

Strategic Agenda-Setting of Institutional Research in Taiwanese Higher Education Institutions

Sophia Shi-Huei Ho, Associate Professor
Graduate School of Educational Administration and Evaluation
University of Taipei, Taiwan
shihuei@utapei.edu.tw

Yao-Ping Peng, Postdoctoral Research Fellow
Institutional Research Fellow
Hsuan Chuang University, Taiwan
s91370001@mail2000.com.tw

Yao-Wen Chang, Doctoral Student
Graduate School of Educational Administration and Evaluation,
University of Taipei, Taiwan
candy22344@gmail.com

Introduction

American higher education institutions (HEIs) have started to explore systematized and institutional decision-making model based on empirical materials as early as 1940s. Relatively, though Taiwan has a late start in studying concept and application of IR, the increasingly fierce and complex environment facing to HEIs provides context for investing in teaching and research (Webber, 2012), thus HEIs have consecutively established the Office of Institutional Research in 2015. At first pass, the menu of research topics and policy promoters might suggest that IR in Taiwan has indeed ‘come of age’.

Taiwanese higher education system has made rapid progress, at least in terms of the number of HEIs. According to statistics of the Ministry of Education (MOE) in Taiwan (2015), there were only 7 HEIs in 1949; rose to 123 in 1991, and 157 in 2015. Among them, 63% are private HEIs, and the total number of college students reached to 1.34 million. Generally, the most preferred HEIs that accept students with the highest college entrance scores are public ones, and most of them are located in northern Taiwan. Since the number of newly-enrolled students has been decreasing year by year, most private HEIs are facing the survival crisis of shortage of incomes, funds and resources. With respect to different facets of autonomy (financial, academic, organizational, staffing), the internal functioning of Taiwanese HEIs differs widely, for instance institutional governance structures. However, existing studies have often focused on providing an overview of the state of institutional research (IR) within the region (or a specific country) through the large-scale compilation of data on activities and organizational structure, very little research has been carried out specifically on HEIs within Taiwan.

In particular, there is a lack of qualitative data regarding institutional experiences of IR, especially individuals’ perceptions about the process and operating. This study therefore aims to make it clearer in the discussion of the status quo and formation of IR Offices in Taiwan by considering the opinions and perceptions of those working in the field. Five HEIs are looking to extend their IR profiles, although each is approaching the tasks from a different starting point. This study adopted three types of aspects - organizational operation, IR professional and institutional application - to examine a sustainable and effective IR function and to undertake proactive analysis which provides a sustainable operating model for the future, focused on supporting strategic agenda - setting rather than conducting historical analysis.

Theoretical Background

Higher education in Taiwan

Since the beginning of the 1960s, economic factors have been the main consideration of the government; namely, the government determined the speed and scope of educational expansion according to manpower projections. The structures and systems under the umbrella of higher education policy in Taiwan have divided into two categories: 4-year general universities offering academic education, and 2-4 year technological and vocational colleges/universities providing practice-based professional education. Apart from government-administrated public higher education institutions (HEIs), there are also private ones operated by private capital, of which the main funds come from non-government resources like tuition fees, donations and fund-raising, so as to maintain the feature of non-government organizations.

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Institutional Research - Definitions and Scope

Institutional research (IR) has been attached great importance to in the United States and has undergone remarkable development in the past century. With the end of the Second World War, institutional researches grew rapidly in higher education institutions. The development of education increases the burdens of the authorities concerning institutional functions and performances, which means that investments should be made into the information system for the purpose of coping with a wide range of analysis indexes. Such open education issues bring in new opportunities and challenges, so that new requirements of human resource emerge and IR offices have been widely established in HEIs. Peterson (2003) charts the development of IR to become a routine activity in US higher education, pointing out how the expectations

laid on institutional researchers have evolved in relation to the external political environment.

Higher education theorists and practitioners claim that IR is essential to effective decision making in colleges and universities. Further, recent development - including growing competition, rising costs, the need for cost containment, public demand for accountability, accreditation reporting requirements, and declining enrollment and graduation rates among certain student segments - have expanded the need both for IR and for effective collaboration between researchers and administrators. Saupe (1990) identified IR as an essential component of sound institutional governance that should occur whenever any planning initiatives, policy formation, or institutional decisions are proposed.

Peterson (1985) also indicated that IR continues to evolve as a consequence of national and local policy decisions, advances in computing and telecommunications, the shifting budgetary climate and the growing internationalization of higher education, the increasing complexity and sophistication of decision making, and the growing number and volume of calls for increased institutional effectiveness. As above, the scope of IR was expanding to encompass the roles of information architect, change agent, and consultant of choice within HEIs. In an effort to identify the role of IR at various HEIs, respondents were also asked to describe the typical research projects conducted. The descriptions of the research projects were then classified into the following eight categories (Delaney, 1997) :

1. Reports: institutional statistics, internal and external administrative reports;
2. Research, planning & policy analysis: planning and policy analysis studies, forecasting/statistical projections, longitudinal research, market and survey research;
3. Financial studies: cost analysis, budget planning, financial projections;
4. Enrollment management studies: admission, financial aid, retention studies;
5. Student surveys: learning engagement and alumni/ae surveys;
6. Faculty studies: faculty evaluations, faculty workload studies, salary analyses;
7. Academic studies: academic program review/evaluation, assessment of placement tests, outcome assessment;
8. Other projects: space utilization studies, transfer studies, and other miscellaneous projects.

Terenzini (1999) referred to IR as *organizational intelligence*, has elaborated on this idea by describing three tiers of organizational intelligence. The first, most basic tier is the *technical and analytical*. This type of intelligence is needed to produce the facts and figures about an HEI: admission, enrollment, degrees awarded, faculty workload, faculty student ratio - all the elements that add up to describing the basic profile of an HEI. Technical and analytical intelligence also includes all the tools of the trade such as spreadsheets, knowledge of statistics, SPSS, and background in survey research. These basic skills are necessary to succeed at an entry level in the profession of IR.

Terenzini's second level, on which the first tier is built, is *issues intelligence*. It includes knowledge not just about the technical aspects of the job but also the particular issues faced by the HEI. Issues such as affirmative action, resource allocation, need for program evaluation, enrollment goal setting, and planning are of immediate importance to the HEI. It also requires knowing about and working with the key actors and people at the HEI who are addressing these issues.

