

Taxonomy of IT Outsourcing Decision Models

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- **ABSTRACT** *The need for a structured review of IT/IS outsourcing literature as it relates to decision making has been raised repeatedly by researchers. Some researchers conclude that the absence of a taxonomy has resulted in outsourcing decisions being made without a structured approach or strategy. This paper proposes a taxonomy of IT/IS outsourcing decision models that may assist both practitioners and researchers. The paper provides an overview of the existing decision models, and an evaluation and classification of these models based on their applicability to the IT/IS outsourcing decision process. Also discussed are the scope and type of outsourcing models, decision factors and the decision dimensions these models support.*

- **Keywords:** Outsourcing, Offshoring, Strategic Decision Making

The practice of IT/IS outsourcing can be traced back to the mid 1960s (Apte et al. 1997; Costa 2001; McFarlan & Nolan 1995) when organisations had a limited need for processing capacity. Following the decision by Eastman Kodak in 1989 to ‘total-outsource’ their IT/IS, which the literature often describes as a turning point for outsourcing (Apte et al. 1997; Bhattacharya, Behara & Gundersen 2003; Costa 2001; Hirschheim, Dibbern & Heinzl 2008), many organisations followed suit and have since adopted outsourcing (Loh & Venkatraman 1992a). Academics have studied the outsourcing phenomenon extensively and provided detailed lists of drivers (compare papers by Antonucci, Lordi & Tucker 1998; Clark Jr, Zmud & McCray 1995; Ketler & Walstrom 1993; Kremic, Tukel & Rom 2006).

Generally, the body of research around IT/IS outsourcing is large (Gonzalez, Gasco & Llopis 2006). Yet Hirschheim et al. (2008) acknowledge that despite the many aspects of IT/IS outsourcing that have already been addressed in the academic literature, there are many areas that need further research. Given that the field of IT/IS outsourcing is so large, it appears that many researchers and practitioners find themselves lost in the ‘jungle of publications’ (Brannemo 2006).

While a number of researchers have attempted to identify and synthesise the different papers on IT/IS outsourcing (Dibbern, Goles, Hirschheim & Jayatilaka 2004; Hui & Beath 2001; Koong, Liu & Yong Jian 2007), when it comes to IT/IS outsourcing decisions practitioners appear to act without direction.

According to Gartner (2008), more than 70% of organisations make outsourcing decisions without a strategy. Yet by looking at what is available in the academic literature, we find that there is plethora of decision models, frameworks and related guidelines available.

The purpose of this paper is to review IT/IS outsourcing decision models based on an intensive literature review of the properties of the decision models, thus developing a taxonomy of them. This could lead to a better understanding of these models and their applicability amongst researchers and practitioners.

Our paper is organised in four major sections:

- Discussion on the need for an IT outsourcing decision model taxonomy
- Development of an IT/IS outsourcing decision model taxonomy
- Summary of findings and discussion on the taxonomy
- Future outlook and suggestions for further research opportunities.

The Need for an IT/IS Outsourcing Decision Taxonomy

Taxonomies in general play an important part in research. Snizek (1980) in Scherpereel (2006: 123) writes that ‘perhaps the most important and basic step in conducting any form of scientific inquiry involves the ordering, classification, or other grouping of objects or phenomena under investigation’. Further, according to Hunt (1976) in Rowley and Slack (2007: 880), taxonomies ‘play fundamental roles in the development of a discipline, since they are the primary means for organising phenomena into classes or groups that are amenable to systematic investigation and theory development’.

The need for an IS/IT outsourcing decision model taxonomy has been raised repeatedly in the academic literature. Brannemo writes: ‘A questionnaire about sourcing decisions indicates that

companies consider sourcing decisions as complex and companies tend to have a lack of models supporting the decision process' (2006: 548). Similarly, Kremic et al. express the need for a decision model taxonomy as follows: 'There is an abundance of information related to outsourcing in the literature that is waiting to be put into a more structured form for better decision support' (2006: 467). Further, De Looft writes that 'terminology in outsourcing seems "far from clear"' (1995: 10). He states: 'Authors and practitioners use different terms for different concepts. This leads to non-comparable research results and to disagreement between clients and suppliers' (1995: 10).

