伴隨著全球化、國際化、分權化、市場化以及數位公民興起等主客觀環境的變化,公部門電子化的發展策略已經成為十分重要的議題。本研究共有2個研究目的: (1) 辨識出電子化專案策略規劃過程中,各利益關係人所產生的策略議題。(2) 評估這些議題如何達成有效的策略方案。

本研究為了暸解公部門「台灣e 網通」地政資訊系統發展推行過程中重要資訊策略議題的發展與擬訂,訪談13個縣市中實際參與此系統專案規劃及開發之人員。本研究分析出最主要被關注的共同議題有7項,並根據這些議題找出及評估有效的策略方案,作為未來推動公部門電子化之動態策略規劃的參考。研究成果亦能作為公部門在開發其他電子化資訊系統規劃的方向指引,有助於降低策略規劃過程中,因利益關係人影響所造成的發展阻礙。

關鍵字: 策略規劃、利害關係人分析、個案調查。
Strategic Planning for the Development of Complex Information Systems: A Case Study on Taiwan E-Net

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In the public sector, the strategic information system is the critical part of the strategic plan through which a business adapts and changes in its dealings with changing technological and globalization, and decentralization environment. The main purpose of this study is to understand how integrate each stakeholders’ demand for interest and influence for strategic information project management in the public sector.

We analyzed the Taiwan E-Net which is the largest telex information service system in Taiwan and interviewed 13 participants from various counties and cities who actually participated in the project planning and development process. We identified a total of seven primary common interests among individual stakeholders’ groups for the strategic information system implementation. Moreover, based on the common interests, the feasibility of each strategical plan was analyzed. Thus, the mangers need to make the strategic plan for the system as a whole, not for the individual parts. Consequently, this study showed the effective cooperation process and solutions could be identified and employed as a guideline for future strategic planning and strategic information system implementation.

Key Words: Strategic Planning, Stakeholder Analysis, Case study.
Introduction

Following material and abstract environmental changes such as globalization, internationalization, decentralization, marketization, and the emergence of digital citizens, the developmental goals for virtualizing public sectors in advanced countries have shifted in focus from early public affairs management to public value creation (Layne and Lee, 2001). Therefore, to reduce the impact of the conflicts of interest that resulted during e-development, understanding the concepts of information strategies used in public sectors is of greater importance compared with those used in private sectors (Bryson, 2004; Huxham, 2003; Scholl, 2004). Nutt (2002) indicated that leaders in public sectors must adopt information strategies in planning processes in order to assist the public sector in identifying its unique role during the e-development process. In addition, novel network services and an organizational structure must be considered when optimizing convenient services provided to citizens. Information strategic planning entails helping actors and beneficiaries achieve their goals, in addition to assisting public-sector workers generate public value (Moore, 1995).

Since the 1980s, strategic planning has been conducted in public sectors to facilitate their own tasks and to assist nonprofit organizations respond effectively to organizational changes (Berry and Wechsler, 1995; Bryson, 1995; Christopher, 2007; Robbins, 2001). At present, strategic planning involves not only resource-sharing and teamwork but also empowerment (Lesca, et al., 2008; Luffman et al., 1996; Scott, 2001; Xu and Kaye, 2010). When the public sector aims to meet its strategic planning goals by establishing strategic information systems, making decisions and cooperating become difficult because of the power and interests of all the stakeholders involved during the planning and execution stages. Differences in power and interests may affect the common interests appearing on the strategic agenda supported by stakeholders, potentially causing conflict in final decisions and proposals (Bunn et al., 2002; Huxham, 2003; Scott, 2001).

The strategic information system is the critical part of the strategic plan through which a business adapts and changes in its dealings with changing technological and business environment (Thomas, 1993; Xu and Kaye, 2010). The idea that the successful evolution of strategic information system as complex systems requires the expression of individual diversity of ideas, interests, conflicts and aims, is very important (Lesca, et al., 2008; Xu and Kaye, 2010). However, the strategic information system is associated with higher complex: multiple domain-knowledge actors, coordination with various internal or external stakeholders, complexity technologies, heterogeneous information infrastructures and irreconcilable conflicts (Sambamurthy et al., 2003). Therefore, these heterogeneous actors, organizations, and technical and their interactions greatly increase the level of complexity in strategic planning for the development of complex information systems (Yoda and Yoshida, 2011). Because coordination is necessary for strategic information system to meet various stakeholders' expectations, an important question arises for both researchers and practitioners of information systems: "How does the strategic plan create and how is the strategic issue supported by the most part of stakeholders who have in/difference interests or conflicts?"

