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A Model of Information Resource Acquisition

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1. Introduction

While direct links between improved organizational performance and the use of information technology are often difficult to demonstrate, spending on information resources (IR) continues to climb. Such resources are here broadly classified into three categories: information (e.g. data, information, knowledge), information technology (e.g. computing and communicating systems), and information services (e.g. outsourcing, training, consulting). When information resources are viewed broadly in this way, it is clear that they can be acquired from many sources, using a variety of acquisition processes. One reason that IR acquisition is important in today's highly competitive organizations is because information management is a critical enabler of strategic initiatives such as quality management, process redesign, cycle time reduction and relationship marketing. A second reason is that IR acquisition is often risky.

Risk in the IR acquisition process stems from a number of factors. The scale of information systems is growing larger, (in terms of lines of code, function points, number of users, network reach and range, etc.) They are also becoming rapidly more complex as the client server architectural model becomes widely deployed, requiring integration of often disparate technologies. However, as systems grow larger and more complex, responsibility for their deployment is often more widely distributed, with non-technologists playing increasingly important roles. And in addition to reliance on non-technologists from within the organization, IR acquisition commonly crosses organizational boundaries, requiring social and business skills such as contracting, boundary spanning, negotiating, influencing, etc.

In this paper we present an information resource acquisition model (IRAM) that attempts to describe dimensions in the IR acquisition process that affect these risk factors. Our motivation in setting forth this model is to provide an organizing framework for these increasingly complex efforts that will be useful to both practitioners and researchers.

2. Background

IRAM draws on three streams of IS research: previous IS frameworks, IS outsourcing, and IS development.

2.1 Previous IS Frameworks. Table 1 summarizes eight conceptual frameworks previously developed in the IS literature. While these models have provided useful organizing frameworks for the purpose of describing and bounding the IS discipline as it developed, they may be less useful today for three reasons. First, they fail to fully account for the comprehensive and integrative view of information management described above. They focus on a narrow subset of the information resources available to organizations. Second, they typically fail to account for the boundary spanning nature of information management activities brought about by phenomena such as outsourcing and inter-organizational systems. Third, they overly emphasize system products, and pay less attention to dynamic processes (such as IR acquisition) involved in information management.

2.2 IS Outsourcing. The phenomenon of information technology outsourcing is one that continues to receive increasing attention from both information technology practitioners and academic researchers. Any decision to outsource an information management activity carries with it the expectation of certain benefits and the assumption of certain risks. Some of the potential benefits which may be expected from an outsourcing decision include financial advantages, strategic benefits, improved it capability, governance advantages. The potential benefits associated with an outsourcing decision are balanced by the assumption of certain risks. These include financial risks, flexibility risks, and vendor performance risks. The ability to better understand, predict and minimize these risks is central to current information management practice (Lacity et al., 1995; McFarlan and Nolan, 1995).

2.3 IS System Development. Efforts to improve software development have predominantly focused on *tools* and *methods*, (e.g. the classic waterfall model, spiral development, iterative or evolutionary prototyping, object-oriented design, Joint-Application Design (JAD), Rapid-Application Design (RAD) and Rapid Prototyping, etc.) The assumption which underlies many of these approaches to improving the software development process is that increased structure and discipline will result in better development products. Present literature on software development, however, provides for a mixed view on the effect of higher levels of structure in the process. Both the productivity of software developers and **Table 1: Models of Information Technology Use in Organizations**

Model	Model Focus	Comments
Ackoff (1967; 1968) Rappaport (1968)	Five underlying assumptions of Information System use.	Organizational perspective. Uses example of one (control) system.
Gorry and Scott Morton (1971)	Seven characteristics of information related to operational control, manage-ment control and strategic planning	Organizational decision-making varies across elements by amount of structure involved.
Mason and Mitroff (1973)	Relate individual needs with problems in organizational context through modes of presentation.	Individual focus. Details components of model but not the potential interactions.
Nolan (1975; 1979)	Organizational use of IT related to an "S" shaped spending pattern.	Empirical findings dispute the phase/stage model.
Ives, Hamilton and Davis (1980)	Relates multiple levels of the environment to the development, use and operation of information systems.	Summarizes other models. Provides empirical validation and a categorization of IS research.
Kling (1980)	Relates six social perspectives to the use of IT in organizations.	Social aspects of computing are expected to dominate technical issues in this model.
Huber (1990)	A set of propositions about the use of IT in organizations	Set of research propositions, not set of managing guides
Henderson (1991)	Relate performance, planning, and IT use in a perspective model.	Actively researched.

the reliability of software remain problems for the software industry (Vaughn and Parkinson, 1994; Boehm, 1981).