This paper aims to fill this void in the academic literature, and based on our research, proposes a taxonomy for IT/IS outsourcing decision models.

Developing an IT/IS Outsourcing Decision Model Taxonomy

In order to develop a taxonomy, this paper follows the first three steps of the approach for taxonomy development described by Fleishmann and Mumford (1991) in Law, Wong and Mobley (1998: 742):

- *Specification of the domain of objects to be classified.*
- *Definition and measurement of the essential properties of objects lying in this domain.*
- *Appraisal of the relative similarity of these objects to each other.*
- *Specification of decision rules for determining when objects display sufficient similarity to permit assignment to a common category.*

Specification of the domain of objects (Step 1)

By definition, IT/IS outsourcing decision models are used in practice to assist a decision maker in determining a decision. They often have a limited purpose and provide input into the decision at a

particular stage of the decision-making process, given that there is data gathered that is available for analysis. These decision models will be examined here for their properties.

Definition and measurement of the essential properties of objects (Step 2)

In order to investigate and classify IT/IS outsourcing decision models, the authors have asked the following questions:

- What is the process stage at which these decision models can be used? What triggers their use?
- Which answers can the models provide?
- What is the scope of the decision model?
- What outsourcing types are considered?
- What are the dimensions of the decision considered?

Along with these questions, the properties of the domain objects, including the decision process stage, the scope, the types and dimensions will be explored in the following sections.

Decision process stage

The first question that should be considered in regards to a classification of decision models is, at which stage of the decision process are the models applicable?

Dibbern et al. (2004) have provided in their seminal paper a roadmap of the IT/IS outsourcing literature, reviewing 74 papers on the topic between 1990 and 2000. This helps to build an understanding of the outsourcing decision. At the beginning of their paper Dibbern et al. (2004) look at a generic decision process model provided by Simon (1960), and then map the stages of the decision process against outsourcing decision-specific stages (see Dibbern et al. 2004: 15). In this way, they determine a range of questions that the IT/IS outsourcing decision process needs to address.

Similarly, this paper explores generic strategic decision processes described by Mintzberg, Raisinghani and Theoret (1976), Harrison and Pelletier (2000), Nutt (2002) and Friday-Stroud and Sutterfield (2007) and compares them with the practitioners' IT/IS outsourcing process descriptions to determine the questions for the properties of the decision models for further investigation.

The stages that were determined align with the description and sequence of process stages provided by Dibbern et al. (2004):

- Stage 1 – Why outsource?
- Stage 2 – What to outsource?
- Stage 3 – Which vendor to select?
- Stage 4 – How to outsource?
- Stage 5 – What is the outcome of outsourcing?

Scope/type of outsourcing

The second question that needs to be explored further relates to the scope or type of outsourcing that the model can determine. In order to understand the types of outsourcing that exist, it seems necessary to review some of the definitions of outsourcing that have been provided in the academic literature, particularly since there is a constant re-invention of new outsourcing types in the market and a growing complexity of outsourcing in general (Hirschheim et al. 2008).

Loh and Venkatraman define outsourcing as 'the significant contribution by external vendors in the physical and/or human resources associated with the entire or specific components of the IT infrastructure in the user organization' (1992b: 9). Although their definition is frequently adapted (see Lee 2006; Yang, Kim, Nam & Min 2007), Loh and Venkatraman's (1992b) definition does not adequately reflect the options available within the sourcing continuum, reducing the sourcing decision like many other papers to make versus buy (compare papers by Aubert, Rivard & Patry 1996; Boer,

Gaytan & Arroyo 2006; Brannemo 2006; Lee 2006). It is posited here, that ‘make vs. buy’ decisions are only a subset of outsourcing thus make vs. buy decision models have a very limited scope and applicability.

Other authors, such as Fill and Visser (2000) and Lacity, Willcocks and Feeny (1996), address this issue. Fill and Visser (2000) acknowledge that there are a number of sourcing options available, grouping them under the term ‘continuum’ – a spectrum between short-term body shopping and long-term partnership. Lacity et al. (1996) find that organisations struggle to comprehend the terms ‘insourcing’ and ‘outsourcing’, therefore promoting a matrix that identifies and classifies various options (buy-in, preferred supplier, in-house, contract out, preferred contractor) into outsourcing and insourcing groupings.

