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The Effect of Strategic Alignment on Strategic Information System Planning (SISP) Success: An Exploratory Study in Public Universities in Malaysia

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Abstract

This research examined the causal relationship between Strategic Alignment (SA) and Strategic Information System Planning (SISP) success in the context of Malaysian public universities. This study was conducted on 100 respondents from the Information Technology (IT) Steering Committee and Strategic User groups of twelve Malaysian public universities. The Structural Equation Modeling results indicate that the causal relationship between SA and SISP success is found to be significant and thus, it confirms the theory that Strategic Alignment has a significant effect on SISP success. Moreover, the current research focuses only on the issue of SISP in Malaysian universities and the results provide insight on how the Malaysian public universities and a similar structure could improve their SISP practices. Finally, this study is perhaps one of the first that address the SISP practices in Malaysian public universities.

Keywords: Strategic alignment; Strategic information system planning (SISP); public universities; Malaysia.

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INTRODUCTION

There are several concerns among the Malaysian public universities after using Strategic Information System Planning (SISP) for about a decade. Issues such as effectiveness and success of using SISP have raised the question whether the Malaysian public universities have been on the right track in terms of their effective of strategic alignment, particularly after spending huge investment on the system (Doherty, *et. al*., 1999; Earl, 1993; Gonzalez, *et. al*., 2005; Newkirk, 2001; Norzaidi *et. al*., 2008a). SISP is considered to be primarily concerned with the identification of a portfolio of information system applications and the necessary technology to support institutions strategic success (Norzaidi, *et. al*., 2008b; Robey, *et. al*., 2006). These concerns focus on the selection of the most appropriate methodology, identifying participants, selecting planning consultants, aligning unarticulated institutional objectives, establishing budget rationale and determining realistic goals. Being proactive through SISP can better position institutions to meet future challenges and continue to realize their mission, and having SISP in hand would enable public universities to take advantage of new and different opportunities in future while minimizing the negative impact of unexpected challenges during its implementation.

Moreover, the current study contemplates on Strategic Alignment (SA) and SISP success since there is have been no attempts to relate all possible factors of Strategic alignment and SISP success (e.g. communication, competency/value, governance, partnership, scope and architecture, skills etc.) in one single setting to investigate their influence on Malaysian public universities performance. Moreover, literature shows (to name a few: Sledgianowski, *et. al*., 2004; Nickerson, *et. al*., 2003) that previous studies on SA and SISP success were conducted in the context of purely profit-organizations or business entities and no effort has been made to deeply study this area in the context of

public universities, except Motjolopane and Brown (2004) who measure SA in South African universities. To fill the gaps, this study examines the effect of SA on SISP success in Malaysian public universities. Specifically, this study attempts to answer the following research questions:

1. What is the significant model to measure Strategic Alignment?
2. What is the significant model to measure SISP Success?
3. Is the model to measure the effect of Strategic Alignment on SISP Success (combination of Q.1 and Q.2) valid and applicable in the Malaysian public universities settings?
4. To what extent does Strategic Alignment effect SISP success in Malaysian public universities?

If the model used in this study is found to have significant success on SISP, recommendations are made on how Malaysian public universities can successfully implement SISP. Further, this study would also serve as a guide to other industries as far as effective and efficient the SISP practice is concerned..

LITERATURE REVIEW

According to Reich and Benbasat (1996), SA is defined as the degree to which the Information Technology (IT) mission, objectives, and plans support and are supported by the business mission, objectives, and plans. In this definition, "objectives" refers to the goals and the strategies of an organizational unit. In another view, Luftman (2000) outlined the operational definition of SA as the planning and implementation of the following key activities: (a) set the goals and establish a team; (b) understand the business-IT linkage; (c) analyze and prioritize gaps; (d) specify the actions (project management); (e) choose and evaluate success criteria, and; (f) sustain alignment.

On the other hand, Raghunathan and Raghunathan (1994) suggested that SISP success is the benefits of the planning process (such as, improved top management support and involvement, better understanding of the organization and its business), and/or in terms of the applications that are developed as a result of planning. Issues such as method, process, and implementation have a very close relationship to the "success" or "unsuccessful" of SISP. In the more operational view, Earl (1993) defined SISP success as the fulfillment of the following criteria: (i) satisfaction scores; (ii) absence of problems, and; (iii) audit checklists.

