A QUALITATIVE MODEL OF THE CRITICAL SUCCESS FACTORS FOR THE
EFFECTIVENESS OF INFORMATION SYSTEMS OUTSOURCING

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ABSTRACT

A QUALITATIVE MODEL OF THE CRITICAL SUCCESS FACTORS FOR THE
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The objective of this research is to construct a model of the critical success factors for the effectiveness of Information Systems (IS) outsourcing. "Lack of in-house expertise" and "cost effectiveness" are the widely accepted major factors of motivation for IS outsourcing. Although various decision models and analytical frameworks have been proposed before, the literature is not abundant on a complete qualitative model. In contrast with the decision models which are executed before an outsourcing engagement (a-priori), an effectiveness model will be an a-posteriori guide which will enable the clients to measure their outsourcing performance and re-evaluate their business and management strategies. This thesis examines the critical success factors for outsourcing effectiveness through qualitative research conducted with multiple case studies for information systems developed for public and private clients. A conceptual model consisting of various hypotheses is constructed and qualitatively evaluated.

Keywords: Information systems, outsourcing, qualitative research, effectiveness, critical success factors.

ÖZ

BİLİŞİM SİSTEMLERİNDE DIŞ KAYNAK KULLANIMININ ETKİLİLİĞİ İÇİN KRİTİK BAŞARI FAKTÖRLERİNİN NİTEL BİR MODELİ

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Bu araştırmanın amacı bilişim sistemlerinde dış kaynak kullanımının etkililiğinin kritik başarı faktörleri için bir model oluşturmaktır. "Uzmanlık yetersizliği" ve "maliyet etkililiği" dış kaynak kullanımının başlıca nedenleri olarak kabul edilir. Çeşitli karar modeli ve analitik çerçeve çalışmalarına rağmen, literatür, bütünsel bir nitel model içermemektedir. Dış kaynak kullanımı girişimlerinden önce (*önsel*) uygulanan karar modellerinin tersine, nitel bir etkililik modeli, müşterilerin dış kaynak kullanımı performanslarını ölçmelerine, dolayısıyla iş ve yönetim stratejilerini tekrar gözden geçirmelerine yarayacak bir *sonsal* kılavuz görevi görecektir. Bu tez, dış kaynak kullanımı etkililiğinin kritik başarı faktörlerini, kamu ve özel sektör müşterileri için geliştirilen bilişim sistemlerini, çoklu örnek olay çalışmaları çerçevesinde inceleyen nitel araştırmalara dayalı olarak hazırlanmıştır. Bu doğrultuda, birçok hipotezden oluşan kavramsal bir model oluşturulmuş ve nitel olarak değerlendirilmiştir.

Anahtar Kelimeler: Bilişim sistemleri, dış kaynak kullanımı, nitel araştırma, etkililik, kritik başarı faktörleri.

dedicated to Rena, Berkan and Kerem

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CHAPTER 1

INTRODUCTION

Outsourcing can be defined as transferring internal business activities to an external provider. It is not a new concept since traditional subcontracting can be viewed as the origin of today's outsourcing. In its simplest view, it is based on a make/buy decision and constitutes a highly strategic management concept today. Similarly, information systems (IS) outsourcing is the transfer of part or all of the IS functions to an external vendor [1]. Among the common IS outsourcing categories, we can mention information technology (IT) infrastructure outsourcing, application development outsourcing, and integration outsourcing. In short, it implies that clients - usually being non-IT entities - use vendors to manage their own IS. Since information systems not only include IT but also make use of human resources and business processes, vendors should be capable of working on both IT and non-IT domains. Being a major parameter of information management of a company, IS outsourcing should be aligned with IT planning.

Throughout the last two decades, IS outsourcing has been studied from various perspectives. The seminal paper by Lacity and Hirschheim being among the first to elaborate on fundamental issues, on the one hand, IS have been considered as commodity services, whereas on the other, "outsourcing IS" is viewed at a more strategic level than other organizational functions [2]. Consequently, the industry is developing, the number of providers and the range of outsourced functions are growing, and eventually the rights and wrongs of the whole process are becoming more critical. Today, IT management (together with CIOs and executive management) is challenged by the cost and risk of IT investments which can be quite critical for the firm. Moreover, the speed and dynamics of technological developments in this domain require skilled and experienced IT staff to cope with this dynamism [3]. Therefore, the number

of firms that consider outsourcing part or all of IS functions is increasing every day. On the other hand, Hu, Saunders and Gebelt's research which analyzed the data from 175 companies shows that the influences of media, vendor pressure, and internal communications between the managers of firms were the main triggers for clients to adopt IS outsourcing (rather than the famous Kodak effect) [4].

In this study, the problem of IS outsourcing effectiveness will be investigated. By "effectiveness" we mean *the degree to which outsourcing reasons/motives of clients are achieved and the level to which in-house problems of concern are solved* (Figure 1.1).
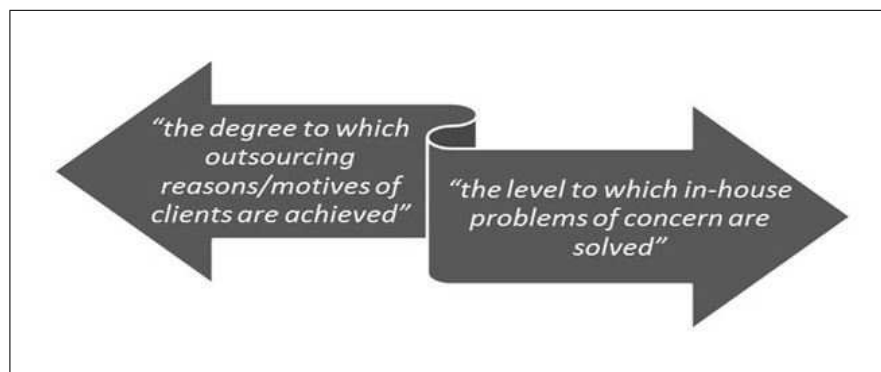
Figure 1.1: What we mean by IS outsourcing effectiveness

1.1 Evolution of IS Outsourcing

Businesses prefer to focus on how they can increase their competitive advantages in order to increase their market shares and profits. Until the 70s, increasing the size of local businesses has been found as the first and only way to achieve this mission. In the upcoming decades, main attempts on globalization for businesses were taken. On the other hand, this shift required radical strategies on management and organizational structures. Corporate agility, which required the effective use of IS as the primary tool, was needed. That is how businesses started filtering their critical success factors (CSF), focusing on them, and determining which ones they can outsource [5].

Professional services and facility management services of the 60s, especially in the financial domains can be viewed as the origins of IS outsourcing [1]. Back then, expensive and

large computing devices required considerable amount of space. Many firms signed contracts with vendors providing data processing services because of these reasons and to eliminate investment in the hardware [6]. IS outsourcing began its evolution in early 60s for the above cost saving reasons. Electronic Data System (EDS) signed an agreement with Blue Cross of Pennsylvania in 1963. The deal was on data processing and was the first time a giant corporation outsourced all of its data processing functions [7].

In the 70s, software development started becoming expensive as well. The concepts of application packages, standardization of systems software like DBMS and network monitoring became popular. With the increasing demand on IS applications and low supply of IT staff, contracting became a viable solution [6]. After the mega-deal with Blue Cross, EDS signed similar contracts with Frito-Lay and General Motors in the 70s and with Continental Airlines, First City Bank, and Enron in the 80s [7].

In the 80s, the control of the product development cycle starting from the raw materials to the delivery of these products to the customer became the main focus. Within this vertical integration, IS was viewed as one of the important value adding function. Moreover, the technological downsizing via cheap mini computers and PCs decreased the use processing services. Thus, clients customized IS usage by investing relatively less amounts on hardware, system software and application software. More or less, the milestone has been Eastman Kodak's outsourcing decision in 1989 [8,9]. Kodak outsourced its mainframes, telecommunications, with their maintenance and service to IBM. Successful outcomes of this deal inspired many other clients. Acquiring information through the technology that others have owned was the main philosophy here. A lot of major clients followed Eastman Kodak with similar strategies [3,4].

In the early 90s, most of the deals were single-vendor total outsourcing contracts. Moreover, vendors started managing the hardware and services (that they purchased) of the client from the client's location (on-site facility management). In some cases, client's IS staff are transferred to the vendor (total outsourcing). On the other hand, in some cases, transfer of at least one subset of client's IS functions are realized (partial outsourcing). This issue is called the *degree of outsourcing* and will be discussed in detail in Chapter 2. While the majority of outsourced IS services were application packages and specific processing services in the 80s,

system integration, software development, and telecommunication management became the main focus in the 90s [10]. Through the 90s, cost reduction again became a popular reason to make use of IS outsourcing. This way, most of the processes which do not relate to the core competencies could be easily transferred to external sources. The utilization of the related staff was another motive, since freeing up resources was seen as a major factor in the economies of scale. Not viewed as a business strategy yet, outsourcing started becoming a good solution for those processes where internal expertise was lacking. Also, within this era, successful outcomes proved that IS outsourcing can overcome user resistance and accepted as a more natural way of delivering new organizational IS.

As of today, the tradeoff between partnership and ownership is the main concern and developing strong and strategic partnerships is one of the key factors for successful outsourcing. Outsourcing deals shifted from simple transfers to complex co-sourcing alliances. More collaborative approaches which involve multiple vendors and multiple clients started becoming popular. With the requirement of sharing risks and rewards, such alliances mainly concentrated on maximizing benefits instead of minimization of costs only. Moreover, different views on the added value of IT/IS for the businesses are studied [11]. Within the last decade some other outsourcing forms have emerged. These are business process outsourcing, application service providers, multi-sourcing, and e-business outsourcing [7]. A recent and comprehensive literature review together with future research directions can be found in Lacity, Khan, and Willcocks' research [12]. In another research, Sashikala presents a theoretical framework for outsourcing actions as a guideline for companies on why and how to outsource [13].

1.2 The Objective of the Study, Research Questions and Scope of the Study

The objective of this study is to identify the determinants of IS outsourcing effectiveness, together with the relationships among those determinants. Hence, the two fundamental research questions to be addressed are:

1. What are the determinants of IS Outsourcing effectiveness?

2. What are the relationships among those determinants?

The scope of the study includes global accumulation of knowledge and experiences with IS outsourcing as reported in the literature to be reviewed in Chapter 2. The case studies are all carried out in Turkey, and their scope covers public as well as private sector clients, working with vendors from the private sector. Defense industry, being a major area of IS outsourcing, is studied from the vendor as well as client viewpoints. Public finance and health are the other two sectors in which outsourcing experiences are studied, from the vendor and client viewpoints.

1.3 Research Method

Literature review and qualitative research based on case studies will constitute the research method applied in this study. The first case presented in this paper serves an exploratory purpose and is followed by two validatory cases. The problem will be investigated from three viewpoints: Firstly, determinants of a typical IS outsourcing life cycle will be presented based on a brief literature review. Secondly, theoretical foundations of IS outsourcing derived from the fields of economics, management, and sociology will be highlighted. Finally, traditional and contemporary software development methods will be considered as factors that influence outsourcing effectiveness. After elaborating on these three viewpoints, our research methodology will be explained and then, the case studies carried out with various vendors and public sector clients in Turkey will be described, leading to the model that consists of hypotheses derived from the analyses of these cases. Each hypothesis will be presented after discussing the pertinent issues in the context of the cases.

1.4 Layout of the Thesis

Making the outsourcing decision requires the effect of outsourcing deals on internal IT costs in addition to vendors' capabilities. Thus, IS outsourcing decision criteria includes the strategic intent, risks, benefits and degree of outsourcing. Additionally, selecting the right vendor(s), contracting, and managing such relationships play critical roles in this process. In Chapter 2, we review the literature on information systems outsourcing in the context of these determinants.

For all of these determinants, managers may find past and/or others' experiences insufficient and consult to theoretical research in the field. The theoretical foundations for IS outsourcing can be viewed in three main categories; economic, strategic/management, and social. In Chapter 3, we propose a conceptual model within four such theories. Additionally this model includes the effects of recent trends in software development approaches such as process improvement methods, particularly the recent development and acquisition constellations of capability maturity model (CMM), agile software development, and software reuse focusing on software product lines (SPL). Although the number of software development methods are not limited to these three, we find that they are the milestones with visible effects on how outsourcing deals are implemented. Process improvement methods mainly aim standardizing the management of software projects and quality assurance procedures. Main functions are to reinforce the strengths and improve the weaknesses. Agile methods, in response to software process improvement methods (esp. popular CMM product suits), aim focusing on user satisfaction rather than processes by enabling strong communication channels instead of heavy documentations. Software reuse emerged with the philosophy of cost reduction and faster product release by adaptation of different methods to creating libraries (especially object-oriented codes) which can be used multiple times. Product lines approach enhanced this philosophy by creating an organizational framework to develop reusable software for specific categories of programs. We consider these concepts to be fundamental to the development, acquisition and management of information systems, and as such, any further research on IS outsourcing must start from a firm grasp on the interrelationships between the theory and practice of outsourcing on one hand and those essential concepts of IS on the other.

Chapter 4 explains our research methodology, specifically; why qualitative research and case study methodology is preferred, the data collection method and the stream of the case studies. In Chapter 5, application of the proposed conceptual model on IS outsourcing is explained by giving the details of the case studies and proposing hypotheses from the exploratory case studies. This chapter also includes a detailed analysis of the results and concludes with the finalized IS outsourcing effectiveness model. The last chapter presents a summary of the study, considers the validity threats and limitations of the case studies together with the undertaken mitigation measures and suggestions for future research directions.

CHAPTER 2

LITERATURE SURVEY: IS OUTSOURCING

Although it is a long process, it is the understanding of the organization's core competencies and critical success factors (CSFs) that should affect the outsourcing decision and what to outsource. It is safe to avoid outsourcing if a task is both a CSF and a core competency because such tasks form the identity of the organization and has a direct affect on the organization's success. Usually such tasks are important for the daily transactions in relation with the suppliers and customers of the organization [5]. A core competency which is not a CSF can be evaluated for outsourcing since different views can cause different decisions. Best candidates for outsourcing are tasks which are not core competencies. If it is a CSF, a strategic alliance through outsourcing would be more beneficial, otherwise a simpler partnership would be enough. Strategic alliances require a more in-depth collaboration and risk-reward-information sharing.

If the client wishes to bring a task back to in-house in the future, the nature and cost of such tasks should be carefully evaluated since gaining the expertise back might be quite difficult. The following sections study the literature in more detail in terms of the determinants of information systems outsourcing.

2.1 Literature Survey Method

This survey is based on journal articles, books and conference proceedings and various databases are searched but the focus was mainly on ScienceDirect, EBSCOhost, Springerlink, and Emerald. The search keywords used are "information systems outsourcing", "IS outsourcing", and "information systems"+"outsourcing". Naturally, a manual filtering through the

abstracts, keywords, and the content is performed as well. Obtained results, as a classification of journals can be seen in Table 2.1.

We have selected articles from 41 journals where the majority of these are included in the Science Citation Index, Science Citation Index Expanded, or the Social Sciences Citation Index as of August 2011. It makes good sense that 10 journals are covered in both Science and Social Sciences domains. More popular among such journals are "Information & Management", "Journal of Information Technology", and "Journal of Management Information Systems". In addition to these, "Communications of the ACM", "MIS Quarterly", "Industrial Management & Data Systems", and "MIT Sloan Management Review" have attracted researchers for the publications in this domain. Almost a quarter of the journals dominate the literature in terms of the number of articles in IS outsourcing. On the other hand, 75% of these sources are IS journals and the remaining belong to the management and/or business domains; naturally concentrating on the organizational aspects and determinants of IS outsourcing.

2.2 Strategic Intent

For IS outsourcing, clients need to form their strategic intent in terms of desired outcomes. One of the most suitable classifications of strategic intents for outsourcing is presented by DiRomualdo and Gurbaxani [14]. According to that study, there are three main classes: IS improvement, business impact, and commercial exploitation.

The main concentrations of the popular *IS improving* outsourcing deals are to cut costs and to increase the IS effectiveness. In such cases, clients expect better performance from the IS resources at hand. Moreover, better service quality, and acquisition of new technical skills are targeted. Achieving these goals can be obtained through the usage of vendor skills.

Achieving business impact is another reason for outsourcing. A new IS can improve the client's business processes. A form of business process reengineering (BPR), such a strategic intent can be the most beneficial type of outsourcing with the reservation of a successful deal. Examples can be given as inventory management, customer relationship management (CRM), and supply chain management. Generally, such deals are processed with a joint effort where

Journal Name	Abbreviation	SCI	SCI-EX	SSCI	IS	non-IS
Administrative Science Quarterly	ASQ			✓		✓
California Management Review	CMR			✓		✓
Communications of the ACM	CACM	✓	✓		✓	
Communications of the Association for IS	CAIS				✓	
Computer Standards & Interfaces	CSI		✓		✓	
DATA BASE for Advances in IS	DATABASE				✓	
Decision Support Systems	DSS		✓		✓	
European Journal of IS	EJIS		✓		✓	
Expert Systems with Applications	ESA		✓		✓	
Harvard Business Review	HBR			✓		✓
Human-Computer Interaction	HCI	✓	✓		✓	
Industrial Management & Data Systems	IM&DS		✓		✓	
Information & Management	I&M		✓	✓	✓	
Information and Software Technology	IST		✓		✓	
Information Systems Frontiers	ISF		✓		✓	
Information Systems Journal	ISJ			✓	✓	
Information Systems Management	ISM		✓		✓	
Information Systems Research	ISR			✓	✓	
Interfaces	INTERFACES		✓	✓	✓	
Intl. Journal of Accounting IS	IJAIS				✓	
Intl. Journal of Human-Computer Studies	IJHCS	✓	✓	✓	✓	
Intl. Journal of Information Management	IJIM			✓	✓	
Intl. Journal of Management Reviews	IJMR			✓		✓
Intl. Journal of Sw. Eng. and Knowledge Eng.	IJSEKE		✓		✓	
Journal of Computer Information Systems	JCIS		✓		✓	
Journal of Information Technology	JIT		✓	✓	✓	
Journal of Information Technology Cases & Appl.	JITCA				✓	
Journal of International Management	JIM			✓		✓
Journal of Management Information Systems	JMIS		✓	✓	✓	
Journal of Operations Management	JOM		✓	✓		✓
Journal of Org. Computing and E-Commerce	JOCEC	✓	✓		✓	
Journal of Strategic Information Systems	JSIS		✓		✓	
Journal of the Association for IS	JAIS		✓	✓	✓	
Logistics Information Management	LIM					✓
Long Range Planning	LRP			✓		✓
Management Science	MS		✓	✓		✓
MIS Quarterly	MISQ		✓	✓	✓	
MIS Quarterly Executive	MISQE				✓	
MIT Sloan Management Review	MIT-SMR			✓		✓
Omega - Intl. Journal of Management Science	OMEGA		✓	✓		✓
Organization Science	OS			✓		✓
		4	24	21	29	12

Table 2.1: Classification of analyzed journals (keywords: "information systems outsourcing", "IS outsourcing", "information systems"+"outsourcing"). The search being performed through the list of journals is as of June 2012.

the complementary skill sets are transferred between both parties. Complete reliance on the vendor may not help [14]. Business perspective of this type of outsourcing dominates the technical perspective. Aligning IS goals and business goals is the key issue here. In case the vendor does not fully understand the client's business, the deal probably ends up with failure. Another metric to avoid failure should be constructed by evaluating visible business successes and arrange vendor payments accordingly.

Finally, *commercial exploitation* can be achieved through a strong partnership with the vendor in order to create new profits from IS resources. One way of performing this is to license previously internal IS products and services to be marketable to other organizations. Innovation is the key factor here. Investments for innovative systems should be carefully calculated and realized only if the market value for these systems seems promising. On the other hand, this type of outsourcing is not as common as the previous ones due to the substantial amount of expertise requirements.

Eventually, the strategic intent behind an outsourcing deal may change along the way. Changes in the organizational structures (e.g. company mergers), realization of different needs in a long term deal, industry shift, the effect of the political climate on the industry can be example reasons for such changes. Each type of strategic intent should be handled differently throughout the contract period. They all require different types of contracts and different performance measures and mechanisms, but all of them should constitute the client-vendor relationship. On the other hand, degree of outsourcing that we study in the upcoming sections has a direct influence on the type of strategic intent.

