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Erhan Edguer
Curtin University of Technology, erhan.edguer@immi.gov.au

Graham Pervan
Curtin University of Technology, pervang@cbs.curtin.edu.au

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Erhan Edguer and Graham Pervan

School of Information Systems, Curtin University of Technology
Perth, Western Australia
erhan.edguer@immi.gov.au, pervang@cbs.curtin.edu.au

Abstract

The main objective of this research was to explore how critical success factors affected the outsourcing arrangements between buyers and suppliers in small government organizations, which collectively outsource their IS/IT activities to a single outsourcing vendor. A major finding of this study was that organizations could have a successful co-sourcing arrangement by determining and putting into practice certain critical success factors. In this regard, it can contribute to the existing body of knowledge in co-sourcing activities that have been growing rapidly in government departments as well as in the private sector.

Keywords

Co-sourcing, Success Measures, Factors of Outsourcing Decisions, Outsourcing in Government, Critical Success Factors.

INTRODUCTION

Outsourcing Information Systems responsibilities has become a viable business for many companies. To ensure success, a relationship between the outsourcing vendor and the buyer that clearly defines roles and responsibilities must be developed. Proper performance measurements and well-defined service levels need to be established and monitored to achieve the desired results. However, for many organizations, measuring the performance of the outsourcer is a frustrating task. Confusion exists over what should be measured and how.

Many research studies have been conducted to inform businesses about these issues. The variety of research conducted in the area of IS/IT outsourcing include: outsourcing types (Lacity et al., 1996), outsourcing decision-making (Gupta & Gupta, 1992), benefits of outsourcing (Khosrowpour, 1995; Galliers et al, 1999), real cost of outsourcing (Ang & Straub, 1998), the role of trust in outsourcing (Sabherwal, 1999), and assessing the risk of outsourcing (Aubert et al., 1998).

There is a need for empirical research to investigate government agencies that collectively outsource their IS/IT activities. This research case study was an exploratory investigation of a government IT outsourcing contract. The data collected was qualitative and the research paradigm was interpretive.

BACKGROUND OF OUTSOURCING

The outsourcing concept is not new. During the 50s, 60s and the 70s many small and medium size businesses subcontracted their information processing activities to data processing service bureaus (Khosrowpour, 1995; Lacity & Hirschheim, 1998), because of the high costs of purchasing and developing computer technologies. However, improvements in information technologies and a wide use of personal computers have made these services redundant.

In the 90s, the emergence of computer technology with communication technologies provided many organizations new tools in the management of information and communication (Khosrowpour, 1995). New global economic forces have forced organizations to again find ways of reducing their costs while becoming more effective in this new competitive market. As a result, many organizations are looking for alternative ways of accessing these tools. Outsourcing is one of these alternatives.

Kodak was the first company to successfully outsource its Information Systems in 1989 and many other organizations have taken up this option. Not all outsourcing attempts have been successful and many have not reaped the benefits of outsourcing.

What is outsourcing

In this research, outsourcing activity is referred to as the dynamic transition from internal provision to external provision as well as the resulting state of external provision. Therefore the definition of outsourcing used in this study is:

"IS outsourcing is the commissioning of part or all of the IS activities an organization needs, and/or transferring the associated human and other IS resources, to one or more external IS suppliers" (De Looff, 1997, p.30).

Where the outsourcing is a collective arrangement between one vendor and multiple clients, the activity is referred to as "co-sourcing".

Why Organizations Outsource

Outsourcing has become an important issue for managers of information systems and technology for different reasons. Competition is becoming fiercer in national and international markets. Market shares are decreasing while global pressures are increasing. Product life cycles are getting shorter, forcing organizations to become more efficient. A shortage of skilled IS professionals places pressure on IS managers to deliver on their promise of faster, cheaper and better solutions. The reasons for organizations to outsource can be categorised as: strategic focus, economies of scale, market forces, and technical considerations (McFarlan, & Nolan, 1995; Rothery, & Robertson, 1995).

When to Outsource

Outsourcing can be justified when the IS department has one or more of the following situations (Gupta & Gupta, 1992):

 ✧ There is immediate need to reduce costs.

 ✧ There is a critical shortage of IS talent to continue with in-house development.

 ✧ The given IS function has no strategic advantage and an outside vendor is better suited to perform that task.

 ✧ The organization does not have suitable IS resources to respond to any sudden change in the environment in order to gain competitive advantage or keep up with the competitors.