The Importance of SA on SISP Success

Literature on SISP has unanimously and clearly indicate that alignment of IT/IS with business strategy is desirable, top priority, management concern and key to leading to superior business performance. Even some literature suggested that organizations cannot be competitive or successful if their business and IT/IS strategies are not aligned (Avison, *et*, *al*., 2002). Thus, any requirements for an organization's IT should be in alignment with its business strategy (Bleistein, *et*. *al*., 2004).

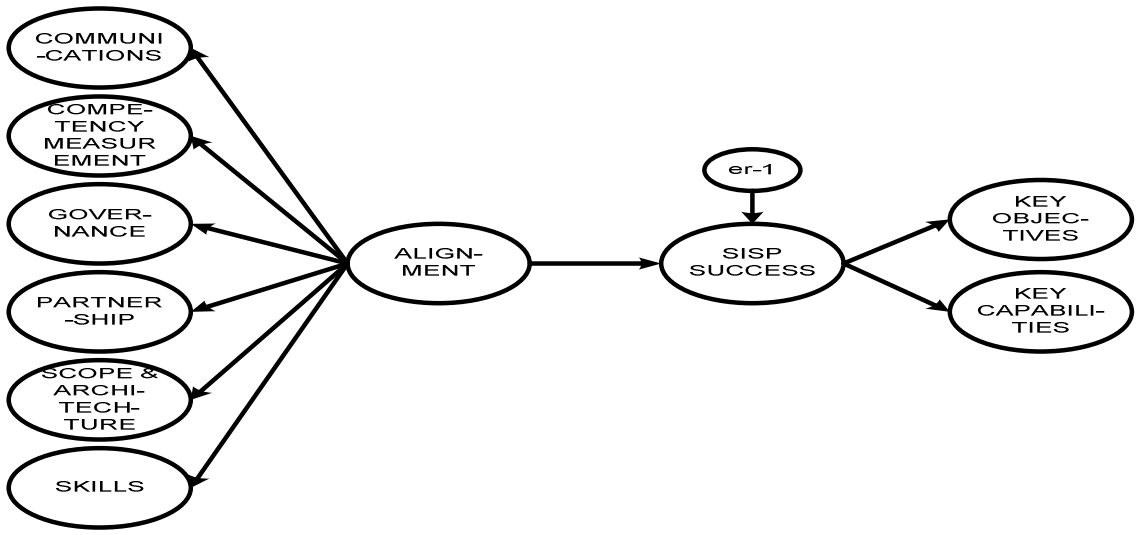
It could be synthesized that alignment is crucial in business domain as it assists organizations in the following areas: (i) maximizing return on IT investment (Avison, *et*. *al*., 2002; Chung, *et*. *al*., 2003; Teo & King, 1999; Lederer & Mendelow, 1989); (ii) helping to achieve competitive advantage through IS (Avison, *et*. *al*., 2002; Teo and King, 1996); (iii) improving efficiency and effectiveness of administration processes while creating an integrated organization in which every function, unit, and person are focused on the organization's competitiveness (Avison, *et*. *al*., 2002); (iv) ensuring the IS function supports organizational goals and activities at every levels as well as to achieve business value from IT (Teo & King, 1996; Chan, 1997; Simonsen, 1999); (v) identifying critical applications for development and ensure that adequate resources are allocated to such applications (Lederer & Sethi, 1988), and; (vi) by providing direction and flexibility to react to new opportunities (Avison, *et*. *al*., 2002). Literature suggests that SA is needed in businesses to coordinate the relationship between the business domain and the IT domain (Simonsen, 1999). Alignment is also important to ensure successful functional operations and business unit operations (Chan, 1997). Nickerson, *et*. *al*., (2003) conclude that businesses would benefit a more added value if their IS is aligned with the firm's business strategy compared to those that are not so aligned. Thus, it is so much directly related to business performance, or overall organizational effectiveness.

