

Association for Information Systems AIS Electronic Library (AISeL)

AMCIS 2001 Proceedings

Americas Conference on Information Systems
(AMCIS)

December 2001

Transforming E-Government Services: The Use of Application Service Providers in U.S. Local Governments

Yu-Che Chen
Indiana University

Jon Gant
Indiana University

Follow this and additional works at: <http://aisel.aisnet.org/amcis2001>

Recommended Citation

Chen, Yu-Che and Gant, Jon, "Transforming E-Government Services: The Use of Application Service Providers in U.S. Local Governments" (2001). *AMCIS 2001 Proceedings*. 308.
<http://aisel.aisnet.org/amcis2001/308>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2001 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

TRANSFORMING E-GOVERNMENT SERVICES: THE USE OF APPLICATION SERVICE PROVIDERS IN U.S. LOCAL GOVERNMENTS

Yu-Che Chen

School of Public and Environmental Affairs
Indiana University
yuchen@indiana.edu

Jon Gant

School of Public and Environmental Affairs
Indiana University
jgant@indiana.edu

Abstract

This research project, based on a review of relevant literature and documents, assesses the potential of using Application Service Providers (ASPs) as a means to transform e-government services. This study identifies a list of drivers and barriers to outsourcing application services. The main drivers include top management commitment to the provision of high quality e-government services, potential cost savings, and utilization of technical expertise available in an ASP. The barriers are mostly related to outsourcing in general, such as the inability to control service quality, security, and potentially limited cost savings. Moreover, this study lists critical success and failure factors associated with the performance of an ASP. The success of an ASP lies in top management support, technical knowledge to monitor performance, and well-designed outsourcing contracts. Failures may stem from cumbersome and rigid rules governing local government outsourcing as well as from organizational resistance to change as the result of outsourcing to an ASP. This research serves as the first step to the full analysis of outsourcing application services by local governments.

Introduction

This research project assesses the potential of using Application Service Providers (ASPs) for improving the efficiency and effectiveness of public information and service delivery in America's local governments. Application service providers are those who "offer an outsourcing mechanism whereby they develop, supply, and manage application software and hardware for their customers" (Holohan, 2000). Examples of applications include those for Enterprise Resource Planning, Geographic Information Systems, and some web-based software for online permitting or tax filing.

Local governments have recently developed or planned to launch their web-portals to serve citizens and businesses online. The first generation of electronic government was characterized by the brochure-type websites that provide links to various departments. These sites are limited in their ability to allow value exchanges, such as filing taxes and getting license plates. The next generation of e-government is expected to increase the satisfaction of the people and entities it serves by providing a one-stop experience.¹ Local governments strive to ride on the wave of next-generation e-government.

However, challenges abound for local governments as they transform themselves in order to be on the forefront of providing services online. Most cited challenges include: lack of technology expertise, limited budget for purchasing state-of-the-art software and hardware, and complexity in implementation and maintenance (Norris, Fletcher, and Holden, 2001; Hunter, 2000). Outsourcing application services has been identified as the main way to address these challenges. For example, renting Enterprise Resource Planning (ERP) and online permitting applications allow government to use the most advanced applications and technology at an affordable rate.

¹ The recent action at the federal level is the introduction of the e-government bill by Senators Mr. Joe Lieberman and Mr. Conrad Burns on May 1. This legislation aims to further improve citizen access to government information and services.

This study identifies the drivers and barriers to outsourcing application services as well as its critical success and critical failure factors. The first section illustrates how an ASP could be an important element of an e-government strategy and the technology infrastructure needed for an ASP to succeed. The second section reviews current literature on the drivers and barriers to IT outsourcing in general and its implications for outsourcing application service in particular. The last section explores the factors affecting the performance of an ASP. Ultimately, these factors and relationships will be tested in the field. However, such an endeavor falls outside the scope of this paper.