More recently, Beasley, Bradford, and Dehning have analyzed how strategic intent of outsourcing forms a value impact on clients [15]. That empirical study has shown that there is a significant relation between the strategic intent and the firm size. One reason for this relation is the behavior of the shareholders of large firms where they believe that economies of scale are already established so outsourcing IS should have reasons other than cost reduction. On the other hand, smaller firms do see outsourcing as the best choice when engaged for reasons like scarcity of expertise. Another result of the study is the relation between the strategic intent and time period. As outsourcing has increased over time, the market reaction got weaker as opposed to early (old) cases.

Seven case studies were done by McLellan et al. in the banking industry to determine the financial motivations behind IS outsourcing [16]. The impacting outcome (for the early 1990s) of the study demonstrated that although financial strategies were quite popular, unresponsiveness of IS departments triggered the outsourcing decisions more. Another driver was found out to be the consideration of IS as a core skill and improvement requirements. The strategic alliance view of outsourcing enabled the clients of the banking industry to start taking more careful steps and re-evaluate such decisions. Ultimately, despite the conflicts in such alliances, outsourcing IS has been viewed as the best solution back then. Briefly, strategic motivations have override the financial ones since the economies of scale of vendors enabled the clients go under such complicated procedures.

One of the important frameworks modeled to assist decision making as to which IS functions to outsource was designed in 1995 by Cronk and Sharp [17]. The motivation behind this research was two conflicting arguments, namely, whether the strategic role of IS allows or prevents outsourcing. The core of this framework was the well-known core competency theory and segmentation of the IT functions accordingly.

Recent research by Dibbern, Chin and Heinzl showed how strategic IS outsourcing decisions were influenced by systemic factors (influences that occur when various IS functions work together effectively) and how dependent these are on cultural contexts [18]. The research was performed with surveys on two different cultures; Germany, considered "moderately individualist," and United States, considered "strongly individualist".

Another decision model for IS outsourcing was Yang & Huang's model designed to use the analytic hierarchy process method for the classification of outsourcing problems [19]. The model input factors related to management, strategy, technology, economics, and quality and formed in the following steps: *(i)* establishment of an expert team, *(ii)* selection of the factors and attributes, *(iii)* construction of the analytical hierarchy, *(iv)* computation of the alternatives, and *(v)* decision making. The message given in the research for the clients was to make use of more than the usual dimensions of decision making for outsourcing (the input factors listed above). On the other hand, other factors like vendor selection and relationship management was not included in the model.

Case based reasoning (CBR) is another popular tool on forecasting outsourcing success and affecting the decision criteria and strategic intent. Hsu et.al. created a two-level CBR-based method by using genetic learning algorithms which is a very good example for the usage of machine learning for IS outsourcing [20].

Various analyses have been made to evaluate the outsourcing decisions in terms of strategic intents of clients. A financial analysis model is created by Hall & Liedtka by using logistic regressions and evidences are provided to highlight the relation between large scale outsourcing deals and the stock market [21].

The strategic profile of the client is a major determinant for outsourcing. Such a relation has to be studied where the business strategies and related core competencies may change the attitude towards outsourcing. The underlying theories of outsourcing, when mapped to business strategies, affect the differentiation between the clients who apply outsourcing for IS and the ones who do not [22] [23].

Another strategic intent of outsourcing is to enable *knowledge transfer* from vendors to clients. Al-Salti and Hackney's research on studying the factors which effect the knowledge transfer in IS outsourcing in the public sector suggests that different types of factors exist: knowledge-related, client-related, vendor-related and relationship-related [24]. This exploratory research was carried out with eight largest public sector organizations of Oman and supports the importance of having an organizational culture supporting innovation, learning and cross-boundary knowledge transfer.

2.3 Degree of Outsourcing

Degree of outsourcing is defined as the scope of outsourcing in terms of the client's IS budget. Usually, an outsourcing deal which corresponds to 80% or more of the client's budget is called *total outsourcing*. If this figure is in the range of 15% - 25%, then it is called *selective outsourcing* [25]. Decisions about this degree are quite critical since there is a high correlation between the scope and the risks/rewards of the project.

Naturally, total outsourcing deals contain more risks and more rewards than selective outsourcing deals which in return have a direct effect on the success or failure of the project. Barthelemy and Geyer have pointed out that most clients favor selective outsourcing in cases where the client has a strong IT department or is in the IS market [26]. On the other hand, when the main motivation is to minimize IT costs, clients prefer total outsourcing.

Gulla and Gupta have suggested a framework for clients to undertake the right IS outsourcing decision and the degree of outsourcing [27]. According to this framework, the outsourcing degree is effected by a lot of outsourcing drivers and the managers should carefully analyze these drivers in short, medium as well as in long term on the IS performance. Moreover, they should align each one of them with the organization's business goals. The framework uses analytical hierarchy process for optimizing the decision on the degree of the outsourcing deal and is applied to three Indian banks.

There are three major lessons learned related to the degree of outsourcing: *(i)* whether total or selective, outsourcing degree should be identified well since it has direct consequences throughout the outsourcing deal. *(ii)* The degree should be confirmed after a careful examination of the strategic intent for the deal in order to be consistent with the project goals. *(iii)* Upon the analysis of the outsourcing degree, there may still be an option to go back and build the system in-house.

2.4 Vendor Selection

Understanding the potential role and contribution of vendors is critical in the outsourcing process. High expectations of clients end up in strong and sometime over-structured contract items. Such an approach affects the outsourcing relationship directly. The determinants of this relationship can be considered in two categories: contextual relationship including mutual benefits, commitment, and predisposition, and active relationship including shared actions, distinctive competencies, and organizational linkage [28]. In the current and the next section we discuss these issues from the perspectives of vendor selection and management of the outsourcing relationship.

In the vendor selection process, clients should follow past experiences with similar purchases where they achieved success. Moreover, identification of potential vendors to meet the client's requirements should be the first step to take. Then, a study on which vendors have the sufficient skill-sets for the deal has to be performed. Focusing on the vendors' resources and technology assets can be quite misleading. The concentration should rather be on understanding the infrastructure, values, and methodologies [29]. According to Feeny et al., the vendor capabilities that should be evaluated can be listed as *domain expertise, business management, behavior management, sourcing skills, technology exploitation, process reengineering skills, customer development skills, planning and contracting skills, organization design, governance skills, project management skills, and leadership skills.*

The process: Upon the decision regarding the degree/level of outsourcing, the client should specify the detailed requirements of the information system to be outsourced. These details should be announced to candidate vendors who would be interested, in the form of a request for proposal (RFP). Candidate vendors are required to respond to the RFP with formal proposals. Other than the detailed specification of the system, the RFP should extensively describe the required qualifications of the vendor for the management, monitoring, and evaluation of the project. Such vendor requirements may include size, financial performance, management details, employee circulation statistics, staff education levels, quality management (e.g. ISO9000, CMMI), intellectual property experiences, ethical conducts, training, reporting experiences, and references from other clients. After the preparation of the RFP, the bidding and the procurement phases begin: once the vendors prepare and send their proposals, the client begins the evaluation stage. The client should evaluate the proposals in detail to check whether they meet all requirements. In addition to that, the client should continue evaluating the vendors from a communication and cooperation perspective for a long term alliance. After the first round of eliminations, the client should meet with the final list of candidate vendors in both parties' sites. Moreover, previous clients of candidate vendors should be referenced when needed. Another key process should aim to assure that the candidate will meet the performance levels specified in the RFP. If more than one vendor qualifies for the development of the required IS, all of them should require their plans to work within a consortium, i.e. a team of multiple vendors. At the end of the day, the project might be divided among these vendors - especially in terms of minimizing the risks. For that reason, the RFP should include

items regarding the physical location of the vendors. Finally, political and cultural issues can be evaluated by specific RFP items.

The whole RFP process is quite complicated and requires great effort, especially if it is the first time for the client. Nevertheless, even if it is costly, third party consultants can be hired [30] [31]. All of the above processes should be handled by a specific vendor selection committee. Final decision of this committee should be made consulting the senior management, legal consultants, and all stakeholders [32].

A decisive factor in the vendor selection process is benchmarking the vendor costs against the cost that would accrue if the system is built in-house. Secondly, the client must apply a *due-diligence process*, to estimate and test whether the vendor has sufficient resources and skills to complete the project. The due-diligence process usually consists of an information exchange beyond the scope of the RFP. Kern, Willcocks, and van Heck state that *"selecting a supplier is a costly undertaking in terms of time, effort, and resources. However, the investment in identifying the right supplier and contract bid is paramount to the success of the overall outsourcing venture"* [33]. In the same study, another critical factor for vendor selection is studied: the reaction of both parties to a *winner's curse*. The term "winner's curse" refers to the situation when the vendor who wins the bidding systematically bids above the actual value of the IS and hence incurs losses. Kern et al. have summarized six strategies to avoid facing a relational loss due to winner's curse:

1. Vendors bidding for the contract may underbid since they do not estimate the real value and cost of the outsourced IS where the main goal is to win.

2. A winner's curse sometimes results in a positive way for the client when the vendor faces the losses and delivers the product to the agreed level.

3. The relational problems can be overcome by performing early contract negotiations which will eventually improve overall efficiency.

4. A winner's curse can be avoided by a vendor through information gathering which will eliminate the problems arising from insufficient information, misinformation, and wrong assumptions.

5. A winner's curse can be avoided by inserting contingency clauses into the contract and by choosing appropriate bidding formats.

6. Identifying the relationship implied by the contract in order to clarify the added values expected from the vendor.

Kim and Chung have studied 207 outsourcing cases and they claim that one of the most critical factors for successful IS outsourcing is the set of vendor capabilities since most of the clients prefer outsourcing when they do not have the sufficient expertise internally [34]. Expectation of a successful outcome increases when the vendor has the experience and financial resources to match the client's goals. Chaudhury, Nam, and Rao had proposed a specific bidding mechanism in order to reduce the cost of the vendor selection process [35].

2.5 Contract and Relationship Management

Operating the contract clauses is not sufficient for success, since management of vendor relationship is just as important as contract management. These two concepts should be worked together for a beneficial outsourcing deal. Focusing too much on the contract may achieve a successful IS in the end. But is it sufficient for a healthy outsourcing life cycle - especially for the future deals with the same vendor?

Numerous studies have addressed the issue of client-vendor partnership and the management of this relationship [36–45].

Official conduct of IS outsourcing definitely requires a strong and structured contract. On the other hand, a productive relationship will enable an added value for the whole deal [46]. Both parties should pay attention to a couple of processes during their outsourcing deal. Firstly, they should invest sufficient resources just for the management of the relationship. Personalization of the contract, i.e. assigning individuals/teams for communication purposes is very important. Secondly, these teams should communicate on a regular basis about the current and future requirements of the deal. Lastly, they should negotiate and agree on a structured and flexible contract, i.e. a contract, which allows for updates in both scope and for price over time. Bryson and Ngwenyama proposed a contract structuring approach for mutual ben-

efits on clients and vendors [47]. Their research was based on constructing incentive schemes for improving vendor performance differentiating between deals having single and multiple vendors. Upon the fact that information processing costs can be fixed or variable, types and structures of outsourcing contracts can vary as well.

The cost of developing a strong relationship between the client and the vendor is usually high. On the other hand, once the costs are neglected and moreover a "partnership" between the parties is established, the probability of a successful outcome increases. Of course, such efforts are results of managerial decisions and highly strategic in the contracting world. Examples of such efforts are described by Klepper [48]. These are attraction, communication & bargaining, expectations development, norm development, and power & justice. Attraction process involves the rewards provided by the vendor and managerial actions for development and implementation of methods on collecting data on reward-related characteristics of the vendors. Communication should involve more than a daily information exchange. Meetings and discussions regarding future actions, capabilities, strengths and weaknesses should also be performed. Bargaining process is highly related to contract negotiation and involves conflict resolution items as well. Another process is expectations development where it is highly a trust-building mechanism (trust is separately discussed below) consisting of reciprocal efforts on fulfilling other party's requirements. Norm development is more of a moral, attitude, and behavioral mechanism to build a strong partnership. Existing norms should be strengthened where additional norms should also be developed in order to demonstrate a more committed profile. Lastly, the power and justice mechanism should be applied in regard of power theories; i.e. if the client is highly dependent on the vendor then the vendor has more power in the relationship and vice versa. Fairness and justice are the key behavioral attributes here. The part who invests more in the relationship may be viewed as having a right to attain more power than the other.

The duration of the relationship is affected by a numerous factors. The negative effects of requirements uncertainty and opportunistic behavior are discussed in the sections where theoretical foundations are explained. In addition to them there are factors which have positive effects as well [49]. Knowledge acquisition of the client is one of the key factors since it helps realizing the financial advantages and vendor's service quality improvement. It enables the relationship to continue and in some cases extension of the contract period. Moreover,

new methodologies and reengineering of business processes can be achieved through active knowledge acquisition.

Moreover, the relationship established may vary depending on clients working with single or multiple vendors. Lee, Heng, and Lee have studied multi-vendor outsourcing relationship management from three dimensions, namely; structural, affective, and cognitive [50].

The issue of *trust* merits special focus in outsourcing relationships. Sabherwal defines trust as "A state involving confident positive expectations about another's motives with respect to oneself in situations entailing risk" [8]. A high level of trust is needed in an outsourcing relationship since it can be viewed as a strategic partnership. Trust, in fact, is a risk-related concept (as can be followed from the above definition). Confidence, quality assurance, staying loyal to the contract, and fairness are samples of trust parameters.

Both parties have to trust each other required that the formal contract is well documented and appropriate structure controls are written clearly. Sabherwal studied 18 outsourcing cases and came up with four types of trust [8]. Calculus-based trust is based on the rewards and penalties. Penalty clauses in the contract minimize opportunistic behavior. Eventually, this will indicate how much the vendor desire to contract for future projects. Knowledge-based trust is a measure of how well both parties know each other. Through the cases analyzed, Sabherwal witnessed this type of trust through shared experiences between the client and the vendor on other projects. It can also be enabled through a courtship between key individuals from both parties. Identification-based trust arise from the fact that both parties should know each other's goals. In this way they both put themselves into other party's shoes. Early team building efforts enforces this type of trust. Lastly, performance-based trust can be created through project's early success. Interim deliverables play great role in this type, since tangible items like prototypes increase the motivation on the client side.

Trust between the client and the vendor should start at the very beginning of the relationship [51]. The contract should be prepared without favoring any one of the parties. All decisions should be transparently made and the level of communication should be high. On the other hand too much or too little trust can harm the success of the IS at stake. Some of the other critical factors of trust are vendor's previous clients (references), performance level,

investments made for the outsourcing deal, commitment, consistency, and obeying the security/confidentiality restrictions [52].

Lander et al., in their research, classified trust-building mechanisms to be applied to IS outsourcing [53]. These mechanisms are contained in three categories of trust levels which are very similar to Sabherwal's study: calculus-based, knowledge-based, and identification-based. Calculus-based mechanisms are initial interactions, integrity, and predictability between the client and the vendor. Knowledge-based mechanism is the communication details. Finally, identification-based mechanisms are sharing and delegating control, concern for others (e.g. fairness, respect), joint identification involving participation, commitment and loyalty, potential for success in terms of competence, and managerial decisions.

Another important study was the formulation of an integrative model of trust in IT outsourcing by Lee et al. [54]. According to the model, there are two antecedents of mutual trust: the positive affect of initial trust (cognitive and calculus-based) and the negative effect of initial distrust economics and psychology-based). Positive consequences of mutual trust are knowledge sharing and expected outsourcing success. On the other hand, the degree of mutual dependency moderates the relationship between mutual trust and knowledge sharing.

According to Weeks & Feeny, existing relationship factors have a significant bearing on "innovation" outcomes. This set of innovation enablers are divided into three: client enablers, vendor enablers, and relationship enablers. Client innovation enablers are technology skills, selective sourcing mind set, IT organizational alignment, and IT leadership. Vendor innovation enablers are business process skills and industry scope. Finally, relationship enablers are innovation governance, trust, and measurement specificity. Innovation governance challenges can be determined by answering three questions; what ideas should be selected for investment, what processes should be used to manage implementation, and how should each party be rewarded for success. Weeks & Feeny suggest three models of trust which are personal trust, competence-based trust, and motivational trust. Another important relationship enabler of innovation is high level of measurement specificity. It refers to the level of detail at which a task is monitored in compliance with the outsourcing contract. It contradicts with the level of trust; in other words they are indirectly proportional. In their research, Weeks & Feeny call it the "trust but verify" approach [55].

Moon et al. created and applied a relationship-based framework to 178 public outsourcing projects in Korea [56]. Results of this research indicate that projects with low strategic impact require a support type of relationship where contract sizes are small and the deals show a low success rate. Moreover, public sector outsourcing requires management of a long-term relationship since it is more complex and strategic.

2.6   Risk Management

Although IS outsourcing brings benefits like cost reduction, high quality, and flexibility, it contains important vulnerabilities where if not handled properly they can eliminate the benefits. The risks causing such vulnerabilities may not be avoided totally, but can be properly managed and proactively handled during the contracting phase.

Lewis suggested using risk-remedy method as an alternative approach to cost-benefit analysis. According to his findings which is derived from the lessons learned; usage of client requirements correctly, cost of the bidding, cost of delay, and usage of designs rather than selections came out to be important factors for risk mitigation for future outsourcing deals [57].

In the early days of IS outsourcing, clients usually preferred total outsourcing with a single vendor with fixed prices and long-term contracts [25]. Most of these deals failed since contract clauses became useless after four or five years. Many clients either renegotiated the contracts or terminated in the middle of the contract periods. Vendor's monopolistic behavior, unexpected evaluation of long term fixed prices as well as license fees and services fees were examples of *hidden costs of IS outsourcing* causing these failures [58]. An alternative happened to be *selective outsourcing with multiple vendors* for risk minimization purposes where success rates were higher. The competition created by such approaches brought a considerable amount of flexibility to the clients. However, the transaction costs of dealing with multiple vendors in terms of monitoring, project management, and communication increased as well which proves that risk would always occur no matter which approach the client followed. A related empirical study can be followed through [59].

Therefore, risk management techniques have to be considered and there are two main processes to be taken [60]. First, the clients should proactively identify the risks and then determine the control procedures for these risks. Risk identification is a critical study where the client has to classify the forecasted risks with their importance factors, in other words priorities. In this way the client focus should start from the areas facing bigger threats.

Currie implemented an empirical study on minimizing outsourcing risks for small and medium sized contracts by making use of multiple vendors [61]. If the number of potential vendors is low (due to the skill sets) then the cost of future services increases and reciprocally innovation level decreases. Barthelemy, in his 2001 dated article, surveyed 50 organizations and the outcome was almost 15% of the total outsourcing deals failed due to the increased amount of service fees [58]. Such hidden costs are referred to as transaction costs by Bahli & Rivard [62]. Examples can be given as costs related to contracting, vendor search, transition and contract management costs [25]. Beginners of outsourcing are not experienced of estimating such costs and the outcome they face is less cost savings through outsourcing.

Control and minimization of these risks require careful and extensive studies. We should note that each outsourcing deal has its own characteristics due to the client's industry, company cultures, and nature of the required IS. Although there is no optimum solution in the literature, different ways of minimizing risks are studied from known practices and lessons learned [63, 64]. One-sided efforts would lack the desired success. Therefore client-vendor relationships play the most important role in such studies. Bahli & Rivard created measures for risk factors in terms of three sources: the transaction, the client, and the vendor [65]. A detailed survey of managing these relationships can be found in the next section. On the other hand, a list of known efforts is collected by the research of Rottman & Lacity and a subset of these practices is explained in the following items [66]:

- Long-term contracts bring more problems to the client during the outsourcing period. It is meaningful to sign long term contracts for the vendor since initial investments they make for the project would be higher at the beginning of the contract period due to the transactions and asset purchases they plan for the duration of the project (capital investments). So we can claim that *the longer the contract period, the more profitable it is for the vendors*. Moreover, the client obtains more benefits at the beginning stages

and this level decreases on the way since market conditions change and technology costs decline. The remedy for such cases is either to sign shorter term contracts or include special renewal clauses in the contract to obtain flexibility.

- Another contractual precaution is to *include a project termination clause* in the contract. On the other hand, such a clause should include fair conditions. This will eliminate the strict vendor dependency and enable the client to switch to another vendor or take the project back to in-house in case of a poor vendor performance. In case of a contract termination, a continuity clause will be of great help in order for the vendors' smooth transition to an alternative arrangement.

- Making use of *pilot projects* has many advantages like gaining outsourcing experience, testing vendor skills on different type of projects with different implementation styles. Since the size of pilot projects is relatively smaller, the same project can be contracted with multiple vendors in order to compare and contrast different performances. Such projects are quite suitable for more effective vendor selection process, therefore minimizing the risks in early stages. Outcomes are then used to fine-tune the later stages of the contract. The researchers define this approach as *the learning curve of a client*.