THEORETICAL MODEL OF CURRENT RESEARCH

Despite the significant changes in technology advancement particularly in SISP success, there has been a little research on measurement of SA on SISP success in public universities. However, there are a few studies that concentrate on SA and SISP success in business area. For instance, Luftman (2000) found that communication significantly influence SISP. On the other hand, Sledgianoswki and Luftman (2001) predicted that competency/value measurement is one of major predictor of SISP success in the business domain. However, another study conducted by Sledgianowski, *et*. *al*. (2004), suggested that there are significant relationship between governance,

partnership, scope and architecture, and skills with success of SISP. Thus, based on these arguments, the theoretical framework of this study is proposed and to be tested (see Figure I). Also, the model developed in this study allows the variables to be studied in a holistic manner, which enable more meaningful results to be generated from this study.

Figure 1: The Effect of SA on SISP Success



RESEARCH APPROACH

Two main research approaches in social science identified by Hevner, et al (2004) are qualitative and quantitative method. The two approaches can, in cases where it is suitable, be combined (Irani, et al, 1999; Lee, 1999). The combination of both methods is believed to be able to increase the robustness of results because findings could be strengthened through triangulation. This study uses the mixed method. From the quantitative perspective, this study is descriptive research that uses survey techniques. As the population size for this research is too small i.e. 17, the sample size is therefore too small to meet the statistical assumptions and conditions, as well as to make generalizations. The qualitative approach of multiple-case studies strategy is adopted so that the findings of the overall cases can be confirmed by each individual case and can hence be accepted in high confidence. Although quantitative research is philosophically positivist and case study is interpretative in nature, they can be combined together to become another rigor method of conducting IS research (Dubé & Paré, 2003).

Data collection method

Data collection method selected considers technical adequacy inclusive of reliability, validity, freedom from bias, practicality: cost, political consequences, duration, personnel needs and ethics: protection of human rights, privacy and legality. Literature has shown that questionnaire with Likert Scale has been used widely in IS research (Earl (1993); Raghunathan and Raghunathan (1994); Lederer and Sethi (1996); Segars and Grover (1999); Teo and Ang (1999); Hartono, *et al* (2003); Motjolopane and Brown (2004)). Evidence from literature has shown that IS researchers combine survey and case study strategies with the use of questionnaires as the methods of data collection (Sharma & Bhagwat (2006), Davidson (2003), Sun, *et al* (2002), Coombs, *et al* (2001), and; Howcroft and Mitey (2000)). Hence the research utilizes questionnaire as research instrument. The questionnaire consists of 59 structured questions where mode of answering is in Likert type scale. All the 59 questions are grouped into eight different sections representing the eight constructs in the research model.

Sample selection

The respondents were are selected from two different groups of stakeholders, i.e. members of IT-Steering Committee or any other committee that own and coordinates the SISP and IS users. The IS user group consists of senior officers in the public universities who are not only users of IS facilities but are well-informed of the strategic functions of the facilities. They are registrar (chancellery), treasurer, librarian, registrar (academic affair), registrar (student affair) and head of development unit.

Employment of census strategy failed due to the poor response rate from the public universities.

However, out of the 17 public universities, researcher managed to gather data from only 14 of them. And out of the 14, the complete sets of data for both IT-Steering committee and strategic user groups are obtained only from 12 public universities. Therefore, this research proceeds with 12 public universities as its sample. The public universities are Universiti Teknologi Malaysia, Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM), Universiti Islam Antarabangsa Malaysia (UIA), Universiti Utara Malaysia (UUM), Universiti Malaysia Sarawak (UNIMAS), Universiti Pendidikan Sultan Idris (UPSI), Universiti Teknikal Malaysia (UTeM), Universiti Sains Islam Malaysia (USIM), Universiti Malaysia Perlis (UNIMAP), Universiti Malaysia Pahang (UMP) and Universiti Malaysia Terengganu (UMT). It must be noted here that 12 samples are representative to the public Universities population (Bartlett, *et al*, 2001). Since the research model of this study consists of 17 different parameters to be estimated, the minimum respondents required for SEM employment in this study is 85 (Benter & Chou, 1987). The sample size of 100 in this study is therefore sufficient (Norzaidi, *et. al.*, 2008b). This procedure is taken with the assumption that all the public universities are homogeneous.

