Outsourced Strategic IT Systems Development Risk

Lili Marziana Abdullah
School of Computer Science and Engineering
UNSW, Sydney, Australia /
IIUM, Malaysia
lilia@cse.unsw.edu.au

June M. Verner
School of Computer Science and Engineering
University of New South Wales
Sydney, Australia
jverner@cse.unsw.edu.au

***Abstract*—Organizations are increasingly outsourcing the development of strategic IT systems to external vendors. Because of the importance of such systems to a client organization, unaddressed risks that develop into serious problems may have a huge negative impact on the organization. There is much reported research on IT development and IT outsourcing risk, and risk management. However, research on risk in outsourced strategic IT system development, from the client perspective, have largely been ignored. We developed a risk framework for outsourced strategic IT development based on the literature. In this paper we review three reported cases of unsuccessful strategic IT system development that provide an initial validation of our outsourced risk framework. A number of risks critical to a client are identified. These risks fall into several categories associated with organizational environment, team, user, complexity, contract, requirements, planning and control, and execution. If critical outsourcing risks are clearly understood by a client organization then strategies for managing such risks can be implemented.**

Keywords-Risks; strategic IT development; outsourcing; client perspective

I. INTRODUCTION

IT plays an increasingly strategic role in the business performance of organizations. Strategic IT systems have great impact and can provide significant returns to an organization. However, developing strategic IT systems involves innovation and entails a high degree of risk [1], [2]. Many organizations, especially those whose in-house IT departments are incapable of, or are unable to develop strategic IT systems, must rely on vendors or contractors for resources, capabilities and expertise for the development of their strategic IT systems [3], [4]. Outsourcing the development of a strategic IT system adds a high degree of uncertainty to an already risky business endeavor and unsuccessful experiences with strategic IT development outsourcing have been reported; not all such outsourcing projects have achieved the intended benefits and some are terminated early. Failure to understand and manage project risks can result in important losses, project failure, and subsequently affect the achievement of an organization's business objectives. Hence, the primary motivation for our research is to build on previous studies and provide a much needed practical means for clients to identify risks that are most likely to affect the successful outcome of outsourcing strategic IT system development projects.

There is much research on IT development and IT outsourcing risk, and risk management reported in the literature. However, research on risks in outsourced strategic IT system development, from the client perspective, have largely been ignored. This paper describes an initial approach to answering: "What are the significant risks for a client in an outsourced strategic IT system development project?" Using a conceptual risk framework first introduced in [5] with later improvements, we conduct a preliminary evaluation of our risk framework against case study accounts of outsourced strategic IT system development project failure. This work is intended to provide an initial validation of our framework and to identify any risks not explicitly presented in the research literature and hence omitted from the framework. By studying specific cases of unsuccessful outsourced strategic IT systems development projects we gain greater insight into factors that threaten their success. The cases were randomly selected but are consistent with our definition of strategic IT system development outsourcing. There is much published about these cases [32-50], and this makes it possible to identify the risks that lead to the failure of these projects. The cases we have selected involve litigation and out of court settlements, hence there is no possibility of contacting the people involved in the projects. One case is still being pursued in the High Court in London. Hence to conduct this research we have no choice but to rely on written documents and transcripts as it is not possible to discuss the cases directly with the litigants. We define a strategic IT system to be:

any type of hybrid IT system that may comprise internally or externally focused systems and is either applied to processes or practices that support the core product or service, or is part of the core product or service that the organization provides to its customers.

Such a system also:

- improves the competitive position of an organization relative to its competitors and consequently, contributes to the growth, earnings or other aspects of profitability of the organization;
- enables an organization to differentiate itself from its competitors in the industry; and
- enables an organization to sustain its competitive advantage for a long enough period before being replicated by competitors.

9781-4244-2865-6/09/$25.00 ©2009 IEEE

We first summarise research on risk and risk management in a literature review. We then present our conceptual risk framework, synthesized from prior research. We follow this with a description of three unsuccessful outsourced strategic IT system development projects; this is followed by an analysis of the failure factors identified in each of the cases. The **bold phrases** highlight the factors identified. We conclude with a comparison of the case study failure factors with our risk framework drawing attention to any gaps existing in our conceptual framework and suggest some future work.

II. Literature Review

Researchers report on a series of risks connected with IT development, IT outsourcing and strategic IT projects; these projects are described in case studies, surveys, from focus group meetings and in accounts of developers' experiences. Most of the work on risk is focused on general IT systems development or software development projects [6-13]. Only a few research papers discuss risks in the context of strategic IT [14-17]. Most of this research is focused on the vendor/development side of a project, identifying risks that threaten in-house systems or vendor software developments.

Owing to an increasing level of IT outsourcing [18], the growing trend to global IT outsourcing [19], [20] and most importantly, industry's growing concerns with project failure and dissatisfaction with IT outsourcing arrangements [21] research on risk in IT outsourcing has recently increased. The early works of [22], [23] and [24] are focused on evaluating the decision whether or not to outsource IT applications. Subsequently, the focus of the research of [25-30] is on the risks of transaction cost, and agency and incomplete contract theories; [31] considers contractual risks in the IT outsourcing environment. Thus far, the scope of IT outsourcing research has been fairly broad including software development, software maintenance, support operations, disaster recovery and data center operations.

Strategic IT outsourcing is now being pursued actively by vendors. However, because of the importance of such projects to a client organization, unaddressed risks that develop into serious problems will adversely impact the organization. Surprisingly, there is little research recognition of the risks faced by the clients of outsourced strategic IT system development projects.

Since the development of a strategic IT system and the development of any IT system have some common characteristics past research on IT risk cannot be discounted; IT development projects require resources, planning and management, and the development processes are fundamentally similar.

III. Risk Framework

We have used prior research to produce a risk classification scheme highlighting factors that contribute to a negative project outcome. Risks we identified were reviewed, sorted iteratively and interpreted based on:

- risks that pertain to the client as members of the project team, as an organization, as part of management, and as users of the completed system;
- risks that pertain to the vendor as members of the project team and as an organization entrusted to provide a service; and
- risks that pertain to elements and activities of the outsourced strategic IT development project itself, from the pre-contract to post-contract stages.

The resulting classification comprises three major sources of risks - the client organization(s), the vendor organization(s), and the outsourced strategic development project. Risks are further classified into ten groups. Risks associated with the client and vendor organizations are grouped together since many of the risks apply to both types of organization. However, risks that only refer to either the client or the vendor are clearly identified. Fig. 1 provides an overview of risks pertaining to the client and vendor, whereas Fig. 2 shows those risks specific to the outsourced strategic IT development project.

IV. Application of Risk Framework

At this point, we have yet to test our framework in the context of outsourced strategic IT systems development projects in order to discover the utility and adequacy of our risk framework. Furthermore, not all of the proposed risks will be critical to a particular project as the types of risk and degree of impact of a risk will differ depending on the project in focus. Hence, we validate our proposed risk framework by applying it to three documented failed strategic IT system development outsourcing projects. Note that none of the literature discussing these three projects was included in the research material used to develop our risk classification scheme and conceptual risk framework.

We rely on anecdotal information, describing the development of these outsourced strategic IT systems, sourced from the press and media reports, trade journals and the academic literature. Examining such outsourced strategic IT system development projects allows us an initial framework validation as well as helping us identify the most important risks impacting negatively on the outcome of such projects. In the following subsections we describe the selected cases, provide insight into the factors that caused these projects to fail and compare these factors with our risk framework.

A. Case 1

The first case we consider is CONFIRM, a travel reservation system that combines airline, car-rental and hotel information [32-37]. The system development that commenced in 1988, was a joint venture project between Hilton Hotels Corporation, Marriott Corporation, and Budget Rent-A-Car Corporation with AMR Information Services Inc. (AMRIS), a subsidiary of American Airlines Corporation, as the subcontractor. The four partners formed a consortium called Intrico. AMRIS was in charge of the design and development of the system. The project was originally budgeted at $55.7 million and scheduled to take three years to

complete. The agreement identified two distinct phases – the design phase which was to take seven months, and development phase which was to be completed within 45 months of the agreement being signed. Four major development phases were then outlined in the fixed-priced contract: business area analysis (BAA) to develop business models; business system design (BSD) to enumerate detailed descriptions of the application systems; construction of the system's code (construction); and testing activities (testing). In July 1992, after three-and-a-half years and $125 million, the project was cancelled and Intrico was disbanded.