- The *performance measures* should be pre-determined and shared with the vendor. That is how the vendor's performance can be correctly measured via comparing with prepared metrics in order to understand if the benefits are achieved or not. Balance scorecards, periodical reports prepared by the vendor and known project management techniques can be used as such measures. This way, daily, weekly, and monthly performances can be recorded easily.

- In addition to others, there are *legal risks* in outsourcing since the physical contract is a legal document. Most of the clients have legal advisors on their payroll. Another form of legal safety is assured by *hiring external legal consultants*. Intellectual property rights, regulation of the outsourcing deals, conflict resolution issues are known examples of issues that can be faced through contracting and outsourcing period which requires such expertise.

- Vendors are more experienced in contractual issues than clients since outsourcing is the main reason they exist. On the other hand, there are *third party consulting firms* serving for both sides, but mainly for the clients. Compared to the vendors which are experienced with different types of projects with different sizes and contract periods, clients - especially if it's the first time - engage in such deals more rarely. Therefore, hiring a

third party expert is quite beneficial to have the same bargaining power during the deal. At the end of the day, contract preparation and negotiation are critical processes for a successful outcome.

- It is quite common that *clients favor fixed-price deals*. Drawback of such an approach is the *lack of innovation* since such deals do not force the vendor for developing more than what is required. Hence, the vendor has a good environment for profit maximization. An alternative approach is a *pricing strategy in parallel with the performance*. This way, the vendors feel more obliged to innovate and go beyond the client's expectations.

CHAPTER 3

CONCEPTUAL MODEL

In this chapter, we shall construct a conceptual view of our research model of IS outsourcing effectiveness, based not only on the IS outsourcing literature reviewed in the preceding chapter, but also on relevant theoretical premises of economics, management strategy, sociology and software development. This model will constitute the starting point for the case studies to be presented in the next chapter, which will serve to formulate and mature the hypotheses and their interrelationships, with the ultimate aim of providing satisfactory responses to the two fundamental research questions of the dissertation, namely the identification of the determinants of IS outsourcing effectiveness and the interrelationships between those determinants.

3.1   Theoretical Framework for the Model

There are a number of relevant theories of different disciplines that have inspired IS outsourcing researchers so far, viz. transaction cost economics and agency theory from *economics*, game theory, resource dependency theory, resource based view, and core competency theory from *management strategy*, institutional theory, social exchange theory, innovation diffusion theory, and power-political theory from *sociology*.

With the booming popularity of IS outsourcing since 90s, quite a number of academic studies on these theoretical models have been carried out in order to perceive the relation between the decision making and/or implementation of outsourcing and how clients perform their business strategies, how information systems are governed in their transactions, and how social and organizational norms effect these processes [67].

We have selected transaction cost economics, agency theory, resource dependency theory, and resource based view, as the four most commonly used theoretical models, in the light of Cheon, Grover, and Teng's study in order to understand clients' outsourcing strategies which helped us to formulate our research questions [68].

3.1.1 Transaction Cost Economics

The main idea behind Transaction Cost Economics (TCE) is determining the make-or-buy selection. Oliver E. Williamson, in his 1979 dated article *"Transaction cost economics: The governance of contractual relations"*, defined "opportunism" as a self-interest-seeking parameter where each individual explains information in a selective and distorted way for his own interest [69]. Williamson claims that efficient governance is triggered by important factors like asset specificity, bounded rationality, uncertainty, and number of potential vendors in the market.

An asset is called firm-specific when its value for different uses is quite lower than its value for its current use. Existence of such assets allows opportunistic vendors harm the client with significant losses. In TCE, this factor is called *asset specificity*. It refers to the degree of an asset being redeployed for alternative uses without losing its productive value. Having low asset specificity enables this use easily [70]. Clients can easily find such assets with low specificity from external sources (e.g. inventory and payroll systems). Often, it is cheaper to buy such applications even if the clients are capable of developing them. On the other hand, processes like IS planning and control can be highly client-specific, i.e. with high asset specificity, therefore hard to obtain from the market. Such assets are not easy to contract due to the vendors viewing them as highly client-specific and an intensive customization effort might be needed.

Other than *bounded rationality* (i.e. limitations on human information processing skills) and opportunistic behaviors, there are other factors affecting outsourcing decisions like the environment of the IS. Large clients with strong IS departments may not favor outsourcing. Moreover, clients and vendors can go into an outsourcing deal once or multiple times. Renegotiation and consequently renewal of outsourcing contracts is quite common. Such decisions are affected by different factors than the initial outsourcing decisions [62].

Aubert, Rivard, and Patry's empirical research on 335 firms showed that *uncertainty* - another important parameter of TCE - plays a big role in outsourcing decisions. Clients prefer outsourcing those IS functions having low uncertainty [71].

A comprehensive investigation of TCE in outsourcing can be found in [72] and [73]. In addition to transaction costs, the implication of production costs on IS outsourcing with empirical data shows that it influences outsourcing decisions as well [74]. A noteworthy summary of how TCE is applied to IS outsourcing is studied by Nam et al. through the following hypotheses [70]:

- "As asset specificity of the relevant IS functions increases, the extent of substitution by vendors decreases".
- "As asset specificity increases, the strategic impact of IS applications increases".
- "As the uncertainty of IS functions increases, the extent of substitution by vendors decreases".
- "As the number of available vendors increases, the extent of substitution by vendors increases".
- "As a firm's tacit knowledge in the IT area increases, the extent of substitution by vendors decreases".
- "IS has a higher strategic impact in firms with high tacit knowledge of IT than in firms with low tacit knowledge".

A very recent study by Aubert et al. proposes and tests a model of outsourcing decisions which includes antecedents of both transaction costs and production costs [75]. Findings of the study include the differences between how IS activities should be treated in firms in knowledge intensive sectors compared to firms in less knowledge intensive sectors. Moreover, activities are not totally independent therefore management of these activities is highly correlated to coordination of them.

3.1.2 Agency Theory

From an economics perspective, *Agency Theory* focuses on the difficulties of the *information asymmetry* between the principal and the contracted agents [7]. The *principal* represents the client and the *agents* represent the vendors. Asymmetric information between the parties causes *uncertainty* and different views of future risks. Although it is rooted in economics, agency theory is strongly related to the relationship factors between the client and the vendor. Main focus of the theory is on the conflicting goals and requirements of the parties and the cost that the client shoulders for monitoring the vendor. Therefore, the main idea should be *determining the most efficient and effective contract which settles down the appropriate relationship in the deal*. The contract can either be behavior-based or outcome-based. In the study by Cheon, Grover and Teng, outsourcing is viewed as an outcome-based contract [68]. According to this view, there are five factors determining the agency costs: outcome uncertainty due to environmental parameters, risk aversion behavior of the client or the vendor, level of expected behavior of the vendor, outcome measurability, and the length of the relationship. Agency costs increase with *high* uncertainty, *high* risk aversion, *low* level of vendor behavior, *low* outcome measurability, and *long* duration of contract relationship. A risk related research rooted in agency theory can be found in [62]. Moreover, Kim, Shin, and Lee studied the effects of knowledge complementarities (KC) which are defined as *"the knowledge stocks of partners that collectively generate greater rents than the sum of those obtained from the individual knowledge stock of each partner"* [76]. This can be viewed as a good example of handling the information asymmetry between the partners.

3.1.3 Resource Dependency Theory

Resource Dependency Theory (RDT) was originally formalized to discuss the relationships between organizations. From the competitiveness point of view, RDT proposes that *companies exchange resources to reduce uncertainty* [77]. Companies who lack critical resources form relationships with others in order to obtain these resources. IS outsourcing is a very typical example of the application of RDT between clients and vendors. The level of the resource dependency is formulated in terms of the *resource value, number of candidate vendors supplying these resources*, and *the switching cost between vendors* in case of failure. The degree of this dependency can be seized through the contract clauses. *A higher number of*

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contract clauses means the client is more dependent on the vendor. If the firm acquires these resources, the dependency level decreases. In addition, this may increase the dependency of others on the particular firm. Therefore, we can imply that RDT is a power theory as well.

The relations between the project size, the contract size, the probability of risks, and the amount of switching costs are all directly proportional. Lacity and Willcocks, in an empirical study of 33 outsourcing cases, demonstrated that short-term contracts (*small contracts*) were more effective than long-term contracts in terms of these risks [78]. The length of the contract may not be proportional to the size of the contract, but they are correlated. Definitely, contracts with long duration create more problems since technology and market fluctuations are more probable [79]. Moreover, as the size and duration of the contract increase, the monitoring costs proportionally increase.

3.1.4 Resource Based View

Resource Based View (RBV) of a firm states that organizations have a lot of resources and some of these resources are more "valuable" or as Meso and Smith calls "strategic" and hence brings competitive advantage to the organization [80]. The sustainability of such resources for a long time makes the organization more powerful in the market. The long term performances of organizations highly depend on the possession of these resources and the skill-set the organization gains through them [81].

Firms are analyzed internally from the viewpoint that it is the set of such resources which constitute that particular firm. Any controllable production factor can be viewed as a firm's resource. Examples are financial, physical, human, technological and organizational capital resources. Physical and financial capital resources are tangible and easy to assess. Human, technological, and organizational capital resources are intangible resources which are the dominant ones in bringing competitive advantage.

RBV reflects the strategy of how a firm diversifies its products through exploiting its resources by contracting with others, instead of expanding its size, viz. via outsourcing. This diversification, at the end, results in the internalization of some of the critical resources. On the other hand, the idle resources have to be worked out and used by acquiring new busi-

ness processes or applications, usually through contracting. Outsourcing helps a lot in the sense that the firm thus focuses more on the core competencies while utilizing its resources to be used in contracted applications. RBV also helps in the decision-making of outsourcing about which tasks to be outsourced and which ones have to be performed in-house [81]. From this point of view, core competency theory is one of the powerful theories to understand why firms prefer outsourcing. It states that a firm should make investments on the core competencies where they constitute the backbone functions for the firm's growth, and outsource the non-core ones. Therefore, performance improvement can be reached through focusing on those resources which are allocated in these core competencies for long-term competitiveness. Alvarez-Suescun studied the resource based determinants in outsourcing decision process [82]. Han, Lee, and Seo created a conceptual model the causal structure of the outsourcing process in light of RBV [83].

3.2 Softare Development Methods and Their Effects on IS Outsourcing

Information systems, whether built in-house or outsourced, are highly influenced by software development methods which have evolved quite fast through the last decades. One can realize the pace of this change about how these methods have emerged by comparing the nature and focus of different approaches and how they have affected the software markets. The hardware and technological infrastructures have definitely shaped these improvements. The popularity of mainframes and structured design approaches in the 60s has turned into formal specifications, iterative, incremental methods, and techniques related to software quality assurance in the 80s with the developments in microcomputer technologies.

In the last two decades, the fast growth of software development methods have also affected the way businesses made strategic decisions like outsourcing their information systems. Systematic improvement of software development processes, the notion of process and organizational maturity, agile software development approaches, software reuse and software product lines are fundamental improvements challenging the businesses in the context of evaluating in-house development capabilities and preferring to "buy" such systems instead of "making" them. The following sections elaborate on these concepts.

3.2.1 Process Improvement Models

Information systems outsourcing come up with extra challenges since the development of system is performed between multiple organizations (at least one client and one vendor). Most of the time, the needs and focus of clients and vendors may conflict. Moreover, process improvement models in software and systems development may increase the complexity of these outsourcing deals.

Among many process improvement models, Capability Maturity Model Integration (CMMI), stands as a primer in terms of its detailed context and widespread use. It is actually a framework for best practices, developed in the late 80s by the Software Engineering Institute (SEI), Carnegie Mellon University as Capability Maturity Model (CMM) and as CMMI in the 90s (most recent version: CMMI v.1.2, released in 2006). Official SEI description is as follows:

The Capability Maturity Model Integration (CMMI) project is a collaborative effort to provide models for achieving product and process improvement. The primary focus of the project is to build tools to support improvement of processes used to develop and sustain systems and products. The output of the CMMI project is a suite of products, which provides an integrated approach across the enterprise for improving processes, while reducing the redundancy, complexity and cost resulting from the use of separate and multiple capability maturity models (CMMs). [84]

This framework on managing, measuring, and monitoring software development processes are also used to benchmark software vendors against others to achieve lower cost and higher quality results. On the other hand, the measurements can take months, sometimes years. Larger businesses with extensive resources may naturally get more benefits of the framework. There are tangible and intangible benefits of CMM-based software process improvement. Tangible benefits can be examplified through empirical studies and could be followed in other guidelines listed in the following paragraphs. Some of the intangible benefits can be listed as; improved communication between inter-related departments, increased participation due to continuous process improvement, decreased overtime hours for software engineers, reduced number of daily problems resulting in higher motivation, increased level of project learning, and an improved understanding of how the organization develops software [85].

General Motors Corporation (GM), being one of the world's largest technology users, worked closely with SEI to come up with a set of best-practices guidelines for the acquisition of technology solutions in 2005. They have published the first version of The CMMI for Acquisition (CMMI-ACQ) to be an extensive guide for clients perform their acquisition strategies with reduced risks and costs of projects. This collaborative effort was in fact initiated when GM and SEI were working on CMMI for Development (CMMI-DEV) v1.2 where CMMI-DEV is another process improvement method for software vendors to develop more effective processes. From an outsourcing perspective, CMMI-ACQ and CMMI-DEV complements each other for software development methods, software acquisition methods, and improved processes to perform both [86].

CMMI-ACQ is an important guideline for clients, advising on process methodologies for sufficient funding, skills, facilities while discussing how to identify product deficiencies. On the other hand both parties of the outsourcing deal should agree on following these guidelines which may seem quite extensive and detailed for some parties. Most of the organizations may focus on individual projects instead of making use of economies-of-scale and economies-of-scope. Although such guides and frameworks are quite new to the users (e.g., CMMI-ACQ constellation was released on Nov.2007), global standardization of software acquisition may improve quality and reliability. At the end of the day, managing outsourcing contracts require sufficient investments in project management capabilities. According to the best-practices of CMMI-ACQ, IT managers of the client leave the project alone once a vendor is hired which unfortunately weakens the project management and it may be too late to realize that the project is beyond schedule or the provided technology is out-dated: almost a quarter of "large" outsourcing projects fail within two years, and another quarter in five years due to mismanagement, inadequate vendor selection, or weak technology selection processes [87].

CMMI-ACQ aims to help client organizations to create efficient operations in order to eliminate known problems in the acquisition process. Moreover, it provides best-practices on preparing Request for Proposals (RFP), vendor selection, and contract preparation-negotiation-management. Finally, client and vendor should form and use a common language in order to produce low-cost, fast, and high-quality information systems.

Processes cannot be assessed unless they are measured. In process improvement and maturity models, such measurements are called "appraisals" resulting in some form of a formal rating in terms of quality. The official SEI method for providing quality ratings (in relation with CMMI models) is called the Standard CMMI Appraisal Method for Process Improvement (SCAMPI). Main goals of SCAMPI appraisals are to determine the current strong and weak processes, to frame capability/maturity ratings, and to identify acquisition risks. SCAMPI is used in two ways: *(a)* as a sub-module of a process improvement activity which is being currently applied, *(b)* in order to rate prospective vendors. Main stages of the appraisal process are planning, on-site tasks, initial observations, results and ratings, final reporting, and follow-up tasks.

Appraisal Requirements for CMMI (ARC), being one of the CMMI requirements specifications, enable the appraisers to be trained to perform SCAMPI appraisals in order to license partners in three levels of appraisals: "Formal" or Class-A SCAMPIs are the basis for these ratings and checks the CMMI maturity levels. These are applied by Lead Appraisers. "Class B" and "Class C" SCAMPIs focus on the approach and deployment respectively. [88]

SCAMPI, collects objective process improvement data during the appraisal phase by the lead appraisers. There are alternative studies, performing similar processes a-priori, i.e. before the actual appraisal is being conducted and even data collection is performed by non-appraisers [89]. Such enhancements on increasing the objectiveness (independence) level of appraisals may increase the number of hybrid software process improvement models. Same rules and approaches apply on the usage of third party audit organizations in any outsourcing deal.

With the enormous growth of the outsourcing market, a client, more than ever, needs powerful tools to measure operational performance of the vendor. In parallel, there are key success factors that outsourcing clients seek; meeting the expected cost and quality benefits, preparation of a well-defined contract, having an efficient interface with the vendor, and ensuring continuous effectiveness. The process improvement models help organizations to raise the level of quality and estimate the time and resources to develop software systems. Main emphasis is on the continuous improvement being embedded in such models. The main philosophy of these models is to provide; *(a)* new practices for benchmarking, *(b)* ways of implementing them,

and *(c)* adapting to changing environmental conditions. Main tool for enabling the organizations to have such capability maturities is through formal appraisals which provide a road map. Then, the organizations make use of the results of appraisals for vendor selection and evaluate different ways to manage them.

The governance of outsourcing projects has big challenges. Independent of which process improvement model is being applied, the client-vendor relationship, good communication and collaboration throughout the deal, and most importantly; shared understanding of the benefits of the deal together with how to measure success are important factors in such engagements.

3.2.2 Agile Software Development

Process improvement methods like CMMI - despite their robust nature in terms of process maturity - contained heavy documentation and extensive procedures. Moreover, planning and contract related processes play crucial roles throughout the development phases. Most of the time, changes in design are expensive and time consuming which may enable the developers start coding from scratch. In addition, metrics are always process-oriented and usually lack user focus. Such a procedural method is time consuming and may delay the release of the software where it may be too late for the dynamically improving market to accept the product. Marketing rush, on the other hand, can yield to an end-product full of bugs.

An alternative approach is agile software development. Main philosophy of the agile approach is that it initially accepts that user requirements will change and these changes should be incorporated into the product whenever necessary by incremental and iterative processes [90] [91]. This way, a potential product release is always ready. Most important system features are developed first. Daily updates and online agile tools enable the users monitor the development process easily. For successful products, agile methods include daily communication between the users and developers. Important success factors of agile processes can be summarized as people, communication, and culture. People must be trained and communicate closely with detailed awareness of the culture of the organization.

Applying agile practices for outsourced projects requires parameters like the size and nature of the project, communication and cultural awareness between the client and the vendor.

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Agile development is usually applied to small systems with small teams (e.g. eXtreme Programming). For larger projects, however, an increased level of formality should be studied.

Traditional software development requires a high level of discipline where agile methods make use of principles and values instead. The agile manifesto focuses on people and communication, working software, collaboration, and adapting to change instead of processes, extensive documentation, and contract negotiation. Informal interactions improve organizational communication with the reservation that the organization structure is not too hierarchical. Since the most common driver for outsourcing is fast and cheap products, working software should be produced quickly by the vendor.

Communication is an important barrier in any outsourcing deal. In offshore outsourcing, this problem is more critical since cultural differences make it more difficult for both parties to understand each other. Communication problems cause development teams misunderstand client requirements. In order to minimize the effect of this risk, clients usually prefer fixed-price contracts where development is performed in a traditional way with serial stages. Fixed-price contracts come up with the necessity of an early requirements document which is prepared by the client in great detail. The general understanding of fixed-price contracts is that they reduce risk big time. On the other hand they don't enable the clients to have control over the project. Alternatively, with agile teams, clients are delivered frequent working parts of the system on a regular basis which brings flexible and variable payment methods for the client. Most important of all, clients can track how much is spent at any time instance. Also, termination decisions can be made at any point of time with still having some working software at hand. Agile methods also enable the vendors to execute software re-use easier than traditional methods. They can apply a different type of contract other than fixed-price contracts - say a time-and-material contract - where the client agrees to pay by the hour for the effort put into their project. Of course, the deal should be similar to a previous experience of the vendor where the clients are from the same business domain [92].

Outsourcing heavily relies on documentation in terms of contractual notions which slows down this production. At the end of the day, especially with larger projects, non-contracted information is assumed as unreliable. Traditional development methods, especially executed through process maturity (e.g. CMMI) frameworks lead to an extensive amount of documen-

tation in parallel with electronic communication which - most of the time - may be insufficient in matching client and vendor expectations. The main goal is to understand the requirements. It can be achieved with more brief but solid documents instead of extremely detailed specifications. Trade-off though would be increasing client-vendor (users-developers) interactions. One trivial way is to locate some vendor teams on the client site. Travel costs may increase but communication risks will reduce. Mutually, some of the client staff could work on the vendor site. In parallel with agile processes, these teams can be rotated on a regular basis yielding to a thorough mutual understanding with stronger bonding. Corporate cultures can be recognized more in this way. On the other hand, if a system is outsourced to vendors with agile know-how, by nature, more effective communication channels are established which in return saves time in such documentation (brief and frequent requirements documents), forming a stronger client-vendor relationship, and increasing measurement success through regular delivery of working parts of the system. Moreover a fixed-price contract may no longer be mandatory.