Other authors, including Brooks (2006) and Pati and Desai (2005), equally acknowledge that there is a wide range of sourcing options; however, they divide them differently. Options include, besides the outsourcing of IT to an external service provider at one end of the spectrum and in-sourcing (to retain all IT services in-house) at the other end of the spectrum, transforming an in-house IT department from a cost centre into a profit centre, migrating decentralised organisation-wide IT departments into a corporate-wide shared service centre, spinning-off one’s own in-house department into a new entity, or partnering (allying) with another company to create a joint venture. All of the above options are in scope for the proposed taxonomy in this paper.

Dimensions

The third property of decision models introduced here is dimensions. The recent literature on IS outsourcing decision making refers to dimensions as an umbrella term to summarise decision factors such as management, strategy, technology, economics and quality (compare papers by Wang & Yang 2007; Yang & Huang 2000). Lee, Miranda and Kim (2004), however, propose that the dimensions of the outsourcing strategy include the degree of integration, allocation of control, and performance

period, which characterise the outsourcing relationship. Cullen, Seddon and Willcocks (2005) concur with Lee et al. and combine the dimensions to a set of 'coherent clusters of characteristics', for which they coin the term 'outsourcing configurations' (2004: 359). According to Cullen et al. (2005) configurations are described by certain attributes, including scope, number of suppliers, financial scale, pricing method, contract duration, resource ownership, and commercial relationship. For further details on the configuration attributes please refer to the paper by Cullen et al. (2005).

Drivers

The next property to investigate is drivers. Drivers are directly related to decision models as they provide the key input into decision factors that should be reflected by the decision model, that is, can outsourcing save me costs?

The way organisations think about outsourcing their IT is typically driven by the need to reduce costs (Bhattacharya et al. 2003; Gottschalk & Solli-Saether 2006; Lacity & Hirschheim 1994), believing that the greater economies of scale of a service provider will help them achieve cost savings (Gerigk 1997). Not surprisingly, research undertaken by various consulting firms shows that reducing costs is the main driver for outsourcing.

Besides costs, which Overby (2006) and McIvor (2000) find that only a few organisations truly understand, according to Costa (2001) other, more 'persuasive' drivers lead to outsourcing. Management, and human and financial resources are scarce within organisations and therefore should be used to *focus on the organisation's core business activities* rather than be locked up in non-core business activities (Brannemo 2006).

Many organisations also wrestle with the issue of keeping up with the latest trends in technology (Costa 2001; Kremic et al. 2006; Loh & Venkatraman 1992a), either because they may lack suitably

qualified staff (Yang & Huang 2000) or because there is reluctance from top management to invest in new, updated and capital-intense IT infrastructure.

One global study, undertaken by Deloitte (2008), has found that 64% of organisations seeking to outsource primarily want to reduce costs. Yet Brannemo (2006) points out that many organisations are choosing outsourcing as a strategy believing it will help them to reduce costs, gain access to other companies' competencies, and allow them to focus on their own core competencies, without actually knowing much about outsourcing or its implications.

Thus, it is found that decisions are often based on individuals trying to imitate success stories they have heard of other organisations that outsourced, a phenomenon explained by the internal influence mechanism of the diffusion theory (Costa 2001; Loh & Venkatraman 1992a).

Appraisal of the relative similarity of these objects to each other (Step 3)

The literature review has identified three types of decision models (Decision Tree Models, Heuristic Models/Portfolio Instruments, and Scoring Models), which are discussed below.

Decision tree models

Grover and Teng (1993), an example of early research on IT outsourcing decisions, propose to base the outsourcing decision on an assessment of the possible attainment of benefits from outsourcing, including strategic, economic and technological benefits. The model is divided into two levels: system level (high-level assessment) and impact level (more detailed assessment). At the first level the as-is of the system and its environment is assessed: the maturity stage of the IS is determined (Initiation, Growth or Mature), the significance of the IS regarding the organisation's competitiveness is determined (Low, High, Sustainably High), and the internal IT capabilities are compared with the organisation's competitors (Weak, Average, Superior). Based on this first analysis (see Figure 1), which mainly addresses strategic and technological considerations, the organisation would be able to

make a preliminary decision followed by a further (level 2) analysis that would help to 'crystallize the choice' (Grover & Teng 1993: 36). This involves a series of questions around the benefits and possible problems associated with an outsourcing rated on a scale of 1 to 7. The final outsourcing decision is derived from the answers given.