An ASP as an Integral Part of the Next-Generation E-Government Strategy

An ASP has several features that address some of the difficulties facing local governments in their provision of online services. Most local governments wish to provide quality online service to their citizens and businesses. However, most of them suffer from limited budget for IT equipment and from difficulty in recruiting quality technology staff. An application service provider, taking advantage of the economy of scale in IT investment and hiring, could offer local government significant expertise in application service and support. For example, Tidemark Solutions provides e-government service to the city of Santa Clara by using web-based client/server software.²

Local governments can rent specialized applications from an ASP that otherwise would be too expensive to purchase themselves. For example, a local government could pay for a time slot from a server running advanced Geographic Information System software to produce maps for city planning. The whole system may cost a city tens of thousands of dollars to buy. Renting time from a server could help a city government manage its cash flow. Another advantage of using an ASP is the relatively short time needed from planning to service delivery. With software and hardware ready, an ASP could roll out customized service in a matter of weeks after the completion of the planning phase.

Using an ASP also helps manage business risks associated with rapid technology change. In-house provision of online service and support usually involves initial capital investment in equipment. However, given the fast-changing nature of technology, an appropriate technology at the time of investment could become obsolete in two or three years. Renting application services helps cities shift business risks to service providers or, at the very least, allows for risk-sharing among renters of similar application services.

The cooperation between the National Information Consortium (NIC) and Indianapolis/Marion County in provision of some police records online is a case in point. This online service is funded by user fees. This service incurs no explicit financial burden on the local government, which sometimes is the main consideration for local government in deciding whether to provide a particular online service. NIC, an ASP, is able to offer high quality application services and support, using its knowledge in government operations and technical expertise.³ As a private entity, NIC has flexible hiring rules to recruit top talents and to upgrade its service. Indianapolis/Marion County is able to transfer business risk on equipment purchase to NIC and use state-of-the-art applications to allow citizens and businesses to obtain policy records online.

At the same time, an ASP solution has limitations due partly to market immaturity. Vendors of applications have the tendency to cut down customization to achieve cost savings. Without customization, it is difficult for local government to meet the various needs of its constituents. Security is another common concern. Having its vital data sitting outside the premises of a local government may subject those data to unnecessary security risks. Another main impediment to the realization of the true potential of an ASP is insufficient telecommunication infrastructure. In most cases, an ASP is running on a client/server environment that relies on a reliable and fast method of data transmission. Local governments could have problems gaining application services if an appropriate telecommunication infrastructure is not in place. Quality of service is to some extent in the vendors' hands. Only when a monitoring and control mechanism is in place can the local government have adequate control of service quality. Most of the constraints mentioned here will be lifted as the ASP market becomes more mature. Technology solutions are available for most of the problems we have. For example, local governments may learn from each other about what terms should go into an outsourcing service contract to ensure service quality.

ASPs have become an increasingly preferred method of online service provision and their importance is likely to grow. Since late 1999, the ASP market has witnessed a strong growth. It is estimated that the revenues of ASPs will reach \$ 2 billion by 2003

²For more information on e-government service provided by Tidemark, please visit <http://www.tidemark.com/>.

³National Information Consortium is one of the leading players in providing application services to government. For more information, please visit its homepage <http://www.nicusa.com/>.

(Brown, 2000). Citizens' and businesses' demands for quality online service are likely to grow as they experience the convenience and efficiency gain in e-commerce. Financial resources available to local government may not grow fast enough to meet these demands with in-house provision. As a result, relying on an ASP will increasingly become a more attractive option. A study of information systems outsourcing among Florida city governments shows that application development and maintenance rank among the top one or two IS functions outsourced (Thai and Kim, 1998). On the supply side of application service, the quality and affordability of service is likely to improve over time. The quality of service will improve as ASPs and local governments learn from each other about government operations and the capability of applications. Managerial and contractual arrangements will be developed to address security and control issues. As more and more local governments subscribe to application services, the cost is likely to go down as the services are shared among more subscribers.

Outsourcing Application Services: Drivers and Barriers

Most of the studies on information technology (IT) and Information Systems (IS) outsourcing focus on firms.⁴ A very limited number of empirical studies examine IT/IS outsourcing in the public sector.⁵ The short history of ASPs renders them to even less empirical investigation. This section will identify the drivers and barriers to outsourcing applications service.

Top management support and commitment to high quality online public service constitute one driver for the use of an ASP. If a local government is content with the current level of service provision, no efforts are likely to be made to provide higher quality online service. Only when a political decision has been made to provide quality online service, does the decision of whether outsourcing is better than in-house provision become an issue. Low quality online service, such as brochure-type websites, may not require the technical expertise and support usually available only through an ASP. Only the managerial commitment to high quality requires a serious consideration for an ASP.

