

The Effects of Outsourcing on C2

John O'Neill

RIACS
NASA Ames Research Center
M/S 269-2, Moffett Field, CA 94035-1000
USA
Email: joneill@mail.arc.nasa.gov

Fergus O'Brien

Software Engineering Research Center
Level 3, 110 Victoria Street
Carlton, Victoria, 3053
AUSTRALIA
Email: fob@serc.rmit.edu.au

Abstract

This paper examines the relationship between outsourcing and changing environments, with particular focus on changes that lead to paradigm shifts. Three different types of outsourcing requirements are identified. Each type of outsourcing requiring different management processes.

1. Introduction

This paper continues a theme investigating the lessons that defense can learn from the business environment. Previous papers have examined an organization's ability to manage large and complex systems (O'Brien and O'Neill, 1998), the process for initiating paradigm shifts in large organizations (O'Neill, 1998), and the importance of career trajectories for maintaining the contextual knowledge required for senior-level decision-making (O'Brien and O'Neill, 1999). The findings to date are that the management of large complex systems is fractal in nature (O'Brien and O'Neill, 1998), and that the key processes for initiating paradigm shifts are "change as internal initiative" and "change in response to external requirements" (O'Neill, 1998).

Outsourcing complicates an organization's ability to manage large, complex systems and initiate paradigm shifts. The central premise of outsourcing is that an organization defines and retains its core competencies, and contracts out all other competencies. An underlying assumption behind outsourcing is that the relationships between competencies are well-defined.

A fundamental tenet of paradigm shifts in organizations is that the old way of doing business is no longer valid and that a new conception of how to conduct business is required. Reconceiving how to conduct business means redefining an organization's core competencies and the relationships between competencies. Paradigm shifts directly challenge, and thereby conflict with, the underlying assumptions behind outsourcing. The conflict is two way. Firstly, the recipients of outsourcing contracts wish to maintain the status quo and continue the contract arrangements. Secondly, the recipients of outsourcing contracts may detect paradigm shifts occurring in related industries, but have difficulty convincing the outsourcing organization of the need to change.

This paper examines the relationship between outsourcing and changing environments. Three different types of outsourcing arrangements are identified, each with different outsourcing management processes. Case studies from commercial air transport in the 1930s, the Royal Air

Force in the 1930s, NASA, and Ericsson are used to illustrate the different types of outsourcing arrangements.

2. Outsourcing

Organizations outsource to maximize operational efficiencies and minimize costs. The central premise of outsourcing is that an organization defines and retains its core competencies and contracts out all other competencies. Underlying assumptions behind outsourcing include that the relationships between competencies are well-defined, and that there are multiple commercial players in the market who will bid for a contract.

Organizations that outsource need to develop an additional core competency, the ability to manage outsourcing over time. Managing outsourcing often takes a legalistic path requiring as shown in Figure 1:

- Defining requirements
- Monitoring and oversight of the implementation of the contract
- Ethical bidding and selection processes
- Management of funding

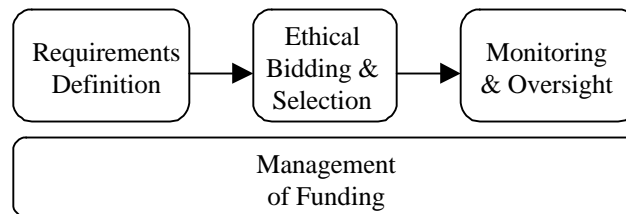


Figure 1. Outsourcing Management Processes

3. Outsourcing and Change

A key requirement for military organizations is the ability to quickly adapt to the needs of the situation. New situations often requiring conducting operations in new ways, the classic example being the advent of peacekeeping in the 1990s.

The underlying assumption behind the management process for outsourcing described in Section 2 is that the requirements are static and that the implementation and execution of the requirements is all that needs to be managed.

This section examines the effects of change on outsourcing in two ways. Firstly, the extent to which requirements may change during a paradigm shift and the sources of these requirements changes. Secondly, the organizational and personnel issues for managing outsourcing across generations of contracts.

