



The Effect of Information Technology Infrastructure Flexibility on Intranet Effectiveness

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Abstract

When intranet was first conceived a decade ago, its adoption was only affordable by large business enterprise or organizations. However, at present, intranet adoption has become so prevalent that almost every organizations, irrespective of sizes and business nature has diffused intranet into their business operations and activities. While studies addressing the effectiveness of the intranet have been greatly reported in the literature, very few have really explored or focused on the antecedents or determinants to intranet effectiveness. Specifically, none has ever attempted to examine the effect of information technology (IT) infrastructure capabilities on intranet effectiveness. Against this concern, this study is an attempt to explore the relationship between IT infrastructure flexibility and intranet effectiveness. In addition, it also seeks to investigate the perceived level of IT infrastructure flexibility and intranet effectiveness in the context of public organizations in Malaysia. Based on the results of the analysis, this study has empirically showed that IT infrastructure flexibility comprising of connectivity and IT personnel are influential in determining intranet effectiveness measured in terms of operation, culture and facilitation.

Keywords: IT infrastructure flexibility, Connectivity, IT personnel, Modularity, Compatibility intranet effectiveness

1. Introduction

An Intranet is an internal information system based on Internet technology, web services, TCP/IP and HTTP communication protocols, and HTML publishing (Hinrichs, 1997). It also refers to the use of World Wide Web (WWW) servers, browsers, home pages, search engines and hyperlinks, file transfer facilities, and management tools within an organization (Muraszkiwicz, 1996). At present intranet technologies have significantly matured and has undergone diverse advancements and sophistications. In fact, to reflect these complexities, new terms such as portal or enterprise portal have been coined to replace intranet. Also, its implementation has become so prevalent that almost every organizations, irrespective of sizes and business nature has diffused intranet into their business operations and activities. In particular, its adoption among public and non-profit organizations is also very common driven by the benefits and advantages associated with its implementation.

As intranets being deployed and implemented into business organizations, studies addressing its effectiveness has and will continue to capture the interest of many IS scholars and researchers alike. However, despite the many studies that addressed intranet effectiveness in diverse implementation settings, very few have really explored or addressed the antecedents or determinants of intranet effectiveness (Masrek, Karim & Hussein, 2007). As noted by Delone & Mclean (2002), when studying information system (IS) effectiveness, one should concentrate on its antecedents or predictors which might include various contextual and demographic factors affected by environmental, organizational, technological and individual traits.

Such studies are certainly important as that would further deepen our understanding on factors that contributes towards the success of the intranet. Findings of such studies would also assist intranet implementers to devise plans and undertake necessary actions as that would further help to improve their intranet effectiveness. Likewise, the findings of this study should be helpful to future intranet adopters as that will provide guidance to them on factors that must be emphasized in the course of running successful intranet systems. Furthermore, considering that intranet is not an

inexpensive technological investment, any organization implementing it would expect better return on its investment. Against this concern, this study is an attempt to examine the relationship between technological factors i.e. IT infrastructure flexibility and intranet effectiveness.

Given that this factor has been shown to be influential in determining IS effectiveness or business performances in numerous IS studies, little is really known as to whether this factor is also applicable in the context of intranet implementations. Furthermore, study addressing both IT infrastructure flexibility and intranet effectiveness has yet to be done in the context of developing country such as Malaysia. To this effect, not much is really known on the level of IT infrastructure flexibility and intranet effectiveness of organizations in Malaysia. In addition to the aforementioned purposes, the study is also meant to validate the instrument of intranet effectiveness developed by Murgolo-Poore *et al.* (2002)

2. The research model

In studies researching IS effectiveness, the IS success model developed by Delone & Mclean (1992) has always been the favorite choice amongst IS researchers. In the decade prior to its updating, Delone & Mclean (2003) identified that its original model had been cited by 285 refereed articles on journals and proceedings. The model defines IS effectiveness as the inter-relationship of six dimensions namely information quality, system quality, IS use, user satisfaction, individual impact and organizational impact. Consequently, Myers, Kappelman & Prybutok (1998), updated the original IS success model to include workgroup impact and service quality. Previous studies have shown that in adopting the IS success model for studying IS effectiveness, researchers have either partially or fully adopted all of the dimensions. When studies were done at the firm level perspectives, researchers would usually give priority on investigating on workgroup impact and organizational. Delone & Mclean (1992) argued that the IS success model was meant to provide the independent variables and thus future studies intending to adopt the model should consider investigating the contributing factors of determinants.