Thus, tier one is more basic than tier two, and tiers one and two are more basic than tier three, which is *contextual intelligence*. The context involves knowing the HEI not just internally but externally its history, culture, evolution, external environment within which the HEI functions, and trends in that environment such as population of high school graduates and economic health of the state, especially if the HEI is primarily government-supported.

Volkwein (1999) had discussed a variety of campus dualities, tensions, and policy collisions - internal versus external, academic versus administrative, professional versus institutional, access versus excellence, efficiency versus effectiveness, and assessing for improvement versus assessing for accountability. These contradictory pressures produce a variety of challenges for institutional researchers and force them to play a medley of roles. Volkwein (2008) then included the science and technology face as a task and implication of IR in different situations, as shown in Table 1. In addition to the four faces of IR, Serban and Luan (2002) had improved Volkwein's (1999) framework by adding a fifth face: IR as knowledge manager.

Table 1

Five faces of institutional research

Organizational Role and Culture	Purposes and Audiences	
	Formative and Internal, for Improvement	Summative and External, for Accountability
Administrative and institutional	Cell 1 To describe the HEI; IR as information authority	Cell 3 To present the best case; IR as spin doctor
Academic and professional	Cell 2 To analyze alternatives; IR as policy analyst	Cell 4 To supply impartial evidence of effectiveness; IR as scholar and researcher
Technology	To gather and transform data into information and knowledge; to collaborate in creating and maintaining information repositories and to facilitate the process of knowledge creation, capture, and sharing; IR as knowledge manager	

Source: Serban, A (2002), "Knowledge Management: The Fifth Face of Institutional Research," J. F. Volkwein (ed.), *New Directions for Institutional Research, Number 113* (Vol. 4): Jossey-Bass.

IR as information authority. The internal and more administrative purpose and support role call on IR to describe the shape and size of the HEI, its students and staff, and its activities. Here the institutional researcher educates the campus community in terms of data on admissions, enrollment, faculty, and degrees awarded. In Cell 1, the institutional researcher is largely concerned with the provision of information for administrative and managerial purposes, and requires expertise in the gathering and analysis of information, and the presentation of appropriate reports. Of the many challenging IR tasks, this one probably requires the least preparation in the form of education and experience. The role requirements correspond roughly to Terenzini's technical intelligence (1999).

IR as policy analyst. The internal and more professional purpose calls on IR to study and analyze the HEI and its policies. In this role, the institutional researcher works with top management as an analyst or consultant by supporting planning and budget allocation decisions, policy revision, administrative restructuring, and other needed changes. Here the institutional researcher is the policy analyst who educates the management team. Beside the technical expertise of Cell 1, there is an emphasis on

researching to generate new information, evaluating it against reference points (for example, by benchmarking against others' performances), and perhaps recommending policy options. Studies that give alternative enrollment scenarios and revenue projections based on particular assumptions about inputs and attributes fall into this category. Comparative cost analysis, student opinion survey, and studies of salary equity are other examples. This role requires a relatively high level of education and training, as well as analytical and issue intelligence.

IR as spin doctor. Of the two external types, the more multi-administrative style is visible when IR assembles descriptive statistics that reflect favorably on the HEI. Many of us are frequently called on to play this advocate role, and we need to protect against carrying this style to an unethical extreme. Here, the IR staff presents the best case for the campus, describing the glass as half full rather than half empty. The institutional researcher needs, in addition to technical expertise, an awareness of the policy context within which reporting is to be produced - for purposes such as external quality scrutiny or accreditation, or the preparation of a bid for funding to a potential sponsor. Some experience on the job and knowledge of the HEI is usually needed for success in this role.

IR as scholar/researcher. The more professionally oriented and analytic version of the external or accountability role is that of the impartial researcher and scholar who investigates and produces evidence so that institutional effectiveness, legal compliance, and goal attainment can be judged. In Cell 4 the emphasis is on the wider academic community and potential generalizability beyond the particular HEI, and the requirement is for standards of research and scholarship that are credible to an audience of educational researchers. While the primary interest is likely to be summative findings, these may nevertheless feed back into institutional functioning.

Conceptual framework: Understanding the development of an IR strategic agenda

Identifying IR issues as a basis for developing an IR strategic agenda

As a rich but still undefined concept, IR encompasses a broad range of concerns. According to the Association of Institutional Research (AIR), IR is a concept whereby HEIs integrate accountability and improvement concerns in their institutional operations and interactions with their stakeholders. Thus, it includes concerns and issues related to faculty rights, student learning outcomes, institutional effectiveness, learning environment, institutional investment, governance, and stakeholder relationship management. Yet IR cannot mean the same thing to everyone, because IR

issues “vary by institutions, by sizes, by sectors and even by geographic regions”. IR expectations to administrators may be inconsistent and inexorably evolve over time. A responsible initiative today may become a potentially harmful action in the future. As a result, any HEI trying to embrace IR must recognize that the subject can easily be interpreted as including almost everyone and everything. Identifying appropriate IR issues therefore entails a tricky task. To respond to societal expectations and allocate resources, HEIs must first identify relevant IR issues so that they can develop their IR strategic agenda. Thereafter, IR issues and related institutional practices demand constant reassessments. Thus, the task of management is to understand the past, current, and future operating environments of an HEI. A systems perspective provides a relevant foundation for such tasks.

Adopting a systems perspective to developing an IR strategic agenda

Systems thinking involves seeing the world not as discretely compartmentalized units but rather a network of overlapping and interrelated elements (Reich 1992); that is, “*seeing interrelationships rather than things, ... seeing patterns of change rather than static snapshots*” (Senge 1990, p. 68). Systems thinking focuses on recognizing the interconnections among the various parts of a system and then synthesizing them into a cohesive view of the whole (Anderson & Johnson 1997).

From a systems viewpoint, HEIs are open social systems that must cope with external environmental and internal institutional uncertainty, as well as develop characteristics and perform processes that enable them to adapt to the opportunities, threats, and constraints that constitute the environment and society (Tushman & Nadler 1978). Because they are influenced by external forces and environmental conditions, HEIs cannot control their own behaviors entirely (Waddell, Cummings & Worley 2004). Adopting an open social systems perspective, we assert that HEIs should be regarded as specific systems of stakeholders (Vos 2003) and of interpretations (Daft & Weick 1984). Furthermore, similar to Gregory and Midgley (2003), we regard systems thinking as a necessary perspective that enables an HEI to comprehend and respond to rising concerns about IR issues at local, regional, and international levels.

