

Full Length Research Paper

The success of intranet usage on managerial performance: The effect of task and technology antecedents on usage

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Using the extended model of task-technology fit, this article examines the impact of task interdependent, task complexity, immediacy of communication, physical interface, and task-technology fit on Intranet usage as well as on manager's performance in Malaysia maritime industry. The structural equation modelling (SEM) results indicate that task interdependent, task complexity, immediacy of communication and physical interface are predictors of task-technology fit. Also, the findings suggested that task-technology fit is a predictor of usage. Similarly, usage influence managers' performance. This is probably the first that investigate the impact of task and technology antecedents on task-technology fit and Intranet usage in Malaysia. The results provide insights on how the Malaysian maritime industry could improve upon their intranet adoption.

Key words: Task interdependent, task complexity, immediacy of communication, physical interface, Malaysia.

INTRODUCTION

Task has long been recognised as a vital factor affecting usage, user satisfaction and in some way surge in return on investment (Browne and Cudek, 1993; Bukhari, 2005; D'Ambra and Wilson, 2004; Davis, 1989; Norzaidi et al., 2011, Norzaidi et al., 2007; Norzaidi and Intan Salwani, 2008; Goodhue, 1995; Goodhue and Thompson, 1995, Goodhue et al., 2000; Igbaria, 1990; Seddon and Kiew, 1995; Ying et al., 2006). Besides, technology is an appliance that permit task to be completed and after all persuade user satisfaction as well as performance. Moreover, it is said that managers' could act better when they apply technology, and *vice-versa*. Yet, managers' could not perform whilst the technology does not fit with the given task (Barbera, 1996; Goodhue and Thompson, 1995; Norzaidi et al., 2007, 2008). Therefore, to enrich managerial performance, task and technology should be fit.

Though, the issues of task antecedents (that is, task interdependent, task complexity), and technology antecedents (that is, physical interface and immediacy of communication) are still much to be discovered (Norzaidi et al., 2009). Given that, task and technology are importance to influence managers' performance, for this reason, there is a need to investigate the critical factors that stimulus task and technology antecedents as well as to examine the relationship between usage, task-technology and managers' performance. Furthermore, nearly all of the previous studies are out of date and so new information gathered is essential. This description, nevertheless, has not been discussed beforehand, and thus, it creates gaps in knowledge. Based on these grounds the current study is conducted to address the following research questions:

- 1) Does task interdependent influence task-technology fit?
- 2) Does task complexity predict task-technology fit?
- 3) Does immediacy of communication influence task-

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technology fit?

- 4) Does physical interface predict task-technology fit?
- 5) Does task-technology fit influence Intranet usage?
- 6) Does Intranet usage predict managers' performance?

This study attempts to answer the research questions through the development of a research framework after investigating prior literatures in this context. Next we present the literature and propositions are then formulated to be tested in this study.

REVIEW OF LITERATURE

Task interdependent and task-technology fit

Campion et al. (1993) believed that interdependent in task implies the degree to which members will interact and depend upon each other to attain their goals. There is a little studies that have investigated the link between task interdependent and task technology fit. For instance, Goodhue and Thompson (1995) found that managers who engaged in tasks that are interdependent with other organisational units would need to identify, access, and integrate data from a variety of systems. Moreover, the finding of this study recommended that task interdependent has relationship with a few components of TTF, such as compatibility ($r=-0.11$), and systems reliability ($r=-0.03$), yet, these relationships are very weak. Besides, Norzaidi et al. (2007) conducted a survey on various organisations in port industry in Malaysia. By using structural equation modelling, they found that task interdependent is significantly predicting task-technology fit with strong negative relationship. This study indicates that if more interdependent tasks are assigned to the port managers, it could eventually reduce their Intranet usage. The reason is some information is not available in Intranet and it leads to less fit, which caused the delay in finishing their jobs. On an overall, the more managers involved with task interdependent, the lesser the fit would be. The study is in line with Goodhue and Thompson's (1995) findings. To confirm this contention, the following hypothesis ensues:

H₁: Task interdependent predict task-technology fit

Task complexity and task-technology fit

Hammond (1986), defined complexity as essentially similar tasks varies as a function of each task's mode of representation. He argued that for judgement tasks, a distinction must be made between situations in which the judgement is based entirely on memory, and situation in which past information is displayed. Up to now, very few studies have examined the link between task complexity and task-technology fit. For instance, studies by which

scrutinised the relationship between task complexity (dimension of technology characteristics) and task-technology fit in various organisations in port industry in Malaysia found that task complexity significantly predicted task-technology fit. This study also found that task complexity had negative strong relationship with task-technology fit. According to Norzaidi and Intan Salwani, if more task complexity is assigned to middle managers, it promotes less fit. Information in Intranet only cater for routine and less complex tasks, hence, if the tasks are highly complex, thus it would promote less fit. Since most of the middle managers in the Malaysian port industry are involved in complex tasks, thus, there is a negative relationship between task complexity and task-technology fit. Thus, the following hypothesis is suggested:

H₂: Task complexity predict task-technology fit

Immediacy of communication and task-technology fit

Immediacy of communication refers to the extent to which a collaboration technology permits the user to hastily communicate with others (Rice, 1987; Straub and Karahanna, 1998) because it is disputed that people are using information and communications technology (ICT) based on the ability to reach their communication partner and end the task at hand (Straub and Karahanna, 1998). In this fashion, the function of immediacy of communication seems to mediate tasks-performance. A handful of studies have concentrated on the issue of immediacy of communication and social presence, and media richness, not on its affects on task-technology fit. For example, Rice (1987) noted that face-to-face meeting or telephone conversations may have greater social presence or greater media richness, though, they also demand for synchronous communication-both parties must be obtainable at the same time. On the contrary, Reinsch and Beswick (1990) reported that leaner technologies such as voice mail and e-mail offer the ability to communicate asynchronously so that even if parties are not readily available, communication may occur and may often prove a faster way to complete a task than attempting to find a shared time to communicate. Another study conducted by Dennis et al. (2001) found a positive relationship between immediacy of communication and perceived usefulness. Technologies that have higher immediacy of communication will be perceived to be effective and efficient and thus will be perceived to have greater usefulness which certainly affect job performance.

Not all of the afore-mentioned studies, however, focus on the relationship between immediacy of communication and task-technology fit except for Norzaidi and Intan Salwani (2008) in the Malaysian port industry. They found that immediacy of communication is an important dimension of technology characteristics. In addition,

immediacy of communication significantly predicted task-technology fit. As such, is one characteristics of technology (that is, Intranet) which influences task-technology fit. To substantiate this argument, the following hypothesis ensues:

H₃: Immediacy of communication predict task-technology fit

Physical interface and task-technology fit

Physical interface becomes an important consideration as customers move towards an increasingly heterogeneous set of interaction devices (PDAs, cell phones, etc.) to support a variety of customer decision processes. Physical interface could be speed of line, size of monitor, keyboard or graphical of the systems (Zhang and Dran, 2001). Several studies found relationship between physical interface and performance. Gebauer and Shaw (2004), for instance, found that over two-thirds of the respondents indicate that the small screens and limited keyboard are significantly or very significantly limiting factors. They noted that a larger colour screen and full keyboard are in fact positive gives of the usability of the application. This means, if the technology functionalities do not fit with task requirements, thus, performance would diminish (Goodhue and Thompson, 1995). More realistically, the organisation can adjust the technology to make it more conducive to customer tasks. Such adjustments can include enhancements to the physical interface, for instance, by selecting an affective interaction device or augmenting a current device (for example, keyboard attachment for PDAs) (Zhang and Dran, 2001).

Timmons (2003), conducted a survey on 31 nurses in three UK hospitals, and found that physical interface such as line of systems is a main concern for job accomplishment. Most of the nurses claimed that most frequently, the systems were time-consuming to use. In addition, after the time-consuming nature of work on the systems, the lack of terminals was the criticism raised most often.

Due to the financial constraints in purchasing the systems, most wards had only two terminals, and sometimes only one and occasionally three. Timmons discovered when this factor was combined with the ward being busy, especially in terms of new admissions, which create a great deal of extra administrative work, there were queues for the terminals. To substantiate this argument, the following hypothesis ensues:

H₄: Physical interface predict task-technology fit

Task-technology fit and usage

Usage refers to the behaviour of employing Intranet in

completing given tasks (Goodhue and Thompson, 1995). Goodhue and his colleague provide evidence from their study that task-technology fit has a strong relationship with usage. Similar findings were obtained from Norzaidi et al. (2007) study where task-technology fit is related to the usage of Intranet among middle managers in Malaysia. Besides, Dishaw and Strong (1998), who investigated the task-technology fit model using software maintenance tools on professional computer programmers working in aerospace, insurance, and financial services companies who support the maintenance of both software and data, found that the tool functionality had a positive significant relationship with task-technology fit while task requirements had a significant negative relationship with task-technology fit and actual use of the tools. They concluded that task functionality drive the usage of IT. To substantiate this argument, the following hypothesis ensues:

H₅: Task-technology fit influence usage

Usage and performance

Many studies have signified the relationship between usages (Davis, 1989, Goodhue and Thompson, 1995; Norzaidi and Intan Salwani, 2011), to some extent affected by IS variables, and is one of the many variables, which ultimately affect managerial performance. In short, usage is a main caused that influence managers' performance. These findings suggest that people ought to utilize system in order to improve their job performance. In other words, the low degree of system usage would reduce performance. In addition, in one-time condition, increase of usage can actually degrade performance. For instance, when there is a fixed task to perform and the system is designed ineffectively thus, it takes more attempts to complete the task than is necessary, or the system is so personally desirable to users that they expend considerable effort using the system in non-productive ways (Miles, 2000; Naveed, 1996; Trice and Treacy, 1988). In the case of this study, it is postulated that if the managers utilize the Intranet systems, this might lead them to achieving better performance (Neumann and Segey, 1980). Thus, the following hypothesis is suggested:

H₆: Usage predict managers' performance

As a summary, Figure 1 shows the propositions proposed to be tested in this study.

RESEARCH METHODOLOGY

Sampling

The targeted population were the entire managers that were attached to marine industry in Malaysia (for example, terminal operators, immigration department, customs department, port

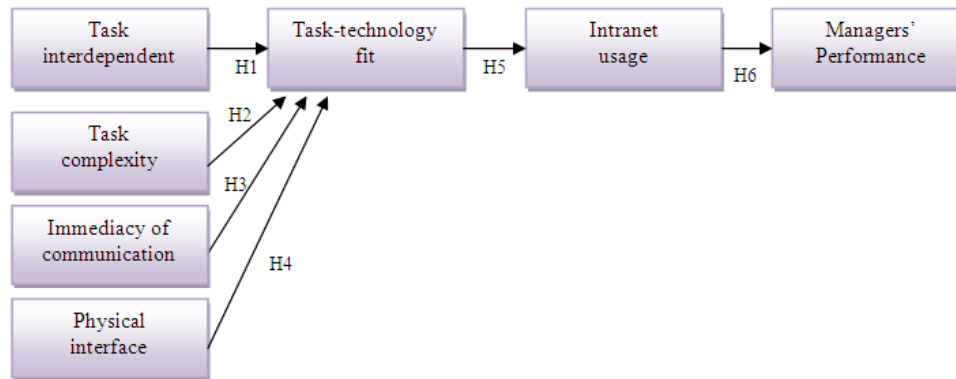


Figure 1. Research framework and hypotheses of the study.

authority, etc). 500 self-reporting questionnaires were distributed to the human resource (HR) departments of the respective terminal operators after an identification of the numbers of managers. Guidelines provided by the researcher. The identification of managers is based on the criteria set forth in the literature where they consist of individuals holding positions of general managers, department managers, division heads, directors, department or agency heads, unit chiefs, district managers, division managers and executives (Norzaidi and Intan Salwani, 2011). Out of the 500 questionnaires sent, 357 (71%) responses were obtained. The response rate is noticeably high and representative of the population studied. This enables generalization of results obtained (Hussey and Hussey, 1997; Sekaran, 2003). The high response rate is due to the recommendation letters provided by the Ministry of Transport and Ministry of Science, Technology and Innovation to designate that the pertinent authorities supported this study.

The instrument

The questionnaire is divided into five sections to specifically address the seven hypotheses formulated in the study. The first section contains five questions capturing the respondents' demographic information such as age, gender, department, highest education qualifications and positions. The remaining sections comprise of 8 items measuring the respondents' perception on task-technology fit (Goodhue and Thompson, 1995); 3 items on usage (Malhotra and Galletta, 1999; Mawhinney and Lederer, 1990); 3 items on perceived resistance (Norzaidi et al., 2008); 10 items on user resistance (Davidson and Walley, 1985; Milman and Hartwick, 1987; Martinko et al., 1996); user satisfaction 3 item (DeLone and McLean, 1992; Lawrence and Low, 1993; Joshi, 1992; 2005; Norzaidi et al., 2009, Norzaidi and Intan Salwani, 2011) and 6 items measuring managers' performance (Davis, 1989; Jarvenpaa and Ives, 1991; McAdam and Galloway, 2005; Moore and Benbasat, 1992; Leonard and Deschamps, 1988; Seddon and Kiew, 1995). All the items (except demographic section) were measured using a 7-point Likert scale from 1 = strongly disagree to 7 = strongly agree.