AMRIS sued Marriott, Hilton and Budget on September 1992 and the three client partners countersued. In January 1994, AMRIS reached an out-of-court settlement with the client partners for an undisclosed sum. The system is a strategic IT system since it was developed to integrate and unify the reservation systems of the partners to create a single computerized reservations system/global distribution system that was to be superior to any other reservation system at the time. The completed reservation system was expected to outpace competition in the hotel and car-rental industries, and a customised version was to be marketed for profit to other hotel and car-rental companies. The partners were relying on the expertise of AMR, the parent of American Airlines Corporation, who developed the SABRE reservation system, a proven and highly acclaimed strategic reservation system.

1) Insight

Several factors led to the demise of the project. CONFIRM was a **large-scale project** involving the development of what was supposed to be the **state-of-the-art** reservation **system** catering to all business needs of three separate industries - travel, hotel and car-rental. This is a **highly complex task**.

Each partner had a professional team stationed at AMRIS to provide input on the functionality, and to test and evaluate the system as it progressed. Apparently, the teams either **failed to develop clear requirements or failed to communicate clearly the requirements** of the system to be built. The developers certainly failed to understand the system's requirements. The design phase, which was supposed to take seven months from commencement on May 24, 1988, was completed 16 months later in September 1989. AMRIS claimed, in May 14, 1993 in an amendment to its complaint suit, that its client partners changed an approved plan to determine the specifications for a common reservation system. Instead, they sought to custom-design the system to the clients' specific needs leading to three separate reservation systems. **Changes to the requirements continued** long into the development project. It has not been reported how the fixed-price contract dealt with changes, and the implications of those changes to the contract (such as additional costs and time).

As a result, when Hilton (CONFIRM's first beta-test user) tested the system in April, 1992 major **technical and performance problems** surfaced. The main problem was to integrate CONFIRM's IBM 3090 mainframe transaction-processing facility-based central reservation system with a MVS- and DB2-based decision support system on another mainframe that contained customer information. CONFIRM required application-to-application bridging for some 60 applications. Other problems reported were **design errors** that left CONFIRM's decision support system's DB2 database unrecoverable in the event of a crash, and failure to complete several applications including a rates program. The developers were technically skilled but the **significant integration** involved was too overwhelming and demanding for them to complete the system within the deadline.

