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THE IMPACT OF E-GOVERNMENT INITIATIVES: LOUISIANA'S "EXPRESS LANE" LICENSE AND VEHICLE REGISTRATION SYSTEM

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Abstract

The utilization of technology by government to deliver information and services—E-Government—offers the ability to provide significant improvements in customer service, while reducing staffing costs and related expenses. But are E-Government projects producing their purported benefits? This paper examines the impact of e-government initiatives by studying the implementation of online and interactive voice response (IVR) systems at the Louisiana Office of Motor Vehicles (OMV). Previous studies relating to the effects of information technology projects are reviewed and a framework for evaluating the impact of information technology initiatives in public sector agencies is proposed. The study then examines the results of the OMV's "Express Lane" project for providing drivers license and vehicle registration renewals online or through its IVR system.

Keywords: E-government, impact of information technology

Introduction

The Internet is revolutionizing the way that business is conducted and is likewise transforming the delivery of traditional governmental services. The utilization of technology by government to deliver information and services --E-Government--offers the ability to provide significant improvements in customer service, while reducing staffing costs and related expenses. By offering constituents a self-service model for interacting with public sector agencies, E-Government permits access to information and services on a 24x7 basis, without the need for additional customer service personnel or extended hours of operation. But is the E-Government movement delivering its purported benefits? Have online governmental services actually resulted in reduced headcounts, and improved operating efficiencies?

This paper examines the impact of e-government initiatives by studying the results of implementing online services and interactive voice response (IVR) systems at the Louisiana Office of Motor Vehicles (OMV). Previous studies relating to the financial impact of information technology investments are reviewed and a framework for evaluating the impact of e-government initiatives is proposed. The study then examines how the OMV's automated services have impacted drivers license and registration processing rates, and employee productivity levels.

Literature Review

The impact of information technology investments on cost savings and productivity improvements has been the subject of considerable controversy for over a decade. Indeed, the issue remains largely unresolved and has been aptly described in the MIS literature as the "productivity paradox" due to the inconclusive results of numerous research studies attempting to establish relationships between information technology investments and improved productivity and financial performance. While some studies have shown clear relationships between IT investments and improved operating performance, many others have failed to establish any direct benefits resulting from such outlays. Still other research efforts have actually shown negative impacts on financial performance as a result of implementing specific IT initiatives.

In his seminal study, *The Productivity Paradox of Information Technology*, Brynjolfsson asserts that traditional productivity statistics do not adequately measure many of the gains that have resulted from increased technology utilization. Brynjolfsson attributes the productivity paradox not only to mismanagement of IT, but also to mismeasurement of inputs and outputs as well as research methodology shortcomings. To address these measurement deficiencies, he proposes that IT researchers examine intangible IT benefits, such as improved customer service and increased operating efficiencies when evaluating the productivity impact of information technology (Brynjolfsson 1993).

In a 1998 follow-up study, Brynjolfsson and Hitt revisit the productivity paradox, citing numerous studies showing “consistent findings that IT indeed has a positive and significant impact on firm output, thus contradicting claims of a productivity paradox.” In general, these firm-level studies cited by Brynjolfsson and Hitt find that IT investments are in fact often associated with substantial returns. However, the authors claim that such returns result from more than purely technology investments. The authors claim that “technology is only one component of an IT investment (and) there are usually large expenditures on training, process redesign, and other organizational changes that accompany a systems investment... (making) exact rate of return calculations more difficult.” In short, they argue that IT investments can indeed, but do not necessarily increase productivity:

“Computerization is an essential component of a broader system of organizational change which does increase productivity...and it is increasingly important to consider these organizational changes as an integral part of the computerization process.” (Brynjolfsson and Hitt 1998)

The organizational changes and business process re-engineering initiatives advocated by Brynjolfsson and Hitt have been a key component in a number of successful e-business initiatives reported in the literature and business press today. By combining Web-based information technologies with significant changes in the manner in which public sector agencies perform business processes and deliver constituent services, e-government initiatives would thus appear to have the potential to achieve significant impacts on agency productivity and staffing expenditures.

The research methodologies employed—and the productivity measures utilized—to evaluate the impact of e-government initiatives are critical factors in finding significant relationships between IT investment levels and productivity improvements. Indeed, many so-called *secondary data analyses*’ utilization of “bottom-line” measures to assess the impact of IT initiatives are at the heart of such studies’ inconclusive findings in this area. In their *Technology Investment and Business Performance* study, Rai, et. al (1997) advocate a shift in IT investment research to examine “intermediate and activity-based measures of performance”. Claiming that such research methodologies are more likely to provide confirmation of IT payoffs, the authors conclude that evaluating IT investments on a “technology-level” offers significant measurement advantages over firm-level analyses, although such “disaggregation” limits the ability to gauge synergies between multiple IT investments and the ability to compare such investments to other investments made by management. Rai et. al also assert that IT investments should be measured on the basis of a specific technology’s investment objective. Applying this recommendation to the present study, IT investments aimed at improving operating efficiencies of governmental agencies should be evaluated on the basis of improved processing rates and similar operating performance measures.