3.1 Paradigm Shifts Require Five Changes

A paradigm shift does not normally result from changing just one thing. Instead, paradigm shifts require the simultaneous change of *five* things to successfully embed the new paradigm into the organizational culture. For example, Boeing introduced four new technologies in the Boeing 247 commercial transport aircraft in the late 1930s and was a relative failure, at the same time

Douglas introduced five new technologies in the Douglas DC-3 producing the most successful commercial aircraft in history.

The five "things" do not necessarily need to be technical. Sometimes the "things" that need to be changed to enable new technologies to be implemented are organizational. For example:

- Need for cross-function partnering
- Need for high-level commitment and support in the form of funding
- Need to separate control, ownership and responsibility for the process from control, ownership and responsibility for the content

3.2 Who Defines the Requirements?

The outsourcing process is often viewed from a legalistic perspective - the outsourcing organization is responsible for defining the requirements and ensuring that the requirements are satisfied. This approach works when a function is simply outsourced, however, the situation is more complex when an organization wants to improve a function, or develop a new capability.

The underlying question in the requirements definition process is "who can contribute new descriptions of requirements". Having the operator define the requirements for technological paradigm shifts is a recipe for failure. The Royal Air Force went through a similar process in the early 1930s in defining the requirements for a new fighter aircraft. What they specified was an evolution from where they currently were (biplane aircraft, carrying two machine guns, with a top speed of 290mph and a fixed undercarriage), and what they got was the Gloster Gladiator. Two aircraft companies who had a better understanding of the technical paradigm shifts in the aviation industry produced the Supermarine Spitfire and Hawker Hurricane as private developments (monoplane aircraft, carrying 8 machine guns, top speed of 360mph with retractable undercarriages). Needless to say it was the Spitfire and Hurricane that won the Battle of Britain in 1940, not the Gladiator.

A key metric for assessing an organization's ability to conduct a paradigm shift is the degree to which an outside agency can shape the requirements. There are a number of different ways that outside agencies can be involved:

- Being members of the requirements definition team
- Responding to requests for information
- Individuals being "posted" to outside agencies as part of career trajectories that are designed to bring new ideas into an organization and enable social networks to be leveraged

Maintaining strong liaison with external agencies is a key requirement for detecting the need for paradigm shifts (since paradigm shifts occur in response to external forces).

3.3 Retaining Competence Across Outsourcing Contracts

Once an outsourcing contract has been placed, one concern for the outsourcing organization is ensuring that competency is retained over time. For example, a logistics organization outsourced its maintenance operations. Eighteen months into the contract, the incidence of maintenance problems started increasing. Investigations into the maintenance problems revealed that the contractor was encountering difficulties hiring staff with the appropriate skills. Traditionally, the logistics organization had trained staff in the appropriate skills. The implementation of the

outsourcing contract removed the need for the logistics organization to train staff, however, the contractor had not thought about the training needs of new staff in order to maintain standards.

The results of the investigation was that the contract was renegotiated with a specific requirement for the contractor to demonstrate how they would retain competency through apprenticeship and training schemes.

A second issue in retaining competence is when the outsourcing contract expires, there is a recomplete process, and a different contractor wins the new contract. Unless there is a large-scale transfer of staff between the losing and winning contractors, the potential exists for loss of tacit knowledge.

The potential loss of tacit knowledge should be one of the factors assessed in the outsourcing contract recomplete process.

A third issue related to outsourcing is the scale of outsourcing. Organizations have always "outsourced" to some degree, however, the scale of outsourcing today requires careful management. For example, large organizations that have outsourced on a function-by-function basis may find that they have hundreds if not thousands of outsourcing contracts to manage.

Managing large numbers of outsourcing contracts may become very resource intensive, challenging an organization's ability to manage outsourcing.

One mechanism for managing large numbers of contracts is consolidation. Consolidation involves grouping a number of functions into a larger outsourcing requirement. The aim of consolidation is to reduce the number of contracts that the organization needs to manage.

There are two dangers in the consolidation approach. Firstly, consolidation of requirements may limit competition due to organizations "teaming up" to produce bids that cover all the requirements. Secondly, "teaming up" requires management of the sub-contractors, adding another level of management to the outsourcing process.