 ✧ There is too much time and talent wasted maintaining old systems and not enough for new developments.

 ✧ Focus on strategic business needs to be sharpened.

 ✧ Hiring restrictions.

Factors in Outsourcing Decisions

Information is defined as a strategic resource regardless of an organization's line of business (Khosrowpour, 1995; Galliers et al., 1999), therefore outsourcing decisions are strategic not just operational (Gupta & Gupta, 1992). Although many organizations use outsourcing to gain a competitive advantage or decrease market pressure, outsourcing may not be right for every organization.

Common factors in outsourcing that are identified in the literature include:

 ✧ Vendor Reputation (De Looff, 1997; Brewer, 1998).

 ✧ Quality of Service (Williams, 1998; Tarsh, 1999).

 ✧ Strategic Applications (Khosrowpour, 1995; Gupta & Gupta, 1992).

 ✧ Loss of IS Positions (Khosrowpour, 1995; De Looff, 1997).

 ✧ Demoralised Employees (Gupta & Gupta, 1992).

 ✧ Untested Waters (Gupta & Gupta, 1992; Rothery & Robertson, 1995).

 ✧ Loss of Control (Rothery & Robertson, 1995; McFarlane, 1998).

 ✧ Cost Benefit Analysis (Khosrowpour, 1995; De Looff, 1997).

Outsourcing in Government

The outsourcing of IT is not limited to the private sector and most government organizations outsource some or all of their IS/IT. Major factors contributing to the trend towards government outsourcing include: tighter budgets, lack of specialised skills among government employees, and politicians' discontent over spending on botched IT programs (Anonymous, 1996).

A 1993 study of businesses and government agencies by Penton Research Services showed that 44% of the executives surveyed said they are doing more outsourcing than they did 5 years before, and 47% said they expected to increase the amount of work they outsourced by the year 2000 (Kelley, 1995). As outsourcing has grown in the last few years, so has its scope.

However, there is very little research done in the area of outsourcing IS/IT in government organizations, especially in the area of government organizations that collectively outsource their IS/IT to a large vendor that provides a full suite of IS/IT services.

RESEARCH QUESTION AND APPROACH

Outsourcing literature clearly identifies a rapid increase in the outsourcing arrangements across the business sector for many different reasons. With the increase in outsourcing arrangements there are a number of issues being identified that affect these outsourcing arrangements. Whether total outsourcing or selective outsourcing, these issues affect the business. Many research studies have been conducted to inform organisations about these issues, but analysis of the literature suggests that there has been little research done in the area of (a) co-sourcing contracts, (b) government IT outsourcing, and (c) co-sourcing contract evaluation.

Therefore this study focuses on these areas of outsourcing identified above. The analysis of the literature led to the following research questions:

> *a) How do government agencies measure the success of the co-sourcing contract?*
>
> *b) What critical success factors determine the success of the co-sourcing contract?*
>
> *c) How successful are co-sourcing contracts?*
>
> *d) What other factors contribute to the success of the co-sourcing contract?*

This study aims to explore the co-sourcing arrangements within government agencies and illustrate the issues involved and give a deeper insight to the reader by answering the above questions.

Selection of the Research Method

The selection of the research method depends on the purpose of the research and context of the research question. Galliers (1991) proposed a revised taxonomy to assist IS researchers to choose the right research method according to their objectives. This taxonomy assesses the research methods whether they are scientific or interpretivist and whether the researches have an impact on societal, organisational/group, or individual level. It assesses if the research methods are concerned with technology or methodology, and if the researches are going to be used for theory building, theory testing or theory extension.

The objectives of the proposed research study in this paper are identified below:

> a) The proposed research is an investigation of the effects of outsourcing contractual agreements for organisations.
>
> b) The proposed research is an investigation of the methodology rather than the technology.
>
> c) The proposed research is an exploratory research conducted to identify the effects of outsourcing contracts on the relationships between organisations.
>
> d) The aim of the research is theory building in the area of outsourcing.

After analysing the above objectives of the proposed research study, the taxonomy (Galliers, 1991) suggests that a case study approach would be appropriate.

Research Design

Given the exploratory nature of the case, the data collected was mostly qualitative and the research paradigm interpretive. The data was collected from: a) six government agencies that were part of a consortium that signed a co-sourcing agreement with an outsourcing service provider; b) the government agency responsible for

contract negotiation and management; and c) from the provider. The core data was obtained through interviews, document reviews, and a brief questionnaire.

