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# Information Technology, Diffusion, and the Human Services Industry

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## 1. Introduction

There has been substantial research in the diffusion of innovation as applied to information systems. For nearly twenty years, this research has relied mostly on IS-process models and IS-factor models. IS-process models consider the typical stages of incorporation of information technologies (IT) into the organization (Gibson and Nolan, 1974; McKenney and McFarlan, 1982). IS-factor models examine the various technological, organizational, and external environmental characteristics that relate to IS-diffusion within an enterprise. Kwon & Zmud (1987) and Fichman (1992) provide extensive reviews of earlier factors research, and outline several factor areas that need further exploration. Current literature includes a third model—the consequence model for IT diffusion. In this model, the extent of IT diffusion serves as an *intervening* variable, with organizational consequences serving as the dependent variable (Ferns & Palley, 1995).

The literature on IT diffusion provides little information about IT diffusion in nonbusiness sectors. There have been some IT diffusion studies that include public administration areas (Bretschneider & Wittmer, 1993), education (Trachtman, Spirek, Sparks & Stohl, 1991) and healthcare systems (Palley, 1991). Nonetheless, there has been little investigation of IT diffusion on other nonprofit sectors. This research addresses problems in applying existing theory on IT diffusion to the Human Services sector, and in Direct Service Providers (DSPs), as defined below, in particular. One, there are few studies in the literature that even describe the extent of IT diffusion in DSPs. Second, most factor model studies operationalize the factor constructs in the context of business organizations. The metrics used in these studies may not be appropriate for DSPs. Finally, studies of the consequences of IT diffusion are rare, and this is particularly true of IT diffusion in DSPs. The lack of data on these consequences creates a vacuum in which potential innovators may have only subjective information on which to base implementation decisions. In such cases, potential innovators may either inappropriately implement or resist IT innovations.

This research considers DSPs in terms of standing IT diffusion research, and indicates probable reasons that have contributed to low levels of diffusion. We examine DSP structural characteristics, contrast the information needs of this sector to business sectors, and project what IT diffusion theory indicates within this industry. This research also will weigh the opportunity costs associated with the lack of IT/DSP diffusion research and will suggest significant areas where more knowledge of IT diffusion would have the greatest potential utility.

## 2. Direct Service Providers

For this research, we focus on direct service provision in the human services industry. Direct service providers (DSPs) can be in either the public or the nonprofit sector. DSPs provide clients direct nonmonetary services, such as shelter; food; medical, mental health, and drug treatment; and various forms of counseling. This distinguishes DSPs from other human service organizations (HSOs). Some public HSOs, such as the Social Security Administration, administer financial benefits but do not provide direct care. Some nonprofit HSOs like United Way act as conduits for private donations, but again, do not provide direct services.

To illustrate some of the differentiating characteristics of DSPs we use a model proposed by Ronen & Palley (1988). The model compared information needs of the financial sector with those of manufacturing, two sectors with widely differing products and processes. Extending the model to include the DSP sector illustrates how DSPs information needs differ from those of other sectors. An excerpt of the Ronen & Palley taxonomy provides the basis for Table 1, which compares basic characteristics of MIS in these three sectors.

The study of how IT diffusion affects DSPs has considerable managerial and economic implications. In 1992, the United States federal expenditures on human services exceeded \$9 billion, not including Medicare reimbursed health care services such as home health care and hospices for over \$7.8 billion (US Committee on Ways and Means, 1993). In 1993, in New York City alone, private direct service providers received \$7 billion from the city, state, and federal governments, and employed 140,000 people (Kamen & Malenga, 1994). With the current economic and political climate and the concomitant expectations for downsizing social service provision, greater IT diffusion in DSPs may provide potential strategic and efficiency gains.

## 3. Differences in IT across Sectors

Table 1 contrasts characteristics of structured information systems across two forprofit sectors, finance and manufacturing, and the direct service provision sector. These organizations will show differences related to information systems objectives, users, and formalized inputs and outputs.

**Table 1 - adapted from Ronen & Palley (1988)**

Attribute	Financial MIS	Manufacturing MIS	Direct Service Provision MIS
Objective	Provide information about assets, liabilities, income, cash flows	Provide mgt. with information regarding productivity	Similar to mfg., compounded by difficulties in measuring quality, productivity, and human behavior
Major Users	External parties, chief executives, financial managers	Internal parties, operations mgrs., supervisors	Similar to mfg., but also external funders, public & private regulatory agencies

Frequency of Reporting	Monthly, quarterly, yearly*	Continuously, up to a few weeks*	Continuously for ongoing cases, periodically for regulatory oversight
Setting policy	Accounting policies	Multiple techniques depending on circumstances	Multiple clinical techniques as well as diverse, possible contradictory & overlapping reporting requirements from funders

\* with exception of Decision-support Systems

In the for-profit sectors, EDP and MIS systems provide management with information regarding company financial conditions. Many of these systems are accounting-based, and are used to measure organizational efficiency--the ratio of input (capital, labor, raw materials) versus output (finished product). Short-term decisions are made for sales strategies, deployment of resources, and scheduling.

