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Recommended Citation

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<http://aisel.aisnet.org/pacis2006/98>

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Examining the Business-Technology Alignment in Government Agencies: A Study of Electronic Record Management Systems in Taiwan

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Abstract

For e-government to succeed, government agencies must manage their records and archives of which the sheer volume and diversity necessitate the use of electronic record management systems (ERMS). Using an established business–technology alignment model, we analyze an agency’s strategic alignment choice and examine the outcomes and agency performance associated with that alignment. The specific research questions addressed in the study are as follows: (1) Do strategic alignment choices vary among agencies that differ in purpose or position within the overall government hierarchy? (2) Do agencies’ alignment choices lead to different outcomes? and (3) Does performance in implementing, operating, and using ERMS vary among agencies that follow different alignment choices? We conducted a large-scale survey study of 3,319 government agencies in Taiwan. Our data support the propositions tested. Based on the findings, we discuss their implications for digital government research and practice.

Keywords: E-government, strategic alignment, electronic record management systems

1. Introduction

Governments around the world increasingly embrace exciting technological opportunities for digitizing their processes and operations to provide innovative e-government services that are conveniently accessible to citizens, constituencies, and various government agencies (Dawes and Prefontaine 2003). Information technology (IT) has been shown to be important for government administration, including collaboration and coordination among different agencies or functional areas (Chen et al. 2006; Kelly 1998). The IT expenditures by the United States government, for example, have grown significantly in recent years. However, the benefits accrued from these investments have been ambiguous and often questioned (Ault and Gleason 2003). Government agencies often organize their

services and operations into programs that may be changed in response to a host of factors, including budgetary constraints, political priorities, and new technology implementations (Walker 2001). As Mullen (2003) note, government agencies must focus on interagency collaborations and fully leveraging their IT capabilities.

The alignment between business and technology strategy is of fundamental importance to agencies in e-government contexts. As Crittenden et al. (2004) conclude, government agencies will continue to struggle to generate appropriate actions and desired outcomes until they can align business/management decisions and technology opportunities. The business–technology alignment in effect represents a critical challenge to managers/administrators in both public and private organizations (Pollalis 2003). In light of their resource constraints and performance expectations, many nonprofit organizations (including government agencies) have become increasingly concerned with actual program effectiveness for performance (Kaplan 2001).

Hence a critical question remains: What leads to agency-effective e-government? Within a governmental system, agencies are endowed with defined autonomy and appropriated resources that make them somewhat comparable to private organizations, whose performance is greatly affected by the alignment of their business and technology strategies (Henderson and Venkatraman 1993). The important but distinct components of an agency's management system and the way it functions and interacts with citizens and other agencies therefore must align with its strategic intent, as far as possible (Scott 2003). A review of extant literature suggests few empirical studies of the relationship between an agency's strategic alignment and its outcomes and agency performance. Therefore, analysis and examination of the key factors across decision-making areas of an agency that affect its strategic alignment choice, outcomes and performance associated are critical.

2. Background Overview and Motivation

When preparing or delivering a service, a government agency often references pertinent records or documents and, in most cases, creates new records to reflect and document the service rendered. The management of such documents, records, and archives is essential but tedious, often challenging government agencies that essentially are in information businesses. Several trends are emerging in the management of government records/archives, including a fundamental shift from paper-based storage to computer-based systems, from paper to electronic documents, from managing information to supporting its access and retrieval, and from a cost-reduction focus to continued process improvement (Stephens 1998). These trends all point to government agencies' need for electronic record management systems (ERMS). According to Heeks (2000), approximately 20-25% of e-government projects in developed countries are either never implemented or abandoned immediately after implementation, and a further 33% fail because they fall short of their major goals or result in significant undesirable outcomes. Continued federal spending on computerization and information systems in the United States has failed to generate convincing results and suffers abundant criticism (Ault and Gleason 2003).

The National Information Infrastructure initiative was launched in November 1997 to create a national platform in Taiwan for rapidly expanding e-government programs that deliver innovative government-to-government, government-to-citizen, and government-to-business services. In December 1999, the Taiwanese government passed the Archives Act, which established the legal foundation and technology standards for managing government records and archives electronically. The National Archives Administration (NAA) was established in November 2001 as the supreme governing entity charged with educating, promoting, and advancing the use of ERMS among government agencies at all levels. To improve administrative efficiency and service quality, the NAA revealed a “Ten-Year Strategic Plan” in 2002, outlining its goals for digitalizing government documents and records, together with a master plan for developing, implementing, and disseminating ERMS to all agencies before 2011. Prior to the creation of the NAA, government records and archives were predominantly paper based and often scattered among different agencies, which both citizens and agencies had great difficulty to locate and access particular records, documents, or archives efficiently or effectively. As a result of the centralized catalog database, government records are now easily and conveniently accessible by the general public and agencies.