4. Managing Outsourcing in Changing Environments

The key question in managing outsourcing is to determine what is being outsourced. There are three ways of viewing "what is being outsourced":

- Outsourcing an existing function with the aim of continuing to perform the current implementation of the function. The outsourcing requirements specify both the "what" and "how".
- Outsourcing the capability to perform a function with the aim being for the contractor to find process improvements that improve the efficiency of the function and increase profit for the contractor. The outsourcing requirements specify the "what" only.
- Outsourcing the function of developing a new capability, providing the basis for a paradigm shift. The outsourcing requirements specify the "why" and the "what" at an abstract level.

Outsourcing an existing function fits the outsourcing management process defined in Section 2. This section examines how to manage outsourcing when the requirements are not static.

4.1 Outsourcing Capability to Perform a Function

The central aim of "outsourcing to perform a function" is to find and implement process improvements that improve the efficiency of the function. The outsourcing contract is often written to provide financial incentives to the contractor to improve performance. These incentives may be in the form of "bonuses" for meeting pre-specified performance goals or they may be in the form of increased profits by reducing costs in fixed price contracts.

The underlying tension in these types of outsourcing contracts is the contractors desire to improve efficiency and maximize profits with the needs of the outsourcing organization to integrate functions in order to conduct business. Some process improvements improve the efficiency of a function, but may have the side-effect of decreasing the efficiency of the overall system.

The key to managing these outsourcing contracts is ensuring that both the outsourcing managers and contractors have knowledge about the integration of functions required to conduct business. Some mechanisms for sharing the integration knowledge and eliciting new process improvement ideas include:

- Career trajectories that move people across functions in both the outsourcing and contractor organizations.
- Conducting regular forums to discuss the integration of functions, areas of breakdown, and to elicit ideas about process improvements.

4.2 Outsourcing the Function of Developing a New Capability

An organization may choose to outsource the function of developing a new capability to provide the basis for a paradigm shift for a variety of reasons:

- The organization chooses to focus management attention on it's current operations and competencies.
- Developing a new capability is seen as a high-risk activity that the organization does not want to manage internally.
- The organization needs to develop staff with different ways of thinking about business, and chooses to recruit new staff into a new organization.

The focus of managing the development of a new capability is focused on defining the needs and determining how to initiate the development. There is little focus on managing how the new capability is developed. Mechanisms used by the outsourcing organization include:

- Creating forums to define "why" the new capability is needed, and "what" it could be at an abstract level. The key to these forums is having external participants bringing new ideas to the table.
- Developing the new capability by "spinning off" a new organizational unit, creating a new agency, or forming a startup. If the new development is successful, the organization must then determine how to reacquire the startup or how to integrate the new organization unit or agency into the organization. In some situations, the organization may choose to allow the old organization "to die" with the view that the new organization unit or agency represents the future of the organization.

5. Conclusions

Examining the relationship between outsourcing and changing environments has revealed the following principles:

- Successfully implementing a paradigm shift requires identifying and implementing 5 changes to the organizational way of working
- If the operational arm of an organization is solely responsible for specifying the requirements for paradigm shifts, then the paradigm shift will fail
- Maintaining strong liaison with external agencies is a key requirement for detecting the need for paradigm shifts (since paradigm shifts occur in response to external forces)
- Organizations that outsource require forums where ideas can be solicited from external organizations and shaped into new ways of conducting business
- A key metric for assessing an organization's ability to conduct a paradigm shift is the degree to which an outside agency can shape the requirements
- The key question in managing outsourcing is to determine what is being outsourced. This paper identifies three different types of outsourcing:
 - Outsource a function
 - Outsource a capability
 - Outsource the development of a new capability
- Each type of outsourcing requires a different management process

6. References

O'Brien, F. & O'Neill, J. *The Limits of Management*, Proceedings of the Fourth International Command and Control Research and Technology Symposium, 1998.

O'Brien, F. & O'Neill, J. *Decision-Making and Currency for C2 Systems*, Proceedings of the Fifth International Command and Control Research and Technology Symposium, 1999.

O'Neill, J. *Social and Organizational Architectures for Command and Control*, Proceedings of the Fourth International Command and Control Research and Technology Symposium, 1998.