DSPs will also use EDP/MIS systems in operational accounting situations. These will include budget variance analyses, payroll, and maintenance of caseload and timekeeping records. The DSP environment, however, has additional complications when analyzing organizational efficiency and resource allocation. Although there may be some analogy to manufacturers in the for-profit sector, DSPs have substantial difficulty quantifying "inputs" and "outputs". Since DSPs deal in human services, inputs are somewhat subjective. It is inadequate to measure size of caseload or hours worked, for instance, since these measures do not reflect the objective quality of the input. Even more complicated is the measurement of "outputs". DSPs produce outcomes that are not easily quantifiable outputs. Measurement of outcomes is highly subjective, since a client's progress is measured relative to himself over time. Standardization is therefore difficult. Furthermore, outcomes often manifest themselves over long periods of time. Recidivism and long-term effects can be too far removed to be observable.

The transition of inputs into outputs is also difficult to track in DSPs. A business performs transactions that clearly contribute to its financial standing. These transactions can be replicated in a way that contributes to auditability. A DSP's clinical services may produce ephemeral results, and the combination of services may not produce a predictable effect. For accountability purposes, the DSP maintains data for individual services over a period of time, but that data may not show a cause-and-effect in the DSPs activities. This type of data is difficult to audit in the financial sense, and is not conducive to decisionmaking at the operational or managerial control level.

The use of strategic information systems for DSPs has not been established nor discussed in the literature. Many of the goals of strategic information systems--the differentiation of a service or product, the creation of barriers to competitors entering the market, and the use of switching costs as disincentives to customers contemplating going to a competitor--are not easily transferable to DSPs for several reasons. First, the DSP's clients are not

necessary the billpaying customers, obscuring any customer-based and pricing strategies. Second, a client's need for social services suggests that the client may have not much latitude in choosing a DSP, which may minimize other competitive, market-oriented strategies. Third, DSPs are vulnerable to swings in the real and the political economy, to the unwillingness of funders--both private and public--to commit to long-term projects, and to an annual budget cycle that implicitly requires "spend-down" at the end of the fiscal year. This vulnerability militates against long-term strategic planning, obviating the need for strategic IS.

#### **4. Research on IT Diffusion in Direct Service Providers**

With the exception of a few case studies, an extensive literature search of IS research journals has revealed almost no published literature on IT diffusion in DSPs. Table 1 suggests that the slow pace of IT development in DSPs may be due to the complexities and intangibility of the information DSPs require. The economic figures above indicate the importance that IT diffusion may have for this part of the economy.

Although research on IT diffusion in DSPs is warranted, factors-model research needs to be modified to gauge accurately what factors relate to IT diffusion in DSPs. Typical constructs in factor-model research include organizational characteristics such as structure and size, external environment aspects including competition and customer characteristics, and policy issues. These constructs are reasonable for the study of IT diffusion in DSPs, but they must be operationalized differently. For example, in businesses, organizational size is typically measured by sales revenues or the number of full-time equivalent employees. These measures may not be appropriate for DSPs because few DSPs generate revenues on a sales or service basis. Annual budget amounts may give a better indication of the organization's size. Additionally, some DSPs utilize a large number of volunteers. The number of volunteers, and the services that they provide, can obscure the use of both the budget figures and the number of employees as measures of organizational size. Additionally, revenue, along with profit, is a measure of a business's quality, but are not necessarily quality measures for DSPs.

*Task-technology compatibility* is the applicability of an innovative technology to solving a specific task. Section 2 outlined how many of the methodologies of service provision are not standardized, and are hard to quantify. Since the task at hand is difficult to measure, so will be the level of task-technology compatibility. In business, the IRS, the SEC, and the FASB provide standards for business sectors to follow, at least in terms of financial recording. But there exist no such oversight authorities with overriding mandates in the DSP sector. The lack of such authority reduces the external pressure to formalize tasks. The less formalized the tasks, the less compatible they are with technology. To compare task-technology compatibility in the DSP sector, researchers must measure the level of formalization and standardization of protocols at individual DSPs, for the task itself may not be incompatible with technology, but the protocol of that task may be.

Other obstacles to applying IT diffusion factors models to DSPs are environmental factors such as competition and interorganizational links. Although DSPs must compete for public funding, funders also have non-market considerations in providing those funds. External funding sources play a hybrid role of the 'customer', since they supply revenues, and a form of exogenous management, since they also have oversight and accountability roles. Additionally, measures of competition from IT factors studies in the profit sector may not be applicable to the DSP sector. Factors models examining IT diffusion in DSPs will need to measure customer orientation in a way that includes both the client and the funder relationship.

(A related working paper is available on request. The authors can be contacted via Internet at CISBB@cunyvm.cuny.edu)

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