Understanding the behavioral intention to use
SaaS ERP sub-modules considering
Perceived Enjoyment, Perceived Anxiety and Perceived System Performance

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Abstract. The use of cloud solution to support Enterprise Resource Planning (ERP) system has become the priority of many organizations to stay competitive in the current global world. This research will be focusing on the behavioral intention among the employees to use Software as a Service (SaaS) ERP sub-modules in a global construction tool provider considering perceived enjoyment, anxiety and system performance. The objective of this research is to analyze and investigate the employees 'behavioral intention to use SaaS ERP sub-modules in the construction tool provider companies considering these unique variables and predictors. The findings of this research can assist and support both organizations and
researchers to build a fundamental level on understanding how these variables can predict the user behavioral intention to use SaaS ERP sub-modules in a global construction tool provider company which significantly beneficial. 250 users ranging from executive and higher management level globally were targeted in 25 countries. A statistical tool will be used to analyze respondents' data and structural equation modelling will be used to analyses the responses and the relation of each hypothesis. The hypothesis will be tested based on the data consolidated.

1. Introduction

In this era of digitalization, SaaS ERP has been attracting high interests from many organizations to gain benefits and improve productivity. SaaS ERP is an innovative solution in the computing world which highlights the introduction of a new computing paradigm (Luis et al., 2008, Buyya et al., 2008) where it sits on cloud computing. Cloud Computing can be categorized as infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS) and software-as-a-Service (SaaS). Even though cloud computing is widely adopted in many global organizations, there are many sub-modules within the Cloud Computing SaaS ERP barrier that inhibit the effective productivity of the employees in the organizations. This research studies on Construction Tools Provider (CTP) which is located globally. The researched company had a good relationship with SAP as their SaaS ERP vendor and been using their services for many years. However, the employees in the organizations have been neglecting to use the sub-modules of the SaaS ERP although these modules are deemed to improve the employee's productivity and efficiency in their daily business tasks. Neglecting to use the sub-modules will leads to sunk costs if the employees are not using it or not actively using it on their daily tasks. There are few challenges which will be discussed later that need to be investigated further to understand the factors to improve the actual usage of the SaaS ERP and recommend solutions to motivate the employees to use it for their daily operations. There are many researchers who focuses on the intention to use a new technology system and the theory which has been commonly used by researchers is Technology Acceptance Model (TAM) which is proposed by Davis (1989) that perceived usefulness and perceived ease of use affect the user's attitude towards the usage of the system. Technology Acceptance Model (TAM) is applied and extended to determine the external variables of the intention to use SaaS ERP in Construction Tools Provider. Three key factors which are perceived anxiety, perceived enjoyment and perceived performance act as the external determinants to TAM are used to determine the behavioral and acceptance among the users towards the system. This research will further examine the enjoyment perception, anxiety perception and performance perception influencing use of SaaS ERP that affects the SaaS ERP sub-modules evaluation process by examining the moderating effect of perceived enjoyment, perceived anxiety and perceived performance on TAM. Thus, the findings from this research would benefits the organizational on planning the implementation of sub-modules towards an organization at a country effectively and avoid the sunk costs. Additionally, the findings to support and benchmark the intention level towards the actual usage of the SaaS ERP sub-modules to validate the research model and contribute on the research academic perspective.

2. Related Work

2.1 Technology Acceptance Model

Davis (1989) has developed Technology Acceptance Model (TAM) to explain and predict adoption use of technology based on the Theory of Reasoned Action built by Fishbein and Azjen's (1975). TAM has been commonly used to understand and predict the outcome of the user adoption and acceptance of new technology. In this case, TAM is the base model of this research study to further understand intention of the employees to use the SaaS ERP sub-modules with the extension variables that will be discussed later in this paper. Further extension of TAM is necessary to tailor it for SaaS ERP sub-modules evaluation, understanding and analyzing different variables; that could possibly influence the behavioral intention of usage among the users towards sub-modules in the SaaS ERP. Martins and Kellermanns (2004) have tailored the change implementation to TAM with more extensive variables such as perceived encouragement and awareness that could potentially affect use new technology.