Scholl (2002) indicated that the decision-making process in the public sector can be affected by outside individuals/groups. Therefore, during strategic planning, it is essential to gather the stakeholders from various backgrounds, with different experiences and disparate opinions, and to manage and analyze them appropriately when addressing public issues and when managing nonprofit organizations. In addition, this approach facilitates launching complex projects, opinion-sharing, and acquiring appropriate resources during policy execution. The development of information strategies in the public sector should emphasize the power interactions exercised between various organizations, interest groups, and other stakeholders. Moreover, public interest and other socioeconomic and environmental factors must be considered (Berry and Wechsler, 1995; Bryson, 2004; Huxham, 2003; Layne and Lee 2001). Bryson (2004) indicated that in the public sector and in nonprofit organizations, analyzing the needs of stakeholders is essential to satisfying their needs, and thus, to achieving a successful policy. However, research is lacking regarding
stakeholder analyses performed during the development of complex information strategies in the public sector. Thus, there are many important questions: how do those stakeholders integrated their individual interests and common interests? How do they propose the strategical planes based on those interests? How do they cooperate and coordinate their respective strategical plans to foster the development of actions?

To implement strategic information system, we argued that individual stakeholder’s interests, support and common interests become essential and the mangers need to make the strategic plan for the system as a whole, not for the individual parts which have the perspective from their positions. The present study investigates the strategic planning for development complex information system. Specifically, we attempt to clarify whether strategic issues and individual interests emerge from each stakeholder group and to study how the stakeholders' interests can be integrated to devise effective strategic plans.

**Literature Review**

Strategic planning involves facilitating the development of a consensus among members within an organization regarding their future goals as well as the means and processes used to achieve these goals (Lesca, et al., 2008; Scott, 2001; Xu and Kaye, 2010). Strategic planning entails devising approaches in advance that could be used to identify solutions (Bryson, 2004; Lefkowith, 2001). After analyzing 26 empirical studies on strategic planning and organization performance, Miller and Cardinal (1994) determined that strategic planning positively affects organizational performance. Nutt and Backoff (1993) reported that strategic planning is typically executed in the private sector to promote corporate competitiveness, and that it may yield multiple advantages for the public sector such as promoting relationships among stakeholders throughout various organizations and environments, resulting in a clear understanding of the future orientation and goals of relevant organizations, and facilitating the identification of solutions. Berry and Wechsler (1995), Bryson (1995), and Robbins (2001) have maintained that the U.S. government and nonprofit organizations understand that strategic planning presents them with advantages, provides the public sector with reasonable benefits, and obtains future-oriented management skills similar to those used in private enterprises.

Conventional organizational planning typically involves only operational planning, and lacks consideration for the future orientation of organizations. A representative strategic planning necessitates considering the planning environment for the organization, various roles, the execution process, and the consequences (Alexander and Robertson, 2004; Bryson, 1995; Lefkowith, 2001; Miller and Cardinal 1994). Borins (2000), Bryson (2004), Kaufman (1992), Nutt and Backoff (1993), Robbins (2001) and Wechsler and Backoff (1987) have systematically and cyclically established models of strategic planning processes. Specifically, Bryson (1995) and Nutt and Backoff (1993) have focused on establishing models of strategic planning processes for public and nonprofit organizations. Bryson (2004) and Nutt (2002) conducted an observation of the strategic planning processes of the virtualization project in the public sector according to the following 10 steps: (1) Ensure smoothness in planning strategies and the acceptance of results by all parties; (2) Confirm and understand the current requirements of the organization as well as stakeholders’ expectations, thereby confirming the scope of the organizational mission and mediating differences among them; (3) Confirm the goals and values of the organizations involved, identify the key strategic decision makers, understand expectations of internal and external stakeholders, and formulate a comprehensive data foundation; (4) Recognize opportunities and threats from the external environment, and analyze the internal advantages and disadvantages of the organization; (5) Effectively resolve conflicts possibly arising from differences among people, situations, and objects in the discussed strategic issues; (6) When developing an organizational strategy, focus on establishing a consensus among internal and external stakeholders, remove as many obstacles that may hinder the execution of the new strategy, promote decision rules, and develop strategic action plans; (7) Direct constant attention to the organizational goals and to the needs of all crucial stakeholders; (8) Ensure that all organizational members
understand the long-term goals of the organization, enhancing the cohesion of various units within the organizations of working toward the same goals, without requiring recurrent management and control; (9) In a diversified, cross-public-sector organization, ensure successful execution of the action plans by the groups involved; and (10) Reassess the strategy and its planning process to serve as a reference for future strategic planning.

Brugha and Varvasovszky (2000), Bryson (2004) and Scholl (2004), Freeman's (1984) definition of stakeholders serves as the core starting point to the concept of stakeholders. Freeman (1984) defined stakeholders as "any group or individual who is affected by or can affect the achievement of an organization’s objectives.” Studies on strategic planning have indicated that the leader of an organization must underscore the needs and expectations of its key stakeholders, and successfully manage them through strategies and action plans (Alexander and Robertson, 2004; Bunn et al., 2002; Christopher, 2007). In addition, securing the benefits of these stakeholders is vital to maintaining the sustainability of an organization (Brugha and Varvasovszky, 2000; Scholl, 2002; Scholl, 2004). Stakeholder analysis is a strategic planning approach that enables an organization to successfully and effectively assess and satisfy the expectations of its key stakeholders (Brugha and Varvasovszky, 2000; Bryson, 2004; Scott, 2001). Moreover, stakeholders are primary engaged in economic transactions with the business and also are affected by or can affect its actions (e.g., the general public, communities, activist groups, business support groups, and the media) (Bryson, 2004; Gazley et al., 2010; Yu et al., 2009). The main focus for the complex project management in the public sector is to understand each stakeholder's demand for interest and influence. The stakeholder analysis helps to gather common interests and create future visions while the complex information system in the public session continues its process of integration to attract investment, to promote its advantages and to involve citizen participation (Yu et al., 2009). Through the model of strategic planning processes devised, this study explores how stakeholders foster attention for various information strategy interests and how they identify solutions while considering individuals' interests and power during the virtualization of the public sector.