Studies from Ang *et al.* (2001) and Hussein *et al.* (2007) empirically showed that technological factors were critical in determining IS/IT effectiveness. Focusing on IT infrastructure flexibility as the technological factors, Saaksjarvi (2000); Chung, Rainer & Lewis (2003), Chung *et al.* (2005), and Ness (2005) further confirmed that IT infrastructure flexibility was influential in predicting IS/IT effectiveness. In the domain of intranet studies, Eder & Igarria (2001) noted that flexible IT infrastructure should provide a foundation that is less complex, hence facilitating the implementations of intranet applications and its service offerings. Their study hypothesized and empirically showed that IT infrastructure flexibility was strongly associated with intranet infusion. Following their findings, Masrek, Karim & Hussein (2007) also conceptualized that IT infrastructure flexibility is a predictor of intranet effectiveness. Based on the aforementioned discussion, this study hypothesizes that IT infrastructure flexibility which consists of compatibility, connectivity, modularity and flexible IT personnel (Byrd & Turner, 2000; Tallon & Kreamer, 2003) will be significantly related to intranet effectiveness measured in terms of operation, culture and facilitation (Murgolo-Poore *et al.* 2002). Accordingly, a research model as shown at Figure 1 is proposed.

2.1 Intranet effectiveness

The effectiveness of an intranet is always associated with the benefits for its implementation. Various studies have empirically demonstrated the benefits and merits of intranet adoption both at the firm level and individual level perspectives. Benefits at the firm level perspectives relates to the effect of intranet on organizational performances such as productivity improvements, cost savings, and enhanced customer service (Lai & Mahapatra, 1998; Leung, Chong & Cheng, 2000; Azzone & Bianchi, 2000; Buchanan-Oliver *et al.* 2000; Knight *et al.*, 2005; Kefos & Riedl, 2005). In contrast, benefit at the individual level perspective denotes the effect of intranet on individual performances such as individual productivity, individual efficiency, and individual effectiveness (Lai & Mahapatra, 1998; Kjernald, 2002; Weber, 2002; Kefos & Riedl, 2005; Daniel & Ward, 2005; Deltour, 2005).

Previous studies addressing intranet effectiveness either at the firm level or individual level perspectives were very much exploratory. Thus, interviews and participant observations was mainly employed in the data gathering techniques. Due to that nature of studies, reliable instruments which can be readily used for measuring intranet effectiveness was rarely found. Hence, in an attempt to provide a sound and reliable instrument for measuring intranet effectiveness, Murgolo-Poore *et al.* (2002) developed an intranet pen and pencil checklist that measures effectiveness from three dimensions i.e. operation, culture and facilitation. The operations dimensions assess the extent to which the organization's intranet impacts the way in which the organization operates. The culture dimensions assess the extent to which the organization's intranet impacts the organizational culture. The facilitation dimensions assess the extent to which the organization's intranet facilitates collaboration and cooperation among organizational members. All the 15-items measures recorded an alpha value above 0.90 suggesting that the instrument is highly reliable. The intranet pen and pencil checklist has shown consistent outcome in terms of its reliability in different intranet studies (Weber, 2002; Murgolo-Poore *et al.*, 2003).

Considering that the developer of IS success model (Delone & Mclean, 1992) did not provide the measures or instruments for gauging all the dimensions, its proponents cautioned that only validated measures should be used when using the model. To this effect, the researcher felt that the instrument developed by Murgolo-Poore *et al.* (2002) is most appropriate. Based on its scope and focus, the researcher argues that all the items measuring intranet effectiveness are suitable for organizational impact dimension of IS effectiveness model (Delone & Mclean, 1992), workgroup impact dimension of the comprehensive IS effectiveness model (Myers, Kappelman & Prybutok, 1998) as well as net benefits dimension of updated IS effectiveness model (Delone & Mclean, 2003). More precisely, the culture and facilitation dimension measures workgroup impact dimension while the operation dimension measures the organizational impact dimension.