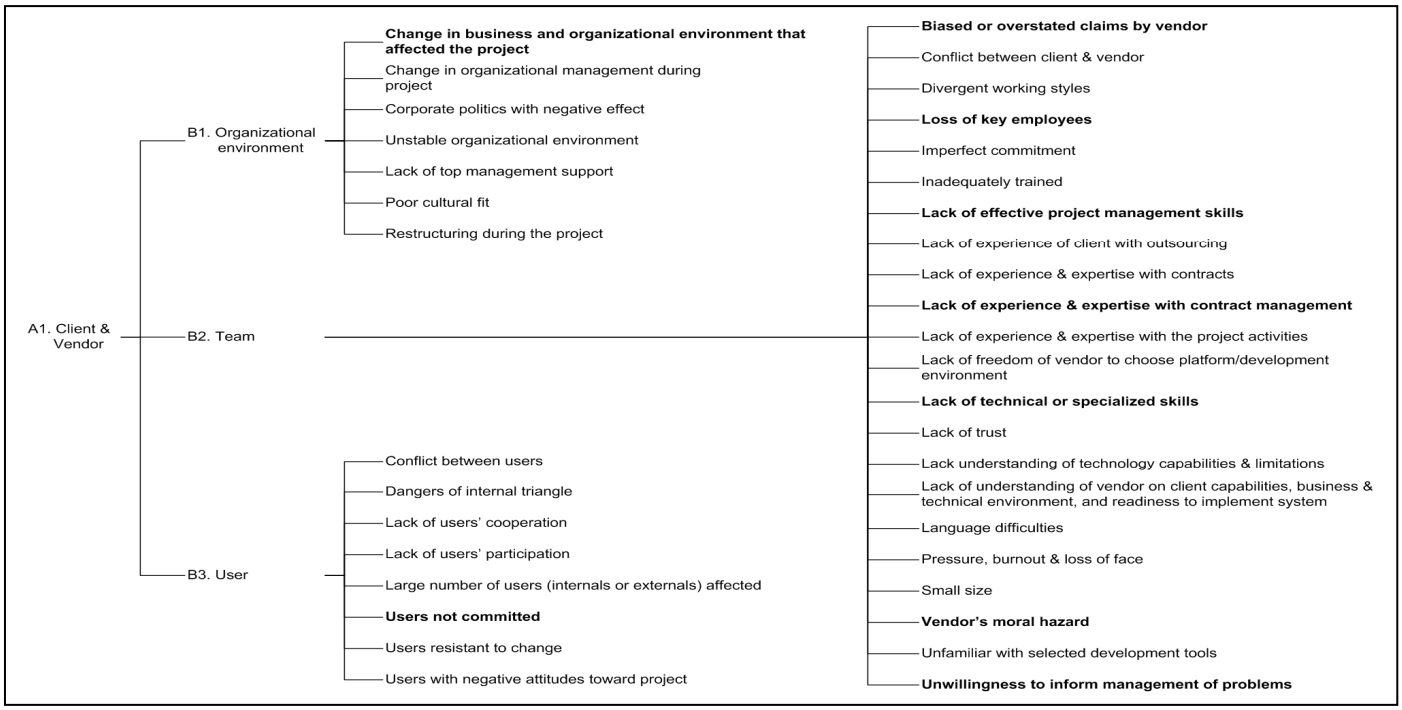

Figure 1. Conceptual Framework of Risks – Client and Vendor

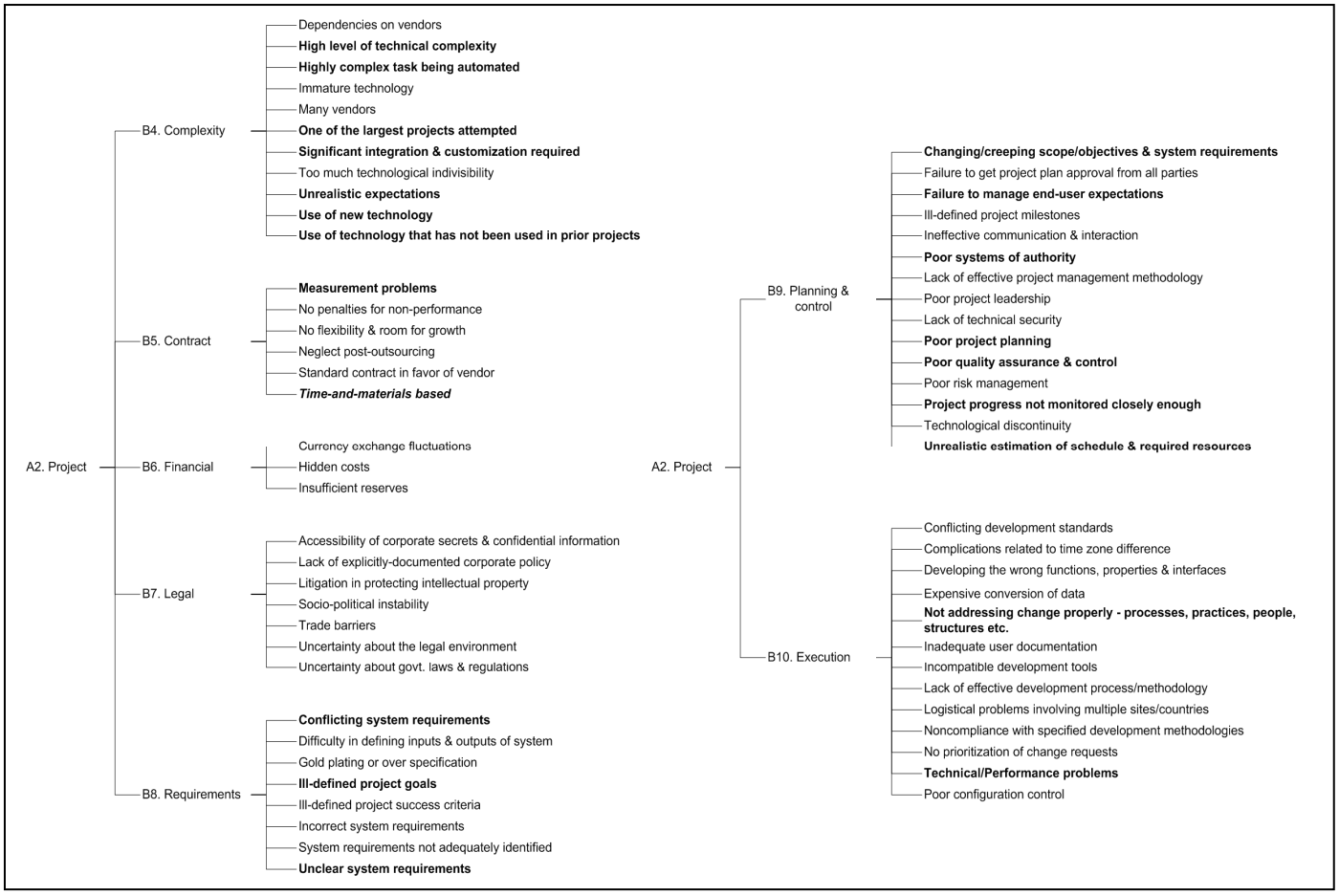

Figure 2. Conceptual Framework of Risks - Project

It also appeared that **quality assurance and control on the project deliverables were lacking**. AMRIS left bugs unresolved hoping to resolve them in a later phase, and the completed deliverables were not verified as AMRIS refused to show or explain the project status when requested by Marriot representatives. **Schedules and cost estimation were unrealistic** as AMRIS failed to take into account the amount and complexity of the work involved, failed to accommodate reasonable delays, and understated personnel and other operating costs. The original project deadline was revised from June 1992 to July 1992 but this was still inadequate. AMRIS management gave assurances that the project would still be on time and on budget even though these were not the actual assessments on the ground. Employees believed the schedules were unrealistic but were forced to comply. Those who refused to comply were re-assigned to other projects, resigned or were let go.

AMRIS management had acted dishonestly and unethically (**vendor's moral hazard**) by:

- Enticing the partners in the first place to embark on the project with promises of an unrealistically low cost and short schedule, in particular, when the real requirements were not known;
- Misrepresenting the financial realities of the project. The partners agreed to proceed with the project after the projected financial statements produced by AMRIS showed that the project was still of value even though the price had increased to $72.6 million. These statements turned out later to be fabricated as costs were understated and the number of reservations overstated;
- Deliberately concealing important technical and performance problems from the partners. The actual status of the project was not disclosed in a timely manner, thus creating deeper ethical and financial problems. The client partners were misled; and
- Pressuring employees to revise dates to reflect unrealistic schedules and firing them for being up-front about the development problems. AMRIS **lost many of its team members during the project**. At one point, almost half of the CONFIRM team members were looking for new jobs.

Overall, AMRIS management had proven to be **incompetent in its ability and judgment in managing CONFIRM**. AMR Corp. Chairman Robert Crandall confirmed this in a letter to the three partners on April 29, 1992 stating that "The individuals whom we gave responsibility for managing CONFIRM have proven to be inept. Additionally, they have apparently deliberately concealed a number of

important technical and performance problems." [1] Top management of AMRIS, AMR and client partners were unaware of how grave the problems were because **AMRIS management was not willing to inform them** until it was too late and the system completely unachievable. This worsened the damage. However, the three client partners were also at fault in their ability to effectively manage and monitor the project. The **systems put in place for authority were faulty**. Intrico had a permanent president but he was unable to function as a normal CEO. Intrico was actually governed by a board that consisted of senior representatives from all four parties but none of them had authority over the project. Surprisingly, considering the magnitude and importance of the CONFIRM project, the client-partner teams met with the developer's representatives only once a month. Even AMRIS asserted that its client partners **failed to assign knowledgeable personnel with decision-making authority**. Essentially, **project progress was never closely tracked or monitored** by the client partners and the top executives of AMR and AMRIS.

Both the clients and vendor were to blame for the failure of the CONFIRM project. From the discussion above, and reviewing the material from the viewpoint of the clients, Fig. 3 summarises the factors we identified as contributing to the project's failure. All the factors identified are present in our risk framework. The most serious risks in this case relate to complexity, requirements, planning and control, execution and the team. However, this case provides a greater understanding of the relationships between risks. The risks, as they materialized, directly and indirectly caused the project to fail.

A major execution risk was unresolved deep-rooted technical problems. A highly complex project with uncontrolled changes to requirements, and poor quality assurance and control can lead to technical problems. Clients need to be aware that setting impractical deadlines and budget without considering or understanding project scope and resources required is a significant risk; clients also must realize the consequences of late requirements changes to the scheduled delivery and costs.

An interesting aspect of this case is the risk "vendor's moral hazard". Trust is placed by the clients that the vendor will provide the required service and behave in a professional manner. Though, it is difficult for clients to directly detect deception or the unethical behaviour of a vendor, there should be signs to alert the client that something is amiss; as in this case: 1) several missed deadlines yet the vendor still assured on-time completion, 2) complex system design, 3) vendor's refusal to show or explain status of deliverables, and 4) loss of team members who started to leave the project in droves or were redeployed elsewhere.

Part of the problem can also be attributed to the clients' poor project tracking and oversight. Knowing how and when to check project progress and intervene is critical to project health. Several suggested actions include task progress monitoring, budget tracking, man-hours expended, and small and specific deliverables reviewed at scheduled short intervals. Project tracking and oversight can be successfully achieved through using both formal and informal reporting channels. However, there are several problems appearing in this case that can hinder successful tracking and oversight of a project; they are:

- Inability of the clients to gain information about the project and problems from an unwilling vendor, as well as from their own team members involved in the development and stationed on site;
- Faulty clients' systems of authority with an ineffective governance structure, and unclear roles and responsibilities; and
- Lack of knowledgeable clients' personnel; in this context they were lacking the skills needed to manage the project, and the experience and expertise to manage an outsourcing contract. A client who lacks experience and expertise is more vulnerable to vendor's moral hazard.

B. Case 2

The second case is FoxMeyer Drug Corporation's enterprise wide software and warehouse management system, called the Delta Information Systems project [38-42].

The Delta project started in January 1994 and was planned to cost $65 million. The project involved the integration of client-server R/3, with enterprise-wide financial and logistics software supplied by SAP AG, Germany, with a warehouse management system supplied by Pinnacle Automation Inc., St. Louis, USA. The client-server hardware was supplied by Hewlett-Packard Corporation, San Jose, USA, and the vendor appointed systems integrator for the project was Andersen Consulting. As part of the project, FoxMeyer also built a warehouse in a rural Ohio town, where computerized robots fill orders for hospitals and pharmacies in the U.S. Midwest.

Through a companywide system, FoxMeyer expected to save $40 million annually. However, the system's total cost reached $100 million, and it was completed late and saved less than half of the projected $40 million. Burdened with huge expenditures from the project and the problems that followed, FoxMeyer filed for bankruptcy-court protection in August 1996 after suffering an uncollectible inventory cost of $34 million. Up to that point, most R/3 modules were rolled out to six of 23 warehouses.