Considering government as a whole, we attempt to investigate business-technology strategy alignment between an agency and the policymaking organization. Henderson and Venkatraman (1993) and Tallon and Kraemer (1999) propose a strategic alignment model for producing desirable outcomes and improved organizational performance. In our context, this model suggests an agency must align its business strategy and the NAA’s technology strategy to succeed in its implementation and use of an ERMS. Thus, it is important to examine an agency’s business strategy, analyze its ERMS implementation choices, and evaluate the outcomes associated with the alignment choice, as well as the resultant agency performance.

3. Literature Review

E-government implements cost-effective models for citizens, industry, and other stakeholders to conduct business transactions online and therefore requires the effective integration of strategy, process, organization, and technology (Whitson and Davis 2001) to link government information technology to the necessary digital domains.

3.1 Previous Electronic Records Management Research

On the public administration front, the Freedom of Information Act was fully implemented by the British government in January 2005, thereby legitimating the right of access to government information and demanding that public authorities publish and disseminate information in accordance with “publication schemes.” This Act encourages all authorities to organize and store their records and archives in compliance with the provisions of a Code of Practice, which focus on desirable practices for gathering, managing, and destroying records (Blake 2005). The Australian government, in complying with the Public Records Act effective since 1973, created the Public Record Office Victoria as the principal architect and implementer of public records strategy in Australian. An initial version of the Victorian Electronic Records Strategy was revealed in April 2000 to assist agencies managing their electronic records; an updated version

appeared in July 2003.

Similar developments have been observed in the United States, where the National Archives and Records Administration (NARA) is charged with addressing these problems and challenges, including divergent record/document formats, many of which are outdated (Weinstein 2005). Technology standards are still evolving and cannot meet the retrieval needs of government agencies satisfactorily (Sprague 1995). In response, NARA has proposed a Records Management Profile in the Federal Enterprise Architecture and supports requirements analyses for Records Management Service Components, both of which are critical to electronic record management.

The implementation and actual use of ERMS are essential but have not received adequate attention in previous researches. The International Records Management Trust has developed an objective system, the Records Management Capacity Assessment System, to assess the strengths and weaknesses of different ERMS (Griffin 2004). Advancements between these capacity levels require mature, delicate, sophisticated integrations of records/archive management and business processes, enabled by technological solutions (Griffin 2004).

3.2 Businesses–Technology Strategy Alignment in Government

Pollalis (2003) shows the importance of aligning business and technology strategies and their integrations in the overall organization system. As described by Venkatraman et al. (1993), management practices act as “alignment mechanisms” that can meet the challenge of translating strategic choices into administrative practices and decision making. Growing researches suggest that investments in technology alone cannot warrant success in e-government. That is, agencies must invest in processes and human capital to ensure effective technology implementation and usage (Chircu and Kauffman 2001). Soh and Markus (1995) suggest that performance enhancements enabled by technology assets must be accompanied by appropriate technology use, which often requires process changes. Such strategic alignment can be conceptualized with an internal or external focus (Henderson and Venkatraman 1993). From an enterprise perspective, government agencies are similar to functional departments in an organization, and legislation and policymaking can facilitate cooperative efforts among them (Ault and Gleason 2003). In turn, an appropriate alignment between the agency and the policymaking institution may induce desirable performance in government.

According to Bacon (1991), an organization needs an IT strategy to comply with regulations and external requirements. Technology investment decision making in the public sector is influenced by political considerations and motives, which define resource allocations directly and indirectly in response to the needs of agencies and their stakeholders (Chircu and Kauffman 2001). Documents must be integrated into a management process that provides desirable transparency to users and creates auditable trails for internal and external control purposes (Thurston 1997). An agency’s business strategy for implementing and operating an ERMS can be analyzed according to the perspective of internal versus external resources. In terms of internal resources, an agency can employ its financial and personnel resources to acquire a customized ERMS through

outsourcing or in-house development. Alternatively, agencies can rely on external resources to acquire free ERMS developed and made available by others.

3.3 Developments of Electronic Record Management Systems in Taiwan

Motivated by improved document and record management, the increasing accessibility of records and archives, and an enhanced realization of the benefits of knowledge embedded in documents and archives, the NAA in Taiwan initiated the National Archives Information System (NAIS) project for 2003-2006. Specifically, the NAA attempted to address several core implementation challenges, such as creating baseline rules for computerized record management and developing electronic record management systems to support a national electronic archives retrieval system that would meet security and authentication requirements. The central government's commitment to electronic record/archive management is strong; it allocated a total budget of US\$17 million between 2003 and 2006.