FINDINGS

Descriptive analysis on respondents

Table 1 show that 48 percent of the respondents are members of university's IT-steering committee, while the other 52 percent are the strategic users of IS.

Table 1: Respondents based on Universities and Groups

	Universities	IT-Steering Committee	Strategic Users of IS
1.	UTM	4	4
2.	UKM	4	6
3.	UPM	4	3
4.	UIAM	4	5
5.	UUM	3	5
6.	UNIMAS	5	6
7.	UPSI	5	6
8.	UTeM	5	6
9.	USIM	2	3
10.	UniMAP	5	6
11.	UMP	3	1
12.	UMT	4	1
			Total = 100

Each of the participants responded to the 59 items in the questionnaire that theoretically represents eight different constructs or variables. To confirm that each construct is being measured accurately by the proposed items, a confirmatory factor analysis is performed using the Principal Components Analysis (PCA) as the extraction method and Varimax with Kaiser Normalization as the rotation method. Both methods are chosen so that multicollinearity can be avoided.

The result of the confirmatory factor analysis reveals that eight factors have been extracted. The Kaiser-Meyer-Olkin (KMO) value that is very well above 0.6 (KMO = 0.817) and the Bartlett's test of sphericity that is significant ($\chi^2_{df=1711} = 4867.770; p = 0.000$) prove that the data set of this research is adequate for factor analysis. All the extracted factors have the estimated eigenvalue (a.k.a. the latent root) very well above 1.0 (between

2.744 and 8.141) which indicates that all factors are very well measured by its items on the basis of the standardized and structure coefficients. By carrying forward all the factors for the rest of the analysis, it would explain 63.77 percent of the total variance of the data set. The values of composite reliability that are below 0.7 (between 0.527 and 0.599) and some of the variance extracted that are below 0.5 (between 0.425 and 0.455) indicate that the design of all the constructs can be further improved. Nevertheless, the value of composite reliability that is higher than the variance extracted for each construct indicates that the construct validity of each construct can be estimated (see Table 2).

Table 2: Result of Data Examination

Extracted Factors/Constructs	Eigenvalue	Cumulative % of Variance	Composite Reliability	Variance Extracted	Cronbach Alpha
Key IS Capabilities	8.141	13.797	0.599	0.519	0.936
Fulfillment of Key IS Objectives	6.949	25.575	0.587	0.502	0.914
Governance	4.958	33.978	0.587	0.504	0.886
Competency/Value Measurement	4.447	41.515	0.596	0.515	0.849
Scope and Architecture	4.002	48.298	0.527	0.425	0.829
Skills	3.492	54.216	0.572	0.484	0.780
Communications	2.890	59.115	0.553	0.455	0.766
Partnership	2.744	63.767	0.597	0.517	0.802
Measure of Sampling Adequacy and Sphericity					
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				0.817	
Bartlett's Test of Sphericity			Apprx. χ^2	4867.770	
			df	1711	
			p	0.000	

To prove that all items under one latent construct are consistent in their measurement, the internal consistency test is performed. The method used is Cronbach-Alpha internal consistency coefficients test. This is the most commonly used for Likert type scale responses (Henson, 2001). The result shows that all the alpha coefficients are very well above 0.5 (between 0.766 and 0.936) therefore reliability of all the constructs are termed to be reliable (Peterson, 1994).

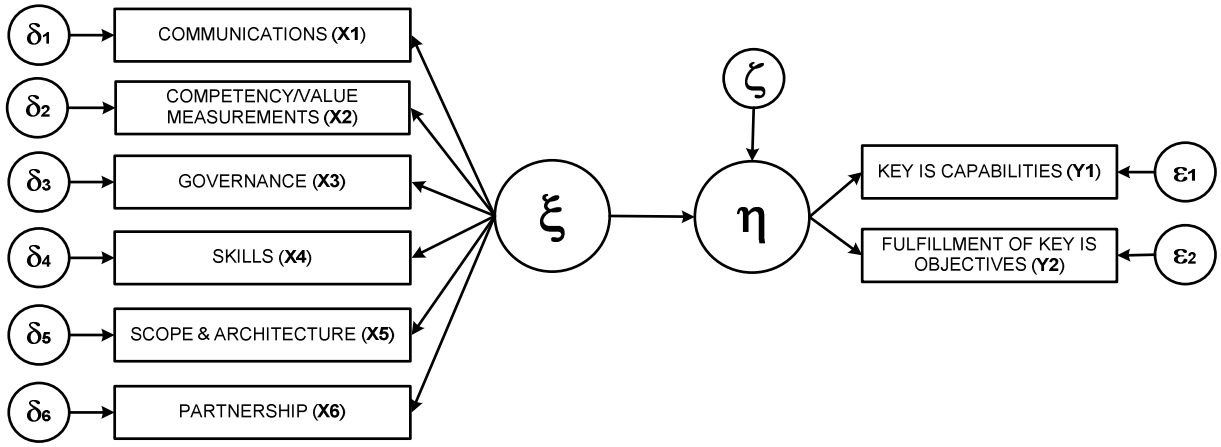
Structural Equation Modeling (SEM)