Interview

The first source was the semi-structured interviews (tape-recorded) that provided us with an understanding of the organisations and the issues being investigated. There were 12 interviews conducted with two different levels of IS/IT management [one contract management level, and one strategic management level] in the organisations being investigated as outsourced agencies. The reason for choosing two different managers from each agency for the interviews was to give a different point of view from different levels of each agency. There were also two separate interviews conducted with the outsourcing vendor and the contract manager. These interviews took place in the agencies' own premises and duration of these interviews was approximately one hour. Interviews were completed in three weeks. The interview tapes were then transcribed and emailed to the interviewee for accuracy checking, and corrected. Approximately 150 pages of transcripts were then analysed.

The interview questions were designed to identify the important issues relating to the co-sourcing contracts. These included objectives of the agencies, effects of the outsourcing decision on their IS departments, critical issues related to outsourcing, the importance of their relationship with the outsourcing vendor, the dynamics of their relationship within the consortium, the risk factors of outsourcing, the critical factors affecting the success of outsourcing in their agency, and measures of success of the contract.

Document Review

The documentary sources reviewed in this study were:

- The head contract agreement and a service agreement signed by both outsourcing vendor and one of the agencies was a very important source of information.

- Contract promotional material was provided by the outsourcing vendor. This material contained the history and intended objectives of the contract and it is given to the government agencies to provide them with preliminary information about the contract arrangement. This document was used to establish the outlines of the contract.

- The State Government Outsourcing Contracts document is another source, which contains a summary of the contract negotiations and the background of the each agency and the alternative contract arrangements. This document is the summary of the information provided by the contract managers about the outsourcing decision with the State Government Agencies. This document contains information about different contracts and the consortiums that set up by the agencies to collectively negotiate these contracts.

- Web sites of all the agencies were used to gather background information about each. These sites provided information about each agency, their core business and of their size, and their other non-core activities. These web sites are available in the reference list.

The document review provided preliminary information about the contract and the agencies that were party to this contract and was used to investigate several organizational issues within the chosen organizations and to provide a means of triangulating the data (Neuman, 2000).

Questionnaire

The researchers used an additional questionnaire to identify and clarify the important issues. The questions were especially designed to discover the objectives and the critical success factors of each agency.

RELIABILITY, VALIDITY AND TRIANGULATION OF THE RESEARCH

Reliability and validity in qualitative research are as important as in quantitative research (Neuman, 2000), but qualitative researchers have a different view to quantitative researchers on validity and reliability issues. These are discussed below:

Reliability

Reliability means dependability or consistency (Neuman, 2000). It is very hard to maintain consistency in a qualitative research study because the subject studied is not stable over time. According to qualitative researchers, the reliability is a living relationship between a researcher and the data (Neuman, 2000). Reliability is a very important part of this research, and reliability of the data in this research is maintained in two different ways:

- The data collected by the researchers at the interviews was first transcribed and then sent to the interviewees for further inspection and amendments if needed and the amended data was then used as part of this research study.

- A questionnaire was given by the researcher to the interviewees during the interviews to identify the importance of the objectives and success factors.

Validity

Validity means truthfulness (Neuman, 2000). Interpretivist validity checks are based on the acceptance of the scientific community (Lacity & Janson, 1994). Qualitative researchers have developed a number of methods to use instead of a quantitative approach to validity. These are ecological validity or natural history methods, used in field research, and internal or external criticism used by historical researchers to determine whether the evidence they gather is real or not (Neuman, 2000). In this research, the validity of the data was tested by the researchers through comparing it with the available literature on the subject. The researchers also compared the head contract agreement with similar contact agreements, which were signed by other organisations with the same objectives that have been identified.

Triangulation

Triangulation is observing something from different angles (Neuman, 2000). The four types are triangulation of: measures, observers, theory, and method. Triangulation in a case study is viewed as being particularly appropriate as it provides increased confidence that the 'richness' of the research context has been fully considered in data collection and analysis. Triangulation is seen as another way of generating confidence in the research outcomes and it serves to increase the rigour and credibility of the outcomes. The triangulation of the data in this research was maintained in four different ways:

- In the interviews conducted with the government agencies.

- By a questionnaire given to the interviewees to complete and return during the interview.