According to the Archive Act, each government agency is responsible for managing its official records electronically, with the necessary accessibility and security. When issuing or receiving an official document, an agency must create the necessary electronic records and transform important records to archives. All agencies must provide a catalog of their records and archives with a prespecified XML data format via e-mail or on website periodically to the NAA. NAA then aggregates these catalogs into the centralized database, conveniently accessible by the general publics and agencies through the "National Electronic Archives Retrieval System" available on the NAA website. To foster the use of official records and archives managed by individual agencies, the NAA has enacted a rule for digitalized record management that establishes a necessary regulatory baseline for the adoption of ERMS by agencies.

4. Research Framework and Propositions

4.1 Research Framework

Our research framework depicted in Figure 1 adapts the strategic alignment model by Tallon and Kraemer (1999), which suggests that an organization can derive favorable outcomes and performance by aligning its business and technology strategies. In this model, management practices represent alignment mechanisms for translating strategic choices into administrative decision making and operational details (Venkatraman et al. 1993). The business-technology alignment in an agency is analyzed from a "shortfall" perspective. A shortfall occurs when an agency's business strategy cannot be supported adequately by the NAA's technology capability or fails to take full advantage of the NAA's technology capability. If an agency's business strategy fits well with the NAA's strategy for implementing ERMS, the alignment may affect the agency's performance in electronic record/archive management directly and significantly. That is, an adequate alignment can greatly facilitate or constrain an agency's favorable outcomes or improved performance in e-government services. In this study, we specifically define strategic alignment as the extent to which an agency's business strategy is congruent with the NAA's technology strategy and thereby meets the regulatory requirements and fully leverages the governmental system resources.

On the basis of Tallon and Kraemer's (1999) model, we analyze individual agencies' business strategies for computerizing records and archives, assess their alignment with the technology strategy of the NAA, and examine the associated outcome and resulting agency performance. As part of their business strategy, some agencies develop ERMS in-house, whereas others acquire proprietary ERMS from outsourcing vendors or adopt the free ERMS, whether in simple or complex form, provided by the NAA. Regardless of their strategic choices, agencies must comply with the related policies and regulations and the NAA's general guidelines. The strategic alignment anchor enables us to examine the outcomes associated with each alignment choice, such as common problems encountered by agencies or their satisfaction with the assistance and services provided by the NAA. In this study, we define strategic alignment specifically as the extent to which the NAA's technology strategy supports and is supported by an agency's business strategy to meet regulations and mandated requirements. An appropriate fit between the technology and business strategies will lead to desired outcomes and improved agency performance.

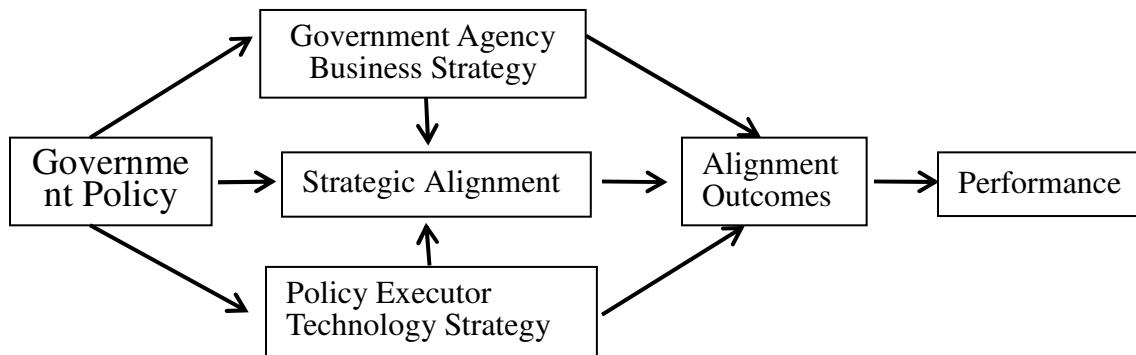


Figure 1. Research Framework

4.2 Analysis of Strategic Alignments

Before the promulgation of the Archives Act, most record management practices were manual and could not provide effective access support. The NAA assumes multiple roles in fostering electronic record/archive management practices among agencies: policymaker, architect, regulator, and auditor. In terms of the NAA's technology strategy, an agency can choose from a range (I–IV) of strategic alignments. If it selected alignment type I, an agency would develop an ERMS in-house using its own IT staff, funding, and existing system resources. In this case, the NAA assumes a supportive role and helps the agency use the online submission function with “Electronic Records Catalog Checking System (ERCCS)” developed and maintained by the NAA to meet the mandated format requirements for delivering the catalog file. Government agencies that subscribe to alignment type I maintain their ERMS themselves. In alignment type II, an agency acquires an ERMS through outsourcing arrangements that may include system design, implementation, and testing by the chosen vendor. In this case, the NAA provides a mandatory baseline for functional specifications that must be noted in the agency's request for quotes or bid assessments. During the outsourcing process, the NAA assists agencies in identifying preferred vendors and assessing their capability and systems. With