Collaboration is very important and can be mapped onto what is called co-sourcing where client and vendor work together on the project. But it does not mean that the change in client's requirements may not be documented. Especially if the changes occur late in the project, such a collaborative environment will be of great help and the vendor teams will feel more confident in applying procedures related to changing costs-iterations-delivery time [93].

With the increasing popularity of IS outsourcing, vendors focus more and more on requirements specification in software development. If the client-vendor interactions increase, the number and level of detail of the requirements increase. User involvement and communication of the requirements is a critical issue especially if the system is being outsourced.

Agile development methods are preferred more for projects having weak scope definitions. Development teams adapting to agile methods do not fear frequent changes in user requirements and focuses on people and communication instead of processes and extensive documentation [94].

The core of outsourcing is the contract. It is the contract itself together with its negotiation, preparation, and management what shapes the whole deal. The contract is a legal document

which defines any exchange between parties enforced and ruled by the law. A standard contract includes obligatory clauses like payment, confidentiality, and guarantee procedures, but may still not be able to ensure complete success due to the dynamics of environmental factors like technology, market shares and so forth. Moreover it is a common experience that the clients are not aware of what they want until they see the end product. Although many recommendations on how agile methods should be adapted to outsourcing are emphasized, it is the contract that makes it difficult to apply. Major drawback is that the changes in client requirements cannot be explicitly formalized in the contract but financial procedures can be written. In addition to that, the contract should define the nature of the relationship, both parties' rights and responsibilities, and a detailed explanation of the procedures to be followed.

If agile methods are new to the development team it may be risky for a couple of reasons. Novice team members lose time but a couple of developers with agile experience can be hired immediately. On the other hand, the management may insist on a traditional serial development method where this problem can be solved by constant training and motivational meetings on agile techniques. Agile development recommendations [95] can be summarized as:

- Default costs that cannot be avoided, trigger clients to avoid small projects and outsource larger information systems to make these overheads more negligible.
- Documentation should be kept concise and to the point.
- Development teams should be coordinated for quick responses to changing requirements.
- In order to build early confidence, working parts of the projects should be produced as frequent as possible.
- Agility shouldn't mean that planning phase can be discarded.
- Face to face communication should be encouraged whenever possible.
- Teams should make use of all available tools for effective communication.

Agile development principles also govern some problems. For example, as in XP, pair programming is difficult to apply between client and vendor sides especially the system is being off-shored [96]. A solution can be an onsite development team bridging between the client and the vendor [97].

If agile methods are preferred in an outsourcing deal then a modified version of agile principles can be adopted. This way, structural and formal advantages of traditional approaches would be merged with agility values and principles. For instance, late changes in client requirements may yield the vendor teams put extra hours or man-power which may contradict with the initial forecast. Agile methods, although focusing on people other than processes, can be customized for an outsourced project in a way where staffing "stronger" employees can override the agile philosophy of training and motivating the weaker ones.

An important agile principle of "self-organized teams", in outsourcing of large projects can be converted to a more hierarchical structure, still remaining self-organized with a more controlled and monitored structure.

Trust, as considered earlier, is a common success factor both in outsourcing and in agile values. Enhancing mutual trust leads to more motivated vendor, and in return development staff. An informal contract can be agreed upon stating that both parties should go for a relationship of mutual trust respecting each other. Main emphasis should be given on maintaining the relationship unless a catastrophic issue arises where such a document should ensure everyone to terminate the project with minimum damage. Strategic partnership is essential for today's IS outsourcing deals. Because of this reason, most of the clients switch to a selective outsourcing with multiple vendors approach. Agile methods strengthen the partnership through co-operative efforts on both sides (e.g. XP). Hence, we can talk about building longer-term relationships for future deals [96].

The level of quality can be increased iteratively through agile methods. It may not always be true to state "if it takes longer, the quality is higher."

3.2.3 Software Reuse

As of today, the issue of vendor efficiency in an outsourcing deal is very important and plays a critical role in vendor selection process. Naturally, this efficiency is defined from two perspectives: cost and time. The economics of outsourcing deals has become significant as fast and cheap vendors come up with great competitive edge. From this viewpoint, vendors who

concentrate on software reuse are making their internal development processes more advantageous.

Software reuse can be defined as developing software systems using existing software components. These components may be any software product from requirements to source code, from proposals to design specifications [98]. Software reuse aims decreasing cost and time while increasing quality. Logically, cost of an initial investment for the process is usually high but the expected pay-off during the whole development process overcomes this cost easily. Empirical evidence of well-known systems supporting this argument can be found in Lim's 1994 article [99]. Increase in the number of reuses decreases the cost of the end product. In parallel with this argument, the richer this component library, the cheaper the software due to the logical fact that the amount of development time is minimized. Other benefits of reusing software components can be summarized as producing more standardized software, minimizing the development team, and increase the circulation of development staff between different projects. Some of these benefits and goals remind us the principles of agile methods. On the other hand, because of reuse philosophy, the reusable software components have to have understandable design specifications with detailed documentation. From this perspective, software reuse has similarities with process improvement methods with this well-defined systematic approach.

With the developments in reuse approach, organizational views that affect the process have evolved and a new concept called a Software Product Line (SPL) has emerged during late 90s. Clements and Northrop define a SPL as *"a set of software-intensive systems sharing a common, managed set of features that satisfy the specific needs of a particular market segment or mission and that are developed from a common set of core assets in a prescribed way"* [100]. Although product line is a very old concept in manufacturing, SPL is a relatively new software development paradigm with its inter-product commonality method. These commonalities bring the advantage of economies of production. Outsourcing clients experience the benefit of acquiring information systems as a product line consisting of software systems with commonalities in terms of minimized costs, fast delivery time, and simplified trainings.

Similar to the specific requirements for a software reuse method to succeed, SPLs come up with some challenges. First of all, an organizational structure to govern and maintain the SPL

has to be defined. Remember that a SPL may contain client specific components other than core assets. Consequently, processes related to the creation and/or update of core assets as a result of client requirements, should be defined. Similarly, processes for assigning functions to these components should be defined. Finally, related training programs should be arranged. Compared to the cost and time benefits - supported by various best practices - such challenges, although may be seen as an important trade-off, are worth implementing. Important requirements should be met to handle these issues. Development staff should be technically equipped with the reuse technologies. Moreover, project management team should be trained especially for the non-technical concepts of reuse management. Last but not least, adequate funding and resources must be allocated. Organizational awareness and readiness for using SPLs are important concepts for successful outsourcing. Individuals getting involved in the product line should be trained for structured and formal methods of SPL implementation. Various models can be applied as long as the specific characteristics of the development environment, staff profile, and integration and communication with other business units are studied [101].

Performance analysis is crucial just like other software development methods. It is important that the stakeholders realize the benefits and costs of implementing SPLs especially for outsourced systems. There are various studies to detect and check the cost effectiveness of SPLs. An example economic analysis framework can be studied from [102]. Such studies demonstrate important evidences that the shift in the organizational culture upon moving to SPL approach can be quite considerable. Unless the management enables the stakeholders being aware of the consequences, an important level of resistance can defect the success of outsourcing deals.

According to McGregor et.al., successful SPL organizations may differ in terms of; *(a) size of the product line and products*: from few products taking months to many products taking hours to build, *(b) organization's structure and agility*: from self-contained organizations to consortia, and *(c) production methods*: from traditional development techniques to model-driven approaches [103]. This recent article also mentions about the influence of service oriented architectures on SPL development with the argument that SPL development being architecture-centric. Evolution of SPLs, major benefits and important case studies can be studied in Linden, Scmid, and Rommes' book called "Software Product Lines in Action" [104].

3.3 Operational Definition of the Parameters of the Conceptual Model

This section summarizes each parameter effecting a typical IS outsourcing process with respect to the literature studied in Chapters 2 and 3 from three perspectives: *(i)* determinants of an outsourcing life cycle, *(ii)* effects of four different theories, and *(iii)* effects of IS development approaches. These operational definitions of the parameters can be followed in Tables 3.1, 3.2, and 3.3 and are used as a guide for our research methodology and the case studies we performed (Chapters 4 and 5).

Table 3.1: Operational definition of the determinants of IS outsourcing life cycle.

Determinant	Related literature and notes
Strategic intent	Strategic intent can be defined as the major reason(s) of outsourcing for a client. It includes the need for such an IS and answers the question 'why can't we build it in-house?'. According to DiRomualdo & Gurbaxani (1998), strategic intents can be studied in three categories: *(i)* improving IS, *(ii)* creating a business impact, and *(iii)* commercial exploitation. Beasley et al. (2009) conclude that strategic intent and the firm size is correlated: large firms do not outsource with the intention of cost minimization. On the other hand, financial intents can be studied through McLellan et al. (1995). The strategic role of IS may or may not result in outsourcing (Cronk & Sharp, 1995). The effects of systemic factors and cultural contexts can be found in Dibbernet al. (2012). Various decision models can be used to determine the strategic intent. Yang & Huang's (2000) model using the analytic hierarchy process and Hsu et al.'s (2004) model using case based reasoning are some examples. Moreover, Hall & Liedtka (2005) used logistic regressions to find the correlation between the strategic intent and stock merket. Another type of stategic intent is transferring knowledge (Al-Salti & Hackney, 2011).
Degree of outsourcing	Degree of outsourcing is defined as the scope of outsourcing in terms of the client's IS budget: deals corresponding to 80% or more of the budget is called *total*, if within the range of 15% to 25% is called *selective* (or *partial*) outsourcing (Willcocks & Lacity, 1999). If the client has a *strong* IT department then selective outsourcing is preferred (Barthelemy & Geyer, 2004). According to Gulla & Gupta (2012) managers should carefully analyze outsourcing drivers which in return effects the degree of outsourcing.

Determinant	Related literature and notes
Vendor selection	Vendor selection is the most important stage of outsourcing life cycle since it is the initial step of a strategic partnership. Pinnington & Woolcock (1997) studied the effects of vendor selection to outsourcing relationship between the clients and vendors intwo categories, viz. *contextual* and *active* relationships. Vendor selection should not be performed according to vendor's resources and assets but should focus more on infrastructure and methodologies (Feeny et al., 2005). Consulting to third parties is quite common in vendor selection process (Feeny & Willcocks 1998, Gable 1996, Michell & Fitzgerald 1997). The *due-diligence* process (process to test if a vendor has enough resources) and *winner's curse* (a situation when the vendor who wins the bidding systematically bids above the actual value of the IS and hence incurs losses) are two important factors to be studied in the vendor selection process (Kern et al., 2002). The importance of vendor experience and bidding power for the vendor selection process is studied by Kim & Chung (2003) and Chaudhury et al. (1995).
Contract and relationship management	Contract management is defined as mutually managing the contract clauses and contractual obligations. Initial phase of contract management is the contract negotiation. Relationship management, on the other hand, is managing the application of these contract items through human relations and effective communication within cultural contexts. The literature is extensively rich on this issue of outsourcing. Satther & Gottschalk (2008) emphasize the importance of resources allocated by both parties only for relationship management since it is the core of a strategic and long-term partnership. Similarly, Bryson & Ngwenyama (2000) studied the effectiveness of incentive schemes enabling a fruitful and solid partnership. According to Klepper (1995), sufficient effort and budget should be spent for communication channels, meetings and discussions. Effectiveness factors for a healthy relationship include knowledge acquisition, methodologies and business process reengineering (BPR) (Goo et al., 2007). Differences between working with single and multiple vendors are studied by Lee et al. (2009). Sabherwal (1999) mentions that *trust* - although involves risk - is a very important factor in outsourcing deals and should be maintained throughout the whole process (Oza et al., 2006). Positive consequences of mutual trust are knowledge sharing and expected outsourcing success (Lander et al. 2004, Lee et al. 2008). According to Weeks & Feeny (2008) solid relationship management results in innovation as well.
Risk management	Due to the uncertainty in outsourcing process, there exist various types of risks (also called the *hidden costs* of outsourcing, Barthelemy 2001, Bahli & Rivard 2003) which have to be managed properly for a successful deal. Other than the classical *cost-benefit analysis*, Lewis (1999) suggested the so known *risk-remedy method*. According to Adeleye et al. (2004), risk management is a two-step process: *(i)* proactive identification of risks, *(ii)* determination of control procedures for them. Risks may vary depending the degree of outsourcing (Currie, 1998). Although there is no optimum solution in the literature, different ways of minimizing risks are studied from known practices and lessons learned (Gonzalez et al. 2005, 2008). Rottman & Lacity's (2006) research is an extensive summary of various risk management techniques.

Table 3.2: Operational definition of the theories effecting IS outsourcing process.

Theory	Related literature and notes
Transaction cost economics (TCE)	TCE is mainly used to determine the make-or-buy decision (Williamson, 1979). In other words it is the theoretical foundation behind strategic intent and degree of outsourcing. *Asset specificity* is the main driver for the application of TCE upon outsourcing (Nam et al., 1996). Large clients with strong IS departments may not favor outsourcing (Bahli, 2003). Moreover, Clients prefer outsourcing those IS functions having low *uncertainty* (Aubert et al., 2004). Outsourcing literature is quite rich in terms of the effects and applications of TCE (Miranda & Kim 2006, Vitharana & Dharwadkar 2007, Ang & Straub 1998).
Agency theory (ACT)	ACT studies the information asymmetry between the client and the vendors. Similar to TCE, important factor of uncertainty which is a result of this information asymmetry is the main concern in ACT (Dibbern et al., 2004). What ACT suggests is the goals and requirements of the client and the vendor should match. Therefore it is highly a relationship (and consequently a contract) related theory (Cheon et al., 1995). Agency costs increase with high uncertainty, high risk aversion, low level of vendor behavior, low outcome measurability, and long duration of contract relationship (Kim et al.,2010).
Resource dependency theory (RDT)	RDT proposes that companies exchange resources to reduce uncertainty (Oh et al., 2006). Application of RDT on IS outsourcing can be explained as the exchange of mutual benefits between the clients and vendors. There are various factors determining this dependency such as resource value, number of potential vendors and the switching cost between vendors (for a failure case) and the level of dependency is directly proportional to the number of contract clauses. Lacity & Willcocks (1995, 1998) studied IS outsourcing in terms of RDT: short-term contracts are more effective due to the minimized cost of vendor monitoring.
Resource based view (RBV)	RBV studies the strategic important of resources an organization possesses (Meso & Smith, 2000). If this possession is sustained, the client gains power in the business domain (Espino-Rodriguez et al., 2006). A client can diversify its resources via outsourcing. In the long run, such a diversification may increase the number of core competencies of the organization which in return prevents the organization to outsource similar resources (some sort of a cycle). Similar to TCE, RBV can be applied to determine which resources to be outsourced. Alvarez-Suescun (2007) and Han et al. (2008) have researched such decision models.

Table 3.3: Operational definition of the IS development approaches effecting IS outsourcing process.

IS development approach	Related literature and notes
Process improvement models	Process improvement models are frameworks to manage, measure, and monitor software development processes and they can be used to benchmark software vendors against others to achieve lower cost and higher quality results (Hyde & Wilson, 2004). Capability Maturity Model Integration (CMMI) stands as a primer among the well-known models in terms of its detailed context and widespread use (Ahern et al., 2008). The CMMI for Acquisition (CMMI-ACQ) is another extensive guide for clients to perform their acquisition strategies with reduced risks and costs of projects (Hoffmann et al., 2008). It is an important guideline for clients, advising on process methodologies for sufficient funding, skills and facilities also providing best practices on RFP preparation, contract negotiation and management. There are some key success factors that clients need; meeting the expected cost and quality benefits, preparation of a well-defined contract, having an efficient interface with the vendor, and ensuring continuous effectiveness. Process improvement models can provide them.
Agile development approaches	Agile methods initially accepts the change in user requirements which then can be iteratively incorporated into the product (Agile Manifesto). This enables a potential product release ready at any time. Agile methods focuses on people and communication, working software, collaboration, and adapting to change instead of processes, extensive documentation, and contract negotiation. With agile teams, clients are delivered frequent working parts of the system on a regular basis which brings flexible and variable payment methods for the client (Hazzan & Dubinsky, 2008). Outsourcing heavily relies on documentation in terms of contractual notions which slows down this production. At the end of the day, especially with larger projects, non-contracted information is assumed as unreliable. Agile methods are advantageous for projects having weak scope definitions (Kussmaul et al., 2004). They strengthen the partnership through co-operative efforts on both parties and hence building longer-term relationships for future deals (Martin et al., 2004).
Software reuse	Software reuse can be defined as developing software systems using existing software components (Mili et al., 1995). Software reuse aims cost and time minimization while increasing quality. Logically, cost of an initial investment for the process is usually high but the expected pay-off during the whole development process overcomes this cost easily (Lim, 1994). With the developments in reuse approach, organizational views that effect the process have evolved and a new concept called a Software Product Line (SPL) has emerged during late 90s (Clements & Northrop, 2002). Clients experience the benefit of acquiring IS as a product line consisting of software systems with commonalities in terms of minimized costs, fast delivery time, and simplified trainings. Individuals getting involved in the product line should be trained for structured and formal methods of SPL implementation (Bosch, 2000). There are various studies to detect and check the cost effectiveness of SPLs. Peterson (2004) introduces an example economic analysis framework. Evolution of SPL, major benefits and important case studies can be studied in Linden et al. (2007).

Figure 3.1 presents a visual summary of the framework thus established, incorporating the viewpoints derived from theoretical models of economics, management and sociology; factors that depend on the outsourcing life cycle, and the particular approach applied in developing the software that underlies the IS.
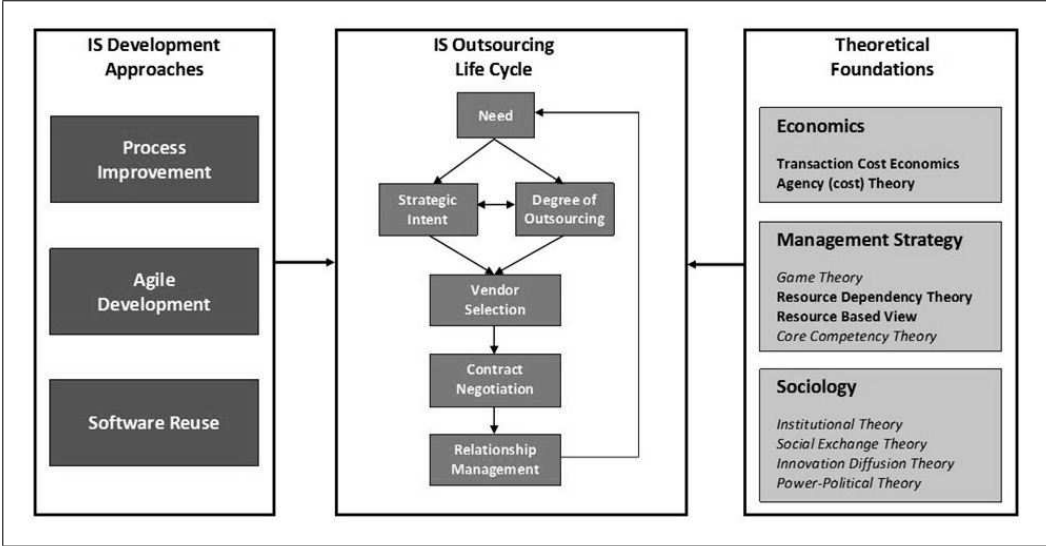

Figure 3.1: Conceptual view of our research model

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Why Qualitative Research?

Research methods usually are classified into two categories: *quantitative* and *qualitative*. Quantitative methods are generally preferred to work in the natural sciences in order to study *natural* phenomena where qualitative methods aim social sciences to understand *social* phenomena. Surveys, formal methods and experimental work can be given as examples of quantitative methods. A recent example of such a quantitative survey can be found in the research of Gonzalez, Gasco, and Llopis where they have performed an extensive survey of 4,107 Spanish firms to find out the effects of IS outsourcing determinants [105]. On the other hand qualitative methods include case studies, action research, and ethnography. Qualitative data collection can be performed through interviews, questionnaires, observations, document analysis and insights. Communication skills are important assets for performing qualitative research. Researcher's insights may not be sustained with quantitative data.