The traditional system development life cycle ensures the IS project developed will align with each organizational goal, users' requirement, and support its business needs (Nguyen et al., 2014; Pan, 2005; Pommeranz et al., 2012; Valacich et al., 2001). Thus, the strategic information system incorporates a variety of stakeholders, organization and technologies that lead to a sustainable competitive advantage (Sambamurthy et al., 2003; Yoda and Yoshida, 2011). The stakeholder analysis is concerned with the elicitation of common interests to be achieved by the different stakeholders. For the development of complex strategic information system, the refinement common interests may guide the organization to face that stakeholders may have different interests, conflict or goals and to specific their services to gain the maximum benefit (Mathiassen et al., 2007; Pommeranz et al., 2012). In another word, the strategic planning in the public sector may include stakeholder analyses, which would result in fulfilling organizational goals, aligning difference stakeholders' interests and successful projects.

Consequently, the process of executing policies by public-sector organizations involves multiple types of stakeholders. Stakeholder analyses could allow public-sector leaders to identify key stakeholders and to assess their expectations and needs, thereby facilitating the generation of strategic plan for developing complex strategic information system in the public-sector organizations (Bryson, 2004; Scholl, 2004). In addition, the stakeholders are individuals or groups having an interest relationship with every aspects of the strategic information system implemented in the public sector. Therefore, during policy execution, the interests of different stakeholders may be aligned in order to ensure fairness in policies and to maximize the benefits provided to the stakeholders. While e-government continues its process of integration to create public value, the management strategies should provide guidelines for the process, and promote its advantages, which include government citizen participation (Layne and Lee, 2001; Scholl, 2002). The main focus for strategic information project management in the public sector is to understand
how integrate each stakeholders’ demand for interest and influence. This helps not only to gather common views, but also to create future visions.

Methodology

Sample Descriptions and Interview Processes

We employed judgmental sampling from nonprobability sampling for this study. This sampling approach does not involve a specific sampling structure during sample selection. The logical inference and effectiveness of judgmental sampling are reflected on the selection of cases with abundant information to facilitate conducting in-depth studies.

Taiwan E-Net is the largest telex information service system in Taiwan, created jointly by the Kaohsiung City government and Internet providers through the use of the Build-Own-Operate (BOO) outsourcing mechanism. The E-Net system was also created collectively by all county and municipal governments and landholding, urban development, as well as construction institutions through a mutual-supply contract in the Government Procurement Act. In 1993, to fulfill the objective of streamlining administrations and optimizing convenience for citizens, the Kaohsiung City Land Administration Department and the branches of outsourced data communication companies jointly developed the videotex system for Kaohsiung castration and land values, which provided people with payment inquiry retrievals made accessible through personal computers, fulfilling the objective of serving people at home. Following advances in computer technology and improvements in network environments, an online version of “Zero-Day” was released in May 1997. In August 1999, through the use of geographic information system technology, a new Kaohsiung land telex information integration system was developed, integrating land-map identification functions and basic topographical data. In October 2000, land data of 29 land administration departments in the five major counties and cities of Taiwan were uploaded on the online network for public access. This not only simplified land administration processes but also reduced administrative costs considerably, in addition to providing the Taiwanese population with access to the Southern Taiwan land telex information integration system. In December 2001, the Taiwanese government worked with the Urban Development Bureau of the Kaohsiung City government through lateral cooperation, providing instant, online-integrated cadastral maps and zoning map information to render a network service characterized by a single contact window. In July 2003, this online service was expanded to 18 counties and cities. The scope of services was no longer limited to Southern Taiwan, and Taiwan E-Net became the largest land service network nationwide. In 2007, the range of services was further expanded to include the 23 administration offices of the 21 counties and cities. In summary, because the Taiwan E-Net information system provides an in-depth history and an abundance of background information, it enables researchers to further their understanding in the development of information strategies in the public sector.

We recruited 13 participants, 11 of whom serve the public sector (including 9 strategy planners and 2 strategy executors), and 1 representative from an outsourcing company and 1 external user. All of the participants consented to having their entire interview recorded, and the interview data transcribed.

Because the system has been operational for years, and has progressed past the early-implementation stage, our investigation focused on the strategic planning development of information systems. Accordingly, the participants in this study comprised primarily key stakeholders who had actually participated in strategic planning, and were matched to secondary stakeholders. The roles assumed by the stakeholders are briefly described as follows: the Players guided the overall direction of the strategic development of the system, the Subjects participated in the entire strategic planning processes, and the Context Setters assisted in executing the policy strategies.