2.2 Perceived Anxiety

Anxiety differs from fear where anxiety is a feeling of worry, fear and uncomfortable which is resulted from overreaction to a situation whereas fear is response to threats that might occur (Bouras and Holt, 2007). In this study, perceived anxiety is defined as the fear or anxious when the users exposed on using new SaaS sub-modules in their organizations. Studies have shown that many users will feel anxious when they are beginning to operate with interactive system such as SaaS sub-modules in their companies (Ganzel, R., 1998). For instance, new employees will feel anxious when they are using an alienated SaaS Sub-module which they never use or seen before in the organization. Conversely, users who can overcome their fear or anxious feelings when they are able to produce positive emotions towards SaaS sub-modules as they get used to the new interface and sub-modules' functionality over the time. When the users can overcome perceived anxiety towards SaaS Sub-modules, they can use the new sub-modules more frequently in their organization, as they are confident and not scared of using it anymore.

2.3 Perceived System Performance

Liu and Ma (2006) have stated that perceived system performance refers to system performance where it is reliable and responsive during the working hours of the organization that enable to perform responsive business tasks. They have found that the perceived system performance is a more direct predictor for behavioral intention to use a new module rather than perceived ease of use. Therefore, it is interesting to measure the perceived system performance in this research concerning the researched company are concern on the reliability of SaaS ERP main and sub-modules which are now operating in 25 organizations globally. It is important for an organization to also consider and utilize the sub-modules that already in place on the SaaS ERP without engaging any other third-party software; which eventually will save the costs and ensure the reliability of the system since it is belonging in a single instance. Thus, IT department in the organizations should ensure seamlessly good performance and stability for the users to use these sub-modules. For instance, employees would be satisfied if they are using the sub-modules which are available rapidly and on-demand when they require to perform the tasks.

2.4 Perceived Enjoyment

Enjoyment can be categorized as the level where individuals use an interactive system enjoyable enough regardless of any extrinsic rewards (Sun and Zhang, 2006). This research defines enjoyment as an important factor that motivates users to fully utilized SaaS sub-modules which is an enjoyment towards SaaS sub-modules (Bruner and Kumar, 2005; Davis et al., 1992; Lee, Cheung and Chen, 2005). In addition, previous researches have conducted that enjoyment is one of the factor for intention of use towards a new interactive functionality which they have not used it in the past (Cyr and Hassanein et al., 2007). In this case, the users who have perceived enjoyment will enjoy using the SaaS sub-modules which eventually boost their productivity at work. Based on the research conducted by Harden (2010), he proves that enjoyment has an important determinant on intention to use and actual use. Thus, it is relevant to include perceived enjoyment as one of the determinant to measure the behaviour of the users that have perceived enjoyment on using SaaS sub-modules. For instance, employees who enjoy using SaaS sub-modules in the organization will use

it more frequently than those who doesn't enjoy. Besides that, perceived enjoyment is linked to the level of satisfaction of SaaS sub-modules itself. A study conducted by Orleans and Laney (2000), they have proven that user's motivation is influenced by an enjoyable service that offered. Thus, the more enjoyable individual use SaaS sub-modules, the more frequent that the user will use it for organizational or personal benefits.

3.0 Problem statements

A construction company has been chosen to conduct the research case study. Preliminary investigation has been conducted among few Head of Regions which consist of Eastern European, Middle
East, Asia, Latin America and Baltics who were involved in the implementation of SaaS ERP in this tool construction provider company.
Open ended questions have been provided to the participants during the interview session regarding the challenges from their employees towards the sub-modules.