We believe that the IS outsourcing life cycle involves quite a number of uncertainty parameters and hence it is a real-life process which is too complex for survey or quantitative methodologies. Moreover, there are no clear explanations of relations between the context, the processes and their effects on outcomes. Therefore we have preferred a qualitative research methodology based on case studies [106].

Qualitative research can be *positivist*, *interpretive*, or *critical*. Positivist research assumes that real life phenomena is objective and measurable which is suitable to test theories. If quantification of variables, generalization of sample data and formal proposition are possi-

ble, IS research can be positivist [107]. On the other hand interpretive research assumes that reality can be accessible through social parameters like language and meaning. IS research can be interpretive when real life phenomena is studied through the meanings people assign to them [108]. Critical research assumes that social reality is formed and constantly being extended by people within the restrictions put by society, culture, and politics [109].

4.2   Why Case Study Research?

One of the most common qualitative methods is case study research. Yin defines a case study as an empirical process which investigates a contemporary phenomenon in its real life context especially when the borders between the context and the phenomenon are not explicitly determined [106]. As Benbasat et al. claim: "The IS field has also seen a shift from technological to managerial and organizational questions, and consequently more interest in how context and innovations interact" [110]. Therefore case study method is very well suited to IS research. Case study research can be positivist, interpretive, or critical, depending on the context of research and assumptions of the researcher.

Case studies may be *exploratory*, *descriptive*, and *explanatory*. Exploratory studies try to find out "what" is happening and seek new ideas and hypotheses. In fact, the case study methodology was originally used mainly for exploratory purposes. Descriptive studies portray a situation or phenomenon and finally explanatory cases seek an explanation of a problem, i.e. answers the "how" and "why" questions [111]. Deciding between exploratory, descriptive, and explanatory designs depends on the richness of competing theories related to the domain of study and requires an extensive review of the literature, discussions with domain experts, asking high quality and differentiating questions and a solid analysis. Definitely, the whole process requires time and effort and can be quite difficult. Moreover, selected cases must reflect the characteristics and problems identified in the theoretical and conceptual framework [106].

The number of cases can be determined according to a couple of points: if the research aims to perform a critical test of an existing theory or a very rare situation then a single-case design is appropriate. On the other hand, if a replication logic is essential to support theoretically simi-

lar or contradictory results, as in the case of assessing the effectiveness of a phenomenon then a multiple-case design is needed. Multiple sources of evidence allow converging methods like an exploratory case followed by a couple of explanatory cases serving (a) for explanatory and (b) confirmatory (or validatory) purposes. Moreover, some explanatory case studies may involve interpretive results enhancing the exploration of the qualitative model at stake. Walsham's research presents a detailed outline on how to carry out fieldwork, relating them to theories, and analyzing the collected data for interpretive case studies [108].

On the other hand, according to Runeson & Höst, there are four major processes in case study research: *(i)* case study design, *(ii)* collecting evidence, *(iii)* analysis of collected data, and *(iv)* reporting [111]. Case study design should define the objectives and prepare a plan. Such a plan should at least contain the following:

- *Objective*: what to achieve?
- *The case*: what is studied?
- *Theory*: frame of reference
- *Research questions*: what to know?
- *Methods*: how to collect data?
- *Selection strategy*: where to seek data?

4.3 Methodology

The conductor or investigator of the case study should have good knowledge of the phenomenon, should ask *good* questions, should be a good listener, and should be flexible. The investigator can find evidence through multiple sources: documents, archival records, interviews, observations, and other physical artifacts. Collecting these data can be done through *(i)* using multiple sources (triangulation: increasing construct validity), *(ii)* creating a case study database or *(iii)* maintaining a chain of evidence (link between initial study questions and case study procedure).

Adopting the multiple-case methodology of Yin, we first designed an exploratory case with preliminary research questions formed from our conceptual model, viz. determinants of IS outsourcing, four theories from the literature and software development methods. In order

to be more precise, we planned two studies on the same case and used more than one data source, viz. both vendor and client perspectives for the same outsourcing deal. We formed eight hypotheses in order to form a basis for the rest of the study. Next we designed two validatory cases, first one performed with the largest client for Turkish military IS projects and the second one performed with the dominant vendor for health IS projects in Turkey. For these two cases, we performed explanation-building data analysis where we compared the findings of our initial case without drifting away from the original problem, viz. IS outsourcing effectiveness. Main structure of our qualitative research design can be viewed in Figure 4.1.
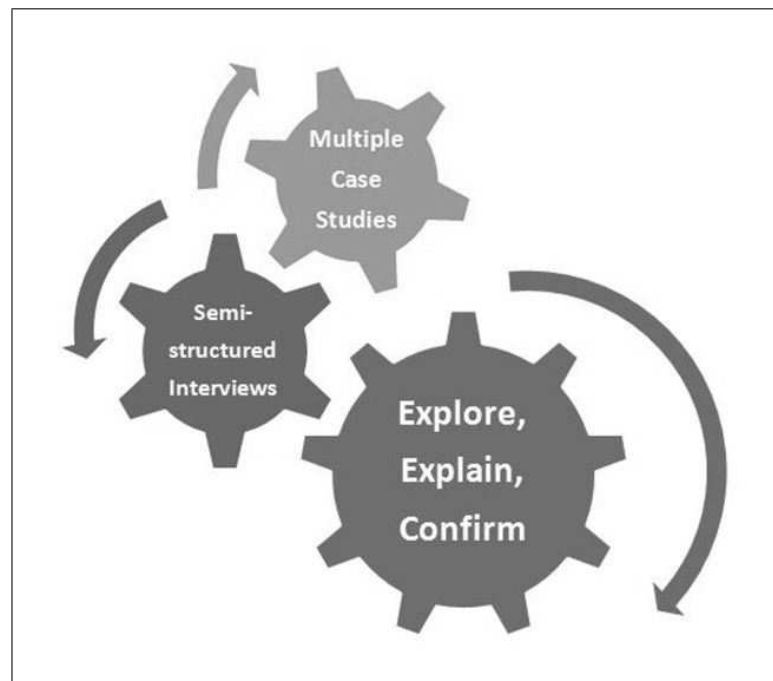

Figure 4.1: Qualitative research design

4.4 Data Collection

We had a flexible design allowing the parameters to change during the course of the study. We performed semi-structured interviews for all four case studies, i.e. we planned our interviews by starting with a set of introductory questions followed by others, mostly open-ended

and with changing sequences depending on our interviewees' responses. For all interviews (except Case 2) we were allowed to use a voice recorder. All parties were informed about the research details beforehand in order to maintain initial trust, avoid unethical issues, also enabling them to get prepared prior to the interviews. In addition, transcripts of the interviews have been sent to the subjects one week after the interviews. The sequence of these four case studies can be seen in Figure 4.2 and the next chapter will explain all of them with results and a detailed analysis. Moreover, transcripts of these interviews can be found in Appendix B.
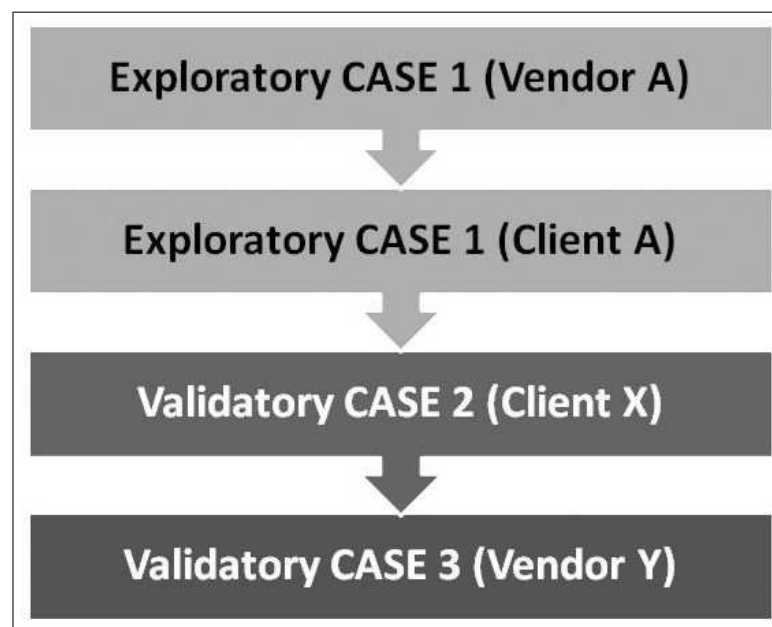
Figure 4.2: The sequence of multiple cases

4.5 Alternative Qualitative Research Methods

4.5.1 Action Research

Action research requires the researcher to be an active participant rather than an independent observer of a system. Thus, the researcher has to take action to solve a problem with a certain intervention technique. Therefore, the researcher is actively involved as a subjective entity where it is assumed that the researcher cannot generalize results in the traditional positivistic

sense [110]. Rapoport defines the aim of action research as "*contributing both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework*" [112]. Action research is a valid research method in organizational theory and education, however, in information systems field it is ignored for a long time. We did not find this method suitable for our study since our main aim is to focus on the results of IS outsourcing deals (together with lessons learned), rather than intervene it.

4.5.2 Ethnography

Ethnography is a discipline of social and cultural anthropology. This research method requires the researcher to immerse themselves in the life of the people of context. It requires a great amount of time while generating substantial amount of data. The data is interpreted through the participant's viewpoints instead of researcher's or some theory's [113]. Ethnography has become popular in the study of IS and understanding its role in organizations, development of such systems and technology management in the last couple of decades [114]. Ethnography was not suitable for our research since it would be very time consuming and it would not allow us to relate the findings to the existing theories. Moreover, we aimed to interpret all findings from our own point of view where it is against the nature and structure of ethnographic research.

CHAPTER 5

CASE STUDIES

5.1 CASE 1 (Exploratory Studies: Vendor-A and Client-A)

5.1.1 Selection

The significance of this preliminary case is to be exploratory so that we can form our initial hypotheses to be the backbone (or infrastructure) for our final IS outsourcing effectiveness model. With this intention, we aimed to study a strategic IS (being one of the core competencies - not a commodity - of the client), developed by one of the experienced national vendors for a public organization. Moreover, we planned to perform two studies; both from vendor and client perspectives so that the case would have an internal verification obtained by comparing and contrasting the two interviews. Therefore we can call this case selection to be 'critical' for our research. We have performed a substantial amount of time communicating with candidate vendors and clients to perform the case study. During this period, some of the vendors were not available for interviewing. Also it was not easy to get approval from some of the clients since - being public organizations - they were hesitating about violating government regulations in terms of confidentiality issues. The next section on Case Design describes the vendor, the client, and the IS being outsourced.

5.1.2 Design

The case is outsourcing of an Electronic Document Management and Archive System (ED-MAS). It started on May 2010 and finished in 7 months. The scope included the purchasing and customization of vendor's document management Commercial Off The Shelf (COTS)

product, analysis of sample business processes, definition and realization of these processes in the system, and training. Average number of users of the system was 1200. The first study has been performed with *a national software house (Vendor-A)* which has been in the software industry in Turkey for almost twenty years. Having a CMMI-3 certification, Vendor-A is mainly specialized in e-government projects developing products with high-end software techniques like *software product lines, XML libraries, and reusable components*. The second study has been performed with one of the senior IT experts of *a public organization (Client-A)* who were the client of Vendor-A in the previous study. The interviewee was directly involved in the deal and also works as one of the system support engineers. The unordered set of open-ended questions we prepared for both interviews are given in Appendix A.

5.1.3 Findings

The Need and Strategic Intent for Outsourcing: Documents in the public sector are very critical and difficult to manage. There are regulations and standards issued by Turkish Prime Ministry and Turkish Standards Institution within the last ten years. Thus, all public organizations have started projects regarding electronic documentation. Before EDMAS, almost all processes were manual and Client-A was able to follow and trace the documents in terms of quantity, source, and destination. EDMAS was acquired for handling official (signed and approved) documents with electronic signature and archiving which was one of the requirements of the government regulations. The main idea behind the project was automation. Client-A has an IT department mainly for system administration type of processes and *they do not have sufficient expertise and man power*. Moreover, *they do not have time* for software development since they can hardly manage other tasks.

Vendor's Experience: The project was quite a success. Most important of all; Vendor-A had a very strong development team compared to the previous vendors the client had worked with. Moreover, the *business analysts of the vendor were very experienced* both on partnering with public organizations and on document management know-how. Vendor-A has 16 years of *outsourcing experience* working with clients from both public and private sector, both national and foreign; not only developing systems from scratch but also selling customizations of COTS products of their own. Vendor-A was the correct organization to work with since both the company and the individuals were experienced in outsourcing (one of the analysts has

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been transferred from a document management company). In terms of requirements specification process, the vendor continually evaluated users' knowledge. Since the acquired system was one of the vendor's *COTS products* - customized for Client-A - it saved quite a considerable amount of time. Otherwise it would have cost approximately two full years. Such experienced vendors having infrastructure and frameworks ready to be customized have an advantage to win the tenders for suitable projects. The outsourcing experience of the vendor can be measured in terms of number of years the *organization* is involved in outsourcing deals in addition to the *individual* outsourcing experiences of the members of the development team. This evaluation leads to the following hypothesis:

H1: The outsourcing experience of the vendor positively effects vendor success.

Hereafter, hypotheses based on case evaluations will be presented after discussion of aspects of the cases.

Client-Vendor Partnership: Unfortunately some vendors with the 'I can develop anything requested' attitude can be quite informal and this is reflected to the partnership throughout the contract period. Vendor-A enables a long-term strong partnership with the clients by sharing their working model transparently. They maintain trust by applying negotiations clearly, trying their best upon explaining the benefits of their working models for the client. They provide 10 to 15 of their own staff to the client for the service period. Special focus should be placed on trust where high level of trust is needed in an outsourcing relationship since it can be viewed as a strategic partnership. Thus partnership quality is proportional to the level of trust between the client and the vendor. This can be determined through shared experiences and should start at the very beginning of the relationship. Although reference is usually made to an informal (or *psychological*) contract, trust can be maintained with the real contractual items as well [8]. Vural has referred to this view of trust as an important success factor in her report on a case study on public IS outsourcing in Turkey [115].

H2: The level of partnership quality is positively associated with outsourcing success.
H3: The level of trust between the client and the vendor is positively associated with partnership quality.

Risk Management: Good vendors would like to finish the project as soon as possible since they allocate resources for this project and they want to free them back. Most of the clients do not perform a solid *risk analysis* in terms of various aspects of the project (e.g. profit-loss analysis). Client-A has not performed such a risk analysis but they have spent sufficient time preparing the RFP. Besides, Vendor-A has won the tender for a lot of reasons including that they made a solid cost and size estimation for the given RFP. Most of the vendors do not do that. Vendor-A has a lot of 'enterprise clients' where such clients do perform such analysis more professionally. An example can be the requested collateral from the vendors during the contract period. The amount of collateral for such enterprise clients can be quite high but this way they do guarantee a lot of issues during this period. Risk management techniques have to be considered and there are two main processes to be taken. First, the clients should proactively identify the risks (which requires outsourcing experience) and then determine the control procedures for these risks.

H4: Adoption of risk management techniques positively effects outsourcing success.

Vendor-specific Results: Vendor-A's perception of *third party support* is the consulting support provided by university staff. They reside in a techno-park where most of their junior developers continue their graduate studies at the university. They believe such support is crucial for transparency and objectivity and especially public sector clients should heavily consult universities through these techno-parks. *Methodologies and maturity models* are vital for vendor success; not only for software development but also for other processes. Having a CMMI-3 certification, *Vendor-A applies methodologies for tender preparation, purchasing and accounting in addition to software development*. They claim that it is impossible to find the time even to prepare a proposal without CMMI compliance. *Internal training* is also crucial for vendor success. Vendor-A holds formal trainings including CMMI, SPICE, ISO trainings, and various software engineering and project management trainings. They also support junior developers for graduate studies, required that they work on related fields and projects at the university (e.g. software management, XML parsing, CORBA, db transaction management).

H5: Having implemented methodologies and maturity models for software development processes positively effects vendor success.

H6: Academic support for software developers positively effects vendor success.

H7: Internal training for software developers positively effects vendor success.

Client-specific Results: One of the critical success factors is the *level of computer-literacy* of the client's end-users. Users get used to GUIs where any slight change in these may create problems enabling them to frequently ask help from Systems Support unit. Therefore, *end-user training* for client users is crucial and Vendor-A provided a very efficient training period for EDMAS. No third party support was used for this project. On the other hand, Government Archives Agency of Turkey - as a regulatory body and like a consultant - examined the project and the end product, by means of an auditor.

H8: Internal auditing of the client and user training positively effects outsourcing success.

Data analyses show that the major factor for IS outsourcing effectiveness is a successful vendor. Therefore:

H0: Vendor success positively effects outsourcing success.

5.1.4 Discussion

We have spent an important portion of our research effort for the exploratory case. As a result we have come up with nine hypotheses. This initial set of hypotheses will serve as the backbone of our effectiveness model. Table 5.1 discusses these hypotheses in more detail and in the light of our conceptual model.

Table 5.1: Discussion of the hypotheses of Case 1.

Hypothesis	Discussion
H0: Vendor success positively effects outsourcing success.	Vendor success is the major critical success factor for outsourcing effectiveness. According to power-political theory, although the client is the customer *paying* for a system, it is the experience and know-how which dominates almost all outsourcing deals. The main indicator for this claim is that the clients give highest priority to the references and past outsourcing deals of candidate vendors during the vendor selection process. It is the successful vendor which determines almost all tasks and stages of an outsourcing process.
H1: The outsourcing experience of the vendor positively effects vendor success.	A vendor can be considered experienced looking at the number of outsourcing deals that the vendor is involved in and the number of years in the business. On the other hand, individual experiences of the staff in a vendor organization is as important as the organization's overall experience. Hiring talented staff (not only developers but managers and admin staff as well) only for a few (even one) outsourcing projects can also contribute to the vendor's experience.
H2: The level of partnership quality is positively associated with outsourcing success.	By both parties (client and vendor), outsourcing should be viewed as a strategic partnership rather than a temporary alliance. Such an approach is quite beneficial, not only for future outsourcing deals but also for the level of commitment for the current deal. There are mainly two categories of studying the partnership management and quality. The first category consists of contractual parameters. Meeting the deadlines, putting contract clauses including communication channels and types, attending and participating the interim meetings and formation of contract rewards and penalties are the major parameters. The second category is about human and cultural skills. To name a few: personalization of the outsourcing contract (assigning representatives on both parties), attending social functions organized by the other party and/or by both parties, and the fine-tuning of the level (in)formality of the communication in between.
H3: The level of trust between the client and the vendor is positively associated with partnership quality.	Trust is the main determinant of the relation between the client and the vendor. There are various trust-building factors like the reputation, references and experience of the vendor/client, effective communication skills, transparency, honesty, level of commitment, consistency, obeying the confidentiality and privacy issues, level of understanding, technical competence, sharing risks, and last but not least the performance levels. Some of these factors create initial trust and some of them maintain the level of trust. Moreover, corporate culture plays a very important role in terms of shaping the characteristics of trust since it can be defined as *the way an organization does business*.

Hypothesis	Discussion
H4: Adoption of risk management techniques positively effects outsourcing success.	There are various risk management techniques in an outsourcing deal. Looking from the client's perspective; performing a cost-benefit analysis is one of the main techniques. Trying to identify the cost of all stages of an outsourcing life cycle is the key here: RFP preparation, vendor selection, contract management, and contract termination. Other than the baseline price of the system, these can be called the *hidden costs* of outsourcing. Moreover the client should make a cost-benefit analysis of the project considering the alternative of building the system in-house rather than outsourcing it (assuming that there is in-house expertise). Working with multiple vendors instead of a single vendor, decreasing the degree of outsourcing from total to selective (if beneficial), auditing mechanisms, insertion of due-diligence and project termination clauses and any sort of performance measurement techniques can be listed as examples of such risk management techniques.
H5: Having implemented methodologies and maturity models for software development processes positively effects vendor success.	Software development requires experience and know-how as well as agility and road-maps. Development methods and maturity models like CMMI, Scrum, and SPL (software product lines) enable these requirements through road-maps, benchmarking and lessons learnt through past experiences. Such models and approaches may not only be used for development but also for other tender processes like acquisition and project management. Just like vendor experience, adoption and implementation of these models increase the vendor success from two very important competitiveness perspectives: (i) although such models may involve additional costs like initial investment, documentation overhead or increased number of meetings, they enable the vendors gain considerable amount of speed at the end of the day and (ii) with the wide use of these models and increasing acceptance and awareness by the clients, some (or *most* depending on the project domain and scope) RFPs require adoption of such models from the candidate vendors to propose bids.
H6: Academic support for software developers positively effects vendor success.	Especially for junior software developers, learning is an ongoing process. Technical competence gained at the college (although supported by internship programs in Turkish higher education system) may not be sufficient enough for some development projects. Vendors encourage such developers to continue their graduate studies by giving them leave offs, say one or two half working days for this purpose. Vendors like Vendor-A which resides in a techno-park (in a university campus) can make good advantage of this fact. They can even allow senior staff to continue PhD programs to enhance the know-how within the organization. An important requirement though would be that the majors and domains of these studies should be software development related. This will increase vendor success.