Interview Questions

According to the steps involved in the strategy change cycle proposed by Bryson (2004), the interview phase in this study was separated into the following four stages: (1)
Define the organization, namely forming a consensus and clarifying the long-term goals of the organization. (The question raised was as follows: How can the use of this system contribute to fulfilling the goals and expectations of your unit? What are the advantages, disadvantages, opportunities, and challenges? Please list the expected direct and indirect strategic benefits gained from using the system); (2) Define the stakeholders by identifying and understanding the stakeholders involved (Question: According to the evolutionary process of the system, please explain the goals, organizational values, and organizational cultures); (3) Identify the environment and common interests related to the project, specifically, by assessing the environment and identifying and framing the strategic common interests (Question: Please list the organization’s advantages as you have perceived, and what is the overall strategic common interest in the development of the Kaohsiung telex information integration system); and (4) Execute and assess strategies, namely in formulating strategies, in reviewing and adopting them, in developing effective execution plans, and in reassessing the strategies (Question: Who needs to participate in project inspections and assessments? and which existing strategies require improvement?).

Reliability and Validity Tests

We conducted this study according to the four standards of reliability and validity for quantitative research, first proposed by Yin's advice (2009), which are detailed as follows:

(a) Credibility: This refers to the level of authenticity in research data (i.e., the consistency in the level of phenomena as observed by researchers in relation to facts). For this study, we conducted face-to-face interviews with the personnel participating in the various roles required for the system. Then, we conducted repeat discussions before comparing the various responses by the participants concerning a single, specific common interest in order to understand the actual circumstances. Comprehensive in-depth interviews were conducted with the public sector workers, Internet service provider (ISP) employees, and external users in order to understand the developmental process of the system. Thus, the interview results from the 13 participants and data that were consistent with actual conditions were obtained.

(b) Transferability: By using the data obtained regarding the perceptions and experiences expressed by the participants, we created data descriptions and converted them into textual descriptions, reducing the probability of information distortion. The interviewers in this study listened thoroughly to the facts and experiences as described by the participants, and transcribed the recorded interview files into text-based transcripts. The transcripts were then verified at least twice, yielding data analyses and a record of the facts as expressed by the participants. During the in-depth interview, if any audio or semantic language obscurity occurred, the interviewers asked the participants to supplement the inadequate parts in order to gain a further understanding of the actual conditions.

(c) Dependability (reliability): The case study was a long-term information system development project, which to date spanned more than 15 years. In addition, long-term usage as well as support units had been employed for this project, making the project a rich, stable and reliable case study.

(d) Confirmability: This term is also known as objectivity. After collecting and analyzing the research data, we avoided subjective bias to prevent any influence on the amount of data collected. During data analysis, we presented the actual data provided by the participants carefully. During this process, the principle of transferability was applied in transcribing the interview recordings. In addition, to prevent excessive subjectivity, we sampled participants from various units and levels in the organization. Accordingly, our study exhibited a satisfactory degree of reliability and validity for qualitative research.

Data Analysis and Discussion

We separated the stakeholders involved in the development of the public sector E-Net information system project into the following 4 groups: (a) Players: Outsourcers and employees of the Kaohsiung City Land Administration Department; (b) Subjects: External system users, Chiayi County Land Administration Department, Chiayi City Land Administration Department, Kaohsiung
County Land Administration Department, Tainan City Land Administration Department, Hsinchu City Department of Land, and Kinmen County Department of Land; (c) Context Setters: land offices, involved business units, audit units, and administrators of the Ministry of the Interior; and (d) Crowd: the Ministry of Finance, the Ministry of Justice, and fire department units. The Players possessed both a high degree of control over the E-Net system and acquired benefits provided by the E-Net system. The Subjects could attain a certain amount of benefits/interests from the E-Net system, but exerted no considerable effect on the system. The Context Setters exerted a substantial influence on the system, but obtained relatively lower benefits. The system development process is relatively unrelated to the nature of work of Crowd and, thus, these users seldom used the system.

By employing the stakeholder analysis tool proposed by Brugha and Varvasovszky (2000), Bryson (2004), Englander and Kaufman (2004), and Freeman (1984) we analyzed our interview data, and were able to devise interaction diagrams depicting the relationships among various common interests of interest from the participants' perspective, in regard to development, participation, and contributing to the information system project. The following subsections present our discussion on the Players, Subjects, and Context Setters.

**Overlapping Common interests**

Focusing on strategic common interests, we addressed common interests that concerned the stakeholders (i.e., those that affected the Players, Subjects, and Context Setters). A complete list of common interests was collated, and an interaction diagram regarding the common interests of mutual concern are shown in Figure 1.

Figure 1 displays the common interests of mutual concern among the 3 groups of stakeholders.

First, the Players and Subjects shared four mutually concerning common interests, which enabled gaining an understanding on how to facilitate interactions and encourage cooperation between the 2 stakeholder groups:

1. Common interest 1: The BOO mechanism. The BOO cooperative outsourcing service jointly developed by the Players involved a cooperative development contract that would require renewing every 2 years. The apportionment of the contract was also determined based on the 2 years of each period. During the cooperation period, if new Subjects or functions are incorporated into the project, additional agreement to the apportionment of the revenue could be made as well.