- The data gathered in the interviews conducted with the outsourcing vendor and the contract manager.

- Examination of, and comparison with, the contract documents.

DISCUSSION OF FINDINGS

The findings presented here are based on a content analysis of all of the data described above. The managers interviewed identified thirteen common success measures. All managers interviewed agreed that, overall, the contract successfully delivered services according to the levels negotiated and defined in the service agreements. This conclusion is consistent with the current outsourcing literature. In their research Lacity et al. (1996) suggest that most companies that had been successful in their outsourcing arrangements used a reasoned, incremental and selective approach to outsourcing.

The managers in their interviews also identified thirteen critical success factors that positively contributed to the success of their co-sourcing contract. These findings are also consistent with the current literature. Brewer (1998) suggested that organizations had to identify critical success factors to succeed in their outsourcing arrangement. Perigo (1998) identified that Government Departments in England used critical success factors such as *'departments made the outsourcing decision to meet their business needs'* to succeed in outsourcing.

Further analysis of the empirical data collected established a relationship between the success measures and the critical success factors identified by the agency representatives. These relationships were vital to the measure of success in the contract. Table 1 below illustrates the relationship mentioned above and Table 2 lists both the critical success factors and the success measures.

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
S1	X		X										
S2				X								X	X
S3	X						X				X		X
S4	X		X	X			X				X		X
S5	X		X	X			X				X		X
S6	X						X				X		X
S7	X	X	X							X		X	
S8	X			X	X		X				X		X
S9	X						X						X
S10	X			X							X		X
S11	X						X				X		X
S12	X		X				X						
S13	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 1: Relationship between Success Measures and Critical Success Factors

Success Measures (S)	Critical Success Factors (F)
1. Decrease the staff numbers	1. Meet the business needs
2. Establish continuity within the IS	2. Involved staff in the process
3. Focus on the core business	3. Clear understanding
4. Reduce costs and manage assets efficiently	4. Tracked the performance
5. Better compete in the market	5. Understood costs performance and quality
6. Increase productivity	6. Communicated regularly and openly
7. Clear operational processes	7. Flexible contracts
8. Reduce or control operating costs	8. Transparent transition to new provider
9. Access world-class leading-edge technology	9. Addressed problems, constructive not defensive
10. Access to skilled IT professionals	10. Understood responsibilities and obligations
11. Implementation of emerging technologies	11. Service provider is proactive
12. Looking for a strategic partner for IT services	12. Problems resolved at an appropriate level
13. Compliance with service level agreements	13. Continually review arrangements

Table 2: List of Success Measures and Critical Success Factors

The analysis established that success measures S1, S2, S9, and S12 were affected by less than four CSFs, while the others were affected by more than four. The least number of CSFs contributed to S1 (Decrease Staff Numbers) and the most CSFs contributed to S13 (Compliant with Service Level Agreement). Thus, S13 may be considered a major success measure for the contract and S1 less important.

The analysis conducted also identified that while some CSFs (F2, F5, F6, F8, F9, F10, and F12) contributed to less than four success measures, others (F1 (12), F7 (9), and F13 (10)) contributed to many more success measures. This implies that F1, F7, and F13 are the most important CSFs, contributing to most success measures.

The research study also identified that all the agencies judged their performance by how much they achieved their objectives, a finding that is supported in the literature (Gupta & Gupta, 1992; Brewer, 1998; McFarlane, 1998). The thirteen success measures will now be discussed in some detail.

Decrease Staff Numbers to Reduce Expenditure (S1)

Decreasing staff numbers to meet business needs was achieved by all the agencies through staff reductions in their IS departments. All the agencies acknowledged the effect of the change in their IS department's role in the

organization. Most of the staff went to work for the outsourcing service provider. This created immediate savings to the agencies through the reduction in salaries.

Establish Continuity within the IS activities (S2)

Establishing continuity within the IS activities was achieved by all the agencies through the contract they signed with the outsourcing vendor. The contract had certain clauses to protect the agencies from the vendor going into liquidation or not meeting the contract service levels. Money was deposited in a trust account to compensate the agencies and assist them to switch to another vendor if necessary, and in addition, agency A kept the ownership of its infrastructure and only outsourced its services.