Hypothesis	Discussion
H7: Internal training for software developers positively effects vendor success.	Similar to the previous hypothesis, the vendors may hold internal training sessions on technical domains. Seminars, workshops and lectures can be given by experts or senior development staff in order to keep the development teams fit and updated regularly. This will increase vendor success for outsourcing deals.
H8: Internal auditing of the client and user training positively effects outsourcing success.	Especially for public clients there are various rules and regulations issued by the government. These are usually strict and require discipline. Sustaining the conformance to these rules and regulations require some sort of an auditing mechanism. The effect of such an internal auditing process to the outsourcing success is positive because such regular audits keep the client fit and creates awareness of the business processes which in return enables them to a solid and fruitful requirements specification stage performed together with the vendors. Similarly, in order to increase the level of computer literacy of end-users, clients should hold internal training sessions.

The initial exploratory model constructed with the hypotheses listed so far is presented in Figure 5.1. The exploratory case indicates the constructs which increase the effectiveness of IS outsourcing from three perspectives: (i) vendor-side constructs are the outsourcing experience of the vendor, having implemented methodologies and maturity models for software development, academic support and internal training for the developers; (ii) client-side constructs are adoption of risk management techniques, internal auditing and user training; (iii) mutual construct is the level of partnership quality which is directly proportional to the level of trust between the client and the vendor.
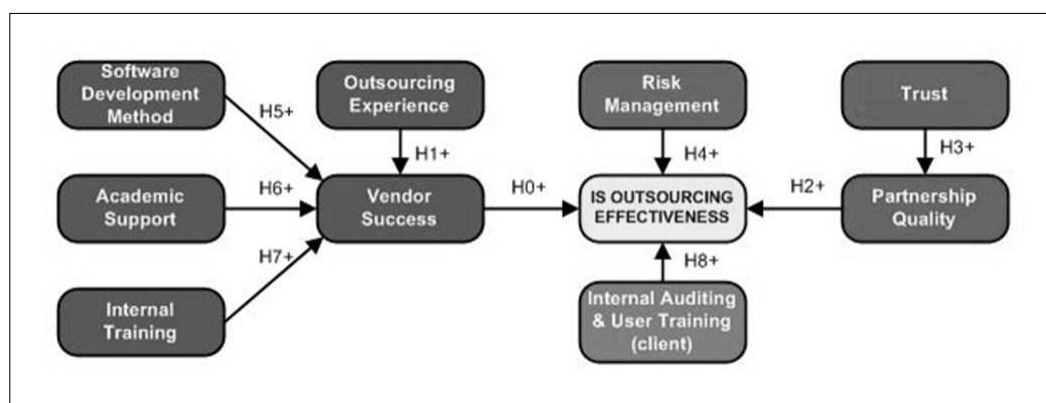

Figure 5.1: Initial IS outsourcing effectiveness model

5.2 CASE 2 (Validatory Study: Client-X)

5.2.1 Selection

After the exploratory case, we planned two more cases to validate and test the initial hypotheses in order to come up with a solid set of critical success factors for the effectiveness of a typical IS outsourcing process. In the second case, we aimed to understand the effectiveness factors from a client's perspective where we believed a powerful client would highlight the main concentrations of the whole outsourcing process. Thus, we wanted to select one of the largest national clients for this purpose.

In order to determine this client, we scanned through the leading (high-volume) industries in Turkey and decided to contact one of the major clients in the defense industry since the number and size of the outsourcing deals in the defense industry are way more than the others (second being the banking and finance industry). Although we were aware of the high-level of confidentiality precautions of the defense industry, we were accepted to hold a relatively short interview with Client-X with high-level security measures. The reader may find the details of Client-X and the interview results in the following sections.

5.2.2 Design

Client-X which was founded in 1985, is the largest client in national outsourcing projects with the mission of working as an under-secretariat organ for military projects in Turkey. The major function of Client-X is to organize these deals, covering all stages from RFP process to contract negotiation and from contract management to termination. They are mainly working with Turkish vendors encouraging national enterprises with possible cost tolerances.

It is specifically stated that Client-X is not dependent on foreign vendors in software projects and this is an important part of their mission (even though some niche products on imaging, communications, and space technologies may require foreign vendors). Moreover, *Client-X usually requires national vendors who are submitting proposals to share 20% of the project income with Small and Medium sized Enterprises (SME).*

The interviewee joined Client-X in 1989 at a time when no large-scale software projects were undertaken in Turkey yet. After year 2000 - especially with Client-X initiatives - the number of software projects accelerated in quantity. He believes that *CMMI-like maturity models, road maps and standards played an important role in this increase*.

5.2.3 Findings

Client's View of Software Quality: Besides its benefits for the industry, penetration of SMEs having a share of maximum 20% of the project income may decrease the level of the quality of the software being developed. *Although CMMI certification is usually required for the main contractors, it is not for the sub-contractors (mainly SMEs) since they enact a separate contract with the main contractors (vendors).* Currently, there are two CMMI-5 level and three CMMI-3 level vendors in Turkey. Most of the projects are found expensive for those vendors who are not among these major players.

On the other hand, Client-X always aims to widely spread the level of quality for the whole industry. *They have come up with a solution where they insert an additional contract clause which enables them to audit sub-contractors as well.* In addition to the quality focus, such an audit option enables Client-X to minimize possible risks.

In contrast to the findings of Case 1, where risk management was proposed to be sustained with financial measures, Client-X of Case 2, being a major public client and a regulatory body for defense industry projects, does not revert to financial security measures; instead they apply close control and performance measurement techniques for the same purpose.

[confirms HYPOTHESIS 4]

At the beginning, Client-X required the vendors to follow the traditional waterfall process model due to its robust nature, but in time this strategy evolved in such a way that *they prefer the vendors to propose their know-how and methodologies, not to work under pressure and to focus more closely on quality*. This shift encouraged those vendors adopting agile development methods to submit proposals as well.

[confirms HYPOTHESIS 5]

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Notes on Contract Duration: Client-X's outsourcing deals are administered according to Public Procurement Law [116] with the major concern of "security". On the other hand, typical contract duration is one to three years due to the rapid change in technologies. If the platform for the applications is also outsourced, this duration can extend to five to seven years. This duration starts when the outsourcing contract becomes effective. *If the duration is short, the level of documentation decreases since preparation of technical documents like Software Requirements Specification (SRS), Software Design Description (SDD), Preliminary Design Review (PDR), and Critical Design Review (CDR) requires extensive amount of time.* Because of the detailed nature of SRS, main contractors usually need a duration of minimum six months as an adaptation period (the interviewee refers to this as 'the SRS shock').

The interviewee claims that since Client-X is fully responsible for military projects and being the largest client in terms of budget, size, number of system users and stakeholders, there is a total concentration on transparency, public awareness, responsibility and ethical issues. *Moreover, the main strategic intent of outsourcing for Client-X is the lack of in-house development expertise.*

[confirms HYPOTHESES 0 and 1]

5.2.4 Discussion

Issues related to software quality were the major outcomes of Case 2. According to Client-X, the quality of software being outsourced depends on three main factors; *(i)* experienced vendors adopting process improvement models (e.g. CMMI) for IS development, *(ii)* subcontracting, and *(iii)* auditing.

Being the largest client in terms of size, resource, and stakeholders, Client-X also acts as a regulatory body for software projects in the defense industry. They require the main contractors to have a process improvement certification (mainly CMMI) to apply for these outsourcing deals.

In order to increase the level of quality, Client-X accepts any kind of a process model so that the vendors can focus on the work to be done, doing it the best way they can. Moreover,

they encourage all vendors to work with sub-contractors so that the software develops and gets bigger. This is a national incentive which flourishes the software development businesses, quality of software and the effectiveness of outsourcing deals.

Lastly, although the requirements applied to the main contractors are not requested from sub-contractors, additional contract clauses enabling the auditing of sub-contractors yields Client-X to minimize risks and increase the success rates. Such risk management techniques are positively associated with outsourcing success.

5.3 CASE 3 (Validatory Study: Vendor-Y)

5.3.1 Selection

We needed one more validatory case study, similar to Case 2 but performed with vendor perspectives this time. We have contacted many vendors with solid outsourcing experiences, being among the major players in the domains they serve their clients.

We selected Vendor-Y because of a couple of reasons; *(a)* being the leader in health industry with the hospital information systems they have been developing in the last decade, *(b)* having a niche business model for the outsourcing deals they perform and *(c)* considering the availability of the vendor for a long and fruitful interview which helped us to validate our initial set of hypotheses(and moreover introduced to more such relations in the outsourcing process). Please check the following Design and Findings sections for the details of this case.

5.3.2 Design

Vendor-Y was financially supported by The Scientific and Technological Research Council of Turkey (TUBITAK) in 2004 for a web-based ERP framework and the interviewee and one of his colleagues have developed this framework. Later on they took leading roles in the development of a *Hospital IS* at all stages including analysis, design and implementation. Everything was based on the initial framework of 2004. This hospital IS constitutes an e-health platform which has been designed and developed within a World Bank financed R&D project and cov-

ers all modules and functionalities required to automate all the business work-flows within the healthcare environment, utilized especially for primary, secondary and tertiary healthcare institutions. Then a larger team developed their second major product, *a Document Management System* which is a full web based document centric workflow management system that enables enterprises to define, manage and control their business processes in a seamlessly integrated digital and paperless environment.

So at the beginning, the interviewee had technical duties including software documentation. In time, he took positions in managerial and administrative positions in Vendor-Y. In short, the interviewee, being one of the partners now, has worked at almost all levels of the organization.

5.3.3 Findings

Client Profiles: *Most clients of Vendor-Y have been from the public sector* - they have developed projects for two private hospitals so far, the rest were public health institutions, and they did not expect the vendor to prepare software documents like SRS and SDD. On the other hand, it was an organizational (internal) requirement to prepare them. In general, very few of the clients (public or private) had competent technical units to discuss these issues. Instead, most of them were only dealing with the verification of the functional specifications, i.e. whether they were complete or not.

Remember from the previous case that Client-X from the defense industry is not like that: they require almost all technical documents through the RFP since such clients recruit a lot of military officers who have a BS degree from majors like software and/or computer engineering. Vendor-Y claims that this is an important advantage in terms of talking the same language. *One may think that a pure non-technical client, without a technical bias, can deliver the requirements in their most naive form but the vendor thinks that it is a matter of client management.* This is a typical example of "vendor power". On the other hand, clients with technical know-how place more functional requirements in the RFP. This enables potential vendors to become more fit and focus more on the proposals. *Besides, according to Vendor-Y, RFP is not the major milestone in a project but contract negotiation is. To summarize; public clients in the health industry are not technically suitable for systems analysis, especially for the requirements specification phase.*

Clients: Private vs. Public: Private clients have the right to buy what they choose but public clients are obliged to follow the Public Procurement Law [116]. On the contrary, private clients select the vendors, then issue the Terms of Reference (TOR), negotiate upon that and perform the acquisition process. (Client-X in the previous case study is an exception among public clients: they have initiatives to select a vendor even if it is not the most cost effective one: viz. *staged contracting*). In the health industry, through PPL, the client has to select the cheapest proposal that conforms to all technical requirements. In order to achieve this, they first get opinions of experts from the industry for RFP preparation. Thus; *the client might have to work with a vendor it may not wish to work with.* Another exception occurs for private clients when the size of the outsourcing deal increases: then there may be a need for a tender also. Vendor-Y's experience with only two private clients shows that these clients did not possess sufficient technical competence.

Vendor's Business Model: *Vendor-Y is not selling its products, but renting them as a service.* They usually apply two business models: In model A, they sell it for the first year, and then in the second or third year they start the service and maintenance. In model B, they do not sell at all; they rent it with a monthly subscription fee and they compensate all expenses that may arise as a result of updated regulations performed by The Ministry of Health of Turkey. *Vendor-Y currently applies model B for almost all of their public clients.*

The most beneficial aspect of model B is that the rental duration is not defined, i.e. theoretically infinite. In practice, there exists a contract period - say two or three years - but if the clients are satisfied then they definitely extend the contract - some hospitals who started a deal in 2004 are still clients of Vendor-Y. The main reason for adapting such a model is that *the specifications of software systems in the health industry are subject to change at an annual rate of 30%.* It is totally nonsense for a public hospital to buy an "as-is" IS since in a year or two it may be idle. We may view it similar to the SaaS (Software as a Service) model in cloud computing with a big difference though: Vendor-Y places a number of service staff in each hospital. Thus, service is provided on-site all the time. Almost all clients of Vendor-Y had another hospital IS before Vendor-Y's product but with this niche business model, Vendor-Y has captured almost 95% of the whole market.

User Training and BPR: An important requirement of Vendor-Y's business model is continuous training sessions for hospital users. Naturally and as an important asset for the vendor, *Vendor-Y applies BPR for these clients* - constant tuning during processes; e.g. billing process. In general, hospitals are hiring 10 to 200 project-based data operators depending on the hospital size and in time, they may shift some of the talented staff to other internal IT positions.

[confirms HYPOTHESIS 8]

In-house or Outsourced? In Turkey, some hospitals did not have an automated hospital information system before 2005. For those who had a hard time making an outsourcing decision, Vendor-Y's argument was clear enough: *for a client - even if they performed a cost-benefit analysis which favoured in-house development - it was impossible to obtain the vendor's know-how and best practices. It would be terribly costly in the long run.* Clearly, it is a win-win situation in a quite wild and competitive market - there were 80 potential vendors in this industry in 2005 when Vendor-Y penetrated the market.

Notes on University Hospitals: Some universities having a school of medicine develop these systems for their hospitals by forming a foundation and hiring software engineers for development purposes. At the end of the day, they cannot compete with a software house since such vendors provide richer and far more usable software libraries and components. Although such in-house developed systems are very client-specific, they cannot provide the same quality since they are not forced to compete with external vendors.

Customer Intimacy: The interviewee says: "number one determinant is *communication*". Business, with its determining local characteristics, is quite different from what is being taught, based mainly on global principles, at the university. Success rate is directly proportional with how good you manage people and this can be achieved with knowledge and communication skills - bringing a competitive edge just like Sabherwal's 'identification-based trust'. One important parameter of these communication channels is ways of socializing with their clients with events like dinners, functions, etc.

[confirms HYPOTHESES 2 and 3]

Rewards/Penalties: In the Turkish software industry, unlike many other global settings, usually there are no rewards but there are penalties. Most of the penalties explicitly stated in the RFPs are due to missed deadlines and unsatisfied requirements. *On the other hand, cultural influences are seen to dominate: there can be three different decisions from two different experts who comment on RFP for public deals and sometimes such penalties can be ignored.* Similar comments have been made by both parties in the exploratory case (Case 1).

We have not hypothesized this parameter back then for two reasons: (a) the outsourcing literature is not abundant on such cultural influences and (b) the interviewees did not emphasize on this issue as much as others. Although Case 3 is a validatory study, re-phrasing of this hypothesis enables us to reflect the specificity of the Turkish, and possibly other similar cultural contexts:

> *H9: The existence of penalty clauses in outsourcing contracts is positively associated with partnership quality.*

Software Development Methods: Vendor-Y applies traditional waterfall methodologies. Moreover, they heavily make use of product lines and reusable component libraries together with capabilities of MS Visual Studio .Net®. Vendor-Y does not apply agile software development methods since their corporate culture is against it and moreover, usually the public clients have the time and the money to afford longer development cycles. They do not have CMMI certification but they do apply their own model where they measure four basic metrics: (i) lines of code (LOC), (ii) estimated duration, (iii) success rates of test results, (iv) whether deadlines are met or not. They track the performance of their developers within the scope of these metrics. Vendor-Y does not make use of well-known tools in the market since they have designed their own software development process.

Third Party Support: Since Vendor-Y mainly contracts with public clients, usually there are no conflicting issues since for public deals the contract structure is pre-determined by law. Therefore there is no need for a third party 'audit'. The vendor may suggest a consultant (probably academic) for the client only if the client requests the potential vendors' ideas. These are generally related to the quality standards (e.g. ISO9000). *On the other hand, for some deals, potential vendors may get a certain certification from the Ministry of Health*

which acts as the regulatory body for these outsourcing deals and therefore performs some sort of an auditing mechanism as well.

[confirms HYPOTHESES 6 and 7]

Subcontracting: Vendor-Y had a negative experience with sub-contracting. The project was again a hospital IS, namely an ERP system with 30 different modules. They subcontracted 3 of those modules which consisted of the Laboratory IS to another vendor due to technical and financial reasons. They experienced a lot of problems with the subcontractor where even the client felt the problem as well. They formally issued a warning nine months prior to the termination of the subcontract and eventually had to change subcontractor. In similar situations, the client may misunderstand the whole issue as "a change to the product" which may end up as a failure of the whole outsourcing deal. The literature on subcontracting is quite rich. Moreover, Client-X of Case 2 encourages it with a nation-wide mission where SMEs should be involved and play an important role in such deals. Therefore, we do not consider the single negative experience of Vendor-Y sufficient to refute the following hypothesis:

H10: Successfully managed subcontracting positively effects vendor success.

5.3.4 Discussion

Being the industry leader in health information systems, Vendor-Y mainly have public clients. This is due to the fact that the number of public hospitals outrunning the private ones and most of such organizations are still running legacy systems. Most of the public hospitals, although having an IT department, do not have the sufficient expertise to develop their own IS. This factor effects the communication between the client and the vendor where Vendor-Y prefers to communicate to a technically competent client in order to determine the system requirements faster and more clearly.

Another important outcome of the study shows that Vendor-Y works sufficiently on partnership issues. Working with public clients require more effort on this matter since they have to follow the Public Procurement Law and at the end of the day they may have to work with a vendor they may not wish to work with (most of the time cheapest bid wins the tender).

Maybe the most important outcome of this case study is the results (mainly advantages) of applying a different business model (the service oriented approach of Vendor-Y). Vendor-Y - in a way - has to apply such a model of renting services since the regulations in Turkish health industry (issued by The Ministry of Health) changes with an annual rate of 30%. This is quite high. As a consequence of this service-based business model, Vendor-Y allocates enough personnel on-site for user training. All of these factors increases the vendor power.

Applying their own software development approach, Vendor-Y can be considered to adopt a methodology and this reminds us the preferences of Client-X of Case 2. This factor together with the work discipline, also increases the competitive edge of Vendor-Y compared to the IT departments of the university hospitals building their IS in-house.

There are two new hypotheses introduced at the end of Cases 2 and 3 and Table 5.2 discusses these hypotheses in more detail. The final qualitative model with the addition of these two hypotheses can be viewed in Figure 5.2.

Hypothesis	Discussion
H9: The existence of penalty clauses in outsourcing contracts is positively associated with partnership quality.	Outsourcing contracts should include rewards and penalties for trust-building and risk-minimization purposes. On the other hand increase in the number of such clauses may create an over-structured contract which may harm the relationship. In the Turkish context, due to cultural motives, usually there are no rewards but there are penalties. Although it may seem to inject some negativity to the relation, existence of such penalty clauses, if placed and adjusted properly, increases the quality of the partnership.
H10: Successfully managed subcontracting positively effects vendor success.	The outsourcing industry is getting bigger. In parallel with this, the number of vendors is increasing constantly. Forming proper relationships and constructing clear and risk-free contracts with sub-contractors can make life easier for the major players in the game. Making use of due-diligence processes and formulating sufficient penalty clauses enable sub-contracting to be a competitive force for many vendors.