alignment type III, an agency adopts “Electronic Records Cataloging System (ERCS)”, a simplified ERMS developed and made available by the NAA. Agencies can download and install this system, which already possesses the functionality required by the NAA, including cataloging. Finally, an agency that follows alignment type IV adopts RecordsOnline, a comprehensive ERMS developed by the NAA. This system has a full range of functionality to support record/archive management and operates in an Internet-based environment supported by a backend, centralized database system maintained by the NAA. After implementing RecordsOnline, ERCS, or ERCCS, agencies receive system administration and end-user training support from the NAA.

For cost effectiveness and external controls, records managers often use existing software packages (Young 2005). However, an agency also should select an appropriate business strategy with respect to its competence and operations scope. Such strategies straddle internal and external domains (Henderson and Venkatraman 1993) and, in the case of acquiring ERMS, can be assessed according to internal versus external controls. An agency can gain increasing internal control by developing an ERMS specific to its needs and operations. In contrast, an agency can allow external control by adopting the ERMS developed and maintained by the NAA. Alternatively, agencies can balance the internal and external controls through resources arrangements. Figure 2 summarizes the strategic alignments between an agency and the NAA.

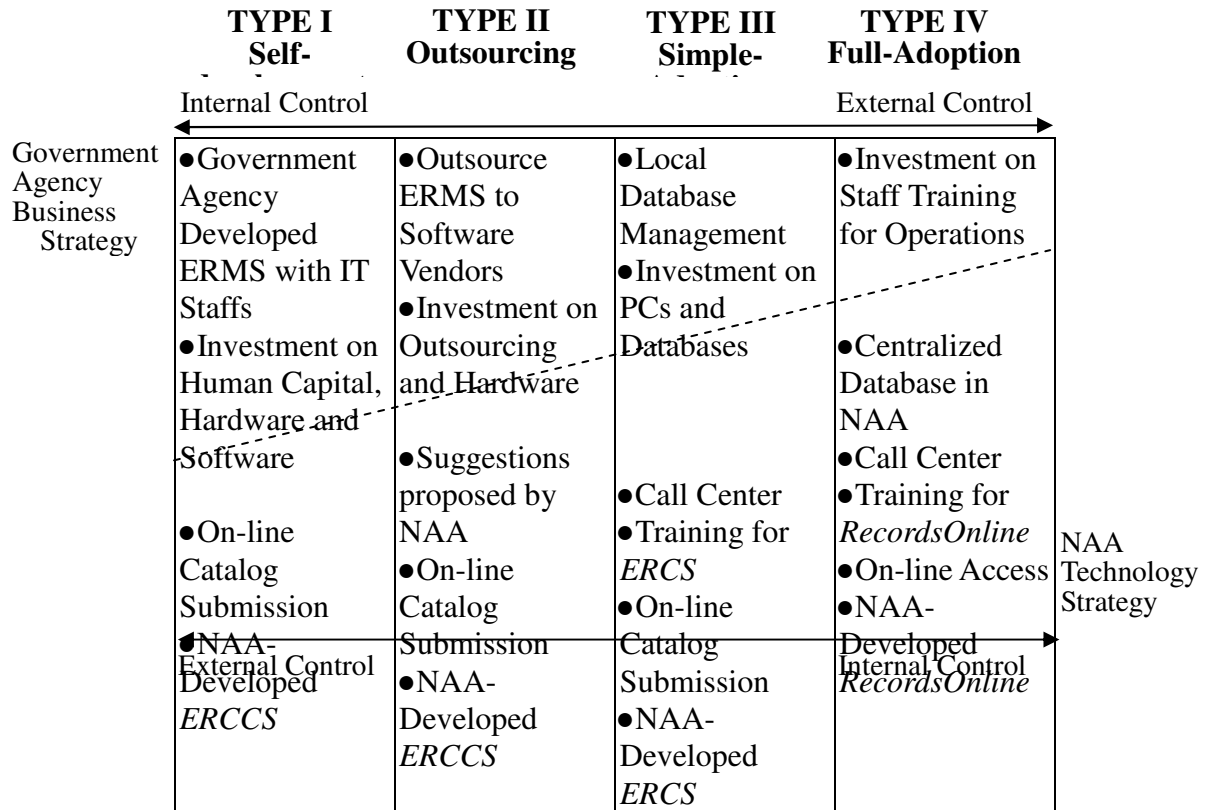


Figure 2. Analysis of Strategic Alignments by Government Agencies

4.3 Propositions

The success of electronic record/archive management demands substantial efforts from an agency to ensure desired system usage and service enhancement (Griffin 2004). Government agencies vary considerably in their resources, such as funding, specialized skills, and manpower. As a result, they must choose adequate strategies to meet their regulatory and operational requirements. On the basis of its primary purpose or function, an agency can be categorized as administration, business, or public school. For example, business agencies generally have a profit orientation and access to more resources than do public schools. E-government can overcome agency and jurisdictional barriers and thereby enable integrated, whole-government services across central and local agencies (Chen et al. 2006). Furthermore, agencies that pertain to the central government are relatively more resourceful than are their local counterparts. Finally, the exact position or level of an agency within the overall government structure can affect its technology deployment (Caudle et al. 1991). Agencies at higher administrative levels often influence agencies at lower administrative levels, partially because of the chain of command and budgetary controls. For example, the National Police Agency has direct administrative influence over the Municipal Police Agency and may exert pressure regarding its adoption of a particular ERMS. Interorganizational network centrality also is germane to any increases in resource contributions (Crittenden et al. 2004). Accordingly, agencies with similar purposes, geographic locations, or positions within the government hierarchy are likely to follow the same alignment choices in acquiring ERMS. Thus, we test the following proposition:

Proposition 1: Government agencies that vary in purpose or position within the government hierarchy are likely to follow different strategic alignments in their implementation of ERMS.