Due to the small sample size, the full model as proposed in Figure 1 needs to be simplified. The second order-factor in the SA and SISP success measurement models needs to be simplified to become a first-order factor by using the composite mean of each construct. Therefore, this research proceeds with the simplified model shown in Figure 2.

SEM is used to estimate "multiple and interrelated dependence relationship and the ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process" (Hair, *et. al*., 1998, p. 584). SEM is used in this paper because it can estimate "a series of separate, but interdependent, multiple regression equations simultaneously" in a specified structural model (Hair, *et. al*., 1998, p. 584). It can estimate the extent of causal relationships between SA and SISP success. Let the variables manifesting SA and SISP success be defined as vectors, where $X = (x_1, x_2, \ldots, x_6)$ and $Y = (y_1, y_2)$ respectively. Let the loadings for SA and SISP Success be defined as $\Lambda_x = (\lambda_1^x, \lambda_2^x, \ldots, \lambda_6^x)$ and $\Lambda_y = (\lambda_1^y, \lambda_2^y)$ respectively. In order to examine the causal relationships between SA and SISP Success, the following general equations are given below. To observe the general equation of SA (exogenous construct), the equation given is:

$$X = \Lambda_x \xi + \delta \quad \ldots(\text{Eqn. 1})$$

Figure 2: The SEM Path Diagram of SA and SISP Success



where ξ is the exogenous construct and δ is the measurement error for Strategic Alignment (note that $E(\delta)=0$). Λ_x is the corresponding loadings of SA. The corresponding equation for (Eqn. 1) can be written as follows:

$$\begin{pmatrix} x_1 \\ x_2 \\ \dots \\ x_6 \end{pmatrix} \quad \text{…(Eqn. 2)}$$

In order to observe SISP success (endogenous construct), the equation is given as:

$$Y = \Lambda_y \eta + \varepsilon \quad \text{…(Eqn. 3)}$$

where η is the exogenous construct and ε is the measurement error for SISP Success (note that $E(\varepsilon)=0$). Λ_y is the corresponding loadings of SA. The corresponding equation for (Eqn. 3) can be written as follows:

$$\begin{pmatrix} y_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} \lambda_1^y \\ \lambda_2^y \end{pmatrix} \eta + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \end{pmatrix} \quad \text{…(Eqn. 4)}$$

Generically, the general equation for the structural model is:

$$\eta = \Gamma\xi + \beta\eta + \zeta \quad \text{…(Eqn. 5)}$$

where η and ξ are vectors of unobserved endogenous and exogenous variables respectively. $\beta_{(n\times n)}$ and $\xi_{(n\times m)}$ are matrix coefficient parameters for η and Γ respectively (where *m* is the number of exogenous constructs and *n* is the number of the endogenous construct). Also note that $E(\zeta)=0$. Based on the previous equations, the general equation for the structural model comprising the relationships between the exogenous construct and endogenous construct can be given as follows:

$$\eta = \Gamma\xi \quad \text{…(Eqn. 6)}$$

(Eqn. 6) elucidates the presence of only one endogenous and exogenous construct. To simplify it, the following equation can be given as:

$$\eta = \gamma\xi \quad \text{…(Eqn. 7)}$$

Referring to (Eqn. 7) γ shows the relationship of SA to SISP Success. The relationships between SA and SISP success are depicted in Figure 2. It holistically shows the entire relationships in a causal format specifying the structural and measurement models given in the previous equations. The structural model was estimated using the Maximum Likelihood Estimation (MLE) procedure. According to Hair et al. (1998), results of MLE correspond to events that are likely to happen based on the observed variance-covariance matrix. In this paper SPSS AMOS was used to estimate the relationship of SA to SISP success.