In 1998, the bankruptcy trustee for FoxMeyer sued Andersen Consulting and SAP for $500 million each. Six years later the bankruptcy trustee and Accenture (formerly Andersen Consulting) settled out of court and the lawsuit was dismissed on August 8, 2002. Meanwhile, SAP reached a settlement with FoxMeyer on June 23, 2004 and all outstanding disputes and litigation were dismissed.

Enterprise Resource Planning (ERP) was a popular new idea back in the 1990s for companies looking for a single system that could orchestrate diverse operations from production to human resources.

[1] M. Halper, "Marriott Suit Damns AMR Role in Confirm," Computerworld, vol. 26, p. 1, October 12, 1992.

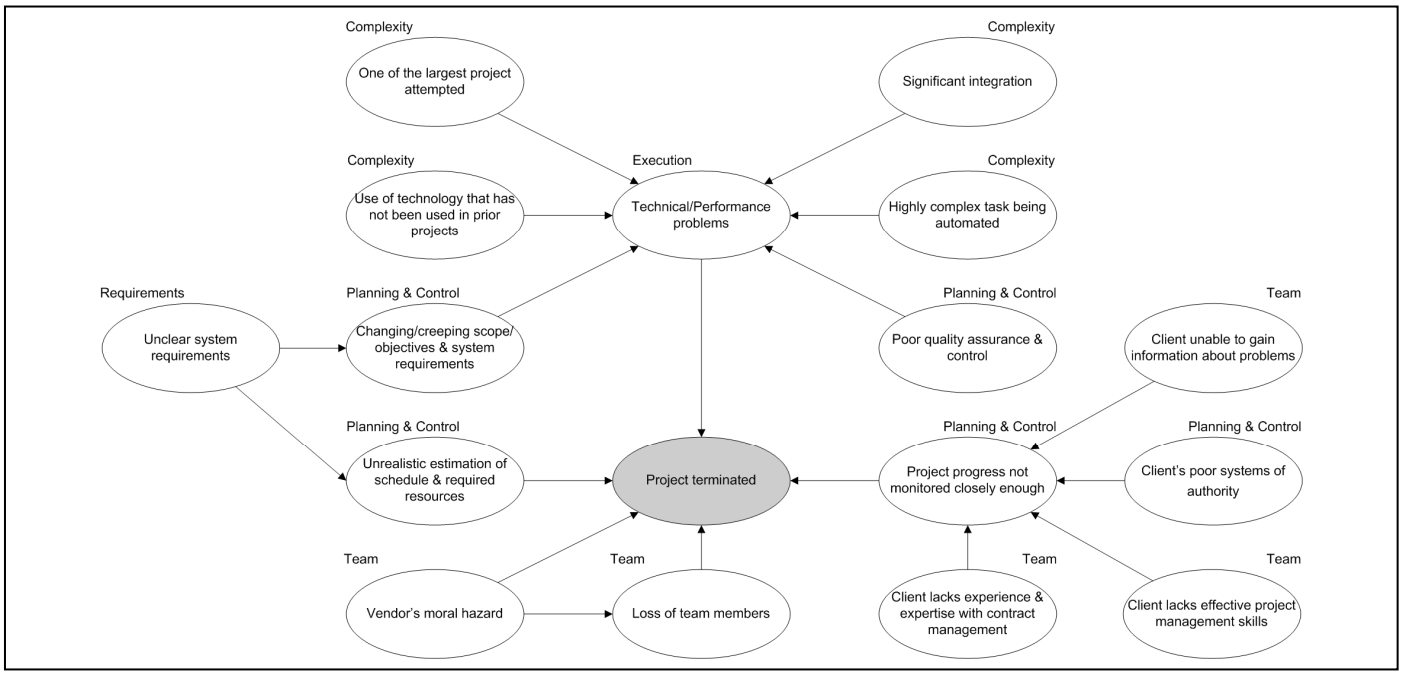

Figure 3. Case 1

FoxMeyer was in the wholesale drug distribution business, a very competitive and relatively unstable industry due to the health care reforms of the early 1990s. Hoping to leapfrog the competition, FoxMeyer initiated Delta to replace its old Unisys Corporation mainframe system, with a companywide client-server system. FoxMeyer expected that a modern client-server R/3 solution integrated with automated warehouses would increase efficiency and accommodate future growth.

1) Insight

Many of the factors that affected the successful outcome of the Delta project can be traced back to the beginning of the project. Due to increasing pressure on health care costs, pharmaceutical distributors' profit margins were thin and many began to consolidate. FoxMeyer was looking at technology to compete with its larger rivals in order to survive. However, FoxMeyer had **unrealistic expectations** of what technology could do and the immediate benefits it would deliver. An unrealistic confidence that technology would fix all of its problems was reflected in the scope, choices of technology and several other top management decisions made later in the project.

The Delta project was a **large-scale project** involving a massive overhaul of FoxMeyer's computer systems that would process hundreds of thousands of customer orders from vendor right to the customer. ERP projects are complicated because of complex software and difficulties in implementation that often require changes to a company's operations. At the same time, FoxMeyer decided to install a new warehouse-automation system to handle orders at a new warehouse. Two **highly complex functions were to be automated**.

FoxMeyer went with two different vendors to computerize the two complex functions. SAP R/3 **was a relatively new technology** at the time starting to gain acceptance among manufacturers embarking on ERP projects. However, SAP was originally designed for manufacturers and it **had never before been used to manage a large wholesale distributor**. It lacked the extensive functionalities needed for a high-volume, complex-pricing wholesale distribution business. Also, FoxMeyer planned to have a **state-of-the-art warehouse system** that could pick 80% of their outgoing orders from the warehouse's shelves automatically. Such a **high level of automation was unlike any other systems used** by most drug wholesalers at that time. **The real-time integration and significant customization required** for the two major systems further increased **the technical complexity** of the project.

The 18-month **schedule laid out in the beginning for the entire development was unrealistic,** and during the project, FoxMeyer pushed the deadline even earlier by 90 days to **accommodate a huge and important five-year contract it signed** in July 1994 with the University HealthSystem Consortium (UHC) worth $1 billion-a-year. Deliveries were scheduled to start in early 1995. FoxMeyer was so optimistic that the projected $40 million savings would be realized immediately that it promised discounted prices in the contract; hoping efficiencies would reduce costs enough to make the contract profitable.

FoxMeyer experienced **technical and performance problems** with the system. SAP R/3 was, at the time, inadequate for processing large volumes of transactions. Pre-implementation simulations were done but with insufficient levels of data. When the system was finally implemented, it could only process 10,000 customer orders per night, compared with 420,000 under the previous mainframe system. The Unisys mainframe system was maintained and interfaced with R/3 but that proved to be difficult and caused delays.

In addition, due to time pressure, FoxMeyer was **unable to reengineer its business operations and the development team only tested the parts of R/3 that were customized**.

Errors occurred in the system and, due to the system's integrated nature worsened problems at the warehouse. The warehouse at Washington Court House, Ohio, was scheduled to open in May 1995 but only started operating in August. The warehouse system had frequent equipment breakdowns initially due to component malfunction, the way shipments were handled through the system route, and most of all, interfacing complexity; this forced temporary workers to put the orders together manually. Employee **change management was inadequate** for addressing the transition to an automated warehouse. Believing that their jobs would soon be eliminated, **experienced workers at the older warehouses began leaving**. FoxMeyer suffered losses when unhappy departing workers damaged inventory when transferring them to the new warehouse.

Reports also reveal that there were some **conflicting system requirements** that might have contributed to the difficulties **and requirement changes** occurring later in the project. Christopher Cole, executive vice president of Pinnacle Automation, maintained that some things about the system were not well thought out, for example "…we were told to design a system that could ship in X number of hours, and we designed a system that could do that. Then later it became a requirement that they be able to ship in one-third to one-half that time."[2] He noted that the initial count by FoxMeyer on shipment stops along the automated route did not reflect reality; a condition that caused occasional congestion in the system. Moreover, with FoxMeyer entering into a new contract in the middle of the project, the load on the system had to be increased significantly.