Previous research surrounding nonprofit organizations has highlighted the importance of key stakeholders in defining and assessing organizational performance (Kaplan, 2001; Crittenden et al. 2004). The long-term success of records management requires agencies to allocate resources and actually use the system, in addition to maintaining the records and achieves to support their functions or services (Griffin 2004). Hence, an organization should avoid internal managerial informality and respond to external interdependence using a planning process (Crittenden et al. 2004). An agency must attend to relevant policies and regulations when assessing and selecting its appropriate strategic alignments with respect to its operations and resource constraints. Such strategic assessments and choices likely relate to particular outcomes (Henderson and Venkatraman 1993). In our case, agencies can choose from a range of alignment types—RecordsOnline, ERCS, ERCCS, and an online submission system by the NAA. Satisfaction offers a critical outcome measure for assessing strategic alignments (Arino 2003). These alignment choices may lead to different outcomes, which we measure in terms of the problems commonly encountered by an agency and its satisfaction with the assistance and services by the NAA. In addition, external interdependence, which reflects how the concerns of clients and external agencies influence an agency's decision making, may be important for satisfaction and resource changes (Crittenden et al. 2004). Similarly, unsatisfactory technology use and common problems in system support, operations, and integration represent important measures of strategic alignment outcomes (Bacon 1991). Thus, we

test the following proposition:

Proposition 2: Government agencies that vary in their strategic alignments for ERMS are likely to experience different outcomes in terms of common problems and satisfaction with the assistance and services by the NAA.

Pollalis (2003) notes the importance of aligning business and technology strategies for improved organizational performance. Similarly, Reich and Benbasat (2000) argue that technology implementation and its connection to the business strategy defines the strategic alignment, which in turn affects management performance and actual technology usage. Garg et al. (2005) suggest that technology investments alone cannot guarantee performance; rather, the business–technology alignment influences organizational performance. Organizations can realize and capitalize on greater payoffs from their technology investments by aligning their business and technology strategies (Tallon et al. 2000). To ensure all agencies' compliance with the Archive Act, the NAA examines their archive/record management practices and grants prestigious Golden Archives Awards to officially recognize those that clearly demonstrate outstanding practices and services. Thus, we test the following proposition:

Proposition 3: Agencies that vary in their strategic alignments are likely to differ in their performance, as manifested by their standing in the assessment rankings for Golden Archives Awards.

5. Study Design and Data Collection

5.1 Measurements and Instrument Validation

On the basis of our research framework, we identified the specific constructs to be examined, then operationalized them using relevant measures from prior research. Specifically, we evaluate choices and outcome of strategic alignment by items adapted from relevant previous researches (Henderson and Venkatraman 1993; Bhattacharjee 2001; Feinberg et al. 2002). These question items pertain to common problems regarding ERMS and satisfaction with the assistance and services from the NAA. We measure individual agencies' performance according to their standing in the Golden Archives Awards contest. Several domain experts reviewed a preliminary questionnaire and provided their evaluative feedback. These experts include information systems managers and NAA managers who are highly knowledgeable about electronic record management practices in agencies. We then conducted a pilot study to assess our survey instrument with key personnel from 10 agencies.

