

H4: *The extent to which a firm possesses IT outsourcing operational capabilities will be positively associated with the extent to which ITO delivery is successful.*

H5: *The extent to which a firm possesses IT outsourcing learning capabilities will be positively associated with the extent of its IT outsourcing dynamic capabilities.*

H6: *The extent to which a firm possesses IT outsourcing learning capabilities will be positively associated with the extent of its IT outsourcing operational capabilities.*

Method

Data were collected using a cross-sectional survey of 152 organizations across different industries and structural equation modeling (PLS-SEM) approach was used to analyze the data.

Measures of all capability constructs, ITO success, and of successful reconfiguration have been developed from the conceptual definitions and based on dynamic capabilities perspective (Eisenhardt and Martin 2000; Helfat et al. 2007; Teece et al. 1997; Zollo and Winter 2002). The measures of successful delivery are adapted from Ho et al. (2003a) and Poppo and Zenger (2002). For the wording of the measures, we used previous studies of dynamic capabilities and learning organizations (e.g., Pavlou and El Sawy 2006). The content of all items (either new or adopted) has been validated by a panel of experts (IT managers or CIOs experienced with ITO). The measures were further validated using a card sorting technique

(Moore and Benbasat 1991). We conducted a pre-test (Churchill 1979) before administrating the survey.

To alleviate the common method variance susceptibility caused by single-respondent design, we applied some of the suggestions made by Sharma et al., (2009) and Podsakoff et al., (2003) (e.g., using different scales for items of different constructs, using psychological distance).

Results

The findings suggest that dynamic capabilities (except for one capability – sourcing mode selection- among five) positively influence IT outsourcing successful reconfiguration (strategic success). Also, the findings suggest that operational capabilities (except for one capability –contract management- among three) positively influence successful delivery (operational success). Moreover, both operational success and strategic success positively influence IT outsourcing success. Learning capabilities are also found to positively and significantly influence all operational and dynamic capabilities. The model also shows a high predictive relevance index. The findings suggest that IT outsourcing success is determined by both strategic as well as operational antecedents. Also, the findings suggest that different types of capabilities will lead to different success antecedents and therefore they impact ITO success through different paths. The study offers a more complete picture of ITO capabilities and their influence on IT outsourcing success.

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