In summary, these are the common problems that arises and need to be address: 1. Sunk Costs occur in terms of implementation costs, maintenance and training costs which doesn't justify the
return of investments (ROI) towards the organizations.
2. Change management from the employees in the organizations that they are unwillingly to use the sub-modules which they prefer to use their current habitual process.
3. Employees in the organizations are not motivated and do not fully utilize the SaaS ERP Sub-modules on their daily business processes which these sub-modules are deemed to improve the productivity.
All the issues are equally interesting to be investigated to solve the actual usage of the SaaS ERP sub-module in the organizations.

However, this research will be focusing on perceived enjoyment, anxiety and system performance as these variables are the major issues based on the feedbacks provided from preliminary investigations study.

In general, these are the questions that will be answered for the outcomes of this research work:
   • What are the recommended solution to the encourage the users to use the sub-modules?
   • How perceived enjoyment would influence the actual usage of SaaS ERP module?
   • How would perceived anxiety influence the actual usage of SaaS ERP module?
   • How would perceived system performance the actual usage of SaaS ERP module system?

4.0 Research Objectives

This research work is intended to investigate the issues related to cloud solution currently faced by the users in this construction tools provider company.

This research work is intended to investigate perceived enjoyment, perceived anxiety and perceived system performance among the users in this construction tools provider company that will eventually affect their intention on using SaaS ERP sub-modules for their daily business operations. This research will predict the behavioral intention to use SaaS ERP sub-modules among the users in the company by examining and investigating on those unique factors. This will improve the usage rate of these sub-modules among the users in the company and improve the ROI of introducing these sub-modules to these organizations.

In summary, these are main objectives that are going to be explored throughout this research:

• To investigate and understand perceived enjoyment, perceived anxiety and perceived system performance among the users in this construction tools provider company towards the behavioral intention to use SaaS ERP sub-modules.

• To provide recommendation of solutions to encourage the users to use the sub-modules.
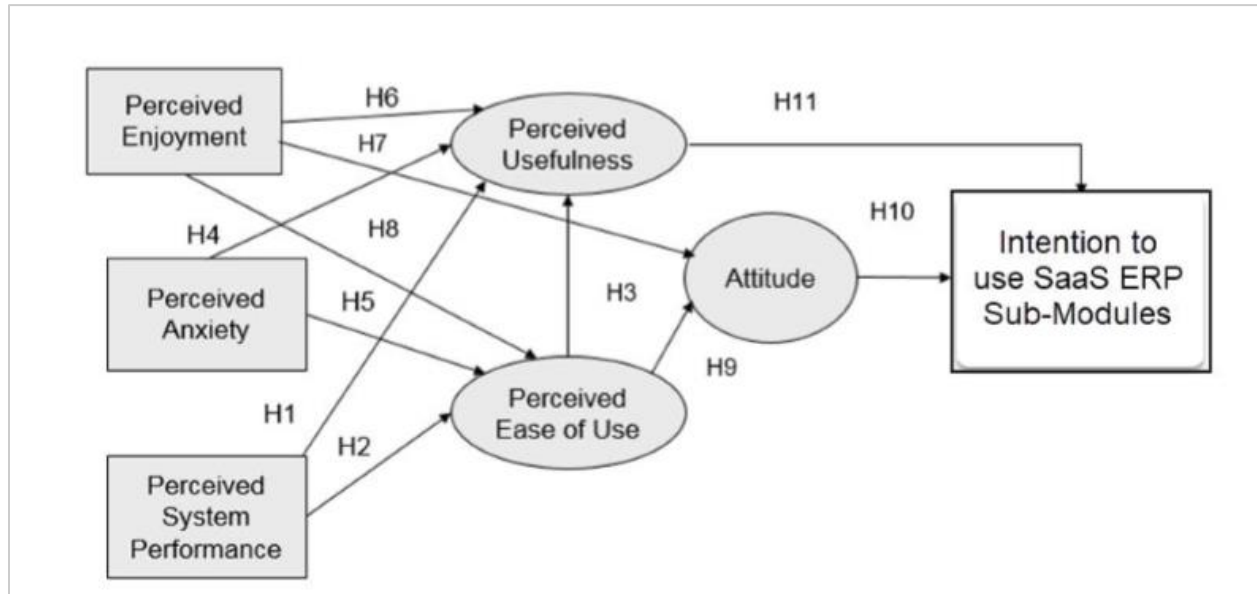
5.0 Proposed Research Model

Figure 1: Proposed Research Model

The diagram above shows the proposed research model that will be measured in this research which consists of external variables that include Perceived Enjoyment, Perceived Anxiety and Perceived System Performance. These elements are affecting Perceived usefulness, perceived ease of use and attitude which eventually or directly affecting the adoption intention to use SaaS ERP Sub-Modules in the organizations.