Goodness-of-Fit Indices

Table 3 shows the Chi-Square value obtained is small and is not significant at $p > 0.05$ ($\chi^2_{df=51} = 54.986$, $p = 0.326$). This indicates that the model based on the observed data is not significantly different from the model proposed. The ratio of $\chi^2 : df$ is less than 2, indicates that the model has a good fit. The RMR index which measures the discrepancy between elements in the observed and proposed covariance matrices is less than 0.1, it also proves that the model has a good fit. The RMSEA index is also lower than 0.08, indicating a very minimum error of approximation (Norzaidi, *et. al.*, 2007). It further proves that the model has a good fit. The GFI value which indicates the relative amount of variance and covariance in the data explained by the proposed model is higher than 0.90, indicating further that the model's fitness is estimated. With the note that all measures have been validated the model, it is therefore sufficient to conclude that the proposed research model is accepted. The data set obtained is proven valid, accepted and fit to carry out the objective of this study as proposed in the research model.

Table 3: The Goodness-of-Fit Indices for the Research Model

Absolute Fit Measures	Result	Recommended Value	Model Fitness
CMIN			
CMIN	54.986		
df	51		
p	0.326	> 0.05	✓
Ratio	1.078	< 2	✓
RMR	0.020	≤ 0.10	✓
GFI	0.942	≥ 0.90	✓
RMSEA	0.020	< 0.08	✓

Path Diagram

Result in Table 4 shows that the exogenous construct (ξ) has a positive and significant association with the endogenous construct (η) ($\gamma = 0.97; p = 0.000$). Based on this result, there is sufficient evidence to conclude that SA (ξ) has positive effects on SISP success (η) in public universities.

Table 4: The Relationship between Strategic Alignment and SISP Success for Public Universities

Construct Associations	α level	Standardized Parameter Estimates (SPE)(γ)	*p*-value	Significant
ξ to η	0.05	0.97	0.000	Yes

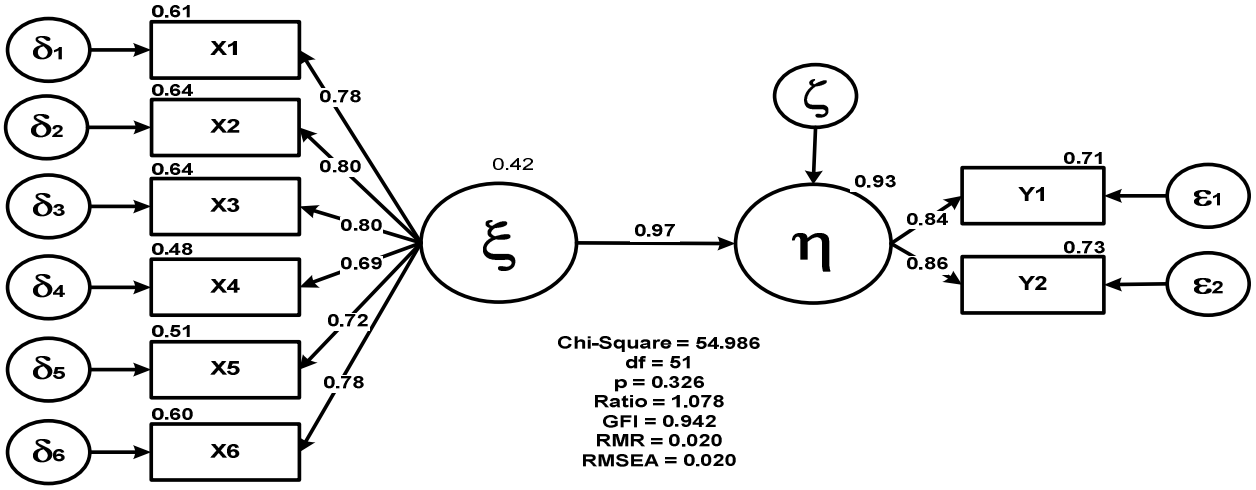
Note: α level denotes significant level (probability of committing a Type 1 error)