3. The Information Resource Acquisition Model (IRAM)

IRAM is a generic framework which describes an organization's method of acquiring any information resource. Figure 1 presents the model.

3.1 Source Dimension: The model's vertical dimension, **Source**, describes the origin of a particular information resource acquired by an organization. The **Source** dimension may

be thought of as a continuum anchored by **MARKET** at one end and **HIERARCHY** at the other. This terminology, derived from transaction cost economics (Williamson, 1975, 1981), reflects the fact that organizations may construct information systems either using resources internal to the organization or resources supplied by external providers. Acquisition of any IR can be represented along this axis. For example, software can be developed internally or purchased as a package. Similarly, organizations can develop their own business intelligence data, or they can acquire it from external organizations. Finally, key technical personnel can be developed internally, or their services can be hired from the market. In practice, relatively few IRs are acquired from purely **MARKET** or purely **HIERARCHY** sources. Most are acquired using some combination of internal and external sources.

3.2 Process Dimension: The model's **Process** dimension describes the methods and practices used to build or buy information resource components. This dimension may be thought of as a continuum anchored by the terms **STRUCTURED** and **UNSTRUCTURED** at either end. This terminology draws on the ongoing evolution of systems development practice from an *ad hoc*, freeform, creative, craft-like activity to a disciplined, systematized, repeatable, engineering-like activity. Characterizing the **Process** dimension in this way suggests that different systems construction methods may be appropriate for different organizational contexts and system types. This dimension is not limited to traditional systems development activities but may also be applied to the organizational practices employed to acquire information system resources from external sources (i.e. IT procurement). The movement from the *ad-hoc* processes of early software development to a more structured and systematic approach to software development is repeating in the evolution of IT procurement. The **Process** of acquiring an IR is independent of IR **Source**.

Figure 1
Information Resource Acquisition Model
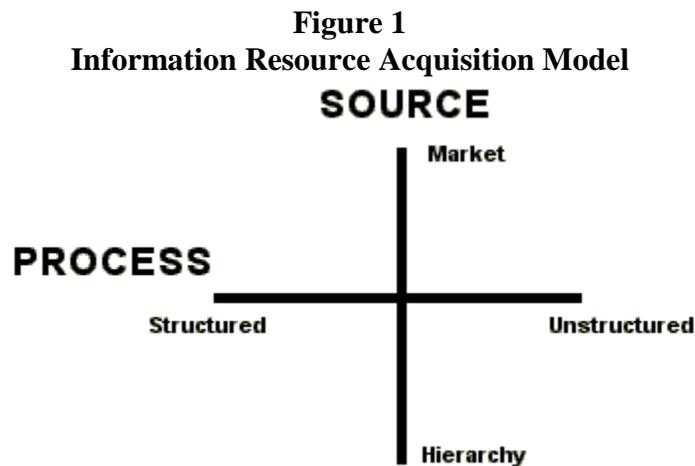
4. Implications for Practice and Research

Practitioners may use the framework as a diagnostic tool to understand and describe the methods an organization employs to construct its information systems. It may also be used to describe an organization's prevailing culture and approach to the information system construction function. Finally, it may be used as a planning tool which helps an organization understand alternative approaches to the acquisition of specific information

systems, or to develop an approach to the acquisition of a future information system portfolio.

Researchers may find the framework useful in the generation, development, and testing of hypotheses about IR acquisition. Preliminary research is underway to validate the framework's claim to identify the risk factors and key issues for each quadrant. Also, work is underway to identify the precursors and outcomes associated with particular locations in IRAM space. Precursors may involve external environmental variables as well as internal structural / cultural variables. Outcome variables may include the full range of success measures identified in IS research (e.g. DeLone and McLean, 1992). Key to this endeavor will be the ability to reliably operationalize measures of IRAM location. Examples of work which may provide insight in this area are attempts to identify the extent of IT outsourcing (Lacity et al., 1995) and the degree of formalization of IT procurement activities (Heckman, 1995). A full discussion of the research agenda will be included in the conference presentation.

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