2.2 IT Infrastructure flexibility

The importance of organizational IT infrastructure capability is increasingly recognized as critical to organizational survival and competitiveness (Broadbent *et al.* 1996; Chung *et al.* 2003). According to Xia & King (2004), IT infrastructure is generally considered to be the foundation of shared IT capabilities that enable the development of IT applications and the support of business processes. They defined IT infrastructure as a set of IT resources and organizational capabilities that are shared across the organization and that provide the foundation on which IT applications are developed and business processes are supported. IT infrastructure capabilities are usually provided by the organizational IT/IS functions (department) but can also encompass public or outsourced facilities used by the organizations (Weill & Broadbent, 1994; PE International, 1995). The prime reason for developing IT infrastructure capabilities is to support the commonality between different application or uses, facilitating information sharing across organization and cross-functional integration (Darnton & Giacolette, 1992)

With regard to flexibility, the term has been defined by most of the literatures, including IS, organization theory, strategic management, and operations management as the capability to respond to environmental changes (Lee & Xia, 2003). Byrd & Turner (2000) defined IT infrastructure flexibility as the organizational capability to support a variety of information technologies and information services. Past studies addressing IT infrastructure flexibility characterized flexibility into four dimensions namely compatibility, connectivity, modularity and flexible IT personnel (Byrd & Turner, 2000; Tallon & Kreamer, 2003; Chung *et al.*, 2003; Ness, 2005; Chung *et al.*, 2005).

Compatibility denotes the ability to share any type of information across any technology component. Connectivity refers to the ability of any technology to attach to any of the other technology components. It also means that every person, every functional area, and every application in the organizations are linked to one another. Modularity signifies that software applications can be more manageable when routines are processed in separate modules. Modularity also provides a firm the ability to quickly build or modify software applications in order to easily support changes in product development. Flexible IT personnel refer to IT workers working cooperatively in cross functional teams embracing different kinds of technologies. Byrd & Turner (2000) noted that IT personnel flexibility should be well-versed in the combination of technical competencies, boundary competencies and functional competencies. Technical competencies denote a set of measures of technical capabilities such as programming, understanding software development process and knowledge of operating systems. Boundary competencies relates to the importance of IT personnel having skills and knowledge to assume roles outside their area of training or original competencies which include project management and business process support. Functional competencies is concerned with the ability of the IT personnel to understand the business processes they are to support and apply the appropriate technical solution to a given business problem.

Based on the items measuring the four dimensions of the IT infrastructure flexibility developed by Byrd & Turner (2000), studies by Chung *et al.*, (2003); Ness, (2005); Chung *et al.* (2005) have found that IT infrastructure flexibility are significantly correlated with IT/IS effectiveness and the extent of IT implementation (i.e. transaction processing systems, management information systems, decision support systems, data warehouse, network management etc). Other studies by Saaksjarvi (2000); Tallon & Kreamer (2005) also indicated that IT infrastructure flexibility are critical in determining IS/IT effectiveness or business performance. In the context of intranet study, Eder & Igbaria (2001) also confirmed that IT infrastructure flexibility were influential in predicting intranet infusion i.e. the process of embedding an intranet application deeply and comprehensively within an individual's or an organization's work systems (Cooper & Zmud 1990).

It has been argued that, in ensuring the effectiveness of the intranet, intranet management activities must be properly in place (Schmid *et al.* 1999; Terplan, 2000; Masrek *et al.*, 2007). Schmid *et al.* (1999) elaborates that intranet management comprises of highly heterogeneous activities including content generations and updates, user accounts management, hardware and software maintenance, and many more. On the other hand, Terplan (2000) advocates that in managing intranets, those critical success factors include (i) management processes that may involved fault, configuration, performance, security and accounting management, (ii) management tools that will be utilized for supporting management process and are usually assigned to human resources, and (iii) human resources of the

management team that would embrace their skills and network management experiences.

Based on the arguments by Terplan (2000) and Schmmid *et al.* (1999), it is apparent that intranet management activities are related with the four dimensions of IT infrastructure flexibility. A close scrutiny on items measuring the four dimensions also suggests that these items revolved around intranet management activities. For instance among the items used for measuring compatibility were “*our firm has extensive electronic links and connections throughout the firm*” and “*end users in our organizations are electronically linked with most other end users*”. The two items simply imply that the compatibility requirement of IT infrastructure flexibility is that organizations should provide adequate technological infrastructure such as intranet that would enable everyone to be connected. Among items for measuring connectivity include “*our bandwidth capabilities provide access to large variety of data including text, voice and graphical*” and “*our firm has very flexible links in its IT links and connections*”. These items clearly stressed the importance of having adequate bandwidth capabilities and flexible IT connectivity such as intranet because that would facilitate users in their data access or retrieval. Likewise, items for measuring modularity and flexible IT personnel relates to the importance of having reusable software modules and competence and flexible IT personnel as that would ensure that new applications can be easily and quickly added onto the intranet, developed by skill IT personnel who are responsive to users needs and flexible enough to be working across diverse business functions. Based on the aforementioned discussion, the researcher also argues that IT infrastructure flexibility should also have significant effect on intranet effectiveness. To this effect, the following hypotheses are formulated:

- *H1: Compatibility of IT infrastructure will be significantly related to intranet effectiveness*
- *H2: Connectivity of IT infrastructure will be significantly related to intranet effectiveness*
- *H3: Modularity of IT infrastructure will be significantly related to intranet effectiveness*
- *H4: Flexibility of IT personnel will be significantly related to intranet effectiveness*

3. Research Methodology

Public organizations consisting both state and federal government agencies were selected as the population for the study. The public sector was chosen because it has long been a leader in the development and use of information systems application. According to Hussein (2004), the public sector should become the next center of empirical research because it is the largest consumer of information technology and the biggest information based organization. A sample frame for the study was drawn from the myGovernment, the Malaysia’s government official portal (<http://www.gov.my>). The portal provides a comprehensive listing and directories of all public agencies both at the state and federal level. By exploring the agencies’ websites, the researcher could identify those that have implemented intranet or portal. Based on this exercise, a sampling frame was prepared. Purposeful sampling was adopted because the study would investigate those agencies or department that have implemented intranet and have IT departments. Data was collected using a survey research design employing cross-sectional approach. Self-administered paper-based and electronic questionnaires were posted and e-mailed to 325 agencies, departments, division, statutory bodies both at the federal and state government. As the study adopts organization as the unit of analysis, the questionnaires were addressed to key-informant holding the post of either IT manager, IS executives or senior programmer. To further boost the number of responses, a follow-up e-mail and phone calls were made two weeks after the questionnaires were sent out. A total of 89 questionnaires were returned but only 71 were found usable. Some of the unusable questionnaires were categorized based on the note written by the respondents indicating that there is no IS department in their organization. Others were simply incomplete.

The questionnaire that was used in the study consists of 34 close and open-ended questions divided into four sections preceded with the cover letter explaining the purpose of the questionnaire and the definition of intranet / portal. The first section captures demographic information such as number of years using the intranet / portal, number of years of IS department existence, total number of employees working in IS department and total number of employees working in the organizations. The second section captures information on IT infrastructure flexibility. The third section captures information on the three dimensions of the intranet effectiveness. The last section is an open ended question asking respondents to add additional any comments regarding their IT infrastructure capabilities and intranet effectiveness. Realizing that Malay Language is the main and formal language for any government correspondence in Malaysia, the questionnaire is therefore prepared in that language. Other than questions on demographics information, all other questions were using perceptual measures with a corresponding five point Likert scale ranging from 1 = strongly disagree and 5 = strongly agree. As noted by Torkzadeh *et al.* (2005), perceptual measures are acceptable measures and extensively used in IS studies. Fifteen items adapted from Chung *et al.* (2005) and Byrd & Turner (2000) were used to measure IT infrastructure flexibility. Thirteen items adapted from Murgolo-Poore *et al.* (2002) were used to measure intranet effectiveness.

4. Findings

Based on the 71 usable responses, data were analyzed using SPSS version 14.0. Non-response bias was checked based

on two groups i.e. early responders vs. late responders using ANOVA and the results yielded that there was no significant difference between them. Subsequently, factor analysis was executed on the four dimensions of IT infrastructure flexibility i.e. compatibility, connectivity, modularity and flexible IT personnel and the three dimensions of the portal effectiveness i.e. operation, culture and facilitation. In interpreting factors to determine which factor loadings are worth considering, this study adopted loadings of 0.65. All the measures were entered into principle axis factoring with Varimax rotation. The results of the factor analysis revealed that all the five items measuring IT personnel cleanly loaded onto Factor 1, all the three items measuring modularity cleanly loaded onto Factor 3, all the three items measuring connectivity plus two items measuring compatibility loaded onto Factor 2. Following this results, the four antecedent factors are reduced to only three and named as flexible IT personnel, modularity and connectivity. Two items from the compatibility measures had to be dropped as they did not meet the cut-off point. As for the intranet effectiveness dimensions, the results indicated that all the five items measuring facilitation dimension cleanly loaded into Factor 1, all the four items measuring cultural dimension cleanly loaded into Factor 2, and all the four items measuring operation dimension cleanly loaded into Factor 3. Thus, the original three dimensions of the intranet effectiveness were retained. Accordingly, reliability analyses were performed on the intranet effectiveness measures and all the three antecedents' factors measures. Result of this procedure is shown at Table 1.