Cost effectiveness in online public service provision is one of the most cited reasons for choosing an ASP. Cost savings is among one of the main reasons for governments to outsource their information systems functions such as application services (Conklin and McLellan, 1994). Studies of outsourcing projects in the private sectors also suggest the importance of efficiency concerns for outsourcing (Alpar and Saharia, 1995; Arnett and Jones, 1994; Lacity and Hirschheim, 1994; Loh, 1992; McFarlan and Nolan, 1995; Palvia, 1995). Limited financial resources for IT contribute to the preference for an ASP. In-house provision of online public service requires IT investment. Local governments with limited financial resources may be in favor of an outsourcing arrangement that is claimed to be cost-effective. Even if a local government has IT resources and staff to provide the same level of online service as an ASP, it may not be able to provide the service at a lower cost. An ASP is likely to reach a wider consumer base and has economies of scale in technology service and support (Newcombe, 2000). The availability of self-funded ASP arrangements can further free a local government from financial constraints.

Limited availability of high quality IT staff is another driver for the use of an ASP. Information systems capabilities also motivate outsourcing (Arnett and Jones, 1994; Grover et al., 1994; Slaughter and Ang, 1996; Teng et al., 1995). When lacking current technical expertise, a firm can use outsourcing to create or retool an information system functions, such as application services (Smith et al, 1998). A local government has difficulty in attracting top talents when it competes with state and federal governments as well as the private sector (Hunter, 2000). IT expertise in an ASP is a resource that a local government would like to utilize. The above two factors are more pronounced in local government than in state or federal governments. Consequently, an ASP solution to financial constraints and limited IT capability is more attractive.

The decision to use an ASP could be motivated by departmental politics (Pfeffer, 1981). An outsourcing decision could be a political means for the top manager to demonstrate the needs for restructuring an IT department (Lacity and Hirschheim, 1993). This is especially the case when an ASP can provide high quality service that cannot be achieved by the existing IT department.

There also are barriers to the use of an ASP. One of the main concerns about an outsourcing arrangement is quality control. The greater the coordination that is required between a local government and an ASP, the less likely that government will choose an

⁴ For an excellent review of existing literature on information technology and systems outsourcing, see Goo et. al. (December 2000).

⁵For example, Brown and Brudney (1998) have studied the contracting out of the Geographic Information System at one local government as a way of IT outsourcing. A more recent book on the role of information technology in government has a few pages that touch on IT outsourcing (Barrett and Greene, 2001: 88-95).

ASP. The cost of coordination includes the costs of negotiating an outsourcing contract and its monitoring and control (de Looff, 1997). The total coordination cost could sometimes offset the efficiency gain from the savings in production cost.⁶

Another barrier stems from the immaturity of the ASP market. Some local governments may take a wait-and-see approach to an ASP. An ASP may not be able to provide a sufficient level of customization that is required by a particular local government. An ASP may have difficulty in offering affordable rates because only a small number of customers subscribe to a service. Moreover, a local government's security concern may not be fully addressed by an ASP. Although the market as a whole is beyond the control of individual local governments, the increasing use of an ASP among them is likely to reach the critical mass that is required for a mature ASP market.

Performance of ASPs: Critical Success and Failure Factors

A fair assessment of ASP performance requires a careful definition of success. Two broad criteria can be used to measure performance. One is the degree of goal attainment, which is a commonly used criterion for program evaluation. For example, if the goal of an outsourcing arrangement is to achieve a certain amount of cost savings, the actual amount of the cost savings as a percentage of expected cost savings can be used as a proxy for the ASP performance. Other goals include, but are not limited to, accessing new value-added services, reducing staff levels, and spreading costs over a number of years (Conklin and McLellan, 1994). The other criterion is the extent to which the potential of an ASP is realized by a local government. Such a potential can be measured by the difference in service provision between an ASP and an existing in-house arrangement. Full potential is likely to be realized when an ASP arrangement complements the characteristics of a local government. For example, a local government with financial difficulty could be best served by a self-funded ASP arrangement. Both criteria are informative in finding the critical success and failure factors.