Figure 1 Strategic Analysis of Decision to Outsource: Level 1 Analysis (Grover & Teng 1993: 35)

Grover and Teng (1993) themselves acknowledge their model is not 'infallible'. However, although it does not reflect the complexity of outsourcing decisions, it does provide a novel approach to outsourcing in the early 1990s by putting technological and strategic considerations above cost considerations.

Venkatesan (1992) and McIvor (2000), both examples of early outsourcing decision research, each provide a model that also resembles a decision tree, very similar to Grover and Teng (1993).

In summary, these decision tree models, although rightly criticised for being too highly aggregated (Canez, Platts & Probert 2000), have provided a considerable input into IT/IS outsourcing decision models, by mapping a basic decision process and steps for decision makers to follow.

Heuristic models/portfolio instruments

McFarlan and Nolan (1995) view the outsourcing decision from an IS perspective proposing the use of a portfolio instrument, the so-called *Strategic Grid*. By using the portfolio instrument, organisations can identify the strategic relevance of IS. Various other factors that go beyond costs, core competency and finance are proposed, including the effort of disentanglement, the cultural fit and so on.

Lacity et al. (1996) also developed a set of portfolio instruments that would aid managers in deciding which IT/IS function to outsource. In principle, there are four steps to follow, starting with the

establishment of the options, selecting the services to outsource, benchmarking internal against external service delivery capabilities, and finally choosing the appropriate contract. Each step is supported by a different portfolio (see Figure 2). For a detailed description of the steps refer to Lacity et al. (1996).

Figure 2: The four portfolio instruments (Lacity et al. 1996: 18–19, 21, 24)

AHP type scoring models

Recently a number of articles have been published that focus on mathematical methods to provide practical tools that are aimed at assisting managers with the outsourcing decision. The use of scoring decision models is growing in popularity, which can be attributed to today's understanding of sourcing decisions as multivariate problems, and the belief amongst Quantitative academics that Quantitative Analysis can compute 'better decisions' (Wang & Yang 2007: 3699).

In this context, the AHP and PROMETHEE methods appear frequently in the literature (compare papers by Cao & Wang 2007; Ngwenyama & Bryson 1999; Sucky 2007; Wang & Yang 2007; Yang et al. 2007).

Summary and Discussion of the Taxonomy

The taxonomy properties, which include the evaluation criteria scope/options, dimensions, process stage and process, and supported decision factors, were analysed across three different models (objects of the taxonomy): (1) decision tree models, (2) heuristic models and (3) mathematic/scoring models. The resulting taxonomy is provided in Table 1.

By assessing the decision models in the taxonomy, the authors make the following two observations:
Observation 1 – Limited process focus of the decision models. It appears that many of the decision models examined here have the same issue – they have a limited applicability only, for example, exploring the service provider selection (Cao & Wang 2007; Ngwenyama & Bryson 1999; Sucky

2007) or the selection of a service for outsourcing (McFarlan & Nolan 1995). Although Lacity et al.'s (1996) decision model attempts to cover the whole decision process, the highly aggregated process appears insufficient to provide more than just guidelines for each stage of the process.

Observation 2 – Simplicity of the decision models. The decision models investigated appear relatively simple. An example of this simplicity is illustrated by the scoring model of Wang and Yang (2007). Although a comprehensive list of criteria based on drivers for outsourcing is assembled, the assumption that the quantitative process of analysing the drivers ensures that 'better decisions' can be made leading to 'better results from outsourcing' (Wang & Yang 2007) is far fetched. It is posited here that outsourcing decisions are not a precise science as there is an element of strategic intuition involved, and many options need consideration. Most scoring models suggest that there are only two ways – to outsource or to insource, without considering the implications of the various dimensions of the decision (the length of the deal, etc.).

Further, more generic and holistic decision models such as those provided by McIvor (2000) and Canez, Platts and Probert (2000), lack depth, particularly when it comes to supported sourcing options. The glaring lack of supported sourcing options other than 'make vs. buy' type decisions, is particularly an issue in the area of IT, where many organisations have opted to spin off their IT department into an external entity, or entered into partnerships with other organisations to run their IT centres, say in joint ventures.