The research hypothesis is shown as below:

Hypothesis 1. Perceived SaaS ERP Sub-Modules performance has a positive influence on the perceived usefulness of SaaS ERP Sub-Modules.

Hypothesis 2. Perceived SaaS ERP Sub-Modules performance has a positive influence on the perceived ease of use of a SaaS ERP Sub-Modules.

Hypothesis 3: Perceived ease of use has positive influence on the perceived usefulness of the SaaS ERP SubModules.

Hypothesis 4. Perceived anxiety will have a negative effect on perceived usefulness of the SaaS ERP Sub-Modules.

Hypothesis 5. Perceived anxiety will have a negative effect on perceived ease of use of SaaS ERP Sub-Modules.

Hypothesis 6. Perceived enjoyment has a positive influence on perceived usefulness.

Hypothesis 7. Perceived enjoyment has positive influence on the attitude for usage intentions of SaaS ERP SubModules.

Hypothesis 8. Perceived enjoyment has positive influence on the perceived ease of use.

Hypothesis 9: Perceived ease of use has positive influence on the attitude of the users towards usage of the SaaS ERP Sub-Modules.

Hypothesis 10: Attitude has a positive influence on the behavioural intention to use SaaS ERP Sub-Modules by the users.

Hypothesis 11: Perceived usefulness has positive influence on the attitude towards the intention to use SaaS ERP Sub-Modules by the users.
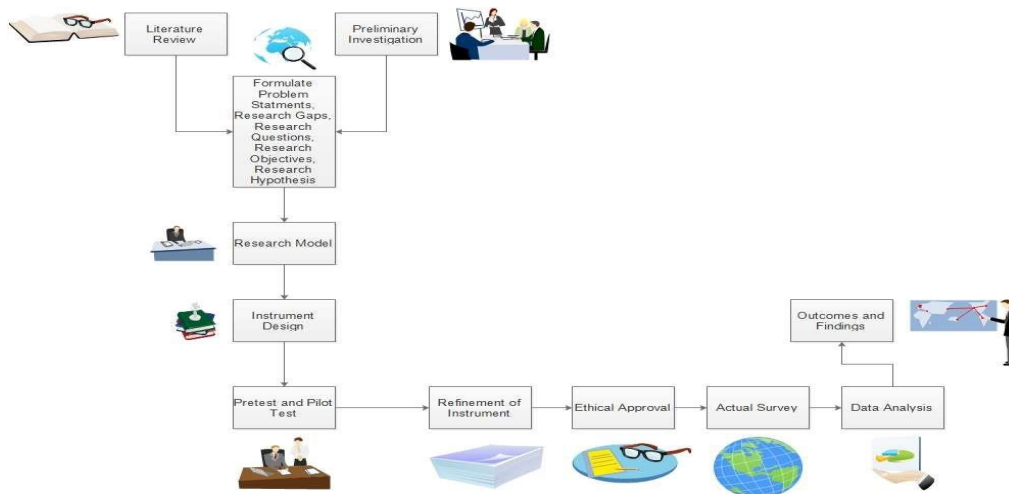
6.0 Research Methodology

