Chapter VII
Adaptive IT Architecture as a Catalyst for Network Capability in Government

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ABSTRACT

Public institutions that are organized in hierarchies find it difficult to address crisis or other unique requirements that demand networked solutions. This chapter first provides a prescriptive transaction-based method for achieving such networking organizations with information technologies (IT) and then discusses how the organization becomes more effective in non-routine responses to citizen requests. We illustrate how the prescriptive transaction-based enterprise architecture[1] framework[2] was used for decision-making in a multi-year interdisciplinary industry-university collaboration resulting in a successful 311 system.

INTRODUCTION

Public institutions are organized in hierarchies making it challenging for them to address *non-routine* problems that demand networked solutions. This chapter first provides a prescriptive method for achieving such networking organizations with information technologies (IT) and then discusses how the resulting capabilities may be used for crisis-management. We illustrate how the underlying transaction-based *enterprise architecture[3] framework[4]* was used for decision-making in a multi-year interdisciplinary industry-university collaboration[5] with the City of Columbus, Ohio which has implemented a successful 311[6] system. The collaboration reported here is based on two

related projects: 1) the Department of Technology's Strategic Plan [Ramnath and Landsbergen 2005] and 2) the Independent Evaluation of the 311 system [Ramnath and Desai 2007].

Finally, we also introduce an *Adaptive Complex Enterprise*[7] (ACE) architecture framework that treats organizations and IT in a holistic manner to create networked service capability. Figure 1 shows how our basic unit of analysis, *the RED transaction* tuple consisting of *Requirements, Execution of transaction and Delivery* arising from Requests in its contextual environment. The ACE consists of a number of nested *dimensions.* The outermost dimension of ACE is the *strategic* dimension where the external context and environment is scanned and external requirements are assessed. The *business* dimension is where the investments and value creation of ACE are aligned to respond to this assessment of the external requirements. The costs and the production aspects of ACE are aligned in the *operations* dimension and the transactions are finally executed in the *infrastructure use* dimension where the Requirements are operationalized into actual transaction tasks and deliverables are produced.

In ACE, service-providing agents (that is organizations, applications and processes) are dynamically assembled to provide adapting responses to specific routine and non-routine Requests. Our focus in this chapter, however, is on the collaboration across silos that must be established in order to manage *non-routine Requests*, which are the defining characteristics of crises. Hence the underlying *ACE* framework offers a *Requirements-Execution-Delivery* based prescription for planning and execution of a strategy through the alignment dimensions where IT plays a catalyst role in building networks that cut across organizational silos. We illustrate how the ACE-based analysis also succeeds in justifying the networking and the prioritization in complex organizations.

A common criticism of a complex systems characterization of an organization, particularly in the public sector, is that because of the complexity and its emergent properties it is difficult to establish clear lines of responsibility. Therefore accountability is not readily established. However, in this fine-grain monitoring of the requests and execution of transactions-deliverables it is possible to provide accountability and to establish a history, on a Request basis, even in highly uncertain and dynamic crisis management contexts.

This chapter is organized as follows. We begin with a discussion of the networking research and trends in government along with the related IT challenges that demand an interdisciplinary approach. We then present the ACE framework itself. We apply this framework to our case study of the implementation of the city's 311 non-emergency response system. Finally, we present the IT deployment process, the results of the 311 deployment and their success in building an adaptive capability for responding to and managing crises.

Figure 1. ACE architecture framework for building network capability on existing silos

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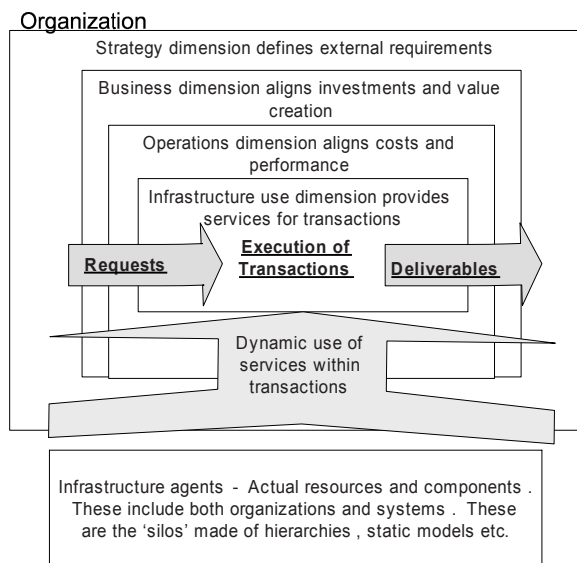
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