2. Common interest 2: Assessment of the Feasibility of System Functions. When users or customers expressed the desire for new requirements, the Subjects assessed the feasibility of the data provision, and the outsourcers (leader group) and their third-party companies evaluated the technical and revenue feasibilities. If the two assessments were compatible, then the likelihood was greater that the new functions would be added to the system as a service item.

3. Common interest 3: Coordination with Policies: The Subjects participated in systems development tasks undertaken by the Players through the mutual-supply contract, and the Players also provided working schemes to the Subjects. Numerous developments were promoted according to the working schemes, and were typically executed in conjunction with policies.

4. Common interest 4: High Intention of Use by People as well as Revenue Increases. It is anticipated that system users were willing to use the diverse information provided by the government institutions, simultaneously raising the revenue of ISPs and all land administration units involved, alleviating financial burdens and providing this service to customers at minimal cost.

Second, the common interests of mutual concern involving the Subjects and the Context Setters concerned data digitization of the government institutions. If the Subjects and the Context Setters were willing to cooperate in promoting data digitization, it could have proved beneficial for future data integration. Thus, standard horizontal integration of the cross-institutional information system could be accomplished, cross-county longitudinal integration could be attained, and a single-window information integration of the public sector could be fulfilled.

Third, the common interests of mutual concern for the Players and Context Setters entailed the comprehensiveness of the e-data of each county and city.
Through a cooperative work conference, both parties must act entirely in accordance with the findings of the negotiation when providing network services.

Finally, all 3 stakeholder groups shared seven common interests, which are described as follows:

(1) Common interest 1: Integration of the Systems of All the Institutions. To encourage people to use the system, in addition to providing new system functions continually, the participants also hoped to involve more Subjects from other counties and municipalities as well as Context Setters from other institutions, to integrate the systems of all additional parties involved, and to develop further novel functions, thereby expanding the range and quality of the services provided, and attaining the ultimate goal of serving the Taiwanese population.

(2) Common interest 2: Compliance with Legal Regulations. Developing and bidding for the system as well as testing it online required following the reasonable legal regulations set by the government, including abiding by restrictions on data provision and meeting the requirements for information safety. Laws such as the Personal Information Protection Act and Electronic Signatures Act, which affect the data provision interface and the innovative development of system functions, warrant attention from the Players, Subjects, and Context Setters involved for the continual development of the system. The Subjects participated in the system developed by the Players in accordance with the Government Procurement Act. Future integration would also involve legal and policy regulations. The Context Setters must also abide by legal regulations regarding data provision.

(3) Common interest 3: Convenience for people. The goal of the Players, Subjects, and Context Setters in the system was to realize the principles of public sector information disclosure through the use of network services, as well as to provide people with more convenient data query services.

(4) Common interest 4: Marketing Promotion. Associate the government to provide e-service. The Players adopted a cooperation model to assist the Subjects and Context Setters in conducting training for adding repair functions to the system as well as live query result announcements, and further promoting campaign activities. The Subjects and Context Setters adhered to
the marketing strategies implemented by the Players in helping solve problems with system usage and data management.

(5) Common interest 5: System Security. Among the Players, the ISP employees and their third-party companies were responsible for rendering network services, specifying the restrictions to system development, use, and execution, and ensuring data protection. The Subjects and assistance worked with the Players in safeguarding the data.

(6) Common interest 6: System Function Diversification. Current and future development involve considering not only the basic system service functions, but also the changing needs of the users. The stakeholders continue to host strategic conferences to evaluate and modify the system and develop new functions, thereby improving the quality of the system.

(7) Common interest 7: System Establishment and System Stability Maintenance. In establishing, managing, and maintaining the system, the ISP employees and third-party companies were responsible for the network transmission and the maintenance of the web master system equipment. The Subjects were in charge of maintaining system application program equipment. The Context Setters managed the data acquisition and updates for the Land Administration Department databases, to provide users with accurate, up-to-date data and a stable system.

We found the all three parties (players, subjects and context setters) determined that current and future system developments must primarily involve the mutual concerns regarding the common interests of the three stakeholder groups, enabling them to develop the Taiwan E-Net information strategy system that can be sustained to provide mutually beneficial outcomes for all three parties. On the basis of such information, the government would be better able to encourage all stakeholders identifying their individual and common interests and to propose appropriate policies to subjects and context setters. From the evidence of our analysis, we posit that:

**P1: In the public sector, the players, subjects and context setters should engage in the IS project actively to gain the common interests.**

**Common interest and stakeholder groups' support**

The remainder of this chapter focuses on these seven common interests of the three stakeholder groups and the levels of support received from the stakeholders. Several problem-frame stakeholder maps were employed to visualize the levels of support the stakeholders have for the common interests and to identify which key stakeholders are required for solving the common interests. Among the aforementioned seven common interests, five received a high level of support from the stakeholders. The common interests were as follows: (a) integration of the systems of all the institutions and the expansion of convenient services to people (Common interest 1); (b) compliance with legal regulations (Common interest 2); (c) citizen convenience (Common interest 3); (d) system marketing and promotion (Common interest 4); and (e) system development and maintenance (Common interest 7). The other two common interests (i.e., strengthening system security [Common interest 5] and improving the diversity of the system functions [Common interest 6]) received less support from the stakeholders. Finally, system development and maintenance garnered the attention of only a few stakeholders but were a common interest highly supported by them.