Figure 2: Research Methodology

The figure 2 above shows the research methodology that is going to be conducted throughout this research. The questionnaires are explained during webinars to the Regional Contact person which will then translate to the end users who are having difficulties in English language. The questionnaires are also created and stored on the organizational Microsoft SharePoint which aligns with the Global data protection and policies. Once the questionnaires hit the amount of the target, the data was consolidated and stored in a format of Excel format form. Next, SAS Enterprise Guide 5.1 was used to provide a summary of the demographic section on the respondent's profiling such as their organization's name, job title, working experiences, age group, gender and level of education. These data provide an insight of the respondent's personal information. The Excel spread sheet is then converted into SAS readable format. The SAS dataset was then run by SAS Enterprise Guide 5.1 to produce descriptive analysis, Cronbach alpha, factor analysis and PLS-SEM will be used to analyze the responses and each hypothesis will be tested based on the data consolidated. Descriptive analysis categorized the factor and produces an output of mean and standard deviation based on each factors of the questionnaires. Cronbach alpha was performed on each of the factors in the questionnaire to determine its reliability and the internal consistency. Besides that, factor analysis was carried out to explore any possibilities of unexplained factors and determine the co-relation of each factor as well as to determine the significance of each factor in the questionnaire. Lastly, Partial Least Square- SEM will be performed to summarize and give an analysis of the research model proposed.

7.0 Data Collection and Analysis

G*Power is used to calculate the required sample. From the results obtained from G*Power, the minimum sample size required for this research is 146 respondents in order to produce generalizable findings for the framework proposed. The total population is estimated around 600 users which are using the system currently. The sample size will be varied from the company's subsidiaries and quantitative method will be used where the survey questionnaire will be distributed after the ethical approval has been performed. In order to achieve the research objectives, Partial Least Square-Structural Equation Modelling (PLS-SEM) technique was applied to analyze the measurement and developed structural model for this research. By using SmartPLS 3.0 (Ringle et al., 2015), validity and reliability of the instrument were tested as well as the relationships of constructs (Hair et al., 2007). To assess the level of collinearity of indicators for formative measurement models, the variance inflation factor (VIF) values of formative indicator was being examined after the convergent validity test was done. The formative indicators are not interchangeable thus high correlations are not expected between items in formative measurement models. When it comes to assessment of the structural model path coefficients, bootstrapping acts a vital role in PLS path model analysis (Efron & Tibshirani, 1986; Davison & Hinkley, 1997).

Bootstrapping is a procedure not involving in any assumptions of parameters in frequency distribution that tests on the significance of coefficients such as outer weights, outer loadings and path coefficient by evaluating standard errors for the estimates. According to Hair et al. (2010), the critical t-values for significant level of 5% (alpha = 0.05; two-tailed test) is 1.96; where the critical t-values for significance levels of 1% (alpha = 0.01; two-tailed test) and 10% (alpha = 0.10; two-tailed test) probability of error are 2.57 and 1.65 respectively.

8.0 Discussion and Conclusion

Overall, the results of all the six measurement models have passed the evaluation on the Outer Loadings, Cronbach's Alpha (CA), Composite Reliability (CR), Average Variance Extracted (AVE), Cross-Loading and Fornell-Larcker.
Hence, the tests have established sufficient levels of internal consistency reliability, convergent validity and discriminant validity.
In general, there are two hypotheses which are not well supported based on the research outcomes which are the following:
Hypothesis 4. Perceived anxiety will have a negative effect on perceived usefulness of the SaaS ERP Sub-Modules.

Hypothesis 5. Perceived anxiety will have a negative effect on perceived ease of use of SaaS ERP Sub-Modules.

Perceived Anxiety has no-significant results towards Perceived Usefulness in the research model which will be explained in the discussion later. This research also found out that there's a high value between attitude and the behavioral intention which the t value = 20.848, p value= 0.00. The in-significant results of Perceive Anxiety have explained that the perceived anxiety has less influence towards their behavioral intention on using the SaaS sub-modules. The results do make sense as the construction tool organization in India is one of the biggest and profit making subsidiaries. This would eventually justify that the employees that are working there are willing to use the new SaaS sub-modules and anxiousness would not prevent them from using it further. The high t and p values between attitude and behavioral intention do makes sense since the participants are based in India which is having the same organization's culture and mindset. In general, perceived enjoyment and perceived system performance has a positive influence towards Perceived usefulness and perceived ease of use which indirectly affects their behavioral intention to use SaaS sub-modules.