HEIs as multi-stakeholder systems

From a systems viewpoint, the open system of stakeholders that constitutes an HEI operates “within the larger system of the host society that provides the necessary infrastructures for the HEI’s activities” (Clarkson 1994, p. 21). Furthermore, according to stakeholder theory, HEIs have a moral duty to take stakeholders’ concerns into consideration (Evan & Freeman 1993), which means addressing the

concerns of “any individual or group who can affect or is affected by the actions, decisions, policies, practices, or goals of an HEI” (Gatewood & Carrol 1991, p. 673; adapted from Freeman 1984). Stakeholder groups that convey their societal expectations to HEIs may include owners and administrators, faculties, students, professors, competitors, the local community, and government. Such groups often form coalitions that “have more influence than a stakeholder alone” (Vos 2003, p. 142). Consequently, HEIs need a reliable mechanism to identify the relevant coalitions and related issues and then define the clear limits of the stakeholder system that it represents.

Critical systems thinking can help resolve the managerial problem of identifying stakeholder coalitions and issues (Achterkamp & Vos 2007; Vos 2003). On the basis of critical systems heuristics (see Ulrich, 1983, 1988) and considering a case of specific innovation projects, Achterkamp and Vos (2007) propose a four-phase method - initiation, development/performance, implementation, and maintenance - for identifying stakeholders according to their level and timing of involvement with regard to a particular project.

We apply this method to the problem of identifying IR stakeholders. Thus, each key IR issue the HEI faced represents a project to manage. For example, a student enrollment project might try to adapt existing procedures by modifying an HEI promoting practices to address student school-selection issues; another project could develop new enrollment channel linked to a particular IR issue, such as developing foreign student recruitment solutions to reduce existing student shortage. The IR strategic agenda that results from such an approach would regroup different projects or programs according to whether they appear decisive and coherent with institutional goals.

However, to develop a consistent IR strategic agenda, HEIs must recall that IR does not simply entail various, disconnected issues. Rather, it pertains to doing some good by developing several interconnected initiatives that help manage the relationships that are central to the future success of the HEIs and resolve any dilemmas among the competing interests of stakeholders (Werther & Chandler 2006). Consequently, projects that constitute the IR strategic agenda must achieve moving equilibrium and help build specific data collection and analysis systems to address key objects and demands within HEIs. The interrelationships among IR issues and their related projects therefore must be recognized to enable the HEI to design a constructive and coherent IR strategic agenda. Furthermore, this perspective demands a sound understanding of each key issue, as well as an institutional mindset that appreciates the complexities of the environment.

HEIs as interpretation systems

To identify the key coalitions of stakeholders, the decisive IR issues, and their interrelationships, HEIs should develop information processing mechanisms they may use to detect events, trends, and developments that are relevant to their activities. To “know” the environment, they must develop internal scanning processes that “identify emerging issues, situations, and potential pitfalls that may affect [their] future” (Albright 2004, p. 40). Institutional data then require interpretation (Daft & Weick 1984) to translate them into knowledge and understanding before the HEI can determine whether and how to respond to a potentially critical IR issue. Ashmos et al. (1998) note that such decision making requires information and knowledge of which institutional developments possess information that can help resolve a specific issue and which groups should participate in the decision-making process.

Besides, identifying HEIs’ key issues requires administrative leaders to listen to, look for, and show consideration for institutional data (Bowen & Heath 2005). Institutional mechanisms for apprehending the environment, processing data and information, and setting goals cannot be divorced from the individuals who possess these capabilities (Daft & Weick 1984). In this sense, the HEI’s interpretations of student data and subsequent decisions depend on how administrators perceive the interdependencies among institutional systems. When administrators share interpretations, they create an overriding institutional interpretation.

Methodology

While a small number of studies on the IR of higher education in Asian regions have been published, very little research has been carried out specifically on HEIs within Taiwan. In particular, there is a lack of qualitative data regarding IR experiences of HEIs, especially individuals’ perceptions about the process. This study therefore aims to consider the thoughts and perceptions of IR projects involved in the institutional development process within HEIs in Taiwan by means of a series of documentary review with HEIs working.

Documentary analysis was undertaken with five IR projects of HEIs in Taiwan. For ease of reference, a key will be used in the text to identify the universities considered. The keys will indicate the regions and public/private status (N-North; C-Central; S-South; Pub-Public; Pri-Private), and a number (1 or 2) to distinguish between individual HEI, i.e. *SPub1* is a South public university; *CPri1* is a Central private university; *SPub2* is also a South public university.

Universities *SPub1* and *SPub2* were both large, well-established, leading public HEIs with several campuses across the regions. University *NPri1* was an autonomous state HEI with a long and prestigious history, and *NPri2* was a smaller private university, considered to be one of the promising HEIs in Taiwan. Finally, University *CPri1* was a prominent private one with a particularly strong international focus. All five HEIs are widely recognized as being amongst the leading universities in their respective regions, and all but one are ranked within the top 50 HEIs in Taiwan. As a result of their prestige and profile, it can be assumed that these HEIs are some of the most active in terms of IR. The selection of public and private HEIs reflected in broad terms the overall distribution of public and private ones in each region. Table 2 shows the detailed information about these five HEIs collected from statistic data of Ministry of Education (MOE) in Taiwan.

Table 2

The basic information of five HEIs in Taiwan

University		<i>NPri1</i>	<i>NPri2</i>	<i>CPri1</i>	<i>SPub1</i>	<i>SPub2</i>
Item						
Location		North	North	Central	South	South
University type		Private	Private	Private	Public	Public
University orientation		Research	Teaching	Teaching	Research	Research
Number of students (2015 Academic Year, including postpone graduation)	Doctoral degree	599	408	286	2,171	852
	Master degree		891	2,306(877)	7,663(1,241)	3,779(862)
	Bachelor degree	5,260	4,596	17,402	11,402	4,681
	Total	5,859	5,895	19,994	21,236	9,312
Student-faculty ratio (2015 Academic Year)	Graduate	22.6	-	2.1	-	20.0
	Undergraduate		-	13.9	-	8.25
	Total	26.6	9.5	16.0	15.8	22.3
Number of graduation (2015 Academic Year)	Graduate	1340	392	4962	3,245	1,371
	Undergraduate	-	910	-	2,416	1,024
	Total	1340	1,302	4962	5,661	2,395
Number of professionals in IR office		20	8	25	7	13
Educational background of staff in IR office	Doctor degree (Doctoral student)	6(1)	10(1)	17	3	10(4)
	Master degree	2	8	6	3	2
	Bachelor degree	0	2	2	1	2

Findings

The response of Taiwanese HEIs

To assess the usefulness of the suggested model, we collected and reviewed the IR projects of five renowned HEIs in Taiwan. These HEIs had already implemented some IR-related initiatives but without a clear vision or any coherence or coordination among the different initiatives. Nevertheless, they had accepted funds from Taiwanese MOE for IR projects and had considerable representativeness in sampling and data collecting.