4.1 Demographic

Table 2 presents the profile of the responding organizations. Majority of the respondents or 53.5 % indicated that their organizations had implemented intranet between 3 and 6 years. 16.9 % of the respondents indicated that intranet had been used between 7 and 10 years. The high percentage of organizations implementing intranet between 3 and 10 years could be attributed by the fact that Malaysia has recovered from the economic downturn experienced in 1997 to 1999. Hence, the spurring economic for the last 7 to 8 years has enabled the government of Malaysia to allocate more fund for ICT deployment expenditure. 11.3 % of the respondents indicated that they had used intranet either more than 12 years or between 11 and 12 years. A post-examination on the questionnaires revealed that these figures came from huge organizations such as ministries or universities at the federal government.

With regard to the age of their IT departments, majority or 52.1% of the respondents answered that IT departments had existed either more than 12 years or between 11 and 12 years. Driven by the growing numbers of public employees and motivated by the realization of the importance of IT functions in realizing paperless office, a relatively high percentage of respondents indicating that their IT departments had existed between 3 and 10 years could be justified. The statistics of the responding organizations also suggest that more than 85% indicated that the number of staffs working in the IT department is between 10 and 40 people. Only 4.2% responded that the number of staffs is more than 70 people. Questions on the number of staffs working in the entire organizations revealed that more than 80% indicated that there are more than 130 people. This huge number implies that intranet utilization is more appropriate and practical in situation where there is large number of users.

4.2 Descriptive statistics

As discussed in the preceding section, the study was carried out with the purpose of investigating the perceived level of IT infrastructure flexibility and intranet effectiveness in participating organizations. To accomplish this research objective, a descriptive statistics for each item measuring all factors relating to IT infrastructure flexibility and intranet effectiveness is prepared. As shown in Table 3, the mean score for each item measuring connectivity and IT personnel is all above 3, implying that respondents generally agree that IT infrastructure in their agencies are flexible in terms of connectivity and IT personnel. However, items measuring modularity scored mean values less than 3 and hence suggesting that respondents generally perceived that IT infrastructure in terms of modularity aspect in government agencies is less flexible. In terms of perceived intranet effectiveness, the mean value for all items of the three dimensions measuring intranet effectiveness is well above 3 and hence signifies that respondents were generally agreed that the intranet that are being used in their agencies are effective in terms of enhancing business operation, promoting the desired organizational culture and facilitating collaboration among organizational members (Table 4). This finding is consistent with that of Lai & Mahapatra (1998), Weber (2002), Murgolo-Poore *et al.* (2003) and Knight *et al.*, (2005).

4.3 Relationship between research variables

As mentioned in the preceding section, this study seeks to investigate the effect of IT infrastructure flexibility on intranet effectiveness. Based on the correlation and regression analyses result shown at Table 5, it can be concluded that H2, H3, and H4 are fully supported. Both connectivity and IT personnel demonstrated high correlation value with intranet effectiveness with each measuring at 0.739 and 0.731 respectively. Correlation between modularity and intranet effectiveness recorded an r-value of 0.476 which can still be considered as strong. These findings denote to some extent that the degree of connectivity, modularity and IT personnel would relate to higher degree of intranet effectiveness. These findings are consistent with Eder & Igarria (2001), Chung *et al.* (2003) and Chung *et al.* (2005) and imply that a high degree of IT infrastructure flexibility would relate to a higher degree of intranet effectiveness.

To further investigate the quantitative estimates of the hypothesized linkages, a path analysis was executed. Path analysis is an extension of the multiple regression technique that examines the pattern of relationship between three or more variables (Bryman & Cramer, 2001). Path analysis also confirms the model produced by regression analysis (Pedhazur, 1997). AMOS version 5.0 was used to execute the path analysis. The results as shown in Figure 2 indicated that amongst the three antecedent variables, modularity was not found to be strong predictor of intranet effectiveness.