Several factors could contribute to the success of using an ASP. The first is managerial support. Managerial support is identified in the IT adoption literature as one important ingredient for success (Kwon and Zmud, 1987; Zmud, 1984). The use of an ASP is a relatively new type of outsourcing arrangement. Such new arrangements usually mean some changes from existing ways of doing business. During this shift, continual managerial support is necessary for an organization to make the transition.

Another critical success factor in IT outsourcing is adequate in-house technical expertise. Some degree of in-house technical expertise is necessary for both identifying the key piece of technology and negotiating an appropriate outsourcing arrangement (Applegate et al., 1999). The IT team in a local government should be able to identify the key pieces of technology needed for online service delivery and have some idea about its costs. Such technical expertise should later help develop performance criteria and monitor the implementation of an ASP.

A well-designed and flexible contract is necessary for an ASP arrangement to succeed. A well-designed outsourcing contract should address the issues of security, performance measurement, technical uncertainty, and liability. Local governments need to protect the privacy of their citizens as well as businesses. Consequently, data security is a prominent issue. Performance measurement helps ensure the quality of service and makes service providers responsive to the clients they serve (Saunders et al., 1997). The contract should also have a plan for technical difficulty and a liability scheme for any loss stemmed from failure in providing certain online services. A short-term contract is preferable over a long-term one (Lacity and Hirshheim, 1995). A short-term contract also gives local governments the flexibility to negotiate new service terms in response to the most recent advances in technology.

There are also critical failure factors. The more cumbersome the rules are for an IT outsourcing arrangement, the more likely such an arrangement is to fail. For example, complex procurement rules are likely to hinder a government's ability to design flexible and timely outsourcing contracts (Graham and Scarborough, 1997). If the government procedure took two or three years to complete, the appropriate technology and service rate at the time of the initial negotiation would not be suitable when it comes to implementation. Technology could be obsolete and the rate for service might be much lower as the ASP market matured.

Organizational resistance to change is also detrimental to an ASP arrangement. The full potential of an ASP can only be realized when both the service provider and the outsourcer have made necessary changes to integrate various elements for quality service delivery. These changes may include information-sharing, institutionalization of strategic partnership, and the investment of financial and personnel resources between partners. One source of resistance could be from lower level staff that is afraid of

⁶The distinction between production and coordination cost is important in the transaction costs literature (Williamson, 1975).

layoff or additional work as the result of outsourcing. If these changes do not occur as the result of organizational resistance, an ASP outsourcing arrangement is unlikely to succeed.

Conclusion

This study identifies a list of drivers and barriers to outsourcing application services, which have the potential of transforming local e-government services. Main drivers include top management commitment to the provision of high quality e-government services, potential cost savings, and utilization of technical expertise available in an ASP. Barriers are mostly concerned about outsourcing in general, such as the inability to control service quality, security, and potentially limited cost savings. In addition, this study provides a preliminary list of critical success and failure factors associated with the performance of an ASP. The success of an ASP lies in top management support, technical knowledge to monitor performance, and well-designed outsourcing contracts. Failure may stem from cumbersome and rigid rules governing local government outsourcing as well as from organizational resistance to change as the result of outsourcing to an ASP. These two lists are the first step to the full analysis of outsourcing application services by local governments. Extensive field research should be conducted to better understand the drivers and barriers to the adoption of outsourcing arrangements like ASPs and the process leading to high performance ASP arrangements.