In order to establish strategic agenda-setting of IR in Taiwan, this study referred to previous literatures, the standards for granting IR projects of MOE and the evaluation criteria proposed by scholars, thus to perform expert assessment over the IR of the five HEIs. Besides, the assessment scores of the IR evaluation criteria are added up and sorted in this research to list the IR activities of the current HEIs and predict the key directions in the future, thus to develop the strategic development path of Taiwan IR. In terms of scoring, "high" means 3 points, "medium" means 2 points and "low" means 1 point.

Significantly, ideas of IR have begun to make an impact in Taiwan; in particular, as shown in Table 3, University *NPri1* got the highest score in the areas of IR, referred to the all-embracing nature of IR with consequences for the most aspects of university life and experiences on the university campus. "In order to promote IR, experts and scholars with academic backgrounds in biostatistics, data processing, big data analysis, medical information management and higher education should be widely recruited. Through the cooperation with the administration, information and research teams, we establish and explore specialized topics for IR characterized by research-based medical universities and propose related suggestions to promote the development of IR, reinforce the teaching quality and enhance the research ability."(*NPri1*) University *SPub2* got a higher score than University *SPub1*; *SPub2* had a policy of focusing IR activities on particular countries such as the United States and Japan which could be turned to the institution's advantage. "Establishing a scientific assurance system for student learning outcomes and implementing institutionalization by orderly organizing professional analysis teams to collect and analyze data are the core ideas to promote the IR of the universities". Though *SPub1* is a state-owned top university, it got a lower score than *NPri2*, indicating that "No clear IR strategy had been developed for the institution". It also showed that the function of IR Office in *NPri2* had recently changed in response to an institutional decision to IR activities, and staff members were now beginning to implement new

policies. In these five HEIs, financial studies, faculty studies and other projects were perceived to be not very important (Table 3), which appeared that Taiwanese HEIs have given priority to student learning outcomes at the initial stage of IR in order to develop the strategic mode and specific methods to enhance student learning performance.

Table 3
Areas of IR seen to be important

Item	<i>NPri1</i>	<i>NPri2</i>	<i>CPri1</i>	<i>SPub1</i>	<i>SPub2</i>	Score
Reports (A1)	High	Medium	High	Low	High	12
Research, Planning & Policy Analysis (A2)	High	Medium	Medium	Medium	High	12
Financial Studies (A3)	Low	Low	Low	Low	Low	5
Enrollment Management Studies (A4)	Medium	Medium	Medium	Low	Low	8
Student Surveys (A5)	High	Medium	High	Medium	High	13
Faculty Studies (A6)	Low	Low	Low	Low	Low	5
Academic Studies (A7)	High	Low	Medium	Medium	High	11
Other Projects (A8)	Low	Low	Low	Low	Low	5
Score	17	12	15	11	16	

An action research undertaken during a three-month period (December 2015 - February 2016) pursues the following objectives to (1) assess the status of IR within the five targeted HEIs; (2) raise IR awareness among administrative leaders; and (3) propose guidelines for developing an integrated and structured IR orientation. To reach these objectives and initiate the process of IR-oriented thinking within the HEI, we apply the suggested model by collecting various sources of information regarding IR initiative projects, administrative leaders' perceptions of IR and relevant issues. Five HEIs received a generic questionnaire to provide their IR projects for review. To select well-established HEIs, we considered their project performance for IR professionals, governance function, and organizational structure within the HEI. From the five IR project applications, we collected and concluded the following important IR perception items based on aspects of stakeholders: (1) satisfaction at work toward faculty; (2) administrative leaders' involvement in IR; (3) administrative leaders' dedication to IR principles; (4) IR professionals' education and training with respect to IR issues; (5) HEI's organizational structure; (6) IR-related normative aspects and commitments; (7) IR-related procedures and documentation; and (8) IR key performance indicators. In the next step, we checked 5 projects of these HEIs to determine their conception of IR practices and highlight IR dimensions. With this first data collection, the HEI's perception of performance with regard to common IR aspects was outlined and, more important, gained an overview of the five HEIs about

IR issues, as shown in Table 4.

In all public and private HEIs, administrative leaders' supports for IR were perceived to be very important. Among all the IR elements, except the university *NPri1* that had the highest score in "satisfaction at work toward faculty", all the other four HEIs (*NPri2*, *CPri1*, *SPub1*, *SPub2*) got a low level score, indicating that IR activities are aimed to improve the quality of the education they provide, but the HEIs failed to notice the cognitions of the faculties, and the improvement of their work loading was not mentioned as a motivation for influences on faculty satisfaction by the respondents. Though *NPri1* and *CPri1* were private HEIs, they considered that IR provided enhancement for student success and learning outcomes. In this case, it appeared that IR elements were primarily an institutional obligation and responsibility. It could be considered, therefore, that an institutional approach to HEIs was relatively inward-facing, and more activity-based than surface-based.

Table 4

Perception of IR elements

Items	<i>NPri1</i>	<i>NPri2</i>	<i>CPri1</i>	<i>SPub1</i>	<i>SPub2</i>	Score
Satisfaction at work toward faculty (P1)	High	Low	Low	Low	Low	7
Administrative leaders' involvement in IR (P2)	High	High	High	Medium	Medium	13
Administrative leaders' dedication to IR principles (P3)	High	High	High	Medium	Medium	13
IR Professionals' education and training with respect to IR issues (P4)	High	Medium	High	High	Low	12
HEI's organizational structure (P5)	High	Low	High	High	High	13
IR-related normative aspects and commitments (P6)	Medium	Medium	High	High	High	13
IR-related procedures and documentation (P7)	High	Medium	High	Medium	Medium	12
IR key performance indicators (P8)	High	Low	High	Medium	High	12
Score	23	15	22	18	17	

Referring to the measurement indicators provided by Taiwanese MOE, including organizational operation perspective, IR professional perspective and institutional application perspective, we assess these five HEIs through IR project review process as shown in Table 5. In *Organizational Operation perspective*, all five HEIs stated that "connecting the institutional and learning outcome system with individual data (O5)" and "establishing IR office to become a formal and professional unit (O12)" were by far the most important rationale, which meant that establishing an IR office to explore student learning outcomes was the priority objective. For example, University

*S*Pub2 was through the IR office to analyze the related topics about student learning outcomes and find out the key influence factors. Overall, it appeared from the projects that some HEIs had difficulties in “conforming the function and orientation of IR operation to American IR offices (O10)” and “hiring full-time professional analysts (O11)”, particularly at the professional level.