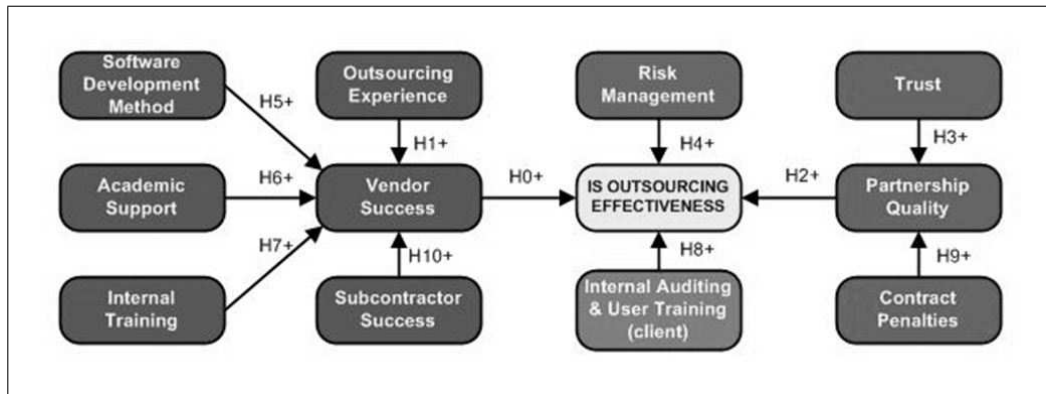Table 5.2: Discussion of the hypotheses of Case 3.

Figure 5.2: Finalized IS outsourcing effectiveness model

5.4 Validity Threats for the Case Studies

The validity of a research is defined in terms of the objectivity and trustworthiness of the results and data analyses. The researchers should not be subjective (or biased) about the outcomes of the study and the results should be assumed to be true to a large extent. The validity issue should be studied throughout the research but it is more convenient to evaluate it at the end of the analysis phase [111]. According to Runeson & Höst, it is easier to make such an evaluation with a classification scheme which includes *construct validity*, *internal validity*, *external validity*, and *reliability*. Below, we discuss the threats we have perceived regarding the validity of our research, and our means and measures to mitigate those threats.

Construct validity: The operational measures we studied represent our thoughts and claims within the framework of the literature and they correspond to the research questions we started with. The tools we used to come up with our research constructs were the interviews and we claim that the interpretations of these constructs are the same between the researchers and the interviewees.

Internal validity: There is a threat to the internal validity since outsourcing is a social and non-deterministic process due to the vast amount of uncertainty that effects almost all stages in the life cycle. Although the steps in IS outsourcing life cycle are clear and well defined, some of the determinants like contract management and relationship management and risk analysis are totally dependent on economic, cultural, and even political contexts. Therefore, even if we believe we performed well in analyzing the inter-relationships between the effectiveness

factors, we cannot guarantee the completeness of these factors for the four case studies we performed.

External validity: The subjects (in terms of organizations and the interviewees) we chose for the case studies are quite important and they represent the industry in a powerful aspect being major clients and vendors for IS outsourcing deals (one of the most experienced vendors in the software industry, the leading public clients in defense industry also acting as a regulatory body, and another vendor being the industry leader in health information systems). Therefore we can claim that our findings are relevant for other cases (of other researchers) to a large extent. On the other hand, since we performed a qualitative research our findings may not be sufficient enough to be generalizable to define new theories in the field.

Reliability: We completed the core of the literature survey in almost a year and constantly updated throught the research and we believe that it was one of the solid surveys made so far in IS outsourcing field. Moreover we continuously tried to update this survey during the course of our research. Thus, we had sufficient strength and power to be as un-biased as possible. Therefore, if another researcher conducts the same study *in the near future*, the results would likely to be the same. On the other hand, in the long run we cannot guarantee the same since regulations, technologies, and communication channels are changing very fast and such dynamics would definitely effect IS outsourcing processes.

Final note: We have started with a preliminary case (Case-1) with exploratory purposes and constructed our main hypotheses based on this case study. Although we have performed two more validatory case studies with leading organizations, we believe that we could have increased the number of preliminary cases if time would permit because it is evident that there are many other factors still waiting to be explored. Some of these are mentioned in the following section. Despite the above limitations, we are confident that this study has met our research objectives.

CHAPTER 6

CONCLUSION

6.1 Summary

The objective of our research was to explore IS outsourcing experiences, the critical factors that effect the success of such outsourcing deals, and how these factors are related to the outcome. We have planned the cases and prepared our research design based on four theories and major software development methods together with the determinants of a typical outsourcing life cycle.

At the end of the exploratory case studies we have come up with nine hypotheses which were then considered in validatory cases for designing a qualitative model answering the following questions from the clients' perspectives: "Have we achieved the expected cost/quality?" and "Has this deal contributed to my IT maturity and business processes?" Although an a-posteriori model is developed, it will also work as a decision model in light of best practices for future outsourcing deals for clients and vendors. Both research questions have been answered in the form of a conceptual model that consists of twelve determinants of IS outsourcing effectiveness and, eleven relationships between pairs of those determinants.

6.2 Contributions

The exploratory case 1 has contributed to our research from three perspectives: (a) initial (infrastructure) of our effectiveness model is formed, (b) the critical success factors of the effectiveness of IS outsourcing, initially created through an extensive literature review, are formed to be used for the following validatory cases, (c) the formation and correlation of the-

oretical foundations and effects of IS development approaches to the determinants of a typical outsourcing life cycle is set. This initial effectiveness model can be used for other researchers since it actually is a summary of the IS outsourcing literature. It may even be used as a roadmap for quantitative research (e.g. survey methods).

The validatory case 2 has contributed to our research from two perspectives: (a) the largest national client's opinions on outsourcing was quite important since their deals are proportional to a large share of the total number of deals in the industry, (b) we realize that additional determinants of IS outsourcing like *sub-contracting* and *contract duration* can be included in our effectiveness model. On the other hand, it is confirmed that for *public IS outsourcing deals*, vendors who implement *process improvement models - mainly CMMI -* have a visible advantage as regards the bidding results.

The validatory case 3 has contributed to our research from a couple of perspectives: (a) contract negotiation may be more important than the RFP in a social and cultural setting such as the Turkish one, (b) when public clients' know-how is quite low, communication and partnership are the major parameters, (c) a different model of IS outsourcing where the whole deal can be based on service fees is seen to be quite beneficial for both sides in the health industry, (d) without having a CMMI like certification, a vendor may lead the industry (depending on the industry dynamics), and (e) subcontracting without prior experience may involve high risks.

6.3   Limitations

We have started our research with an extensive literature review. Next, we have formulated our research objective and research questions. The case selections were carefully made and a substantial amount of qualitative data was collected through interviews. The research findings, as a result of these interviews, are supported by the literature review for validity purposes.

On the other hand, the interviews and the findings show that due to the nature of the outsourcing process, the existence of *uncertainty* is the major limitation for all similar types of

research. Cultural, political and economical factors, all together, cause and form the level of uncertainty. Especially for the public clients where in-house experience is quite low, governmental regulations, budget and resource allocation, and bureaucracy created by deep organizational hierarchies are the main reasons for uncertainty. Due to this reason, the completeness and continuity of the relations and constructs we formed for the effectiveness model may not be sustained all the time but we believe they remain to be the critical success factors most of the time.

Although we believe that the cases (the organizations and the subjects we interviewed) are studied after a careful selection process, the interpretations and results may contain some level of bias since all of the cases were success cases. The interviewees may have a positive interpretation of the outsourcing experiences in their organization.

The industry shifts, emerging IS development methods, technological advancements and all other types of dynamics may cause similar research to conclude with slightly different results in the long run. On the other hand, in the near future, we believe similar results can be obtained within the same context by other researchers.

6.4   Future Research Directions

In this research, theoretically the success factors are studied. If confidentiality issues permit, future studies may include *failure cases* so that a different perspective on the final qualitative model can be formed. We believe that studying such cases will contribute to the effectiveness model and in return, will contribute to current and potential clients and vendors for better benchmarking and regulating their business processes in light of lessons learned from these cases.

Extending the study to *multi-cultural* settings to establish a more comprehensive assessment of *global and local aspects* of the issue of modeling, assessing or ensuring IS outsourcing effectiveness would also definitely contribute to this field.

With the advancements in internet infrastructure and web technologies, cloud solutions like *Software as a Service (SaaS)* are becoming very popular. This way the clients are getting all types of services from the vendors through the cloud (the internet). We believe, such advancements may change procurement models in outsourcing. This form of *service outsourcing* can be integrated to our effectiveness model in the future.

Looking at the results of Case-2 and Case-3 on making use of sub-contractors, sufficient thought should be put on the following *dilemma* in order to better evaluate the pros and cons of *subcontracting*:

- "SMEs should be encouraged to benefit from corporate software houses' know-how and best practices and hence contribute to the growth of software industry."
- "A certain maturity level is required from the main contractor but not from the subcontractors and this may lead to some vulnerabilities in the level of software quality."

As a final remark, a quantitative research like a comprehensive survey can be combined with our case study to test and validate most of the (quantifiable) hypotheses we formed. Thus, more generalizable statements can be provided for the researchers on information systems outsourcing.

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APPENDIX A

CASE 1 INTERVIEW QUESTIONS

The unordered set of open-ended questions we prepared for both interviews of CASE 1 are as follows:

Vendor-A:

- What are the *strategic intents* of outsourcing for your clients?
- Do they outsource their IS *completely* or just some *important modules* of them?
- For the tenders you win, what are the main reasons for being a *selected vendor*?
- How do you build a *partnership* with your clients during the contract period?
- Which *software development methods* do you apply?

Client-A:

- What was your *strategic intent of outsourcing* for this system?
- Did you outsource the system *completely* or just some *important modules* of it?
- Why did you *select Vendor-A* for this deal?
- How did you build a *partnership* with Vendor-A during the contract period?
- How *specific* - as an asset - were the outsourced system (EDMAS) for your organization?
- Have you faced any *uncertainty* during the contract period?
- What *benefits* did you get from the deal you made with Vendor-A?

APPENDIX B

CASE STUDY INTERVIEWS

The following sections are the transcripts of the interviews we performed in our cases. Among the four interviews; three of them are recorded with a voice recorder in order to keep the conversations fluent and in order not to miss any details. The interview with Client-X (of Case 2) on the other hand is performed without any voice recorder because of confidentiality regulations of the public agency. All parties were informed about the research details beforehand in order to maintain initial trust, avoid unethical issues, also enabling them to get prepared prior to the interviews. In addition, these transcripts have been sent to the subjects one week after the interviews.

B.1   CASE 1

The case is outsourcing of an Electronic Document Management and Archive System (ED-MAS). It started on May 2010 and finished in 7 months. The scope included the purchasing and customization of vendor's document management Commercial Off The Shelf (COTS) product, analysis of sample business processes, definition and realization of these processes in the system, and training. Average number of users of the system was 1200. The first study has been performed with *a national software house (Vendor-A)* which has been in the software industry in Turkey for almost twenty years. Having a CMMI-3 certification, Vendor-A is mainly specialized in e-government projects developing products with high-end software techniques like *software product lines, XML libraries, and reusable components*. The second study has been performed with one of the senior IT experts of *a public organization (Client-A)* who were the client of Vendor-A in the previous study. The interviewee was directly involved in the deal and also works as one of the system support engineers.

B.1.1 Interview with Vendor-A

After outsourcing, our clients should phrase the question: "have we done everything right?" (1) *"Have we finished with the real/expected cost?"* (2) *"Did we achieve expected quality?"* (a) quality of the content (b) even if the content is ok there can be hidden costs like additional hardware need, additional network requirements, additional backup costs, user-interface problems, integrated corporate system upgrade need. (3) *"Did it contibute to my IT maturity/experience/know-how?"* E.g. project management, quality approach, user training, BPR. (4) *"Did it contribute economically to my business methods?"* Can I use it for my real business? in case of Client-A: mining, buying some goods, use it for mining, put them on stock exchange. Therefore the question is "How will we assess these?"

The outsourcing life cycle starts from the outsourcing decision. One important criteria is to examine whether I have expertise in-house or not. There are a lot of reasons or strategic intents for outsourcing. Currently Turkish public sector is facing the dilemma *"to outsource or not"* Ten years ago, public agencies were not be able to 'keep' talented IT staff since their costs were quite high. Even some of the private sector faced this problem. Staff circulation was quite high. Hence, public agencies were making an outsourcing decision 90-95% of the time. Increase in the number of universities, number of IT departments and number of graduates changed the picture especially in the last five years. Especially software industry realized that recruiting only engineers is not a requirement anymore. Thus, cost of IT staff decreased by the use of such intermediate IT staff. In addition, public agencies increased their IT budget and hence for today, there exists a good pool of IT staff working in the public sector (e.g., a lot of IT staff who are graduates of leading universities in Turkey have transferred from private to public sector.) If we call this an *issue*, a scientific approach to this issue would contribute to the public IT industry a lot, viz. assisting the public sector on their decision: *"to outsource or not?"*

A specific version of this problem is to "hire the IT staff project-based and develop the system in-house". To examplify: independent of the project definition, let us hire 5 java programmer, 1 quality specialist, 1 database designer all having a 4-year diploma. This may also be seen as some sort of Human Resource Outsourcing. As we all know, we also have 'turnkey projects'. In my opinion, public agencies should perform project management and content management

but they should not perform the development, they should outsource it. Software development is a totally different discipline. Bringing a lot of engineers together does not guarantee success and effectiveness. Using common libraries, product lines, corporate culture, experience and similar parameters effect this success and these can be found in professional vendors. In shoryt, vendors have best practices.

Developers' most efficient and effective period is between ages 25-35. Then they move towards project management, process management or administrative positions. In public agencies, you cannot expect them to work overtime and with stress and moreover you cannot get rid of them. For instance we constantly circulate such employees: replace with younger ones. Public agencies cannot do this.

Those agencies who perform in-house development move towards outsourcing after say 7-8 years. Because they need more dynamic teams but there is no room for newcomers since the older ones stay where they are. On the contrary, those who do outsource take development back in-house after 7-8 years with the enthusiasm that they wanna have more in control and want to have more know-how. *So this cycle repeats in every 8-10 years.*

Vendor-A has 16 years of vendor experience: for the first 8 years serving to public agencies only and in the last 8 years; both public and private sectors (including foreign countries). First 8 years we did not produce any COTS product. We used to go and submit proposals for tenders. Right now, we have products so we sell customizations. One of the biggest projects we developed is called 'Public Communication Platform', an XML-based library enabling communication between 80 public agencies. We also develop document management Systems and banking and finance systems.

Especially CMMI-based software houses have a methodology for getting prepared for the tenders. We are talking about tender documents of 500 pages (Term Of Reference (TOR) or Request for Proposals (RFP)). Some examples can be given as EU tenders or World Bank tenders. Right now as Vendor-A Ankara branch, we follow around 60-70 different tenders. Some of these are not announced yet so we just perform marketing. CMMI, SPICE type of maturity models do not only include software development process but it goes beyond that: including general business processes of the vendors. For example, for Vendor-A: purchasing,

accounting, proposal processes are also CMMI-compliant. We use a CRM software for this purpose. For instance information like "for which companies we made presentations 2 years ago and who attended" are all stored into this system. *If you don't have such maturities, you cannot even make time to prepare a proposal.* After winning the tender you still need a lot of know-how and maturity supported by methodologies. One example is project management where Vendor-A has 10 PMP-certified specialists.

Motivation and senior support is an important requirement. In our organization; more than 40 people (out of 240) are working more than 10 years with us (Vendor-A is 16 years old). This may even be a national record. We put juniors near these experienced people, we allow them to go for graduate studies (by default: two half days a week). In our recruitment process, we try to select bright talents in order to maintain a core team. This is very important for accumulating experiences. There are a lot of other motivational tools as well: salary, title, fringe benefits. Most important is to pay our staff the industry standards (minimum) and even more. But then they may still leave. You should show them a career path. You should be transparent. You should make them 'feel' your support.

A different method of motivation we apply is that each project has a *sponsor*: one of the three Board Members. For instance I am the sponsor of 7 different projects right now. Sponsor works hard for getting the project, supports all phases of the project including client relations. When a PM faces a problem he knows whom to contact. A PM may say "3 of my team members are not happy". PM is tactically the top manager of a project but when needed there should be Senior Executives (sponsors) to help and solve problems.

For the whole globe (not only Turkey): public agencies should not perform development! Because public agencies cannot have continuity, it simply is not possible. In one of our Azerbaijan projects the client was also a public agency (Ministry of Finance). We formed a company there and this company continued for maintenance and support. They couldn't transfer even these processes in-house.

We shouldn't call it *outsourcing* for some system components, even if they are outsourced (e.g. database maintenance, maintenance of MS Office applications, Oracle products, etc.) Even if there is some procurement, we shouldn't treat it as outsourcing. We should concen-

trate on organizational IS where it effects the business directly. In my opinion, there is nothing wrong to maintain e.g. content management in-house, required that the IT-competence comes to a maturity. Sometimes we recommend transferring some processes back to our clients. If a client frequently updates its web-based content, we recommend to develop an infrastructure so that they can go on with such updates on their own (we can still manage transactions, users, security, and load-balancing). Such an approach decreases the cost on the client-side. We also put recommendations on client A with the experience we get from client B, mainly for business processes.

After two major financial IS development experiences (Turkey and Azerbaijan) we approach to a similar project (Syria) more comfortably. Strong references and site visits enable us to win a new tender as well. We now know what an automation for a Ministry of Finance in detail. We can make 90% accurate estimations and calculations for such a project with our past outsourcing experience. A three-day analysis on tax types, tax-payers, transaction-rates, break-down upon cities would be enough for scaling and estimating costs. This wasn't the case before our first experience. If the RFP is not detailed enough, other vendors cannot do this estimation as accurate as us (or an experienced vendor). For instance the 'system load' in tax business should be calculated according to peak times, i.e. you cannot divide the total transactions by number of days since 90% of those transactions might happen in a single day! We provide such critical information to the client during the Proposal stage. The cheapest proposal does not always win: technical points matter! e.g. 60% technical points, 40% baseline price. For instance, World Bank uses a two-stage tender process. They first publish a TOR and request proposals from say 20 vendors. Then they eliminate the vendors down to 3 to 5 according to qualifications. There are no prices negotiated yet. So a vendor with highest bid can get the project at the end of the day. In the second round they ask for prices only. Vendor-A won 'all' tenders which evaluated according to technical points. On the other hand, if baseline price matters, we lost some tenders due to our high prices. For such tenders, even if you lose you learn your technical points because they announce these points. *In short, vendors should reflect all experiences to the proposals in return of RFPs.*

Another method is where we develop the system together with the client. This is almost impossible with clients from public sector but for the private sector it is quite a feasible method. In this method, RFP is formed together where the client, for example, states that they will

provide *n* staff with such and such qualifications. Most of the time, the client requests a training (typically for a week) for its own staff before system analysis starts.

In the past, third party support was being used heavily but right now almost none. We always support the use of such organizations for transparency and objectivity. Especially in Ankara (where public sector is huge), there are a lot of informal interference of vendors at the client site especially with political connections. A vendor might say: "even if it is claimed that this stage lasts for 3 months, we can manage in 3 weeks!" So we like an objective view of a third party to eliminate such interferences as well. But as I mentioned before, especially in the last decade, third party usage decreased in Ankara. In Istanbul, banking and finance projects still make use of them (esp. Deloitte). In Ankara, Ministry of Energy and Natural Resources used to work with Deloitte. Actually, organizations like Deloitte staffs young computer and software engineers for this matter. An important portion of third parties were academicians in the past. Universities were quite involved, especially for RFP preparation as experts. But eventually, because the majority of the academicians approached too idealistic, most of them did not match the real aspects. Vendor-A always encourages academicians and other third party support. Universities should be involved heavily while proving their objectivity and contribution. Moreover, third party support used to be quite expensive (e.g. 1000 USD/day for a newly graduated engineer). *In my opinion, public sector should get university/academic support through TechnoParks!* Unfortunately current cooperation is very very weak. Companies try to get into TechnoParks for two reasons: (i) taxation exemption (ii) trying to get a couple of PhDs for tender proposals.