ANALYSIS OF DATA

Sample characteristics

The majority of them are male (70%). Most of them fall between the age cohort of 40 to 49 years old (38%), followed by 30 to 39 years old (29.3%) and those between 21 to 29 years old

(22%). The majority of them works in non-IT department (77.3%) and has a bachelor's degree (60%). This is followed by respondents with diploma (16%) and Master's degree (10.7%), indicating that most of the respondents have received tertiary education, including a small percentage of them having a PhD/DBA qualification. This is not surprising because tertiary education is a requirement for an executive position. Further, the education qualification of the respondents corresponds with their age. In terms of position, most of them consist of senior executives/ executives (28%), followed by manager/assistant managers and head of departments.

Assessing validity and reliability

In determining the reliability of the instrument, a general rule is that the indicators should have a Cronbach's alpha of 0.6 or more (Nunnally, 1978). With the range of alpha scores between 0.66 and 0.95 obtained in this study, we can conclude that the questionnaire is reliable and the data can be applied for the analysis (Tzu and Yin, 2005).

Descriptive analysis

In order to validate the instrument, apart from content validity, this study considers construct validation and to achieve construct validity, the data was examined using principal component analysis as the extraction technique and varimax as the method of rotation. With a cut-off loading of 0.40 and eigenvalues greater than 1.0, none of the attributes was dropped. Further, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated a practical level of common variance. On top, the construct validity of the model's scales was also evaluated using analysis of moment structures (AMOS) software with maximum likelihood to analyse the data. AMOS software is used because of its simplicity and technically advanced nature and more importantly, it provides more precise assessment of discriminant validity of an instrument than exploratory analysis (Sekaran, 2003). As there is no single recommended fit measurement for the structural equation model (SEM), varieties of measures are proposed in numerous research reports (Segar and Grover, 1993).

Goodness-of-fit measurement

The results of the chi-square test indicates that the model fits the data obtained (chi-square=344.56; $p > 0.05$; $p = 0.131$). As an

Table 1. Goodness-of-fit measures of the research model.

Goodness-of-fit-measure	Recommended value	Approximate boundary as a good fit
Relative chi-square	<3.00	1.023
Ratio of chi-square	p>0.05	p=0.131
GFI	Close to 1.0 is better	0.977
IFI Delta 2	Close to 1.0 is better	0.998
TLI rho2	Close to 1.0 is better	0.912
CFI	Close to 1.0 is better	0.986
RMSEA	<0.08	0.004

Table 2. Hypotheses testing.

Hypothesis	Causal relationship	Factor	β	Significance	Result
H ₁	Task interdependent	→ Task-technology fit	0.877	***	Supported
H ₂	Task complexity	→ Task-technology fit	0.547	***	Supported
H ₃	Physical interface	→ Task-technology fit	0.964	0.006	Supported
H ₄	Immediacy of communication	→ Task-technology fit	0.774	0.037	Supported
H ₅	Task-technology fit	→ Intranet usage	0.653	***	Supported
H ₆	Intranet usage	→ Managers' performance	0.558	***	Supported

alternative, we also measured the model using other multiple fit criteria, such as model chi-square (χ^2/DF), relative chi-square, comparative fit index (CFI), the goodness of fit Index (GFI), PCLOSE, the incremental fit index (IFI Delta2), TLI rho2, and root mean square error of approximation (RMSEA). The value of χ^2/DF is 1.023, which is less than the desired cut-off value of 3.000 suggested by Segars and Grover (1993). Moreover, the GFI (0.977), IFI Delta 2 (0.998), TLI rho2 (0.912) and CFI (0.986) values were considered close to the recommended value. Nonetheless, RMSEA score (0.004) shows that the model meets a reasonable error of approximation with a cut-off 0.080 (Table 1) (Browne and Cudek, 1993). Therefore, it can be concluded that the adapted TTF model used in this study is valid. The results have confirmed that the responses of the middle managers generally support the theoretical and conceptual distinctions of all the variables proposed in this study. As such, the data can be applied for further analyses. Next we present the results of the 6 hypotheses tested in this study.

RESULTS

Table 2 shows the results with respect to the six hypotheses constructed. The structural equation modelling (SEM) analysis indicates that task interdependent significantly predicting task-technology fit, thus, do not reject hypothesis 1 (p value is less than 0.001). Similarly, task complexity significantly predicts task-technology fit (p value less than 0.001), and do not reject hypothesis 2. Also, physical interface influence task-technology fit (p value = 0.006), hence, do not reject hypothesis 3. Immediacy of communication significantly predicts task-technology fit, and as a result, do not reject hypothesis 4 (p value = 0.006). Similarly, task-technology

fit influence Intranet usage (p value less than 0.001), and hence, do not reject hypothesis 5. Finally, Intranet usage significantly predicts managers' performance (p value = less than 0.001), and thus, do not reject hypothesis 6. Concisely, all of concepts are predictors of task-technology fit, and circuitously manipulate intranet usage as well as managers' performance. Moreover, this study suggested that task interdependent is more powerful than task complexity. Likewise, physical interface is more potent than immediacy of communication. Hence, we could suggest that managers' in maritime industry believe that the successes of their works are largely influenced by suitable intranet applications.