In *IR professional perspective*, except for the high score got by *CPriI*, the other four HEIs seldom mentioned how to develop and promote the professional abilities and skills of IR professionals, especially in “providing IR staffs mechanisms for professional development with capabilities to make international linkage (H3)”. University *CPriI* deployed IR team members based on task contents and features, and arranged them to participate in professional training and experience sharing to accumulate IR competence, that is, to develop a profession-oriented development mechanism.

In *Institutional application perspective*, the total scores of the HEIs and their average on each indicator are about the same, except “combining the analysis results of student learning outcomes with decision-making of institutional resource distribution (I4)”. This is an interesting finding, as it implies that any analysis results on student learning outcomes taking place within the HEI, such as learning assessment or faculty promotion, cannot be reflected on the resource integration or distribution, indicating that student learning analyses in most HEIs just reflect the results but cannot be used to make resource-allocation and -integration decisions, so that the value and application of its analytic results is significantly reduced.

In addition, it is less clear how the perceived government support translates into assistance for individual HEI. Most private HEIs mentioned that MOE provided funds for HEIs to implement IR activities (including areas, elements, and constructs of IR). In fact, insufficient fund was cited as a significant obstacle, indicating that government support did not extend to individual institutional initiatives.

Overall, most of the HEIs stressed that their independent status (as a public or private one) meant that the decision to IR was primarily taken at an institutional level, although for public HEIs there was existing obligation for evaluation and accreditation processes. The clear restriction was that private HEIs were constrained by government funding and, as such, IR activities in private HEIs were always likely to be more limited than public ones.

Table 5

The score of three IR constructs of five HEIs IR projects

Constructs	Items	Indicators	NPri1	NPri2	CPri1	SPub1	SPub2	Score
Organizational Operation perspective	The relationship between the implementation plan proposed by the university and the assessment and improvement of student learning outcomes	Selecting and processing the issues of student learning outcomes (O1)	High	Medium	High	Medium	High	13
		Identifying specific learning outcomes (O2)	High	Low	High	High	High	13
		Implementing the assessment of student learning outcomes (O3)	High	Medium	High	High	High	14
		Clarifying strategic improvement of student learning outcomes (O4)	Medium	Low	High	High	High	12
	The professional degree of students' acquiring, collecting, storing and analyzing the data for improving learning outcomes	Connecting the institutional and learning outcome system with individual data (O5)	High	High	High	High	High	15
		Specifying the structure and assessment method of student learning outcomes logically and systematically (O6)	High	Medium	Medium	Medium	High	12
		Using data storing, data visualization and business intelligence tools to facilitate data accuracy, reliability and accessibility (O7)	High	Low	High	Medium	Medium	11
		Building the central data warehousing system (O8)	High	Medium	High	Medium	Medium	12
	The affiliation, labor division and partnership between IR office and other departments	Drawing the organizational-level guidelines to cooperate with other institutional departments (O9)	Medium	Low	High	High	High	12
		Conforming the function and orientation of IR operation to American IR offices (O10)	Medium	Low	High	Medium	Medium	9
		Hiring full-time professional analysts (O11)	Low	Medium	Medium	Low	Medium	8
		Establishing IR office to become a formal and professional unit (O12)	High	High	High	High	High	15
IR professional perspective	The professional background of IR professionals	IR staffs possessing major fields in higher education, quantitative analysis and database management (H1)	Medium	Medium	High	Medium	Medium	11
		Conforming the staffs' background and salary with their professions (H2)	Medium	Low	Medium	Medium	Medium	9
	The mechanism of professional development to IR professionals	Providing IR staffs mechanisms for professional development with capabilities to make international linkage (H3)	Medium	Low	Medium	Medium	Low	8

Constructs	Items	Indicators	<i>NPri1</i>	<i>NPri2</i>	<i>CPri1</i>	<i>SPub1</i>	<i>SPub2</i>	Score
Institutional application perspective	The integration degree of teaching tutorship system and analysis of student learning outcomes	Combining analysis results of student learning outcome with mentoring policy (I1)	High	Low	High	Medium	High	12
		Applying the analysis results of student learning outcomes to improve effects on mentoring service (I2)	Medium	Medium	High	Medium	High	12
	The integration degree of resource distribution, faculty promotion and student learning outcomes	Connecting the analysis results of student learning outcomes with evaluating faculty for promotion, and emphasizing teaching quality by the reward system (I3)	Medium	Low	High	High	High	12
		Combining the analysis results of student learning outcomes with decision-making of institutional resource distribution (I4)	Low	Low	Medium	Low	Medium	7
	Other measures that can provide individualized learning experience and initiative tutorship based on the data analysis of student learning outcomes	Considering the analysis results of student learning outcomes to improve students' learning experiences (I5)	Low	Low	High	High	High	11
Score			46	31	55	46	51	

Developing strategic agenda of IR in Taiwan

The preceding theoretical background leads us to suggest a comprehensive conceptual framework for understanding how IR strategic agendas are developed and implemented by HEIs. This descriptive model consists of two sequential loops, interconnected by two central elements: (1) managerial perceptions of IR issues and their importance, and (2) the resulting convergence of these managerial perceptions into an institutional interpretation, leveraged by existing institutional attributes and features. In large HEIs, convergence often requires an established IR committee or department (Beadle & Donnelly 2004; Walker 2005), composed of key administrators who debate and prioritize IR issues. Such committees usually deal with and evaluate the relevance of IR issues for the institutional development and culture of the HEI, orient the IR strategic agenda, and coordinate IR initiatives within the various components of the institutional system (Figure 1).

The first loop of our model, the stakeholder dialogue loop, refers to the process of interaction between the HEI and its stakeholders, and can also be considered as IR office building period. Through this process, stakeholders can express their views about IR issues through a structured exchange (Stoll-Kleemann & Welp, 2006) on a continuous (or at least regular) basis. Such dialogue influences administrators' perceptions of the external environment and produces greater awareness of IR issues at stake. Feedback during the stakeholder dialogue process eventually influences administrators' personal perceptions of IR issues and their relevance for the HEI. In this stage, in order to "improve student learning outcomes", stakeholders will assist HEIs to perfect school infrastructure, integrate data and establish information system, build student learning outcome tracing system and gradually complete IR issues.