(1) Common interest 1: Integration of the Systems of All the Institutions (Figure 2)

The stakeholders who had more authority over Common interest 1 and expressed higher levels of support for this common interest included the Kaohsiung City Land Administration Department (player) and the Kaohsiung City Department of Urban Development, Kaohsiung City Public Works Department, Hsinhsing, and Nanzhi Land Offices (Context Setters). Stakeholders expressing a high level of support for the common interest but who had less authority in terms of power included the Subjects: the Hsinchu, Tainan City, Kaohsiung County, Chiayi County, Chiayi City, and Kinmen County Land Administration Departments, as well as third-party system users.

In summary, the future direction of the strategies
received a high level of support from all of the stakeholders, similar to Common interest 3 regarding the provision of convenient service to people. In addition to all of the Context Setters supporting this common interest, the Subjects supported it as well. For example, as the leader, Kaohsiung City Land Administration Department actively introduced the Kaohsiung City Urban Development and Public Works Departments to the system. These departments applied the land use zoning system and construction management system to the Kaohsiung City land telex information operation environment. Thus, a network service integrated with the cross-institutional information system was provided, thereby broadening the scope of services rendered, providing convenient and excellent services to citizens of Taiwan. The Subjects attempted to realize the cross-institutional integration of the Kaohsiung City Land Administration Department to provide the Taiwanese population with a convenient information query service. Acknowledging the goals of rendering convenient services to people, the Context Setters actively provided electronic data required for integrating services with the cross-institutional information system.

In addition to integrating the system of the Urban Development and Public Works Departments, the participants also hoped to focus future system developments on diversifying the data query, such as data integrated with the applications for household and tax units. However, cross-institutional integration involves numerous complex problems, such as revenue apportionment, internal communication and coordination, and data digitization. Consequently, although this interest gained support from numerous stakeholders, the details on how to execute it still required extensive discussion.

(2) Common interest 2: Compliance with Legal Regulations (Figure 3)

This common interest received a high level of support from all of the stakeholders. Because all of the system data were related to people’s land and property, the data must be provided in accordance with legal regulations to safeguard their property rights. Principally, all of the Players, Subjects, and Context Setters agreed that new functions should be developed and necessary data should be provided in accordance with the law.

In addition to the data requirement of any new

![Figure 2 Problem-frame stakeholder map on the integration of the systems of all the institutions](image-url)
functions, establishing payment standards and integrating data of public sector units must also be executed according to laws and regulations. For example, regarding the cooperation between the Department of Urban Development and the Land Administration Department in Kaohsiung City, developing new regulations to solve the problems on payment and data provision must be considered.

In summary, compliance with legal regulations was critical to the system development. All of the involved system components must be executed in accordance with legal regulations. Therefore, executing the system components or promoting related activities within the legal framework facilitated improving the consensus among the stakeholders, making the tasks easier to accomplish.

(3) Common interest 3: Convenience for people (Figure 4)

For all of the Subjects, providing convenient services raised public satisfaction, thus contributing to political achievements. Therefore, serving the public was the primary reason explaining why the Subjects participated in rendering system services. Therefore, placing emphasis on the convenience for the public encourages more Subjects to join the system, thereby expanding the scope of the system services and providing further convenience for the public. For example, the personnel from the Chiayi County Land Administration Department observed that each county and municipality had provided convenient access to existing data for the public to inquire about. Therefore, the personnel joined the system to provide the public with convenient access to services.

Providing convenient services to the public facilitated system development. Each innovative service function was created to provide further convenience for the public, thereby raising public satisfaction with the government sector. With current developments in advanced network technologies, the public sectors need to provide electronic services to expand the scope of services for the public, to optimize the quality of services available to network citizens, and to improve the administration efficiency of the public sectors. Therefore, in addition to the e-services, the system incorporated such technologies as a global positioning system, personal digital assistant, wireless network access, and a geographic information system.
Thus, the time and social costs for over-the-counter services could be reduced, and the goals of a single-window operation of cross-institutional joint services provided by the public sector and the objectives of the public sector’s endeavor in virtualization could be fulfilled. Therefore, if the system development focuses on providing convenient services to people as the goal, then the consensus among the stakeholders could be achieved more easily.

(4) Common interest 4: Marketing Promotion (Figure 5)

This common interest received a high level of support from all of the stakeholders. Therefore, through the guidance of powerful Players, a consensus among the stakeholders could be achieved faster, and the goals could be accomplished more easily. For example, for the outsourcing companies, introducing the system to more users through effective marketing and promotion increased the revenues and income for each associate. Conversely, ineffective marketing would result in low system usage and decreased revenues and incomes for the Subjects.