5.2 Participating Agencies and Data Collection

The e-government policy in Taiwan requires all 8,029 agencies to implement ERMS. We took a key informant approach by targeting records management staff, who understand the implementation and current practice of ERMS within the agency. The survey packet consisted of a cover letter describing our objectives and data management plan, a support letter from the NAA, and the questionnaire was sent to government agencies via postal mail. Through the official reporting channel, a total of 3,319 completed questionnaires and signatures from the chief officer of the participating agencies was received and

accounted for an effective response rate of 41.5%.

Principal component factor analysis and Cronbach's alpha were used to evaluate the construct validity and reliability of each construct. As shown in Table 1, six factors—representing problems in resources, problems in literacy, problems in systems integration, problems in digital archives, satisfaction with ERMS, and satisfaction with call centers of the NAA—are extracted from the question items for measuring alignment outcomes. These factors correspond to key outcome dimensions and show satisfactory convergent and discriminant validity, in that the loadings of the items measuring the same construct are considerably higher than those for any different construct, with eigenvalues greater than 1.0, a common threshold. All investigated outcome dimensions exhibit an alpha value greater than or close to the common threshold of 0.7, evidence of adequate reliability. Because the “deficiency on systems integration” item concerns to the integration among ERMS and other systems, the alpha of “problems in system integration” factor is lower expectedly.

Table 1. Summary of Question Items Used to Measure Alignment Outcome

Factor	Cronbach's Alpha	Eigenvalue	Loading
Problems in Resources	0.82	1.18	
• Deficiency on Financial Budget			0.71
• Deficiency on Human Resources			0.63
Problems in Literacy	0.94	1.68	
• Deficiency on Information Literacy			0.83
• Deficiency on Archives Knowledge			0.83
Problems in Systems Integration	0.68	1.30	
• Deficiency on Software Functions			0.68
• Deficiency on Hardware Capability			0.59
• Deficiency on Systems Integration			0.47
Problems in Digital Archives	0.83	1.85	
• Deficiency on Digital Archives Management			0.78
• Deficiency on Information Security			0.71
• Deficiency on Digital Archives			0.63
Satisfaction with ERMS by NAA	0.91	3.92	
• Satisfaction with Online-Submission			0.82
• Satisfaction with RecordsOnline			0.80
• Satisfaction with NEAR			0.72
• Satisfaction with ERCS			0.71
• Satisfaction with ERCCS			0.70
• Satisfaction with NAA Information Services			0.68
• Satisfaction with NAA Training			0.51
Satisfaction with Call Centers of NAA	0.93	3.08	
• Satisfaction with Expertise of Call Centers			0.89
• Satisfaction with Services by Call Centers			0.88
• Overall Satisfaction with Call Centers			0.75

6. Analysis Results and Discussion

Our sample includes 1,450 administration agencies, 190 business agencies, and 1,679 public schools. The agencies' purposes are summarized in Table 2.

Table 2. Summary of Participating Agencies by Purpose

Administration	Count	Business	Count	Public Schools	Count
General Administration	775	Petroleum, Power, Tobacco	27	University	26
Police and Army	84	Liquor, Water	8	College	4
Finance and Tax	67	Transportation	116	Military School	7
Culture and Education	61	Bank	14	Police School	2
Justice	47	Hospital	25	General High School	70
Economic Affairs	80			Vocational High School	33
Traffics	59			Special Education School	6
Health	211			Junior High School	322
Social Welfare	66			Elementary School	1198
				Kindergarten	11

According to our analysis, 564 participating agencies are at the central level, and the remaining 2,755 agencies pertain to local government. 1,555 of 3,319 agencies have

separate record management departments, and 620 have a part-time records management staff. A total of 212 agencies developed their own ERMS, 359 agencies outsourced ERMS development, 2,746 adopted the ERCS made available by the NAA, and the remaining 2 agencies used the NAA's RecordsOnline system. We also analyzed the agencies (43 central and 37 local) that received Golden Archives Awards between 2003 and 2005. Only two participating agencies followed the full-adoption alignment strategy, i.e. alignment type IV; because of this small number, we do not include this alignment type in later analysis and discussion.

6.1 Strategic Alignments of Government Agencies in Implementing ERMS

By design, central government agencies deal with issues, activities, or affairs pertinent to the national level. In Taiwan, the central government consists of agencies at four levels, whereas local government agencies are classified by three different levels. Taking local governments as examples, the Taipei City Government is a level 1 agency, whereas the Zhongshan District Office, under the Taipei City Government, is a level 2 agency, and the Zhongshan Elementary School in the Zhongshan District is a level 3 local agency. Typically, central and high level agencies have larger staffs and more resources than local and low ones.