The constructive nature of stakeholder dialogue and feedback depends, however, on the resources initially invested in the process. The second loop of the model, the IR integration loop, can also be considered as IR decision application period, addressing the development and implementation of key IR initiatives. Specifically, administrative leaders provide their perceptions of IR concerns, which become the institutional interpretation, which in turn serves as the basis for the IR strategic agenda. From a strategic planning perspective, university administrative leaders typically assess the HEI's internal IR strengths and weaknesses, evaluate alternative strategies, and then develop action plans. Implementing IR initiatives and perceptions about the fulfillment of strategic objectives eventually influence administrators' perceptions of the various IR issues and their importance. In this stage, focused on evidence-oriented decision making, professionals will assist the institutions to analyze data, produce

reports, expand research issues and apply data and institutional decision-making to analyze the effectiveness of policies. Therefore, perfecting the functions of the IR office can support internal and external information analysis, project planning and decision-making, information storage and technical support, research and development and other tasks.

Finally, stakeholders' feedback will combine with the perceptual outcomes of IR-related initiatives and influence administrative leaders' perceptions of IR issues and their importance which depend on leaders' personal values, beliefs, and characteristics. This process induces a better understanding of current issues and the identification of new IR issues. It also demands recurrent adaptations to the HEI's IR strategic agenda. Our model further highlights the need to establish efficient procedures to initiate IR strategic agenda development. This topic is especially critical to HEIs that lack any structured IR policies or systematic IR-related scanning processes; for these HEIs, administrative leaders' awareness, knowledge, and perceptions of IR are likely to be severely restricted or, at the very least, tacit and unshared.

This study collected the IR projects of five HEIs and sorted them based on IR measurement indicators, so as to plan out the Taiwan IR development strategy, as shown in Figure 2. The IR strategic agenda highlights how an HEI can rely on diversified internal managerial perceptions and know-how to identify key IR-related issues and establish its current IR status. In light of document analysis, it enables us to suggest simple but practical recommendations in terms of internal processes that HEIs should explore useful agenda for the development of action-oriented goals. Some IR activities are difficult to classify because they overlap several categories (Volkwein, 2008). When researchers score and report IR activities ratings, we act as the information authority and become the research analyst as this study is carried out based on IR activities ratings data. This study suggested a five-stage agenda relating the purposes, activities and elements of IR (Figure 2).

Strategic agenda #1 (IR office initiate stage): Assessment and data connection of student learning outcomes is made to identify how to establish a formal designated office, and how this IR office to implement analysis strategies of student learning outcomes with the support and assistance of all relevant departments within an HEI. In this stage, IR office has to formulate an institution-wide strategic policy for developing, acquiring and applying student data. (Indicator O3, O5, O12)

Strategic agenda #2 (IR issue diffusion stage): Student survey strategies, including research design of data collection, deserve high priority to more clearly link

problem-solving, improvement programs, assessment methods and database establishment to student learning outcomes and exploit analysis results to tie well-developed institutional policies. In this stage, IR office has to implement student learning outcome strategies with the support and cooperation of all relevant parties within an HEI.(Indicator A1, A2, A5, P2, P3, P4, P5, P6, P7, P8, O1, O2, O4, O6, O8, O9, I1, I2, I3)

Strategic agenda #3 (IR knowledge management stage): High-quality human resource management would be helpful for contextualizing student learning outcome analyses and give us better foundations for answering what IR professional initiatives are most appropriate to a particular IR office, and what types of data integration need to occur to increase data accuracy, reliability and accessibility for achieving intended outcomes. In this stage, IR office has to build up the improvement of human resource, and then use this in its quality enhancement activities. (Indicator A7, O7, H1, I5)

Strategic agenda #4 (Professional development and matching stage): Research is needed that compares the efficacy of human resource practices across contexts, including sectors, IR professionals, research synthesis, and other appropriate quantitative and qualitative methods. Importantly, theory-based research needs to assess human resource management practices and performance holistically at the agency, organizational, and program levels. In this stage, IR office has to monitor and evaluate the achievements of IR professionals' knowledge assets. (Indicator A4, P1, O10, O11, H2, H3, I4)

Strategic agenda #5 (Institutional resource integration and IR institutionalization stage): Future research should give high priority to resource distribution, finance, budget, and space planning in institutional sustainable development, with particular attention to linkages between institutional resource and student learning outcomes. In this stage, IR office has to formulate institutionalized management and then further monitor and evaluate IR office's overall effectiveness and efficiency. (Indicator A3, A6, A8)