Based on the result in Table IV, the equation of the structural model can be specified as:

$\eta = 0.97\xi$ …(Eqn. 8)

Figure 4 shows the path diagram for public universities. The standardized output shows that Fulfillment of Key IS Objectives and Key IS Capabilities explain 93.0 percent of the variance in SISP success. In other words, the error variance of SISP success is approximately 7.0 percent of the variance of SISP success itself. The standardized regression weights show that Fulfillment of Key IS Objectives predicts SISP Success better than Key IS Capabilities (0.86 compared to 0.84). These estimates are significant at $p < 0.001$. The variance for Strategic Alignment is 0.42. It has been significantly (at $p < 0.001$) predicted by six factors, i.e. Competency/Value measurements, governance, communications, partnership, scope and architecture, and; skills.

Figure 3: SEM Path Diagram for Public Universities



DISCUSSION AND RECOMMENDATIONS

This research proposes a structural model that represents the relationship between SA and SISP Success in public universities. The result of this study shows that SA has a very significantly strong causal effect on SISP success in public universities. This finding is in line with the theory (Dery, 2003). It indicates that to rise the level of SISP success in public universities, measures that could raise the level of SA are crucial.

This study also found that the significant factors that contribute to SA are competency/value measurements, governance, communications, partnership, scope and architecture, and; skills. This indicates that to increase the level of SISP Success, all the important areas related to SA as represented by the six factors are fundamentals. Converting the six factors into practical guidelines, following are the actions that may help to increase the level of SISP success in public universities:

a. Public universities need to address the justifications of IT human resource considerations such as how to hire/fire, motivate, train/educate, and culture.
b. Public universities are suggested to support a flexible infrastructure (Chung, *et. al*., 2003) that is transparent to all business partners and customers, evaluate and apply emerging technologies effectively (Mistry, 2006), enable or drive business processes and strategies as a true standard, and provide solutions customizable to customer needs. They are also required to have a so-called balanced "dashboard" that demonstrates the value of IT in terms of contribution to the core business of the organization.
c. Each department and unit in public universities needs to better perceive the contribution of IT, to better trust the participants in IT projects, to ensure the better appropriate business sponsors and champions of IT endeavors, and to share of risks and rewards;
d. Public universities need to have a better exchange of ideas and a better understanding of what it takes to ensure successful strategies in the light of enablers and inhibitors of SA. Previous research (Earl, 1993: Luftman, 2000; Muller and Seuring, 2007) stated that too often there is little business awareness on the part of IT or little IT appreciation on the part of the business. Given the dynamic environment in which most organizations find themselves, ensuring ongoing knowledge sharing across organizations is paramount, and;
e. Public universities need to ensure that the appropriate business and IT participants formally discuss and review the priorities and allocation of IT resources.

CONCLUSION AND FUTURE RESEARCH

This study has advanced knowledge with the development of the model of SA that measure ISIS success in public universities. Based on the findings, it is hoped that the recommendations given in this paper shed some lights to the Malaysian organizations to recuperate their technology implementation to ensure a system is valuable to the organization. Moreover, it is also hoped that the recommendations would work as a guide to other industries on how to preeminent implement strategic alignment on technology.

Nevertheless, this research chooses to use the quantitative approach as it draws conclusions based on statistical tests that are said to be more accurate and rigor. The quantitative data is also believed to yield more objective and accurate information because they are collected using standardized methods. However, the findings is more general and not as details as it will be when the qualitative method is chosen. This research also conducts data examination procedures in order to get the best

combination of items and constructs. However, these measures may only minimize the bias but not totally avoid it. Although the sample size is representative and sufficient to make generalization, it must be noted that generalized finding is always subjected to possibility of a certain margin of error. With the awareness that this weakness is unavoidable as it is usually happen in many survey research, the limitation of this research which relates to the selection of cases is hereby noted. Thus, it is recommended for prospect studies to embrace a bigger sample size and across different industries. Moreover, a cross-cultural study is also viable to distinguish whether the findings are different, or otherwise.

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