By focusing on the evaluation of advantages and disadvantages of outsourcing in general, many sourcing models disqualify for a complex decision such as IT/IS outsourcing. Although the literature has suggested that some of the generic outsourcing decision models, such as McIvor's (2000), could be applied to IT/IS outsourcing decisions (Pati & Desai 2005), it seems questionable whether the complexity of IT/IS and all the implications of an outsourcing decision for IT/IS would be sufficiently reflected within those models.

Table 1 Proposed Taxonomy for Outsourcing Decisions

Conclusions

While research seems to have identified many of the factors that impact an outsourcing decision, including triggers, benefits and risks, determinants and decision factors, and they all seem well understood (Jiang & Qureshi 2006), Kremic et al. (2006) argue that there is a lack of guidelines and tools when it comes to decision support.

The taxonomy presented here classifies the existing IT/IS outsourcing decision models, thus providing decision makers with an overview of available decision models. At the same time, it also becomes clear from the classification of the decision models, that these models have a number of limitations.

Besides the limitations discussed in the previous section (limited applicability/focus of the models, simplicity), it is clear that decision models appear to be insufficiently operationalised. Although Canez et al. (2000) attempt to provide to some extent an operationalisation of their decision model, essential information that would sufficiently enable operationalisation is omitted. In other words, a truly complete decision model would, besides the provision of the tool itself, describe the underlying process of how to apply the tool, including the selection of decision makers and so on.

Brannemo (2006) confirms in various case studies that none of the practitioners she interviewed used decision models. Based on this she posits that the decision models required too many resources, were not known within organisations, and were seen as being 'just theoretical models and were never tested in real life' (Brannemo 2006: 557).

This in turn supports Vroom and Searle's (2003) finding that many decisions fail because of missing participation. Without the strong support of the decision process with decision models, powerful decision makers decide at their sole discretion about IT/IS outsourcing, without appreciation for the implications of their decision.

De Looff also finds that: 'a formal decision method was not used in any of the cases' he studied, due to the belief among decision makers that models were 'not available' (De Looff 1995: 290) and decisions were anyway 'too strategic or too political to be captured by any decision model' (De Looff 1995: 290).

In summary, this paper has provided a taxonomy of IT/IS outsourcing decision support models, which can assist and guide practitioners in selecting a decision model for their IT/IS outsourcing decision process. Further, by assessing the models in the taxonomy, we have found a number of limitations of the decision models, which in turn could provide an explanation for why practitioners refuse to use any of the formalised decision support models, particularly when they have only a limited purpose.

The IT/IS outsourcing decision model taxonomy can also assist researchers in addressing the identified gaps in the decision models, providing a direction for future research. In the next stage of their work, researchers are testing their classification of IT/IS outsourcing decision models by investigating in depth the use of decision models by real-world decision makers. The research explores the experiences of the decision makers, their knowledge of these models, and their attributes (usability, scope, supported dimensions, and decision factors).