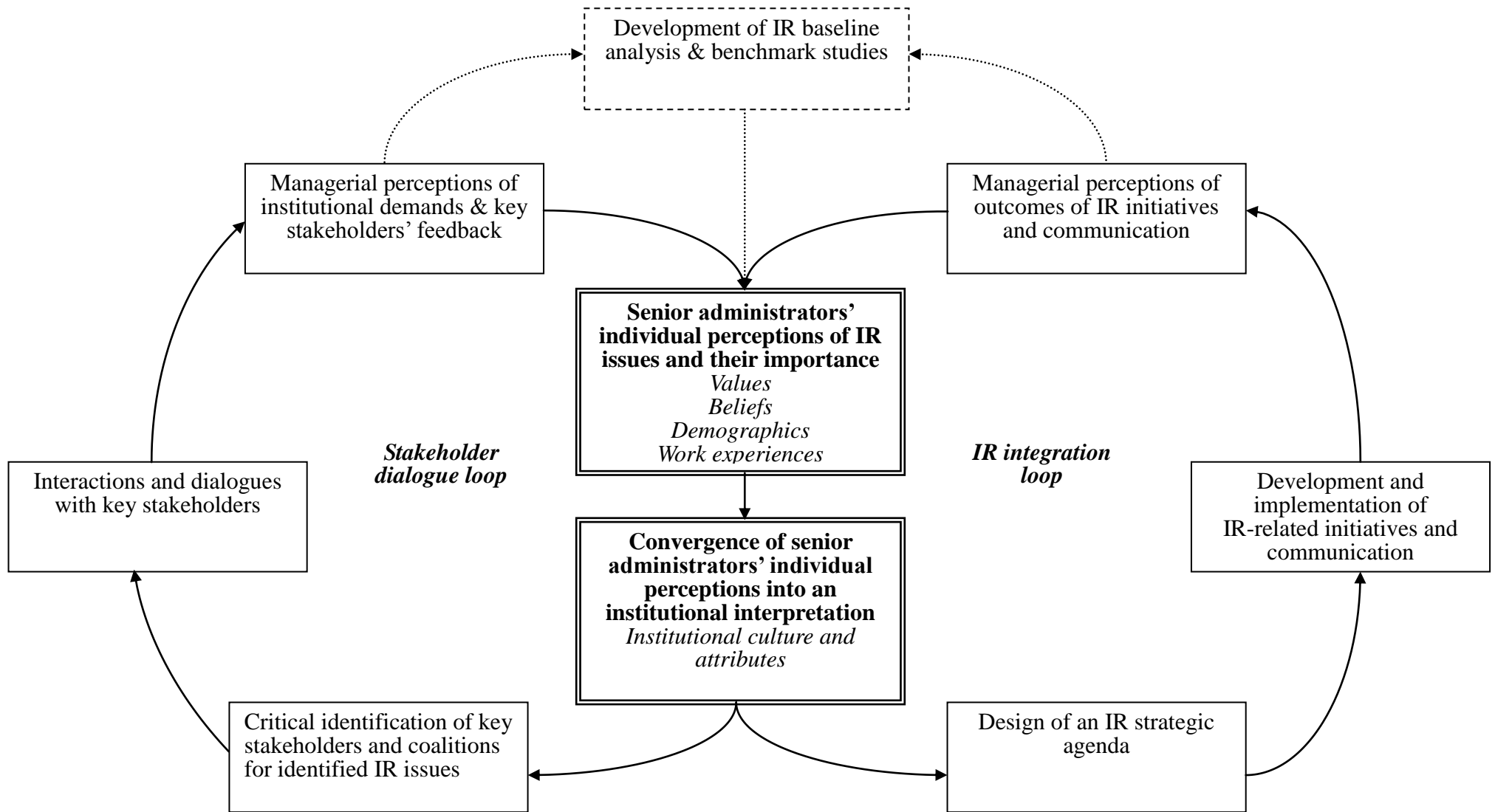


Figure 1 The double loops of HEIs develop IR projects in Taiwan

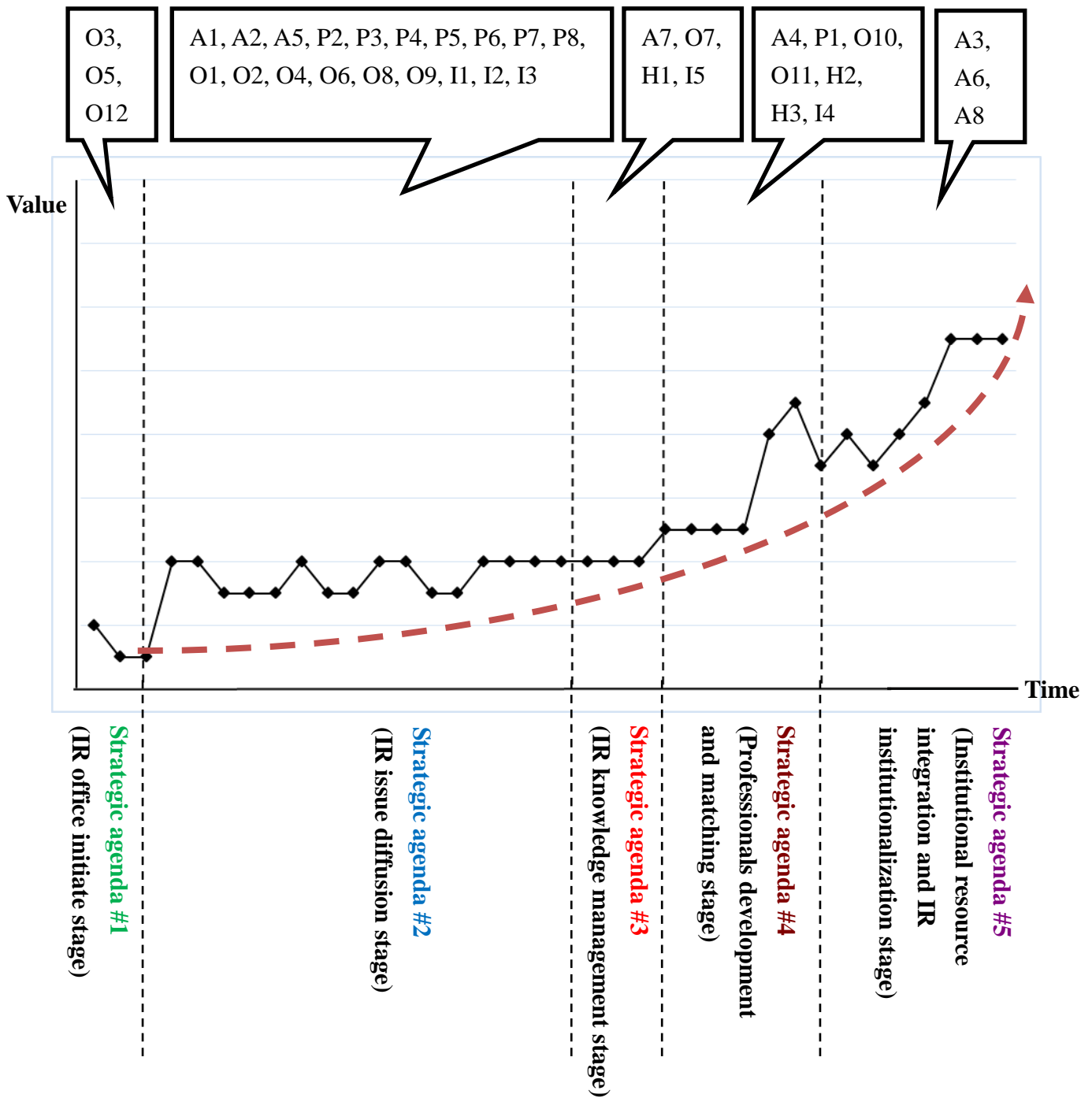


Figure 2 The five IR strategic agendas of HEIs in Taiwan

Discussion and Conclusions

As we can see above analyses on IR projects, technology becomes an important basis of development of IR activities, and it provides a powerful facilitator for IR office's process - the heart as a pump, the professional as an information processor, and the IR office as a machine. Thus, HEIs have been similarly augmented with organic models, and the use of IT leads to the dominance of a database-centered view

of organizational information resources and processes.