Consultancy and management of outsourcing deals are very important. Previous head of IT department of a very big group of companies was only managing outsourcing processes because the whole IT department had only two staff: him and a technician! Everything was being outsourced. On the other hand if the system is directly involving core business processes, it better be kept in-house. Because the processes may be quite dynamic, it may not be very easy to transform requirements into contractual clauses. For such cases: *we suggest the clients to outsource the infrastructure but keep the rest in-house by running it on that infrastructure.*

In general, clients wish to have the latest technology, most recent trends, etc. With this enthusiastic climate, this type of behavior continues for some time. After some period, business requirements start dominating all other facts. At some point, client starts saying "I will be quite happy if all the requirements are met!" If it is an automation project, all manual tasks are being automated which means that the system (or project) becomes indispensable. We have applied to a competition organized by UN with our famous system known as *'e-declaration'* saying that there is a very high-tech XML library, forums, etc. Right now nobody cares. They just want it to run 24/7 smoothly! As Vendor-A, we request high payment at the point where we provide 'know-how', after that the payments decline exponentially since the rest is a long-term service fee. The critical point is we share this model 100% transparent with the client. e.g. providing our maintenance staff's payroll as is (displaying tax, insurance, gross pay, etc.) This enables a long-term and strong partnership with the client. We have applied this model to 12 clients so far and it worked 100%. They usually hire 10-15 staff from us in this service period. It becomes affordable for them and profitable for us as well. After that period, technologies may change (XML, cloud solutions, etc.) and the cycle begins all over again. If, as a vendor, you miss that break-even point you lose the next cycle to another vendor. In the past, some very important public clients paid huge amounts because of vendors acting just the opposite.

In our organization, there are two types of training: (a) formal trainings (b) others. Formal trainings include required trainings of certifications like CMMI, SPICE, ISO. Other types include all types of support we provide to our staff including graduate studies support. Vendor-A has an important R&D philosophy and has the highest ratio of staff with graduate degrees (MS, PhD). When a newcomer starts, (s)he automatically gets two half-days (per week) permission to attend graduate courses (of-course (s)he should compensate it with overtime). One of the requirements is that they should choose their thesis topics related to our work (software management, XML parsing, db transaction management, CORBA, etc.). Of course our facilities are in an advantageous location, being in a techno-park and very close to two other techno-parks. I would like to thank to all academicians for supporting us on this matter. We collaborate with them very frequently (we are even invited to lots of thesis presentations as jury members).

There is an information asymmetry between the clients and the vendors. Especially when it is a first-time partnership, sincerity is at minimum level. For example, Turkish Airline Reservation and Ticket Purchasing application is 40 years old, coded in IBM-CICS which is a very popular example of a legacy system. No one attempts to change it. Similarly, Is-Bank's IS where you deposit cash to your bank account is 20 years old. For such systems and clients it is not easy for new vendors have a very solid partnership and fully symmetric information at first experiences. But eventually the level of information asymmetry decreases.

In Turkey, some of the tenders dated 2005-2006 are still a court case! Some vendors estimated 3 TL for ERP projects (back then) with real value of 10 TL! Of course the Public Tender Law was not as mature as today but almost the same. Even if the vendors accept to pay the fees, Turkish law system has too many vague points as we know. A very important public organization gave the job to a Greek vendor and they faced a legal case for 5 years. Consider the public reputation and all other types of losses in such a case. When you check the web site of Public Tender Law you will see that 60% of the tenders are assigned to vendors directly. You can't even call them 'tenders'. You can find tons of defects in that law. How did we succeed in this climate, especially when we do not lower our prices? We have a lot of enterprise clients! Of course it was not easy to get to this level. Enterprise clients make good risk analysis and do not get into such adventures (like the ones exemplified above) and accept the cost in order to minimize these risks. In the long run it is a win-win situation. We work with 18 banks in Istanbul. On the other hand there are a lot of new vendors in Istanbul which we confirm and like their working disciplines. We usually go and try finding ways to work with them as our sub-contractors.

Finally, there should be a minimum level of understanding and agreement between both parties on a couple of items like content, process, technology, resources, external services, training, and operation support. The weaknesses on these issues increase *uncertainty* and in return the number of *penalties*! I remember an RFP stating: "We will develop such and such applications for 30,000 users, we want such and such functions and in the worst case in one second we want the results on our monitors, you can handle the rest". They don't even care about the hardware, the network technologies, etc. The point they miss is in such cases the number of potential vendors increase and even if they fail, they worth $300,000 the most. Even if the penalties are strict there is nothing the client can do more. On the other hand a

$30M company like Vendor-A is more cautious in giving a proposal since it may lose more! Clients should increase the collateral mentioned in the RFP (say 15% instead of 3%).

B.1.2   Interview with Client-A

There are 10 modules in EDMAS: vouchers, documents, archive, forms, workflow, faximile and electronic mail, announcement and messaging, CCR&index, electronic signature, templates and forms management.

Documents in public sector are very important and critical and managing these documents is quite difficult. The regulation called 2008/16 (issued by Turkish Prime Ministry) and the software standard TSE-13298 are two important regulations to be followed by public organizations. Moreover there is a project called 'e-correspondence' started by Ministry of Development. So all public organizations started projects regarding electronic documentation. *But an important problem is the lack of a standard between these organizations enabling an integrated document exchange platform.*

Before EDMAS, almost all processes were manual. We were only able to follow and trace the documents in terms of quantity, source, and destination, that's all. Now we can archive and display official documents with a lot of other features. Document (Dokuman) and Official Document (belge) are two different entities. The main difference is *official document is a signed and approved document*. We used to work with documents before EDMAS but not with the official ones. With the formation of the 2008-16 regulation, we had the opportunity to acquire a new system for this purpose.

We have an IT department where we also develop software other than system administration type of processes. We have an ERP system acquired from Bilisim Ltd. like 15-20 years ago. During this period, IT department updated and continually customized this system for Client-A. This department was used to be called 'Planning and Information Processing Department'. The IT section of this department used to perform system support, hardware maintenance, software applications and web processes. Today the name changed to 'MIS Department' where HR breakdown is like the following: software and web (12), network (5), hardware (5) and management (2). Managers run the systems support and software departments. So,

there are 24 employees in total. When we consider the software development section of the department, we can say that *we do not have the sufficient expertise and man power*. Even if we had the expertise, we do not have time for software development since we can hardly manage other tasks.

The main idea behind this outsourcing deal was to automate manual processes. For all types of public organizations, document management, although viewed as a commodity, is *vital for daily transactions since public organizations are very deep and too hierarchical*. Despite this fact, some manual processes were easier since we used to work in a more flexible fashion with hardcopies. When automated, there are additional restrictions like limited space but the gain in processing speed is very valuable for sure. In addition to that, remember that we had regulations forcing these automations. Actually as Client-A, we have started this project before this regulation with a deadline of July 2010. On the other hand, it does not state that all public organizations should start until July 2010. Instead it says "if you have a current system, adopt it to TSE 13298" (which is a nationwide standard). Actually there is a vagueness here. Ideally, one way or another, all public organizations should have such an automation. In summary, this system was quite important for us, so we decided to outsource it.

The project was quite a success. Most important of all, Vendor-A has a very strong software development team. I can easily make such a comment by comparing them to the previous vendors we worked with. Not only the developers, Vendor-A's team of business analysts were great. Some team members were very experienced in terms of both public organizations know how and document management know how. So Vendor-A was the correct vendor to work with since both the company and the individuals were experienced in outsourcing (one of the analysts was a transfer from a document management company). Moreover, in terms of requirements specifications, the vendor continually evaluated user knowledge. Previous vendors were in a mood of "You just tell us what to do, we can do anything for you!" Another success factor is senior management support. The management not only supported us but at all times they constantly pushed and directed us as well. We had no budget or resource limitations. Of course there was a budget for the system but it was more than sufficient throughout the process. Previously we experienced to make partnerships with comparatively weak vendors. Since we have to outsource according to Public Tender Law, we can't directly select our vendor. This is good and bad because although it is legal and democratic, sometimes the ven-

dor who wins the tender cannot satisfy your goals. And this puts great deal of responsibility on the RFP and the client.

Since EDMAS was in fact one of Vendor-A's COTS products customized for Client-A, we can say this model was better, saving considerable amount of development time. Otherwise it would have costed minimum two full years. Such experienced (and strong) vendors having infrastructure and frameworks ready to be customized has an advantage to win the tenders for suitable projects (product line engineering approach of Vendor-A).

The project finished in 6 months for complete document management support and then for electronic signature module, Vendor-A worked for another month. For an important portion of the system requirements phase, vendor's system analysts did not directly communicate with end-users but preferred us (client's IT staff) to act as a bridge between the two parties. Most of the time we "filtered and refined" user requirements. This, in my opinion, has fastened the whole process.

We haven't perform any type of risk analysis, actually not even a cost-analysis (how much would it cost if built in-house?) On the other hand, we have prepared the RFP. Vendor-A is one of those vendors - as far as I have experienced - which makes a solid cost and size estimation upon a given RFP. But, I believe, most of the vendors do not do that.

We have not made use of any third party support. On the other hand, in terms of auditing; Government Archives Directorate, as a regulatory body and like a consultant examined the project and the end product. This was one of the clauses in the RFP. This is a very critical but necessary procedure since the last address of each public document is this directorate. In other words, they control and measure the quality of an asset that they will receive, beforehand.

In general (not only for EDMAS project), some projects are managed within the RFP scope precisely. Serious (solid) vendors work that way. Unfortunately, some vendors with the "I can develop anything requested" mood don't care about any formality and can be quite informal and intimate. The borders should be highlighted clearly. On the other hand, if an RFP is prepared perfectly (100% detailed, accurate and complete) then best approach would be to

stay in RFP limits. But most of the public sector organizations do not prepare a top notch RFP anyway. *Ideally, there should be three separate teams for RFP, acceptance, and project management (client side). But we do all of them because of limited HR and time.*

For those vendors who jump into a tender (no matter what) and having no solid plans, extending contract duration means that they can delay the deadlines. Good vendors would like to finish the project as soon as possible since they allocate resources for this project and they want to free them back. In general, I did not experience any *long-term* project during my Client-A experience. In addition to that, there are standards and regulations that we have to obey. Other than political and economic factors, I do not experience any *uncertainty* during the contract periods. *If the contract duration was longer, maybe there would be some uncertainties related to time.*

One of the most important topic is the level of computer literacy of users. Users get used to graphical user interfaces (GUI) and with a slight change in the interface, they may face problems and they directly call the Systems Support Unit for problem solving. Training is very important and for EDMAS we had a fruitful training period.

From time to time, we (me and my peers from other public organizations) discuss the issue of having a standardized document management system so that all of these organizations can talk the same language. These differences come from different management styles and approaches. In my opinion, Ministry of Science, Industry and Technology, in accordance with Prime Ministry must solve this problem. In short, because of the limited HR, in-house development is almost impossible for Client-A. In addition to that, vendors are very much experienced in IS development. These are important indicators that public organizations favour outsourcing rather than building their systems in-house.

B.2   CASE 2

Client-X which was founded in 1985, is the largest client in national outsourcing projects with the mission of working as an under-secretariat organ for military projects in Turkey. The major function of Client-X is to organize these deals, covering all stages from RFP process

to contract negotiation and from contract management to termination. They are mainly working with Turkish vendors encouraging national enterprises with possible cost tolerances. It is specifically stated that Client-X is not dependent on foreign vendors in software projects and this is an important part of their mission (even though some niche products on imaging, communications, and space technologies may require foreign vendors). Moreover, *Client-X usually requires national vendors who are submitting proposals to share 20% of the project income with Small and Medium sized Enterprises (SME).*

The interviewee joined Client-X in 1989 at a time when no large-scale software projects were undertaken in Turkey yet. After year 2000 - especially with Client-X initiatives - the number of software projects accelerated in quantity. He believes that *CMMI-like maturity models, road maps and standards played an important role in this increase.*

B.2.1 Interview with Client-X

Besides its benefits for the industry, penetration of SMEs (20% or less) may decrease the level of the quality of the software being developed. Although CMMI is a requirement for the main contractors, it is not for the sub-contractors (mainly SMEs) since they are making a separate contract with the main contractors (vendors). There are two CMMI-5 level and three CMMI-3 level vendors in Turkey. Most of the projects are found expensive for those vendors who are not among these major players. On the other hand, as Client-X we always aim to widespread a minimum level of quality for the whole industry. *We have come up with a solution where we insert an additional contract clause which enables us to audit sub-contractors as well.* On the other hand, the main reason for us outsourcing these systems is the lack of in-house expertise.

Outsourcing deals of Turkish Armed Forces are administered by Client-X according to Public Tender Law. Security is a major concern here. On the other hand, typical contract duration is one to three years due to the rapid change in technologies. If the platform for the applications is also outsourced, this duration can extend to five to seven years. This duration starts when the outsourcing contract becomes effective. If the duration is short, the level of documentation decreases since technical documents like SRS, SDD, PDR, and CDR requires extensive amount of time. Because of the detailed nature of SRS, main contractors usually need a duration of minimum six months as an adaptation period (I call it *'the SRS shock'*).

At the beginning, we required the vendors to follow waterfall process model because of its robust nature, but not any more. We prefer the vendors propose their know-how and method-ologies, *not to work under pressure and focus on quality more.*

For specific (niche) projects, Client-X "invites" candidate vendors for proposals. For other types, they apply "open bidding".

Since Client-X is fully responsible for projects of Turkish Armed Forces (which is the largest client in terms of budget, size, number of system users and stakeholders) *there is a total con-centration on transparency, public awareness, responsibility and ethical issues throughout all processes of outsourcing deals.*

B.3   CASE 3

Vendor-Y was financially supported by The Scientific and Technological Research Council of Turkey (TÜBİTAK) in 2004 for a web-based ERP framework and the interviewee and one of his colleagues have developed this framework. Later on they took leading roles in the develop-ment of a *Hospital IS* at all stages including analysis, design and implementation. Everything was based on the initial framework of 2004. This hospital IS constitutes an e-health platform which has been designed and developed within a World Bank financed R&D project and cov-ers all modules and functionalities required to automate all the business work-flows within the healthcare environment, utilized especially for primary, secondary and tertiary healthcare institutions. Then a larger team developed their second major product, *a Document Manage-ment System* which is a full web based document centric workflow management system that enables enterprises to define, manage and control their business processes in a seamlessly integrated digital and paperless environment. So at the beginning, the interviewee had tech-nical duties including software documentation. In time, he took positions in managerial and administrative positions in Vendor-Y. In short, the interviewee, being one of the partners now, has worked at almost all levels of the organization.

B.3.1 Interview with Vendor-Y

Since most of the clients of Vendor-Y are from the public sector (they have developed projects for two private hospitals so far, the rest were public health institutions), such clients did not expect the vendor to prepare software documents like SRS and SDD. On the other hand, it was an organizational (internal) requirement to prepare them. In general, very few of the clients (public or private) had competent technical units to discuss these issues. Most of them were verifying whether the functional specifications were complete or not. *For instance, clients of the defense industry are not like that; they require almost all technical documents through the RFP since there are a lot of military officers having a BS degree from majors like software and/or computer engineering.* This is an important advantage in terms of talking the same language. One may think that a pure non-technical client, without a technical bias, can deliver the requirements in its most naive form but we think that it is a matter of *client management* (this is a typical example of *vendor power*). On the other hand, *clients with technical know-how place more functional requirements in the RFP*. This enables potential vendors become more fit and focus more on the proposals. Besides, at least in Turkey, RFP is not the major milestone but contract negotiation is. To summarize; public clients in the health industry are not technically sufficient enough for systems analysis, especially the requirements specification phase.

"Private clients have the right to buy what they choose". Public clients are obliged to follow the Public Tender Law. On the contrary, private clients select the vendors, then put the Terms of Reference (TOR), negotiate upon that and perform the acquisition process. (rem: Client-X in the previous case study is an exception among public clients: they have initiatives to select a vendor even if it is not the most cost effective one: staged contracting). In health industry, through Public Tender Law, the client has to select the cheapest proposal/vendor: they first get opinions of experts from the industry for RFP preparation. Thus; *the client might have to work with a vendor it may not wish to work with*. Another exception occurs for private clients when the size of the outsourcing deal increases: then there exists a need for a tender also. Vendor-Y's experience with (the two) private clients shows that these clients were not technically competent enough. NOTE: these comments are restricted to "hospital ERP systems".

Vendor-Y does not sell its products, but rents them as a service. Model A: they sell it for the first year, then in the second (or third) year they start the service and maintenance. Model B: they do not sell it at all; they rent it with a monthly subscription fee and they compensate all expenses that may arise as a result of updated regulations performed by The Ministry of Health of Turkey. *Vendor-Y, currently applies model B for almost all of their public clients.* Beneficial part of model B is that the rental duration is not defined, viz. theoretically infinite (like an ADSL subscription). In practice, there exists a contract period (say 2 to 3 years) but if the clients are satisfied then they definitely extend the contract (some hospitals who started a deal in 2004 are still clients of Vendor-Y). The biggest reason for adapting such a model is that *the specifications of software systems in health industry is subject to change at an annual rate of 30%.* It is totally nonsense for a public hospital to buy an IS "as-is" since in a year or two-years time it may be idle. We may view it similar to the SaaS model in cloud computing with a big difference though: Vendor-Y keeps service staff in each hospital. Thus, service is performed at the site all the time. Almost all clients of Vendor-Y had an hospital ERP before our product but with this model our penetration in the market can be viewed as 100%.

This also requires continuous training sessions for hospital users. Naturally - and as an important asset for the vendor - we apply BPR for these clients (constant tuning during the process; e.g. billing process). In general, hospitals are hiring 10 to 200 data operators on a project-based model (depending on hospital size) and in time, they may shift some of the talented ones to other internal IT positions.

Before 2005, some hospitals did not have an hospital information system. For those who had a hard time to make an outsourcing decision, our argument was clear: for a client - even if they performed a cost-benefit analysis which favored in-house development - it was impossible to obtain the vendor's know-how and best practices. It would be terribly costly in the long run. Clearly, it is a win-win situation in a quite wild competitive market (there were 80 potential vendors in this industry in 2005 when we started). Some universities develop these systems for their hospitals (e.g. Ege University, Capa University) by forming a foundation and hiring a couple of engineers for development purposes. At the end of the day they cannot compete with a software house since such vendors provide richer and far more usable libraries and components. Although such systems are very client-specific, they cannot provide the same quality since there is no competition.

"In Turkey, number one determinant is communication!" Turkish people are very emotional and sensitive. *"I stayed five years in places where I would fire myself if I were them."* Business is far more different than what is being taught at the university. Success is equal to knowledge and communication (managing people). It brings a competitive edge (rem: Sabherwal's 'identification-based trust'). We also socialize with our clients (dinners, functions, etc).

In general, in this industry there are no rewards but there are penalties. Most of the penalties explicitly stated in the RFPs are due to missed deadlines and unsatisfied requirements. On the other hand, Turkish dynamics take place again: there can be three different decisions from two different experts who comment on RFP for public deals. Sometimes penalties can be ignored (no need to say that this is not illegal, it is because the laws are designed with flexibilities).

We apply waterfall methodologies with continues re-cycling. Moreover, we heavily make use of product lines and reusable component libraries and heavily use MS Visual Studio .Net®. What is niche about Vendor-Y is that we do not make use of well-known tools in the market. We developed our own process: a requirement (which can be input through various channels) flow into a program module, someone who is not from the software department approves this requirement, then it is sent to the list of a developer where he is connected to the Requirements Module with a Visual Studio add-in, if the approver has requested an addition (e.g. screen design document) then the developer cannot check-out without implementing the additions on top of the requirement, after he checks out, it is sent to the Test Module where the test cases are previously defined and testing is performed. Meanwhile, suitability check for the coding standards, design patterns are also automated. At the end, this piece of code is added to a library and automatically compiled. We do not apply agile methods since our corporate culture is against it and moreover, the client has sufficient time and the money. We do not have CMMI certification but we do apply our own model: we have four basic metrics: (i) Line of code (LOC), (ii) estimated duration, (iii) success rates of test results, (iv) frequency of meeting the deadlines. We perform follow-ups for our developers within the scope of these metrics.

Vendor-Y has three main departments: Production/Development, Sales, and Support/Maintenance. We can measure software but not the service level. Right now we are working on this matter. After we automate the Support department, we will have measurable items there as well,

e.g. "how many service requests did he collect?", "how many of the requests he collected, he could solve himself?"

Since we are mainly contracting with public clients, there is no conflicting issues, therefore there is no need for a third party 'audit' because even the contract is pre-determined in such deals (legally). Only if the client asks the potential vendors' ideas, then we may suggest a consultant (probably academic) for the client. These are generally related to the quality standards (e.g. ISO9000). On the other hand, for some deals, potential vendors may get a certain certification from the Ministry of Health (in the context of hospital IS).

Vendor-Y had a bad experience with sub-contracting. The project was an Hospital Information System; an ERP system with thirty modules. We have subcontracted three of those modules (which were the Laboratory IS) to another vendor due to technical and financial reasons. We experienced a lot of problems with the subcontractor where the client sensed the problem as well. We put a warning nine months prior to the termination of our contract with the subcontractor and at the end they had to change them. The client may misunderstand the whole issue as "a change to the product!"