Focus on the Core Business (S3)

The agencies achieved this at different levels. While Agencies A, C, and E were experiencing difficulties with the service provider's delivery, the others recognised that they were able to focus on their core business after the outsourcing arrangement. This could be related to the agencies' views on the critical success factors that affected this success measure. Agencies A, C, and E were all concerned that their service provider was not being proactive in advising them in their business decisions. Others were quite happy with the service provider's actions. Gupta and Gupta (1992) suggest that outsourcing IT functions could enable the organizations to focus more on their core business and leave IT delivery to the outsourcers.

Reduce Costs and Manage Assets More Efficiently (S4)

Reducing costs and managing assets more efficiently was identified as being achieved with some aspects of the arrangement. All the agencies agreed that cost reduction in hardware and software licences was achieved in the first three years of the contract but in the long run there were no cost savings. Lacity and Hirschheim (1996) suggest that organizations could reduce their IT operating costs by selectively outsourcing their IT functions for a limited period.

Enable the Organization to Better Compete in the Market (S5)

Brewer (1998) suggests that market forces could force an organization to resort to outsourcing and, by the outsourcer running this support function more efficiently, creating a competitive advantage. This may not currently be the case for government organizations, as they usually don't compete with other organizations in delivering their goods and services in the market place. Only Agency D, which has a different corporate structure and culture than the other government agencies, acknowledged the importance of this measure.

Increase in Productivity (S6)

This was created by the service provider's buying power and ability to use more efficient managerial processes. However, agency A and E both said that they did not achieve the expected increase in productivity, perhaps because their expectations were too high and the outsourcing arrangement could not fulfil these expectations. The other four agencies had more realistic expectations on their productivity improvement. Jones (1997) suggests that outsourcing activities that are not core competencies allow companies to focus their attention on areas that add the most value.

Clear Operational Processes (S7)

Four agencies (B, C, E, and F) indicated that they achieved clearer operational processes through their outsourcing arrangement. This could be explained by their ability to respond to the changes made to their business procedures. They all believed that outsourcing enabled the processes to be more simple and accountable. Agency A and D both claimed that they did not experience any major improvements and this could be because they had problems adjusting to the new system.

Reduce or Control Operating Costs (S8)

One of the research outcomes was that the agencies were able to control and reduce operating costs through the contract. The outsourcing vendor could create economies of scale and deliver the same services more efficiently and at a cheaper cost through the ability to access bigger markets and use the same infrastructure, hardware and software in similar contracts. All the agencies acknowledged that there was a significant cost saving in services delivered by the outsourcing vendor. However, all the managers interviewed said that these savings were only short term, and in the long run outsourcing would not bring any cost savings. This could be because the vendor

would increase the charge of delivery of services due to an increase in their costs. Lacity et al. (1996) suggest that organizations IT operating costs could be reduced for a limited period only.

Access World-class Capabilities and Leading-edge Technology (S9)

All agencies outsourced networking, which incorporated helpdesk as well as LAN and WAN support, and SAP application development. Agency F held the view that the outsourcing service provider had been successful in delivering the outsourced applications overall, but Agency E had the opposite view on networking and remote logins. The reason for this could be that the relationship between the agency F and the vendor was very good. The dissatisfaction could be due to lack of understanding, early days of the contract, the network being affected by factors outside the agency, and lacking a good relationship between two parties. Gupta & Gupta (1992) suggested that one of the reasons for many organizations to outsource was to gain access to the outsourcing vendor's capability of providing access to the leading-edge technologies.

Access to Skilled IT Professionals (S10)

None of the agencies could recruit skilled IT professionals due to their staffing and salary arrangements. Agency F claimed that they had previously recruited through a contractor and it had cost them twice the amount of a reasonable IT salary. They employed the contractors for a short period on a needs basis. All the agencies agreed they gained access to a wide range of skilled professionals through their outsourcing service provider. They claimed that it was very hard to run certain applications without an outsourcing vendor because they would not have all the right skilled people available in-house. The outsourcing arrangement helped the agencies to access a pool of IT staff that was provided by the outsourcing vendor. However, Agency A and C suggested that it wasn't always easy to access this pool of staff but it was there if any agency urgently needed them. This could be explained, as the source being scarce but available when needed according to the priority of the work to be conducted. Brewer (1998) suggested that outsourcing would assist organizations with addressing their resource constraints and skill shortages.