Andersen Consulting brought in some 70 analysts and programmers but many **lacked technical skills, and R/3 experience and expertise**. Meanwhile, SAP **lacked experience and expertise with R/3 implementation in the wholesale distribution business**. FoxMeyer claimed that the Delta project was more of a "training ground" for Andersen's trainees, and a research and development project for SAP. Both vendors were accused of having **overstated or oversold their capabilities**. FoxMeyer knew that R/3 had not yet been used at distribution companies but claimed that it was assured by SAP that R/3 was well suited to their needs

There was **no report to indicate that FoxMeyer had a proper structure at a sufficiently high level to govern or oversee the project** except for a project champion. Also **lacking were in-house personnel with the technical skills and knowledge** needed to ensure that the ERP system and the warehouse-automation software would work together smoothly. FoxMeyer was **dependent on the vendors and was even relying on Andersen to do its quality assurance and control work.** Christopher Cole confirmed that "They had good people, just not very many."[3] This **affected the tracking and monitoring of project progress**. FoxMeyer was so intent on expanding and pushing technology to solve every problem, it **failed to carefully plan and control the project**.

[2] J. Jesitus, "Broken Promises?," IndustryWeek, p. 36, Nov. 3, 1997.

[3] D. Buss. (Spring 1998). Nightmare. Context Magazine. [Online]. Available: http://www.contextmag.com/setFrameRedirect.asp?src=/archives/199803/Feature3nightmare.asp

Both client and vendors were responsible for how the project turned out. Fig. 4 illustrates factors found to have contributed to the failure of this project from the client's standpoint. This case highlights the similarities between the factors identified and risks (in our framework) associated with organizational environment, complexity, requirements, planning and control, execution, team, and user. The Delta project draws attention to several other important risks that were not present in the previous case.

Technology can offer strategic value needed by organizations but the value is only realized by how technology is applied in innovative and creative processes, and practices. FoxMeyer had unrealistic expectations of the power of technology and developed a strategy to use technology to solve all its problems. This led to a highly ambitious and complex project. On top of that, the change in the client's business environment, with the new contract placed significant demands on the system and basically, changed the focus of the project part way through.

Technical errors and/or system performance problems are again another major risk evident in this case. Compared with the previous case, the Delta project displays more risks that could result in technical errors and/or performance problems, namely:

- use of new technology;
- high level of technical complexity;
- lack of technically skilled and knowledgeable client personnel to ensure the system works; and
- not improving the manual processes to make the system more efficient.

The case also highlights the risk of overstated claims by vendors regarding the performance of the application packages provided, and their capabilities. Client due diligence could avoid this problem through reference checks with other companies, more thorough testing, and if adequate testing is not possible, negotiation for risk sharing and rewards for early adoption. The vendors' tactic of using a client's project as a "training ground" could also have been prevented if the contract had included details of the vendors' staff who were to be involved in the project, and if the project had been closely supervised and managed by the client. In this case however, close project tracking and oversight by the client was lacking.

Poor project planning by the client resulted in many subsequent problems associated with requirements, quality assurance and control, employee change management, reengineering, estimation and governance. A sufficiently detailed project plan included in the contract could have assisted clients in executing and managing the project thus, reducing such risks. A well thought out plan guides the client in terms of the methodologies, tasks, deliverables, schedule, resource usage, organizational structure and responsibilities; a risk management plan, quality management plan, change management plan and other supporting plans are also required.

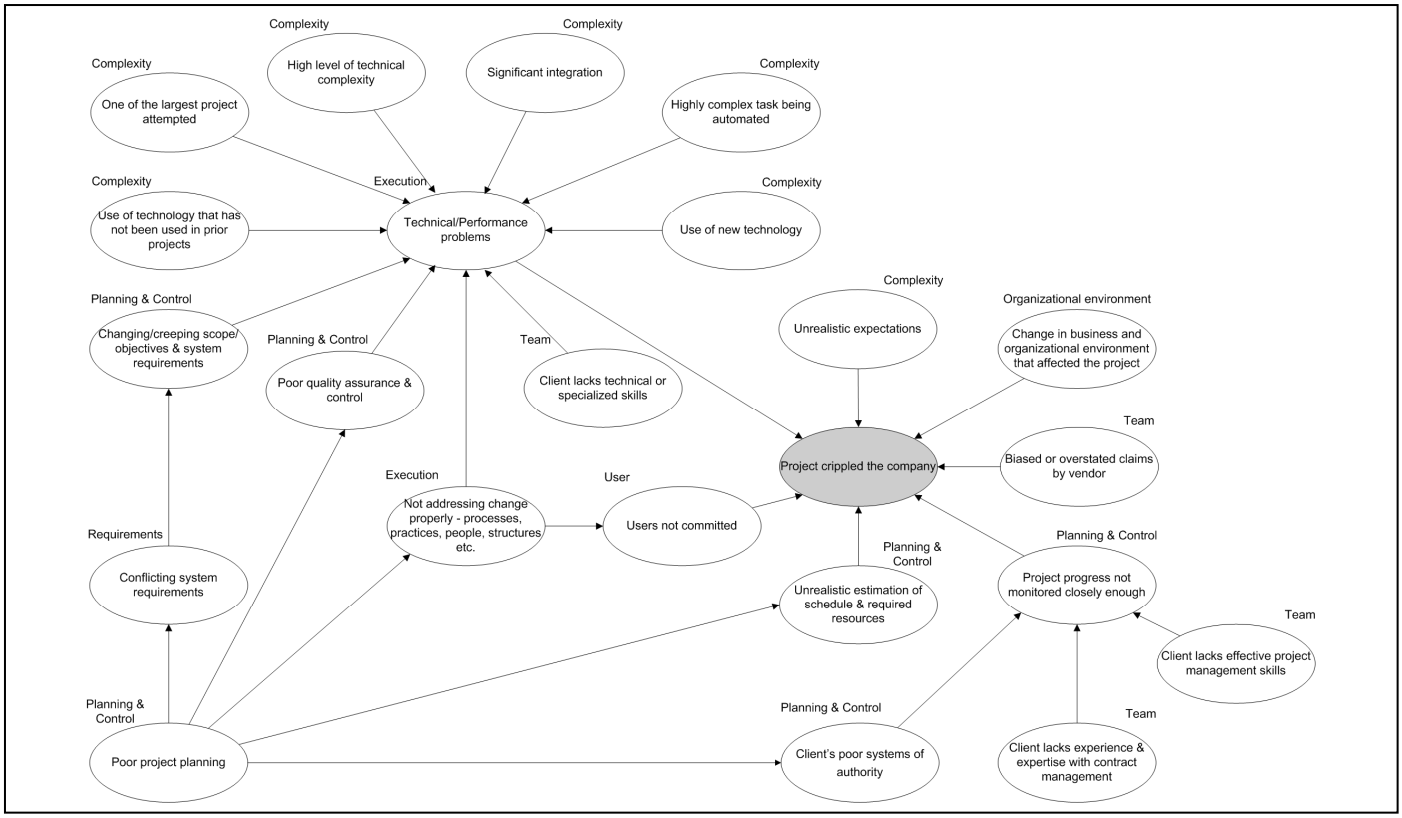

Figure 4. Case 2

C. Case 3

The third case is a Call Center and Customer Relationship Management (CRM) project for British Sky Broadcasting Group PLC (BSkyB), operator of the UK's largest digital pay television platform and a leading broadcaster of sports, movies, entertainment and news [43-50]. BSkyB also offers broadband and telephone services.

BSkyB appointed a US company, Electronic Data System (EDS), in 2000 on a time and materials basis to design, develop, and implement a CRM system. The system, built around Sun Microsystems hardware and Chordiant Software's CRM software, was to be installed at BSkyB's contact centres in Livingston and Dunfermline, Scotland, where 1,000 agents handle calls at any given time. Also included was an intelligent communications system provided by Lucent Technologies to enhance BSkyB's automated pay-per-view booking process. Lucent Technologies was responsible for design and installation of the advanced communications solution at the two contact centres. EDS was the system integrator for the project.