This study presents a broader concept of IR by using thirty-six indicators previously found to be characteristic of an HEI effectively managing IR activities. It is the model which appears in many conceptualizations of knowledge management. In fact, in our strategic agenda, this database model may not be the most valuable in the context of IR information processes. We provide evidence of the importance of effective IR professional management, such as strategic agenda 4 and 5. Thomas Davenport, director of research at Ernst and Young's Centre for Information Technology and Strategy in Boston, argues that the majority of information that managers draw upon is not embedded in computer systems - rather, it is principally in the heads of the professionals, or communicated to them through a number of channels.

There is a now awareness that, for the majority of HEIs, traditional database structures and IT approaches can capture or represent only a fraction of their knowledge and intellectual capital. Of course, this varies between sectors and organizational types - some forms of organization depend on large databases of tightly-structured information, but here the value added may still occur at a meta-level having knowledge about which information sources are accurate, and what types of information, and patterns in the data, specific stakeholders may wish to pay for. Knowledge adds value to data by providing selectivity and judgment. Most HEIs confront environments that continue to grow more complex, unpredictable, and multifaceted. Because stakeholders convey "a variety of conflicting values and interests" (Lozano, 1996, p. 233), HEIs face serious challenges in their efforts to identify and prioritize the range of student learning outcome issues they should address. In particular, developing an IR strategic agenda can be a challenging task.

In this study, we offer three main contributions. First, we provide a better understanding of the processes and rationales that underlie the development of an IR strategic agenda. By integrating systems thinking, IR and organizational interpretation theories, we present the first comprehensive conceptual framework to highlight how IR issues emerge, get prioritized, and become integrated into an HEI's major goals. Moreover, the systemic nature of the continuous process we imagined requires IR office to design structured dialogues with their stakeholders and efficient monitoring systems if they want to implement IR strategic objectives. In accordance with Hebel and Davis (2005, p. 526), our framework emphasizes that at all points during the development process toward an IR orientation, "the requirements of the various stakeholders involved must be accounted for, matched or adapted according to need in order to achieve the required student learning outcome." Furthermore, we specify that

IR offices must find ways to scan their own full-time analysts regularly to identify potential key IR issues, as well as institutional resource allocation and student learning outcomes. Second, we note the critical supporting role of administrative leaders during the development of a structured IR-related agenda. Together, these elements contribute to an innovative perspective into the development of IR strategic agendas by contemporary HEIs. Third, findings from the document analysis approach confirm that existing managerial knowledge and technological analysis within an IR office constituted cannot be a strong basis for initiating an IR strategic agenda. Specifically, the results, highlighting how different perceptions about IR by five projects, must complement one another if the HEI wants to identify its IR status comprehensively. Our findings further emphasize that IR issues systematically consist of two distinct groups pertaining to connect student learning outcomes with individual data and enhance well-established IR professionals' analysis skills and capabilities.

This study is not exempt from limitations. First, our conceptual framework requires further empirical support, perhaps with specific more case studies that could provide relevant insights. Second, by emphasizing the central role of administrative leaders' perceptions, we may limit potential constructive inputs from other stakeholders. However, this study conceives of IR development primarily as an institutional, strategic issue initiated by the IR office and the professionals who manage and analyze student data. This IR office may be subject to multiple constraints and pressures from various actors, but its chief constraints involve its own resources and capabilities. Thus, though our intent is certainly not to underestimate the power and influence of key stakeholders, our conceptual framework focuses on reaffirming the role of the subjective human factor and system factor in the dynamic processes of responding to the environment and developing IR initiatives.

In a word, a successful process to develop IR office strategic initiatives and policies must rely on a comprehensive understanding of the issues that the IR office faces. In particular, IR offices benefit when they achieve a cohesive definition of the issues they must consider (Jaques 2006). Besides, developing IR involves a long, continuous process, and establishing a solid foundation for the coherent agenda represents a prerequisite for any constructive initiative.

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Learning Outcomes

This study will contribute for three learning outcomes.

- Firstly, participants in this session will learn in the full picture of higher education system in Taiwan, and understand how HEIs initiate and operate the Office of Institutional Research.
- Secondly, this study serves as an example work task in which an institutional researcher draw on theory and research to develop a strategy, to design a methodological plan, and then to provide data and information that is used in strategic planning among administrative leaders.
- Thirdly, participants in this session will also understand the highlights that there is a significant diversity to be found in terms of approaches, priorities and perceptions of institutional research, even between five most well-known HEIs in Taiwan.

Presenter(s) Experience

Dr. Sophia Shi-Huei Ho is an associate professor of Graduate School of Educational Administration and Evaluation from University of Taipei (UT). Her research fields include higher education, faculty development and promotion, student learning outcomes, and institutional governance. She was the guest researcher of Institute for the Advancement of Higher Education at Hokkaido University (Japan) in 2011, and also the Director of Research Center for Curriculum and Instruction in National Academy for Educational Research (NAER) (Taiwan) in 2012. Currently, she participates in an international research team including 30 countries with two projects: the Academic Profession in Knowledge Society (APKS) and Formative Academics in Knowledge Society (FAKS).

Dr. Yao-Ping Peng is one of co-author in this study. He majors in Marketing and Strategic Management, thus his research interests are focused on the application of organizational management theory and the discussion on organizational operation. As a higher educational institution can be regarded as a well-structured organization, theories applied to discussions on organizational behavior and performance can also be applied to Taiwan institutional research. He has participated in many international conferences in the past five years with good presentation skills and expression capability. He was also the co-presenter participating in 2015 AIR Forum in Denver and made a presentation in the Speaker Session

Program Book Abstract

As higher education around the world faces increasingly challenging times in responding to increasing forms of accountability and competition, new stakeholder expectations, and rapidly changing technologies, institutional research will inevitably evolve to become a stronger force. This study is concerned with institutional research in Asia and seeks to understand the establishment and development of the Offices of Institutional Research in Taiwan, by comparing their function and practice in public and private HEIs. Based on detailed analysis with five well-known HEIs, we show a growing level of planning and establishing strategy of offices of institutional research. Implications for IR practitioners, contributions to institutional effectiveness, and institutional synergy are discussed.

Target Audience Experience Level : Intro/Beginner

Key Words : institutional application; office of institutional research; organizational operation; professional human resource; Taiwan