Implementation of Emerging Technologies (S11)

Prior to their outsourcing decision, all the agencies had concerns over their inability to use new emerging technologies. All the agencies believed that outsourcing would give them the opportunity to access these new and flexible technologies. The study identified that the agencies gained access to the emerging technologies through their outsourcing arrangement. They all claimed that their platform changes were assisted and implemented by their outsourcing vendor during major infrastructure changing process, which involved switching from mainframe environment to networking. The outsourcing vendor provided the right skilled staff and the infrastructure. Gupta and Gupta (1992) said that technical considerations push companies towards outsourcing their information systems needs rather than meeting them in-house.

Looking for a Strategic Partner for IT Service (S12)

The managers agreed that the current contract was an open book strategic partnership agreement and was quite successful overall. The agencies said that they had regular meetings at two different levels with the outsourcing vendor: a) Contract management level, and b) Strategic management level.

All the agencies commented on the importance of these regular meetings, and suggested that they were positively contributing to the success of the contract. Marcolin and McLennan, (1998) suggested that relationships are very important to the success of any outsourcing decision and the organizations with strategic partnerships were more successful in their arrangement than buyer/seller type of outsourcing.

Compliance with Service Level Agreements (S13)

The strategic management of the agencies measured the performance of their outsourcing vendor by evaluating how much they complied with their service level agreements. Lacity and Hirschheim (1995) suggested that in order to complete the contract the service levels, cost structures and penalties for non-performance must be specified and agreed to by both parties. Service level agreements play a major role in outsourcing contracts.

Other issues

The study also identified that the agencies were affected by the outsourcing decision at different levels. For example while one of the agencies (Agency E) suggested that the effect on its IS department was minimal, the other five agencies described the effects from being devastating to substantial. They all measured the effect with the reduction of IS personnel loss in their agency. Prior to outsourcing, Agency E had already been in a

contractual relationship with a service provider for its payroll system therefore its in-house IS service delivery was already minimal. However, the other agencies relied heavily on in-house IS service delivery.

The study also identified that different agencies within the consortium had different views on the service provider's performance. While Agencies B, D, and F described the service provider's performance as very good, the other agencies claimed that they had several major problems. This could be attributed to the different agencies' attitudes towards the outsourcing service provider. Another reason could be that the agencies had been pressured into outsourcing.

Another important issue pointed out by a manager from Agency E was the reporting process between the vendor and the agency. The manager said that the vendor provided the agency with regular reports, however, by the time management read and acted upon this report it was two months old. During the interview the manager said *"We are coming to the end of September, we will almost be in November when we receive the September report, so the validity of the information we are dealing with becomes a bit grey. We recall from our memory that the issues are valid but it loses quite a bit of its meaning".* Clearly, internal procedures have to be re-engineered to gain maximum leverage from these arrangements.

SUMMARY AND CONCLUSION

Outsourcing has become a popular business strategy being implemented by private and government organizations. Various research studies have been conducted to evaluate the benefits and risks involved in outsourcing. However, most of the studies done in this area have been carried out in the private sector, and very little published work has been conducted in the government sector.

This empirical research was an exploratory case study through the collection of qualitative data by semi-structured interviews, questionnaires and document review that aimed to explore how successful were the outsourcing arrangements between the buyers and suppliers within government organisations.

While there were some time and resource limitations for this case study, it did reveal that co-sourcing contracts could be successful if certain critical factors are identified and implemented correctly. Thirteen critical success factors were identified from the analysis and these were associated in varying degrees with thirteen success measures.

While many of these factors and measures are supported by previous research, this study confirms their relevance in a public sector IT outsourcing environment. In particular, this research fills a gap in the situation where the outsourcing is a multi-client, single-vendor (co-sourcing) arrangement.

This research study aimed to identify how successful co-sourcing arrangements were in the government sector. Much of the success of the co-sourcing arrangements depended on the type of contract negotiated, the relationship between the agencies and the outsourcing vendor, trust between both parties, a proactive approach by the vendor, strong communication channels between the vendor and the agency, and a strong relationship between the consortium members. The relationship and the communication issues need to be investigated further to identify how they contribute to the success of the contract.

The agencies had different expectations of the vendor and each valued the vendor's performance differently within the same consortium, depending on the culture of the agency and their relationship with the vendor. The effects of organisational culture on the success also needs to be researched within the co-sourcing arrangement.

Another good area of research is identifying if there are cost savings in the co-sourcing arrangement. Deriving mathematical formulae and computing the costs and benefits of co-sourcing arrangements to improve the performance indicators as a benchmark is another research activity that deserves time and effort.

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