The project was estimated to take 18 months but in 2001, BSkyB and EDS revisited the terms and conditions of the contract. Renegotiation broke down and in March 2002, EDS handed over its system integrator responsibilities to a BSkyB subsidiary, Sky Subscribers Services Ltd, but stayed on to provide consultancy support for the project. In December 2002, EDS pulled out of the contract completely and the contract ended. The contract had a baseline budget of around £48 million but when it was terminated, BSkyB had spent £170 million on software, systems integration, infrastructure costs, and the remodelling of contact centre facilities. The project ultimately took six years to complete and cost £265 million.

In July 2002, BSkyB claimed £49 million compensation from EDS for lost time and benefits, but the amount had grown to £221 million by December 2003, £430 million by August 2004 and £709 million by October 2008.

Unlike the normal sales, marketing and support CRM software used by the sales people to manage accounts activities, BSkyB was taking a more strategic view of CRM deployment. With the number of digital customers expected to rise to seven million by 2003, BSkyB announced that it wanted to install a cutting-edge CRM system that not only enabled it to respond quickly to fast changing customer demands but also to allow it to lead innovation in customer service, and to maintain its industry-leading levels of customer retention. Because BSkyB envisioned an advanced system that would strengthen its ability to offer more relevant, personalised services to customers and to identify new sales opportunities to put it ahead of its competitors in areas such as churn management and call resolution, we regard this project as a strategic IT development project.

1) Insight

This case highlights several factors leading to an unsuccessful contract that went beyond just disagreements in renegotiating the terms and conditions of the contract. The contract ran into difficulties in the initial twelve months. Like the two previous cases, this was a **large-scale project** considering its costs and scope that would not only integrate

different data sources and create more comprehensive customer profiles, but also allow subscribers to access account, billing and other information and services via an agent, by phone, the Web or an interactive television service.

The level of integration and the technical complexity of the project were both significant, i.e., a Chordiant infrastructure with an intelligent communications system, a new billing system at the front end, and multiple legacy systems at the back end, including a sales system, field management system, marketing system and customer database. The Chordiant software on which the project was based was **a new technology**. Chordiant 5, based on open systems standards (J2EE, XML and SOAP), was the software industry's first end-to-end J2EE-standard CRM solution. Launched in January 2002, it was also reported to be the only CRM platform, at the time able to scale to millions of individual customers, and flexible enough to fit the enterprise. Chordiant 5's enterprise CRM platform, and Chordiant 5 Marketing Director, a campaign management automation tool, were successfully implemented by 2002. However, when the contract ended later in the year, overall completion was still nowhere in sight as the **project was performing poorly** with delays and extra costs incurred**.**

BSkyB had **no specific and clear project goals** other than knowing it wanted a strategic CRM system. Mike Hughes, former managing director of Sky Services noted that BSkyB had made it clear from the beginning that it wanted a flexible programme, with service providers adapting to needs along the way. BSkyB acknowledged that there was uncertainty in the amount of work and cost involved but, as claimed by EDS, was determined to arrange things in a way that it paid as little as possible. As a result, BSkyB **employed EDS on a time-and-materials basis**. Apparently, ambiguities made it **difficult to get clear requirements**. According to EDS, BSkyB took more than five months to select the system integrator and then took another four months to finalise the contract while producing only a preliminary specification.

As details of the project began to emerge, the project scope and complexity amplified. It was reported that the **project requirements remained unclear and kept changing** until 2003, by which point Sky had taken over the project management and a special team was set up to define the exact project requirements. EDS' Queen's Council Mark Barnes said that the "main problem with this project was that it was wholly unspecified"[4] and that Sky's requirements "kept on emerging like handkerchiefs from a magician's sleeve."[5] An analyst at Ovum Holway, Phil Codling, stated that the project was a classic case of "scope creep".

BSkyB had expected the development of the system to take 18 months wanting to have it ready in time for the 2001 peak Christmas customer sales period. However, with a vague understanding of the project to begin with, this appeared to be an **unrealistic estimate**. According to BSkyB, EDS knew about the importance of the timing to BSkyB and in a bid to secure the contract produced a plan that **overstated or oversold their capabilities and unrealistically estimated the resources required**. BSkyB claimed that it was led to believe that EDS had the resources, proven technology and methodology readily available to deliver the solution within a suitable timescale and cost. BSkyB's legal claim against EDS was filed on the basis of incompetence, and "deceit and negligent misrepresentation"[6] in EDS' sales presentation and the service agreement BSkyB signed. The contract included compensation for underperformance, limited to £30 million. Alleging fraud was the only way BSkyB could claim more than this liability limit. It appeared that **vendor service level measures were not well thought out** in the contract.

EDS denied the claim, and attributed time and cost overruns to the undefined project scope. However, it also appeared that EDS had **not demonstrated it had the ability** to fully manage the project and deliver on its promise. EDS admitted that it had failed to deliver several aspects of the contract and was partly responsible for poor specifications later in the project. In addition, an EDS project manager had indicated that the project was in crisis stating "**poor initial customer expectations management as to EDS' delivery capability**", **"lack of required and requested resources across the programme"**, and **"lack of experienced software developers within the CRM practice who have a successful track record of large scale integration programmes**."[7]

As of October 2008, this is by far the costliest legal dispute (£709 million) in the history of the IT industry and is still in litigation. An outcome is expected early 2009.

Contributing factors to the BSkyB failure are identified in Fig. 5. These factors relate to the following risks listed in our framework: complexity, requirements, planning and control, execution, and team. This case has highlighted a risk not already identified in our framework; a "time-and-materials based contract" risk, and emphasizes a significant risk "ill-defined project goals". In a time-and-materials contract, the client pays the vendor for the number of hours needed to perform the service. However, with ill-defined goals, unclear business and system requirements, expanding scope, growing complexity and an inexperienced vendor, a project is likely to experience technical and/or performance problems, thus requiring more time, and incurring more costs. In this sense, a time-and materials-based contract can be a significant risk to a client.

With an expectation that EDS had the capability and capacity to deliver the work, BSkyB, relied on EDS to plan the details of the project. Yet, there was a no clear and common understanding or agreement on what the work was, and what was going to be produced. Clients need to be aware that unless there is a common expectation to begin with, a vendor will not be able to manage client's expectations effectively.

[4] T. Collins. (2008). BSkyB v. EDS judgement could shake IT suppliers. ComputerWeekly.com. [Online]. Available: http://www.computerweekly.com/Articles/2008/09/26/232452/bskyb-v.-eds-judgement-could-shake-it-suppliers.htm

[5] P. Michael, "EDS legal team hits at BSkyB claim," in Financial Times, 2007, p. 4.

[6] M. Songini, "Media giant BskyB sues EDS over troubled CRM system," Computerworld, vol. 2008, Aug. 17, 2004.