References

- Alpar, P and Sharia, A. N. "Outsourcing Information System Functions: An Organization Economics Perspective." *Journal of Organizational Computing* (5:3), 1995, pp. 197-217.
- Applegate, L. M., McFarlan, F. W., and McKenney, J. L. *Corporate Information Systems Management: The Challenges of Managing in an Information Age*, Boston, MA: Irwin McGraw-Hill, 1999.
- Arnett, K. P. and Jones, M. C. "Firms that Choose Outsourcing: A Profile." *Information and Management* (26:4), 1994, pp. 179-88.
- Barrett, K. and Greene, R. *Powering Up: How Public Managers Can Take Control of Information Technology*, Washington D.C.: CQ Press, 2001.
- Brown, J. K. "Pay to Play." *Government Technology*, 2000, pp. 32-4.
- Conklin, D. W. and McLellan, K. "Should Governments Outsource their Information Systems." *Optimum: The Journal of Public Sector Management* (25:2), 1994, pp. 9-15.
- de Looft, L. *Information Systems Outsourcing Decision Making: A Managerial Approach*. PA: Idea Group Publishing, 1997.
- Fichman, R. G. Information Technology Diffusion: A Review of Empirical Research. In *Proceeding Thirteenth International Conference on Information Systems*, Dallas, TX, Association for Computing Machinery, 1992.
- Goo, J., Kishore, R. and Rao, R. H. A Content-Analytic Longitudinal Study of the Drivers for Information Technology and Systems Outsourcing. In *Proceedings of the Twenty-First International Conference on Information Systems*. Association for Information Systems, 2000.
- Graham, M. and Scarborough, H. "Information Technology Outsourcing by State Governments in Australia." *Australian Journal of Public Administration* (56:3), 1997, pp. 30-9.
- Grover, V., Cheon, M.J., and Teng, J. T.C. "A Descriptive Study on the Outsourcing of the Information Systems Functions." *Information and Management* (27), July 1994, pp. 33-44.
- Holohan, M. "Application Service Providers." *Computerworld* (34), 2000, p.70.
- Hunter, W. "New Pilot Program Tests Info Technology Solution." *PA TIMES*, (23), 2000.
- Kwon, T. H. and Zmud, R. W. Unifying the Fragmented Model of Information Systems Implementation. In *Critical Issues in Information Systems Research*. Ed. Boland, J. R. and Hirschheim, R. New York: John Wiley, 1987.
- Lacity, M. and Hirschheim, R. "Realizing Outsourcing Expectations: Incredible Expectations, Credible Outcomes." *Information Systems Management* (11:4), 1994, pp.7-19.
- Lacity, M. C. and Rudy Hirschheim, R. *Information Systems Outsourcing: Myths, Metaphors and Realities*. Chichester, England: John Wiley & Sons Ltd, 1993.
- Lacity, M. C. and Hirschheim, R. *Beyond the Information Systems Outsourcing Bandwagon: The Insourcing Response*. Chichester, England: John Wiley & Sons, 1995.
- Loh, L. and Venkatraman, N. "Determinants of Information Technology Outsourcing: A Cross-Sectional Analysis." *Journal of Management Information Systems* (9:1), 1992, pp. 7-34.
- McFarlan, F. W. and Nolan, R. L. "How to Manage an IS Outsourcing Alliance." *Sloan Management Review* (36:2), Winter 1995, pp. 9-23.
- Newcombe, T. "The Lease We Can Do." *Government Technology*, 2000, pp. 37-8.

- Norris, D. F., Fletcher, P. D., and Holden, S. H. *Is Your Local Government Plugged In? Highlights of the 2000 Electronic Government Survey*, University of Maryland, Baltimore County, 2001.
- Palvia, P. C. "A Dialectic View of Information Systems Outsourcing: Pros and Cons." *Information and Management* (29), November 1995, pp. 265-75.
- Pfeffer, J. *Power in Organizations*. Marshfield, MA: Pitman, 1981.
- Saunders, C., Gebelt, M. and Qing, H. "Achieving Success in Information Systems Outsourcing." *California Management Review* (39:2), 1997, pp. 63-79.
- Slaughter, S. and Ang, S. "Employment Outsourcing in Information Systems." *Communications of the ACM* (39:7), 1996, pp. 47-54.
- Smith, M. A., Mitra, S. A., and Narasimhan, S. "Information Systems Outsourcing: A Study of Pre-Event Firm Characteristics." *Journal of Management Information Systems* (15:2), 1998, pp. 61-93.
- Teng, J. T. C., Cheon, M. J. and Grover, V. "Decisions to Outsource Information System Functions: Testing a Strategy-Theoretic Discrepancy Model." *Decision Sciences* (26:1), 1995, pp. 75-103.
- Thai, K. V. and Kim, Y. M. "Information Systems Outsourcing: A Study of Florida Cities." *Government Finance Review* (14:3), 1998, pp. 39-43.
- Williamson, O. E. *Markets and Hierarchies*. New York: MacMillan, 1975.
- Zmud, R. "An Examination of "Push-Pull" Theory Applied to Process Innovation in Knowledge Work." *Management Science* (30:6), 1984, pp. 727-38.