5. Discussion and conclusion

The central focus of this study was to investigate the relationship between IT infrastructure flexibility and intranet effectiveness. In the process, instruments developed by Murgolo-Poore *et al.* (2002) was used to measure intranet effectiveness while the instrument from Chung *et al.* (2005) but originally developed by Byrd & Turner (2000) was adopted to measure IT infrastructure flexibility. Upon doing factor analysis, the items grouping of the intranet effectiveness measures turned out to be consistent with the conceptualized dimensions. This finding further supports previous studies by Weber (2002) and Murgolo-Poore *et al.*, (2003) and hence suggests that the instrument is highly reliable. However, when similar analysis was applied to the IT infrastructure flexibility instrument, the results emerged to be different from the initial conceptualized dimensions. More specifically, several items measuring compatibility turned out to be insignificant while the remaining items had loaded onto connectivity dimension. This finding is not considered uncommon as the original instrument developed by Byrd & Turner (2000) had also yielded almost similar results and that they have used the term integration to represent those items from both connectivity and compatibility dimensions.

Having confirmed with the acceptability level of the reliability of the research instrument, further analysis involving correlation and liner regression were employed with the purpose of testing the formulated hypotheses. Evidently, the results turned out to be consistent with the researcher's expectations and that H2, H3 and H4 were supported. Conversely three dimensions of IT infrastructure flexibility i.e. connectivity, modularity and flexible IT personnel are significantly related to intranet effectiveness. Subsequent analysis further unveiled two most significant predictors of intranet effectiveness were connectivity and flexible IT personnel. One plausible explanation as to why modularity was not found to be strong predictor could be that most IS projects in Malaysian government agencies are not in-house developed but outsourced to third party software developer or vendors. The propriety nature of software or application systems brought by these different vendors would definitely reduced modularity. Nevertheless, as opposed to modularity, both connectivity and flexible IT personnel have shown their predictive power in explaining intranet effectiveness. Apparently, in accomplishing connectivity, organizational members or functional units could exploit the use of organizational intranets. The more is the intranet being used, the more it would be perceived as being effective. Likewise, as the intranet is being continuously used, the on-going support and maintenance by the IS/IT function is very critical. An effective team comprising of flexible IT personnel would certainly ensure that the intranet would not fail.

In essence, the study has contributed to the body of knowledge in three perspectives. First, it has developed empirical based framework linking IT infrastructure flexibility and intranet effectiveness. The framework could be use by other prospective researchers to study divers IS/IT implementation settings. Secondly, from the methodological standpoint, the study has successful validated the instruments used by previous researcher and applied in intranet implementation settings. Thirdly, from the pragmatic standpoint, the instrument used in the study can be utilized as a checklist by intranet practitioners to evaluate their IT infrastructure flexibility as well as their intranet effectiveness. Also, as this study has shown the effect of IT infrastructure flexibility on intranet effectiveness, it does send a strong message to IS planners of the importance of giving serious attention on IT infrastructure flexibility issue when devising IS planning.

While this study has successfully accomplished its objectives, it bears several limitations. The perceptual self-report measures instead of objectives measures adopted in this study would contribute to biasness. Furthermore, this study adopted a cross-sectional design hence data was captured only at one point in time. Future research should consider conducting similar study employing experimental design study or even longitudinal study to capture data of a given time frame is also seen plausible. Other possible approach could be mixing the qualitative and quantitative design involving in-depth interview with users and observation in a natural intranet usage setting.

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Table 1. Reliability analysis of research variables

Variables	No. of Items	Reliability (<i>Cronbach Alpha</i>)
Connectivity	5	0.89
Modularity	3	0.96
IT Personnel	5	0.93
Overall Intranet Effectiveness Measure	13	0.88

Table 2. Profile of respondents

Characteristics	Items	Frequency	Percentage
Age of Intranet Usage	< 1 or 1 – 2	13	18.3
	3 – 6	38	53.5
	7 – 10	12	16.9
	11 – 12 or > 12	8	11.3
Age of IT Department	< 1 or 1 – 2	0	0
	3 – 6	16	22.5
	7 – 10	18	25.4
	11 – 12 or > 12	37	52.1
No of staffs in IT Department	< 10 or 10 – 20	32	45.1
	21 – 40	30	42.3
	41 – 60	6	8.5
	61 – 70 or > 70	3	4.2
Total no. of staffs in agencies	< 30 or 30 – 50	2	2.8
	51 – 90	6	8.5
	91 – 130	6	8.5
	130 – 150 or > 150	57	80.3