(5) Common interest 5: System Security (Figure 6)

Support from the stakeholders concerning this common interest was relatively scattered. Because the responsibility of data security was on the Subjects and Players, they typically supported strengthening system security more than the Context Setters did. The Subjects in the public sector were responsible for protecting the personal data of the public. Therefore, they considered strengthening the system security to be crucial. Each associate must establish effective preventive measures and mechanisms to prevent and solve information security problems; otherwise, property loss would occur, and the public’s faith in the system would decrease. For the subjects, the outsourcers were responsible for providing the network environments and monitoring the system developments by the third-party users. Therefore, from the perspective of the system, the outsourcers must not only satisfy the needs of each customer, but they must also actively acquire professional certification to ensure the quality of services, thereby enabling the public sector units to cooperate with the outsourcers more at ease. For subjects in the public session, when acquiring certification from the Internet security management system, the
associate from the Tainan City Land Administration Department must establish response measures for ensuring both personnel safety and information security. Thus, data encryption and security could be achieved,

**Figure 5** Problem-frame stakeholder map on marketing

**Figure 6** Problem-frame stakeholder map on system security
improving the system’s security service. As third-party system users, land registration agents also hoped that the system would be equipped with more secure mechanisms to safeguard the property rights of the public. Thus, data inquiry could become more effective and the public’s faith in the system data could also be improved.

To the Context Setters, system security involved entering existing data into the system. The Context Setters also played the roles in the system security. However, comparing with other common interests, the “system security” is not first priority for Context setters because their daily works and critical responsibility is to proved real time and accuracy information for the citizens and to serve the greatest public interest. Therefore, the Context Setters had fewer comments about “system security” than Players and Subjects. To fulfill data security requirements, the Context Setters would follow the mechanisms recommended by the Land Administration Department and restrict the data processing by the developers.

(6) Common interest 6: System Function Diversification (Figure 7)

Similar to the common interest on system security, Common interest 6 garnered relatively scattered levels of support from the stakeholders. Because the system had been operating for years, some stakeholders believed that the room for enhancing the diversification of the functions was limited. For example, to the outsourcers, because the service items required from the system were almost completely comprehensive, any further changes to the system’s functions would make no difference. Moreover, because the demand for new functions was inconsiderable, developing new functions had little effect on the quality of the system services. Therefore, unless an extremely innovative technology or demand is proposed and executed in conjunction with corresponding policies, there would not be any more major changes to the service functions in the near future. Furthermore, because this common interest was typically discussed by the Players throughout the work conference, each associate voluntarily assessed and determined whether additional service items should be added, and only a few of the Subjects proposed adding new functions. Most of the Subjects merely followed the Players in executing the serviceable items. Only when demands were proposed
by the public would the Subjects express the demands to the Players in the work conference, during which the feasibility of the new functions would be discussed.

Each county and city government expressed various levels of support for diversifying the system functions. Because the Context Setters were tasked with establishing and data digitization services, the Context Setters were less likely to express opinions on this common interest. If new service items were proposed for a pilot test, the leader Kaohsiung City Land Administration Department was always the first to try out the service functions, providing other county and city governments with a reference for future implementation. In addition to providing basic system functions, the Subjects determined whether new service items must be offered according to the needs of the public and the abilities of the Subjects to offer these services. Generally, the Subjects would imitate other county and city governments that have implemented the services, learning from to ultimately fulfill the needs of the public.

(7) Common interest 7: System Establishment and System Stability Maintenance (Figure 8)

Relatively few stakeholders expressed concerns for this common interest, but all of them expressed a high level of support; none of the stakeholders expressed a low level of support for this common interest. Because the system has been operating stably, the opinions on this common interest were more consolidated. For this common interest, the Players were tasked with formulating policies for ensuring stable system operation and with stabilizing network services. The Subjects were tasked with ensuring the stability of the system hardware, whereas the Context Setters were required to manage the equipment for data updates. Correspondence among the three groups was vital to maintaining the stability of the system operations.

However, to optimize the service quality, the Subjects not only updated the hardware equipment regularly, but they also modified the system software when system instability occurred. Additionally, appropriate response measures were provided as contingencies to system malfunction in both the data provision units and telex information centers. If people encountered problems with system operation or usage, they could inform the system managers or service providers via telephone to solve the
problems rapidly.

The distribution of the responsibilities on jointly maintaining the system was clear. Therefore, future system maintenance for system stability requires the continual cooperation mechanism and model among the stakeholders in order to optimize the service quality.