Using a similar rationale in their *Information Systems Research* study, Barua, Kriebel, and Mukhopadhyay (1995) propose that “intermediate-level” financial variables such as inventory turnover are better measures to evaluate the impact of IT investments on organization performance than the macro-level measures often implicated in the “productivity paradox” literature. The authors claim that the effects of information technology can be best measured at lower operational levels in an organization, “at or near the sight where the technology is implemented.” Barua et.al propose that the ability to measure the impact of IT decreases as the distance between “first-order” and higher level affects increase: “microeconomic-based research may not have the power to reveal an association (between information technology investments and improved financial performance) with high statistical significance.” Due to the efficacy of using such intermediate level variables to gauge the impact of IT initiatives, the proposed research framework incorporates an appropriate intermediate level measure to serve as the dependent variable in the model used to evaluate the impact of e-government initiatives.

Research Framework

To effectively evaluate the impact of information technology investments, the question of how such “impacts” will be measured must first be resolved. A wide range of productivity measures have been used in the large number of studies that have examined the impact of information technology spending on organizational performance. The variables utilized in studying the impact of IT initiatives have evaluated both operational-level productivity gains, as well as strategic-level productivity improvements, and

have included both quantitative and qualitative measures in their analyses. Because this study focuses on the effects of e-government initiatives on license and registration processing productivity, the proposed framework adopts an *operational-level* focus.

Traditionally, researchers have advocated using a model relating financial performance measures to IT input levels while controlling for potentially confounding variables (Ahituv and Giladi, 1993; Alpar and Kim, 1990; Harris and Katz, 1989; Strassman, 1990; Weill, 1992). Specifically, the framework proposed by Hitt and Brynjolfsson (1996) relates specific financial performance ratios to IT investment levels:

$$\text{Profitability Ratio} = \alpha_0 + \alpha_1 * (\text{IT investment levels}) + \text{control variables} + \text{error}$$

Since public sector agencies do not report “profitability” measures per se, we must instead rely on measures of output or employee productivity to measure the effectiveness of governmental information technology initiatives. In the present case, an appropriate measure would appear to be the number of drivers licenses processed per month, or the number of vehicle registration transactions completed within a given period. On the opposite side, IT investment levels could likewise be represented by the status of the e-government technology implementation, and other variables could be examined to control for possible confounding effects. By examining the e-government project’s implementation status (IT input) in relation to the project’s impact (IT output), the following model is proposed to evaluate the impact of information technology initiatives in public sector agencies:

$$\text{TOTLPROC} = \alpha_0 + \alpha_1 * (\text{IMPLEM}) + \text{control variables} + \text{error}$$

Where TOTLPROC is equal to the total number of drivers licenses, vehicle registration renewals, or similar forms or applications processed per employee for a given period; IMPLEM is a binary variable representing the implementation status of the e-government initiative; and the control variables represent extraneous factors possibly effecting processing levels. The model is designed to examine total license and registration applications processed per employee before and after the “Express Lane” implementation date, and to gauge whether the e-government implementation status is significantly related to OMV productivity levels. The following hypotheses are proposed:

H₀₁: The total applications processed per employee will not be significantly impacted by the e-government implementation status

H_{a1}: The total applications processed per employee will be positively impacted by the e-government implementation status

To test the null hypothesis, the research methodology described below is proposed.

Research Methodology

In order to test the hypothesis that Louisiana’s “Express Lane” e-government initiative has significantly impacted processing rates for drivers license and vehicle registration renewals, the research methodology involves comparing average monthly processing rates per employee for the pre-implementation and post-implementation periods. To help ensure the validity of the statistical results, the research methodology will include a triangulation approach, including ANOVA, multiple regression, and structural equation modeling. The triangulation is designed to validate the consistency of the statistical results obtained and to otherwise ensure the validity of the research conclusions. The initial stage of the triangulation will involve performing a one-way analysis of variance (ANOVA) to test whether pre-implementation and post-implementation processing rates per employee are significantly different. The multiple regression modeling will examine associations between the model’s dependent and independent variables and test the validity of the proposed models. In the final phase, structural equation modeling techniques will be employed to confirm the statistical results obtained from the ANOVA and multiple regression analyses.

Limitations

Because of the numerous confounding factors impacting increased operating efficiencies and organizational performance improvements, it is not possible to attribute any resulting productivity gains completely to specific IT initiatives. As Mukhopadhyay et al (1995) caution, due to various confounding factors that may impact the dependent variables in the research

framework other than the IT project under study “it is not possible to completely tease out ex post the impact of (other factors)” that could likewise impact any increases in operating efficiencies. As such, information technology projects “should be considered a necessary but not sufficient condition for the business value quantified” by the proposed research framework.

Due to the lack of a complete data set, the present study is still in progress. It is anticipated that the required data will be obtained and the specified statistical analyses will be performed prior to the conference date.

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Table 1. Total Online and IVR Renewals: July 2000–January 2002

	Drivers License	Vehicle Registration	Total
Online Renewals	34,295	77,525	111,825
IVR Renewals	16,630	46,705	63,335
Total Renewals	50,925	124,230	175,155
Total Fees Collected	\$1,163,100	\$4,422,022	\$5,585,196

Louisiana Office of Motor Vehicles Express Lane Transactions and Fees Collected