Latent Variable	Indicators	Convergent Validity			Internal Consistency Reliability		Discriminant Validity
		Outer Loadings	Indicator Reliability	AVE	Composite Reliability	Cron-bach's Alpha	Outer Loadings > Cross Loadings with Other Constructs
		> 0.70	> 0.50	> 0.50	0.60 - 0.90	> 0.70	
Attitude Towards SaaS Sub-modules	A1	0.912	0.832	0.841	0.964	0.953	yes
	A2	0.911	0.830				
	A3	0.909	0.826				
	A4	0.941	0.885				
	A5	0.911	0.830				
Behavioral intention to use SaaS Sub-modules	BH1	0.841	0.920	0.841	0.955	0.937	yes
	BH2	0.699	0.902				
	BH3	0.787	0.934				
	BH4	0.787	0.912				
Perceived Ease of Use on SaaS Sub-modules	PEU1	0.373	0.257	0.760	0.939	0.915	yes
	PEU2	0.694	0.591				
	PEU3	0.726	0.648				
	PEU4	0.689	0.637				
	PEU5	0.748	0.697				

Figure 3: Evaluation of Reflective Measurement Model Analysis

No	Domain	Content Validity (AVE & Loading)	Internal Construct Reliability	Discriminant Validity (Cross-Loading; Fornell Lacker)
1	Attitude	Passed	Passed	Passed
2	Perceived Ease of Use	Passed	Passed	Passed
3	Perceived Usefulness	Passed	Passed	Passed
4	Behavioral Intention	Passed	Passed	Passed
5	Perceived Enjoyment	Passed	Passed	Passed
6	Perceived Anxiety	Passed	Passed	Passed
7	Perceived System Performance	Passed	Passed	Passed

Figure 4: Summary of Evaluation Measurement Model

This research suggests that organizations should concentrate on user interfaces and system performance for the employees to use the SaaS sub-modules. From this study it is recommended that the employees that works for big organization are more willing to explore new SaaS sub-modules even though the modules could be entirely new interfaces and complex to them; if it brings enjoyment and system performance to them which indirectly boosts their work productivity and happiness in the organization.

This research also contributed to the theoretical implication as the results are significantly better than the past literature reviews which have been analyzed and heavily supported the TAM model which can be used as a reference for other researchers in the future.

The limitation of this research is a bias of techniques allied with survey research because this research depends on a single source of data gathering which is the questionnaire. Hence, the analysis for this current research was cross sectional data obtained from survey respondents within this organization. To further upsurge the general universality, future research needs to repeat such methodology with a larger sample size to take in participants for more communities or organizations. The results of this research might not be applicable to other organizations due to its nature of respective industries. Thus, it should not be implemented without a thorough critical analysis. Consequently, future research should imitate the methodology utilized in this research to diagnose new aspects of intention to use SaaS sub-modules in the framework of the study.

The findings indicated that nine (9) of the hypotheses were supported and two (2) of the hypothesis was not supported, which generally consistent with previous studies. Behavioral intention to use SaaS sub-modules can be highly motivated or engaged by the employees in the organization if those modules are designed in such a way that the interfaces are simple, fun and the system performance is fast for the user to work. Thus, the organization should re-design the employee training and user interfaces in a more graphical and fun approach for the employees to use it more frequently; as well as ensuring the modules are fast for their daily operations.

The results from the research also could be significant for the organization to deliver the same feedback to the SaaS vendors to ensure the ROI of the SaaS sub-modules are delivered in an expected result. Technology Acceptance Model (Davis, 1986) and Technology Acceptance Model 2 (Venkatesh and Davis, 2000 are also proven again as appropriate models to forecast technology adoption and intention to use in organizations hinged on individual level, cognitive, and organizational variables.

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