Table 3. Descriptive statistics of IT infrastructure flexibility

Modularity	Mean	Std. Dev.
Reusable software modules are widely utilized in new systems development in our firm	2.46	1.067
IT personnel utilize object-oriented and other modular tools to create software applications	2.42	1.023
Computer software modules can easily be added to, modified or removed from the existing IT infrastructure with very few problems	2.46	1.119
IT Personnel	Mean	Std. Dev.
Our IT personnel work well in cross-functional teams addressing business problems	3.70	0.800
Our IT personnel are encouraged to learn new technologies	3.49	0.876
Our IT personnel are able to interpret business problems and develop appropriate technical solutions	3.69	0.748
Our IT personnel have the ability to work cooperatively in a team environment	3.72	0.759
Our IT personnel are in multiple technologies and tools	3.68	0.732

Table 4. Descriptive statistics of intranet effectiveness

Operation	Mean	Std. Dev.
Our intranet has changed the way our firm communicate internally	3.42	0.889
Our intranet is very effective for saving resources, such as times, facilities and money	3.46	0.842
Our intranet has become an integral part of the way we operate	3.54	0.983
Our intranet brings us together and helps us work more effectively	3.72	0.778
Culture	Mean	Std. Dev.
Our intranet is a solution of bringing people within our organization together	3.90	0.848
Our intranet provides major cultural revolution in our firm in the way people work, think and communicate	3.92	0.824
Our intranet has truly allowed a global community to grow	3.55	1.131
The overall effect of our intranet has been to make our members of our firm better communicator	3.94	0.843
Facilitation	Mean	Std. Dev.
Our intranet foster collaboration	3.58	0.690
Our intranet allows to effectively implement business strategy	3.58	0.710
Our intranet helps to bring product or services much quicker	3.73	0.774
Our intranet is a way to communicate, design, develop and deliver new product or services	3.63	0.702
Our intranet makes our employee feel like a significant part of the firm	3.61	0.707

Table 5. Correlation and linear regression results

Independent Variable	Dependent Variable: Intranet Effectiveness					Hypotheses Testing
	R ²	F	β / r	t	P value	Outcome
Connectivity	0.547	83.151	0.739**	9.119	0.00	H2: Supported
Modularity	0.227	20.221	0.476**	4.497	0.00	H3: Supported
Flexible IT Personnel	0.535	79.232	0.731**	8.901	0.00	H4: Supported

** Correlation is significant at 0.01 level (2-tailed)

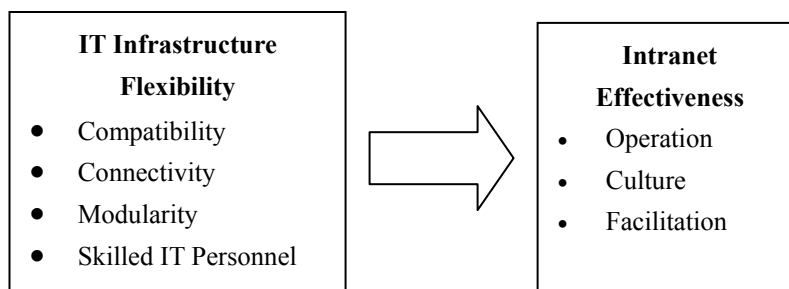


Figure 1. The Research Model

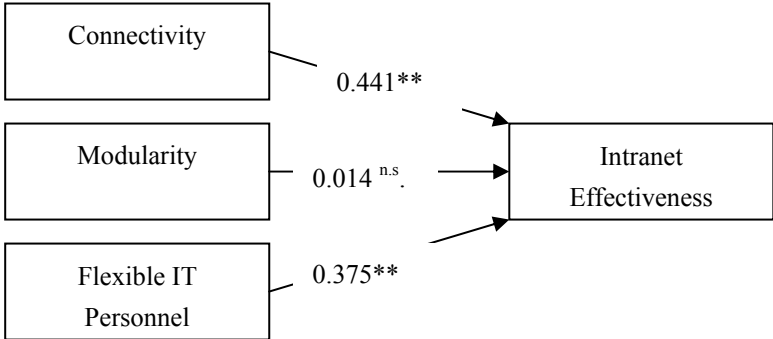


Figure 2. Path analysis of research model

Legend: ** = significant at 0.001 level, n.s. = non significant