[7] T. Nikki, "EDS to address charges it deceived BSkyB," in Financial Times, 2007, p. 19

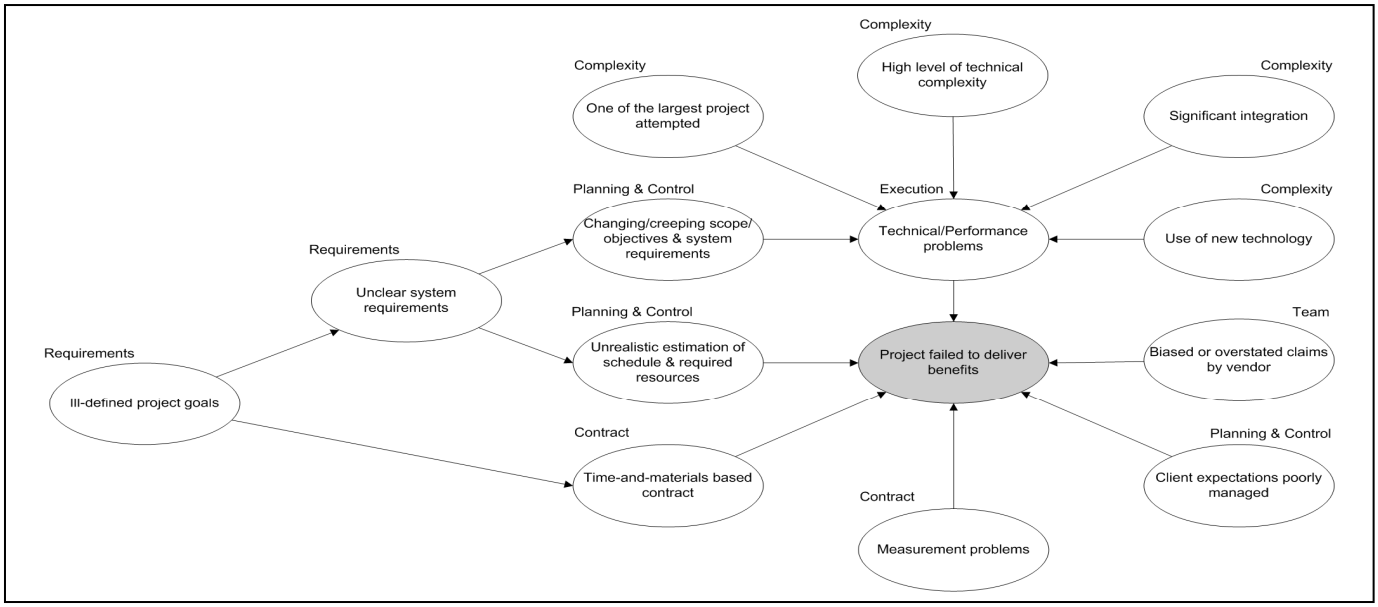

Figure 5. Case 3

On the other hand, clients will be encouraged by oversold or overstated vendor resources and capabilities in a proposal and therefore, have certain expectations of what the vendor can do; a vendor then has a difficult task to live up to those expectations. This case highlights the need for balanced service level measures in a contract. Claiming undefined scope for its failure to manage client expectations is irresponsible. If it is not clear what it is supposed to deliver to the client, the vendor should have not taken on the project in the first place.

V. FINDINGS

We found that our risk framework assisted the analysis of factors contributing to the failure of the projects we reviewed. The three cases above provide support for our conceptual risk framework. The failure factors, highlighted in **bold,** are manifestations of risks that both vendors and clients should consider when entering into agreements for outsourcing strategic IT projects. However, in line with the focus of our research, we concentrate more on risks from the client perspective. Table 1 compares the risks we have identified across all three cases. While all three projects exhibited risks present in our framework a risk not already included, but identified in one or more of the cases, has been included in the framework under its relevant classification. In this case, only a "time-and materials-based contract" risk was not listed in the original framework. This risk is highlighted in **bold** and *italicized* in Fig. 2.

Secondly, the cases highlight a number of critical risks that can threaten the success of outsourced strategic IT development projects. While our framework offers a list of risks identified from the literature, the cases provide further insight into the most important risks in the context of outsourced strategic IT systems development projects. The critical risks identified in our three cases (and highlighted in **bold** in Fig. 2) are 1) organizational environment, 2) team, 3) user, 4) complexity, 5) contract, 6) requirements, 7) planning and control, and 8) execution risks.

A single individual risk will not cause a project to fail but combinations of risks, if not addressed, will certainly lead to failure. Risks can be interrelated as certain risks may arise if an earlier risk is not properly dealt with, causing an escalation of problems. The arrows in Figures 3-5, show direct risk relationships for each of the projects. However, this does not rule out indirect influences, i.e., the effect that one risk may have on other risks.

Thirdly, though each case is distinct, the appearance of certain types of risks in all three cases is particularly significant. Those appearing in all three cases are 1) team, 2) complexity, 3) requirements, 4) planning and control, and 5) execution risks. Our findings agree in principal with [17] which identifies complexity as a risk in strategic application developments. However, [17] was based on a survey of software project managers; it is not an empirical study of outsourced and strategic IT projects themselves. In addition, we identify here that outsourced strategic IT development projects exhibit both team, and planning and control risks. Requirements risk is a recurring theme in software development projects and, as shown in the cases above, are also major concerns in outsourced strategic IT development projects. Execution risks are associated with the actual building of physical project deliverables. All three projects demonstrate this risk with system technical and/or performance deficiencies, but this risk is closely linked to other risks related to complexity, team and planning and control.

VI. CONCLUSIONS

By reviewing three cases of failed outsourced strategic IT system development projects we present an initial validation of our conceptual framework. Unfortunately, there is little research presenting detailed objective data about factors

contributing to the failure of strategic IT projects. Thus, we have relied on anecdotal information and press releases of court proceedings regarding the projects and their outcomes.

No doubt, accounts of such projects in the press are likely to emphasize the more sensational aspects, and focus on large projects with big budgets. However, a review of several such cases can shed light on the risks that affect the success of outsourced strategic IT system development projects.

Based on three unsuccessful projects we have identified some of the risks critical to the projects' clients. Risks that clients need to be concerned about fall within categories associated with 1) the client itself, 2) vendor and 3) project, with the most likely risks associated with

- team,
- complexity,
- requirements,
- planning and control,
- execution.

While three cases do not represent a thorough validation of our conceptual risk framework, they nonetheless illustrate its utility and effectiveness, and motivate further research. More reported cases, and actual case studies with input from client organizations will undoubtedly yield further interesting findings. Evaluation of the framework with real cases will provide a clear-cut means for understanding the most critical risks and further validate our framework. A question to explore in future research is how the client can actually manage the most significant risks in an outsourced strategic IT system development project.

TABLE I. CASES SUMMARY

Risk Classification	**Cases**		
	Case 1	***Case 2***	***Case 3***
Organizational Environment		Change in business and organizational environment that affected the project	
Team	Client lacks effective project management skills Client lacks experience and expertise with contract management Client unable to gain information/insight into problems Vendor's moral hazard Loss of team members	Client lacks effective effective project management skills Client lacks experience and expertise with contract management Client lacks technical or specialized skills Biased or overstated claims by vendor	Biased or overstated claims by vendor
User		Users not committed	
Complexity	One of the largest project attempted Use of technology that has not been used in prior projects Significant integration required Highly complex task being automated	One of the largest projects attempted Use of technology that has not been used in prior projects Significant integration required Highly complex task being automated High level of technical complexity Use of new technology Unrealistic expectations	One of the largest projects attempted Significant integration required High level of technical complexity Use of new technology
Contract			Time-and-materials based contract Measurement problems
Requirements	Unclear system requirements	Conflicting system requirements	Unclear system requirements Ill-defined project goals
Planning and Control	Changing/creeping scope/objectives and system requirements Unrealistic estimation of schedule and required resources Poor quality assurance and control Project progress not monitored closely enough Client's poor systems of authority	Changing/creeping scope/objectives and system requirements Unrealistic estimation of schedule and required resources Poor quality assurance and control Project progress not monitored closely enough Client's poor systems of authority Poor project planning	Changing/creeping scope/objectives and system requirements Unrealistic estimation of schedule and required resources Client expectations poorly managed
Execution	Technical/Performance problems	Technical/Performance problems Not addressing change properly – processes, practices, people, structures etc.	Technical/Performance problems

REFERENCES

[1] E. K. Clemons, "Evaluation of strategic investments in information technology," Communications of the ACM, vol. 34, pp. 22-36, 1991.

[2] P. Weill and S. Aral. (2005). IT Savvy Pays Off:How Top Performers Match IT Portfolio and Organizational Practices. MIT Sloan Research Paper. [Online]. Available: http://web.mit.edu/cisr/working%20papers/cisrwp353.pdf

[3] H. R. Rao, K. Nam, and A. Chaudhury, "Information systems outsourcing," Communications of the ACM, vol. 39, pp. 27-28, 1996.

[4] V. Gurbaxani, "The new world of information technology outsourcing," Communications of the ACM, vol. 39, pp. 45-46, 1996.