DISCUSSION AND PRACTICAL IMPLEMENTATIONS

This paper contributes to the existing body knowledge in terms of narrowing the research gap by examining the causal relationships between the task and technology antecedents and the managers' performance. The novelty of this study is that it provides a holistic perspective of the critical factors that influence technological usage, in light of the Intranet technology. The model used is based upon a unified framework combining task-technology fit model with theories related to task interdependent, task complexity, physical interface, immediacy of communication, which were identified from the extensive review of literature. Moreover, the model is to aid decision makers to understand the relationships between

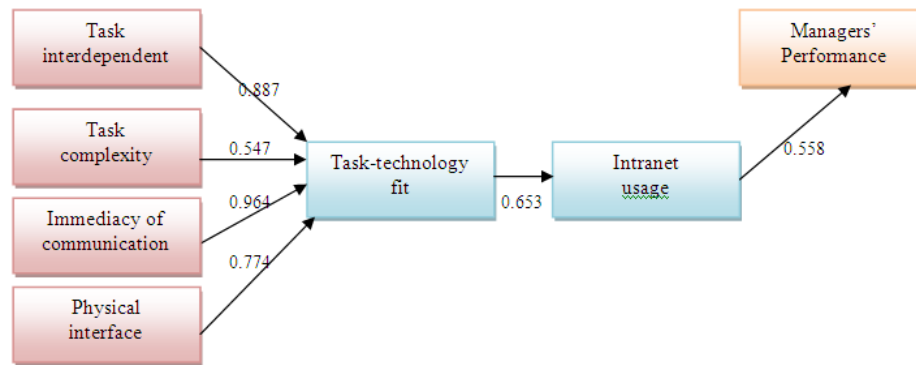


Figure 2. Findings of the current study.

the variables, which have received very little research attention to date. Thus, by combining the variables and testing them in a single setting, this has allowed us to generate a more precise picture of the causal relationships between the variables.

This study suggested that task interdependent as well as task complexity predict task-technology fit. This indicates that managers consider the combination of task complexity, with interdependent tasks. In other words, managers in the Malaysian maritime industry are involved with more than one job functions. Other tasks that the managers are frequently involved with are complex tasks. Since the managers are managing two challenging tasks, there is a need for information acquisition, because it is most often associated with unstructured management tasks, and there is a frequent need for middle managers to apply their own judgement and intuition (Figure 2).

Moreover, this study suggested that physical interface and immediacy of communication are predictors of task-technology fit. The combination of physical interface (that is, speed line) shows that faster line and the degree to which individual perceive that the others as being physically present during the communication process play a role as one of Intranet functionalities. Managers prefer to have faster line together with concurrency and immediacy of communication because those dimensions would influence their performance. To be efficient and effective, managers need to have high speed Intranet, such as a lease line, which enables them to quickly respond to their communication partner. In this way, managers could make quick decisions and make strategic planning.

Corroborating Norzaidi et al. (2007, 2008) findings, this paper imparts further empirical support that task-technology fit has significant relationships with the Intranet usage. Correspondingly, empirical support was also provided for the results between the Intranet usage and managers' performance. As expected, task-technology fit influence usage and indirectly influences managers' performance. These findings suggest that in order to attain improvements in the managers'

performance, organisations in maritime industry have to consider the fit between the tasks requirements and the functionalities of their Intranet systems. When there is a fit, this would create a positive perception among managers in terms of the usefulness and satisfaction of their Intranet systems and therefore, promote higher level of usage among them (Jackson et al., 2006; Goodhue and Thompson, 1995).

CONCLUSION AND FUTURE RESEARCH

This study has advanced knowledge with the development of the extended task-technology fit model. Based on the survey findings, it is hoped that the recommendations given in this paper shed some lights to the port organizations to recuperate their Intranet implementation. Moreover, it is also hoped that the recommendations would work as a guide to other industries on how to preeminent implement a new technology. Nevertheless, given the limited sample size and scope, the interpretation of the survey result has been prepared cautiously. It is recommended for prospect studies to embrace a bigger sample size and across different industries (Mazuki et al., 2007). It is also warranted for future studies to consider two other essential issues (that is, resistance and perceived resistance) and associate it to managerial performance.

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