As shown in Table 3, central and local government agencies obviously differ in their strategic alignment choices. Results of the Chi-square tests indicate a significant difference between central and local agencies ($p < 0.001$), as well as between agencies at different levels ($p < 0.001$). Most local agencies choose alignment type III, whereas many central agencies adopt alignment type II, which offers them more direct control. According to our findings, local agencies tend to use the ERMS provided by the NAA instead of using their own resources to build ERMS or outsource the system development. In addition, agencies at lower levels, both central and local, appear to favor alignment type III. For instance, a total of 2,500 level 3 local agencies adopted the ERCS available from the NAA at no cost.

Table 3. Analysis of Agencies' Alignment Choices by Administrative Hierarchy

		Alignment Type I	Alignment Type II	Alignment Type III
<i>Central Government Agencies</i>	<i>Level 1</i>	1	2	0
	<i>Level 2</i>	8	19	5
	<i>Level 3</i>	45	105	85
	<i>Level 4</i>	90	93	110
	<i>Total</i>	144	219	200
<i>Local Government Agencies</i>	<i>Level 1</i>	0	2	2
	<i>Level 2</i>	3	13	44
	<i>Level 3</i>	65	125	2,500
	<i>Total</i>	68	140	2,546

In Table 4, agencies that have the business purpose are more likely to adopt alignment types I or II than are agencies responsible for administration or education, as suggested by the p -value less than 0.001 in the Chi-square test. Business-oriented agencies, such as

the Bank of Taiwan, have the necessary resources and autonomy to develop and implement their own ERMS and therefore are more likely to develop or outsource ERMS (i.e., alignment types I or II). Overall results, as summarized in Tables 4 and 5, support the first proposition tested.

Table 4. Analysis of Alignment Choices by Agencies by Agency Purpose

	<i>Alignment Type I</i>	<i>Alignment Type II</i>	<i>Alignment Type III</i>	<i>Total</i>
<i>Administratio</i>	79 (5.5%)	201 (13.9%)	1168 (80.6%)	1448
<i>n</i>				(100%)
<i>Business</i>	67 (35.2%)	49 (25.8%)	74 (39.0%)	190 (100%)
<i>Public</i>	66 (3.9%)	109 (6.5%)	1504 (89.6%)	1679
<i>Schools</i>				(100%)

6.2 Outcomes of ERMS in Government Agencies

ANOVA and Scheffe’s posterior analysis are performed to evaluate the difference among the alignment outcomes associated with the various choices. Table 5 summarizes the mean and standard deviation of each factor, together with the *p*-value and Scheffe test. Agencies that choose alignment type III experience more problems in capital, literacy, and integration than in other areas. Agencies that adopt alignment type II (i.e., outsourcing) seem more satisfied with ERMS and the NAA’s call centers and report fewer problems than agencies following other alignment types. The use of outsourcing services to achieve desired system integration therefore is understandably common (Pollalis 2003). As suggested by a *p*-value less than 0.001 in the Chi-square test, the data support our second proposition.

Table 5. Analysis of Alignment Choices and Outcomes

	<i>Alignment Type I</i>	<i>Alignment Type II</i>	<i>Alignment Type III</i>	<i>p-value</i>
<i>Problems in Capitals</i>	5.63 (1.28)	5.49 (1.24)	6.05 (1.11)	<0.001 III > I = II
<i>Problems in Literacy</i>	5.75 (1.11)	5.88 (1.06)	5.96 (1.03)	0.010 III > I
<i>Problems in Systems Integration</i>	4.76 (1.25)	4.52 (1.36)	5.20 (1.11)	<0.001 III > I > II
<i>Problems in Digital Archives</i>	5.02 (1.08)	5.25 (1.12)	5.11 (1.13)	0.023 II = III = I
<i>Satisfaction with NAA ERMS and Assistance</i>	4.86 (0.99)	5.02 (1.03)	4.76 (1.04)	0.001 II > III
<i>Satisfaction with NAA Call Centers</i>	5.10 (1.11)	5.33 (1.14)	4.99 (1.16)	<0.001 II > I = III

Notes: I, II, and III in Scheffe test denote alignment types I, II, and III, respectively.

Of the 80 agencies that received Golden Archives Awards, 42 of them participated in our study. Table 6 shows the alignment choices by the award-winning agencies and other agencies. According to the Chi-square test, agencies that choose alignment type II are more likely to win Golden Archives Awards than other agencies (*p* < 0.001). The winning ratio is significantly higher among agencies that outsource ERMS developments than among those that develop the system in-house or adopt the ERMS from the NAA. These agencies provide financial support of outsourcing efforts and must comply with the

NAA’s system requirements, functional specifications, and vendor selection criteria. According to our analysis, coordination between an agency following alignment type II and the NAA is critical. The development or acquisition of adequate ERMS demands strong monetary investments, specialized personnel, management involvement, and administrative support.