According to the data assist, firstly, all three parts (the players, subjects and context setters) have the consensus for the common interests and they may need to increase the level of support for confirm the goals of the strategical information system. In the modern societies, there are diverse interest groups competing for attention. The challenge to governments in steering a pragmatic course to generate maximum value to citizens is very significance. Secondly, there are five common interests are high-supported by three parts, one common in tests is middle-supported and one common is low-supported. Increasing the level of support among common interests would be very important for proposing and performing strategical actions in the middle or long term as it is necessary to coordinate and cooperate with each other for achieve the goals of E-Net. From the evidence of our analysis, we posit that:

**P2: In the public sector, the high-level of support among the common interests is important to clarify the development strategy actions.**

In summary, according to the level of support for the common interests selected by the stakeholders, we recommend prioritizing the common interests in the following order: the immediate goals should stress integrating the systems of all institutions and broadening the scope of services, complying with legal regulations in catering to the data needs of the public, and maximizing the convenience of services for the public, thereby founding the sustainable operation of the strategic information system. Medium-term goals must emphasize the continual operation and marketing promotion of the system in order to maintain the system stability, thereby attracting more diverse users. Because the rapid development of information technologies has caused an increase in the diversity of applications and crimes, the long-term goal for all stakeholders should be system security so that a more secure, convenient network service can be rendered to the public.

**Conclusion**

To understand which information strategical plans, which were based on the common interests of stakeholder groups, were underlined during the process of developing the complex project in the public sector, we interviewed 13 participants from various counties and cities who actually participated in the project planning and development process. We analyzed a total of seven primary common interests of mutual concern, supported-level of common interest and proposed two propositions. Subsequently, the feasibility of each strategical plan was analyzed, yielding the following four major findings.

First, common interests that received a high level of support from the stakeholders and actions associated with such common interests that also received high level of interest from the stakeholders, are common interests that the stakeholders are highly concerned about and are acknowledged by them. Therefore, during strategic planning, considering these types of common interest is recommended for the stakeholders in order to form a consensus promptly. Such common interests, which are related to information development, can be divided into two subtypes. One subtype, which includes providing convenience to the public and complying with legal regulations, were concerns for many stakeholders and thus received a high level of support. Through the concern and support from most of the public, this subtype facilitates the smooth execution of projects that received a high level of focus. Therefore, prioritizing this subtype of strategic project is recommended. The other subtype, which includes assessing the system development and maintaining system stability, concerns only a few stakeholders yet received a high level of support. Because the strategies involved in this subtype received a high level of focus, they received considerable attention from more stakeholders, fostering cooperation among the stakeholders in executing the corresponding projects.

Second, common interests received a high level of
support from the stakeholders, but the level to which the proposed actions were attracted to the stakeholders was relatively diverse, such as system integration, expansion of service scopes, and marketing promotions for the system. Although this common interest facilitates forming a consensus among the stakeholders, the stakeholders expressed little supports during the conference. Moreover, the stakeholders were highly concerned about this type of common interests; however, it lacked their support during the planning and implementation stages. Therefore, repurposing feasible projects was critical in consolidating a consensus. For example, the government units were eager to attempt to integrate the systems laterally. However, because the level of urgency to provide information services and the data provision abilities of each unit could not be ascertained and because the work schedules had changed, the project did not receive support form most stakeholders.

Third, common interests such as strengthening the system security received inconsistent support from the stakeholders, although they expressed a high level of interest in the corresponding actions. Specifically, although no consensus was achieved on this common interest, the stakeholders expressed a high level of interest in executing the actions related to this common interest. For example, the system managers from all of the county and city administrative units expressed a high level of concern about the network services and permissions given to each unit. However, no consensus was formed regarding a solution for the system security problem. Discussing the network services and permission management clarifies the stakeholders’ needs in establishing the network security mechanism, thereby facilitating further discussion on information security strategies.

Fourth, common interests received inconsistent levels of support from the stakeholders, and the relevant actions were relatively unattractive to the stakeholders. Forming a consensus on this type of strategic topic is difficult, and therefore the associated projects cannot be effectively promoted or implemented. Consequently, forming a consensus among the stakeholders on this type of common interest requires more resource inputs or more time, to identify projects that are more appealing to relevant authorities. For example, concerning the common interest of expanding the diversity of the system functions, because the resources possessed by the stakeholders and their standpoints differed, this common interest did not gain a high level of approval and attention from the stakeholders.

The contributions of this study are listed as follows: (a) the level of participation stakeholders had in developing the system was examined, and the vital opinions and perspectives on the information strategic plan, which is based on common interests and the corresponding projects, were included in the strategic planning processes, enabling a structural investigation into the involved processes. (b) According to the study results, we proposed suggestions to assist the Taiwan E-Net team in future system development and maintenance, such as identifying the characteristics of each stakeholder in the team and their strategic planning. (c) The study results on the Taiwan E-Net system provide a reference for other complex information system projects in the public sector. Thus, stakeholder resistance during the strategic planning stage could be reduced. Through analyzing the common interests for the stakeholders, the overall direction of strategic planning can be adjusted dynamically. Consequently, the effective cooperation models and solutions could be identified and employed as a guideline for future strategic planning and strategic information system implementation.

Because of limited resources and time, data sampling was limited to the 13 county and city units that had participated in the system project analyzed in the present study. Nevertheless, based on the development history of the system and job responsibilities, we recruited the personnel who were involved in the promotion of government-supported virtualization projects, had a unique function, and played specific roles, as the participants, in order to comprehensively present the contents of this case study. Additionally, the goal of extensively analyzing the cases with adequate information was not to identify the generalized rules with which the public sector complies when developing information systems, but to identify which mechanisms were vital to
developing the systems in the public sector.

摘錄
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