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Tables and Figures

Table 1 Proposed taxonomy for outsourcing decisions

Decision Model Type	Model (Example)	Process		Content			Critique	Other, similar models
		Decision Process Stage	Process Description	Scope/Options	Dimensions	Decision Factors	Applicability to IT/IS Outsourcing Decision	
Decision Tree	(McIvor 2000)	Strategy setting	<p>The process is divided into three or four major phases:</p> <ul style="list-style-type: none"> - Identify core components/core services - Benchmarking internal vs. external capabilities for components/service - Total Cost Analysis: If strategic service, consider investment to leverage internal capabilities, otherwise benchmark costs to see if outsourcing is cost effective - Relationship Analysis (best outfit) 	Make vs. buy	Service Scope only	<ul style="list-style-type: none"> - Core Competencies - Resource - Economics: Costs 	<ul style="list-style-type: none"> - Over-simplification does not allow for options other than make vs. buy 	(Grover & Teng 1993), (Venkatesan 1992)
Heuristic Models/ Portfolio Instruments	(Lacity et al. 1996)	Strategy setting Vendor Selection	<ul style="list-style-type: none"> - Selecting IT activities for outsourcing based on their contribution to business efficiency and to business competitiveness - Compare economics of vendor offering with in-house capabilities by identifying proficiency of managerial practices and achievement of in-house economies of scale for this activity - Technical considerations rating the activity for its technical maturity and degree of integration 	Various options on the Insourcing– Outsourcing Continuum	Service Scope, and Recipient Scope only	<ul style="list-style-type: none"> - Core Competencies/ Strategic Value - Resource - Economics: Cost/ Finance - Technology - Degree of Integration - Degree of Maturity 	<ul style="list-style-type: none"> - Greater degree of operationalisation providing actual tool support - Spans across 2 of 3 process stages 	(McFarlan & Nolan 1995)
Scoring Models	(Wang & Yang 2007)	Strategy setting	<p>Using the AHP method (weighted factor-scoring model):</p> <ul style="list-style-type: none"> - Construction of the hierarchy (creating a list of criteria) - Priority setting (comparing criteria pair wise) - Consistency calculation 	Make vs. Buy	N/A because dimensions were set equal with decision factors/ criteria	<ul style="list-style-type: none"> - Economics: Cost/ Finance - Resource - Strategy - Management - Risk - Quality 	<ul style="list-style-type: none"> - Lack of operationalisation – no underlying process and lack of identification of stakeholders/participants - Quantitative process misleads to assumption of greater accuracy 	(Yang & Huang 2000), (Fill & Visser 2000)

Figure 1 Strategic analysis of decision to outsource: Level 1 analysis (Grover & Teng 1993: 35)

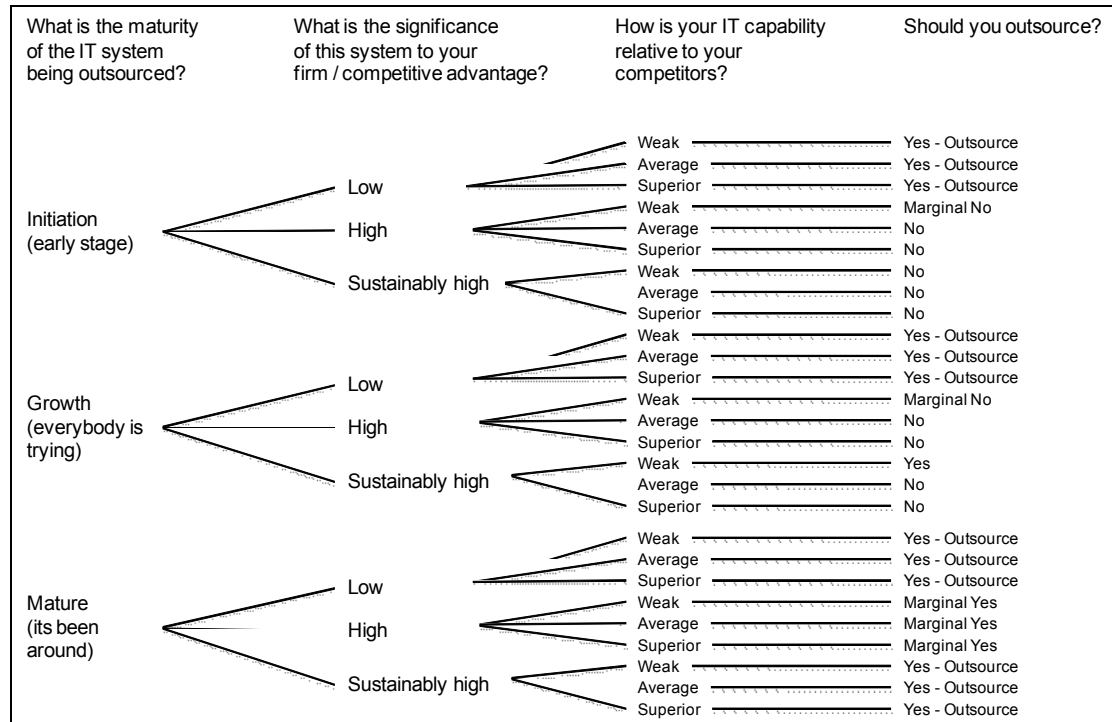


Figure 2 The four portfolio instruments (Lacity et al. 1996: 18–19, 21, 24)