Table 6. Alignment Choice and Performance by Winning Golden Archives Awards

	<i>Alignment Type I</i>	<i>Alignment Type II</i>	<i>Alignment Type III</i>
<i>Agencies with GAA</i>	4 (1.89%)	26 (7.24%)	12 (0.44%)
<i>Agencies without GAA</i>	208 (98.11%)	333 (92.76%)	2,734 (99.56%)
<i>Total</i>	212 (100%)	359 (100%)	2,746 (100%)

For our measurement of an agency’s performance according to whether it won a Golden Archives Awards, we performed stepwise discriminate analysis, in which winning the award is the target class and important alignment outcome factors are predictor variables. Among the alignment outcome dimensions studied, we find that problems in systems integration, problems in digital archives, and satisfaction with the NAA call centers are significant for distinguishing individual agencies’ performance. Table 7 summarizes the mean and standard deviation of each alignment outcome dimension among agencies.

Table 7. Analysis of Alignment Outcomes and Agency Performance

	<i>Agencies without GAA</i>	<i>Agencies with GAA</i>
<i>Problems in Capitals</i>	5.976 (1.158)	6.085 (1.071)
<i>Problems in Literacy</i>	5.945 (1.034)	6.011 (1.192)
<i>Problems in Systems Integration</i>	5.104 (1.168)	4.722 (1.634)
<i>Problems in Digital Archives</i>	5.120 (1.132)	5.569 (1.123)
<i>Satisfaction with NAA ERMS and Assistance</i>	4.793 (1.035)	4.708 (1.109)
<i>Satisfaction with NAA Call Centers</i>	5.024 (1.160)	5.608 (1.023)

Agencies that received award have fewer problems in systems integration than other agencies. Data in ERMS are exported from backend document systems, and the strategic alignment between business and technology can create favorable outcomes and improved performance when the agency’s ERMS is integrated into the overall system (Pollalis 2003). By improving the integration between an ERMS and document systems, an agency can reduce human involvement, a common source of errors. Digital archives represent a logical extension in agencies’ management of their official records and archives. Analysis of qualitative comments from 26 participating agencies suggests that the award-winning agencies, as a group, have greater concerns about and a better appreciation of future trends in record/archive management. Besides, from a co-adaptation aspect, people adapt to a system which evolves to meet their needs (Ackerman 2000). The call centers allow NAA to maintain positive working relationships with agencies by providing relevant information or solving problems in a timely manner. In this vein, higher satisfaction with the call centers leads to more positive working relationships between an agency and the NAA. According to our analysis, the alignment outcome factors can explain differential performance among agencies—namely, winning versus not winning Golden Archives Awards. Hence, our data support our third

proposition.

7. Summary

The alignment between business and technology strategies is important and can affect outcomes and organizational performance. Such alignments represent a process of continuous adaptation and change (Henderson and Venkatraman 1993). In e-government contexts, agencies that differ in purposes or resources should analyze and select appropriate alignment strategies for favorable outcomes and performance. Our study shows that the alignment between the agency's business strategy and the NAA's technology strategy is essential and that different alignment choices lead to various outcomes and agency performance.

The agency's purpose and position within the overall government structure affect its alignment choice in implementing ERMS. Because agencies in charge of similar tasks or affairs need to exchange information routinely and frequently, their alignment choices must support commonality and inter-organizational working relationships through the ERMS electronic channel and related systems (Blake 2005). Their use of outsourcing arrangements may improve organizational efficiency and knowledge sharing/transfer and possibly provide better alignment between the agency's mission and national policy with greater implementation flexibility (Castro et al. 2003). Agencies also vary considerably in the resources; they can expend to acquire and implement ERMS. Agencies with a business orientation often have more resources, and many adopt an outsourcing strategy. In general, agencies that select the outsourcing alignment type have fewer problems and are more satisfied with the assistance and services of the NAA than are other agencies that follow self-development or adoption alignment choices. Meanwhile, local agencies that have relatively stringent resource constraints tend to adopt the ERMS made available by the NAA. The NAA grants Golden Archives Awards to agencies that are outstanding in the operations, services, and use of ERMS. These recognized agencies are required to share their best practices with other agencies for benchmark purposes and host onsite visits.

Seamless integration among related systems is crucial to the ultimate success of ERMS. Typically, input to ERMS comes from document management systems and database systems. Such systems are autonomous and have limited compatibility, which necessitates an analysis of the different specifications needed to transfer data into an ERMS. The interface between an ERMS and a backend image system also is important and must comply with both the ERMS and existing systems. Although they may recognize the criticality of a seamless integration among documents systems, database systems, image systems, and ERMS, most government agencies in Taiwan are far from achieving ultimate integration. Therefore, continued efforts must advance current ERMS practice toward seamless integration. Additional investigations are needed to further analyze business-technology alignments and investigate their effects on agency service quality.

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