[5] L. M. Abdullah and J. M. Verner, "Risk Framework for Outsourced Strategic IT System Development from The Client Perspective," in Software Measurement European Forum - SMEF 2008 Milan, Italy, 2008, pp. 1-12.

[6] F. W. McFarlan, "Portfolio approach to information systems," Harvard Business Review, vol. 59, pp. 142-150, September - October 1981.

[7] B. W. Boehm, Tutorial: Software Risk Management. Los Alamitos, California: IEEE Computer Society Press, 1989.

[8] R. N. Charette, Software Engineering Risk Analysis and Management. New York: McGraw-Hill, 1989.

[9] H. Barki, S. Rivard, and J. Talbot, "Toward an assessment of software development risk," Journal of Management Information Systems, vol. 10, p. 203, Fall 1993.

[10] T. Moynihan, "An inventory of personal constructs for information systems project risk researchers," Journal of Information Technology (Routledge, Ltd.), vol. 11, p. 359, December 1996.

[11] K. Lyytinen and L. Mathiassen, "Attention Shaping and Software Risk--A Categorical Analysis of Four Classical Risk Management Approaches," Information Systems Research, vol. 9, pp. 233-255, September 1998.

[12] R. Schmidt, K. Lyytinen, M. Keil, and P. Cule, "Identifying Software Project Risks: An International Delphi Study," Journal of Management Information Systems, vol. 17, pp. 5-36, Spring 2001.

[13] L. Wallace and M. Keil, "Software project risks and their effect on outcomes," Communinations of the ACM, vol. 47, pp. 68-73, 2004.

[14] A. L. Gilbert and M. F. Vitale, "Containing strategic information systems risk: control and intelligence," in Proceedings of the Twenty-First Annual Hawaii International Conference on System Sciences, 1988. Vol.III. Decision Support and Knowledge Based Systems Track, Hawaii, USA, 1988, pp. 52-60.

[15] C. F. Kemerer and G. L. Sosa, "Systems development risks in strategic information systems," Information and Software Technology, vol. 33, pp. 212-223, 1991.

[16] E. K. Clemons and B. W. Weber, "Strategic Information Technology Investments: Guidelines for Decision Making," Journal of Management Information Systems, vol. 7, pp. 9-28, Fall 1990.

[17] L. Wallace, M. Keil, and A. Rai, "Understanding software project risk: a cluster analysis," Information & Management, vol. 42, pp. 115-125, 2004b.

[18] A. McCue. (2005). Global IT outsourcing deals rocket up to $163bn. Silicon. [Online]. vol. 2007, Available: http://management.silicon.com/itdirector/0,39024673,39127146,00.htm

[19] R. Kliem, "Managing the Risks of Offshore IT Development Projects," EDPACS, vol. 32, pp. 12-20, 2004.

[20] M. H. A. Tafti, "Risks factors associated with offshore IT outsourcing," Industrial Management & Data Systems, vol. 105, pp. 549-559, 2005.

[21] T. Weakland and B. Tumpowsky, "2006 Global IT Outsourcing Study," Diamond Management & Technology Consultants, Chicago, Illinois 2006.

[22] J. Jurison, "The role of risk and return in information technology outsourcing decisions," Journal of Information Technology (Routledge, Ltd.), vol. 10, p. 239, December 1995.

[23] M. J. Earl, "The risks of outsourcing IT. (information technology)," Sloan Management Review, vol. v37, p. p26(7), March 22, 1996.

[24] R. Klepper and W. O. Jones, Outsourcing Information Technology, Systems & Services. New Jersey: Prentice Hall, 1998.

[25] B. A. Aubert, M. Patry, and S. Rivard, "Assessing the risk of IT outsourcing," in Proceedings of the Thirty-First Hawaii International Conference on System Sciences, 1998, pp. 685-692.

[26] B. A. Aubert, M. Patry, and S. Rivard. (2001). Managing IT Outsourcing Risk: Lessons Learned. [Online]. pp. 1-19. Available: http://gresi.hec.ca/SHAPS/cp/gescah/formajout/ajout/test/uploaded/cahier0111.pdf

[27] B. A. Aubert, M. Patry, and S. Rivard, "A Framework for Information Technology Outsourcing Risk Management," The Database for Advances in Information Systems, vol. 36, pp. 9-28, 2005.

[28] B. A. Aubert, S. Dussault, M. Patry, and S. Rivard, "Managing the risk of IT outsourcing," in Proceedings of the 32nd Annual Hawaii International Conference on System Sciences. HICSS-32., 1999, p. 10.

[29] B. A. Aubert, M. Patry, S. Rivard, and H. Smith, "IT outsourcing risk management at British Petroleum," in Proceedings of the 34th Annual Hawaii International Conference on System Sciences, 2001, p. 10.

[30] B. Bahli and S. Rivard, "Validating measures of information technology outsourcing risk factors *," Omega, vol. 33, pp. 175-187, April 1, 2005.

[31] L. P. Willcocks and M. C. Lacity, "IT outsourcing in insurance services: risk, creative contracting and business advantage," Information Systems Journal, vol. 9, pp. 163-180, July 1999.

[32] E. Oz, "When professional standards are lax: the CONFIRM failure and its lessons," Communications of the ACM, vol. 37, pp. 29-43, 1994.

[33] M. Halper, "Outsourcer Confirms Demise of Reservation Coalition Plan," Computerworld, vol. 26, p. 20, August 3, 1992.

[34] M. Halper, "Marriott Suit Damns AMR Role in Confirm," Computerworld, vol. 26, p. 1, October 12, 1992

[35] M. Halper, "AMR Sues Partners over Failed Venture," Computerworld, vol. 26, p. 1, October 5, 1992.

[36] M. Halper, "IS Cover-Up Charged in System Kill," Computerworld, vol. 26, p. 1, August 10, 1992.

[37] M. Halper, "AMR calls Confirm partners selfish," Computerworld, vol. 27, p. 4, May 24, 1993.

[38] W. M. Bulkeley, "Technology (A Special Report): Working Together --- When Things Go Wrong: FoxMeyer Drug took a huge High-tech gamble; It didn't work," in Wall Street Journal, 1996, p. R.25.

[39] J. E. Scott, "The foxMeyer Drugs' Bankruptcy: Was it a Failure of ERP?," in Proceedings of the Association for Information Systems Fifth Americas Conference on Information Systems Milwaukee, Wisconsin, 1999.

[40] P. Key, "SAP America hit with a $500M suit," Philadelphia Business Journal, October 30, 1998.

[41] D. Buss. (Spring 1998). Nightmare. Context Magazine. [Online]. Available: http://www.contextmag.com/setFrameRedirect.asp?src=/archives/199803/Feature3nightmare.asp

[42] J. Jesitus, "Broken Promises?," IndustryWeek, pp. 31-36, Nov. 3, 1997.

[43] M. L. Songini, "Broadcaster Sues EDS Over CRMContract," Computerworld, vol. 38, pp. 8-8, August 23, 2004.

[44] "BSkyB Selects Chordiant Software for Multi-Million Dollar Unified Customer Relationship Management Strategy," PR Newswire, p. 1, 2001.

[45] T. Nikki, "EDS to address charges it deceived BSkyB," in Financial Times, 2007, p. 19.

[46] M. Songini, "Media giant BskyB sues EDS over troubled CRM system," Computerworld, vol. 2008, Aug. 17, 2004.

[47] L. King, "Sky EDS dispute 'shows service contract risks'," CIO, October 23, 2007.

[48] L. King, "Sky and EDS clash over "cutting edge" CRM system," Computerworlduk, November 13, 2007.

[49] T. Collins. (2008). BSkyB v. EDS judgement could shake IT suppliers. ComputerWeekly.com. [Online]. Available: http://www.computerweekly.com/Articles/2008/09/26/232452/bskyb-v.-eds-judgement-could-shake-it-suppliers.htm

[50] P. Michael, "EDS legal team hits at BSkyB claim," in Financial Times, 2007, p. 4.