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THE IMPACT OF DYNAMIC FACTORS ON THE SUCCESSFUL IMPLEMENTATION OF SAP

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Abstract---*Over the years, SAP has grown and evolved to become the world premier provider of client/server business solutions for which it is so well known today. In this paper we will focus on the problem face by selected organization in Malaysia during the implementation stage and you will realize they face almost the same problems. The study mainly established links between factors influencing the implementations of SAP, while in order to analyze the impacts as well as relationships, Project formulation, Implementation development and deployment are the elected independent variables in this study on the dependent variable SAP implementation success. Data has been selected in this study while emphasizing variables of this study, where regression and correlation analysis has been performed in this study. Result shows significance towards the factors that duly influencing the dependent variable of this study, whereas; significant relationship is also ascertained.*

Keywords---*SAP, Solutions, Organization, Malaysia, Project Formulations, Deployment.*

I. Introduction

The adoption of any system will have an impact on an organization in term of strategy, processes, business flow and workflow. An organization needs to evaluate if the system they plan to implement will meet their requirements and the costs involved represent a reasonable investment for them. SAP stands for Systems, Applications and Products in Data Processing; the SAP ERP system is a new system widely used in the world today and has become the market leader in the commercial software business (Soliman, Janz, Puschmann, & Alt, 2005; Nguyen et al., 2019; Nikhashemi et al., 2013; Pathiratne et al., 2018; Seneviratne et al., 2019; Tarofder et al., 2019). The system integrates business functions such as planning/control, inventory, accounting, manufacturing and purchasing into one system. Advantages of ERP allow easier global integration (Barriers of currency exchange rates, language, and culture can be bridged automatically). Company-wide update implementation only needs to be completed once. Provides real-time information, reducing the possibility of redundancy errors and disadvantages of ERP Locked into vendor relationship by contract and system specific manageability processes-a contract will hold companies to the vendor until it expires; it can be unprofitable to switch vendors due to high switching costs (Holland, Light, & Gibson, 1999). Due to the high investment costs, only large organization can afford to take advantage of this technology; this results in small and medium businesses falling behind in technology advances. Inflexibility-vendor packages may not exactly fit a company's business model and any customization can be very expensive.

The reasons companies implement SAP ERP is because of the systems integration of business processes and it improves a company's competitive position in the market (Al-Fawaz, Eldabi, & Kamal, 2011). It will also replace outdated existing and inefficient systems (Java-samples.com, 2013) In Malaysia, as a result of rapid economic growth, local organizations

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have been given the opportunity to expand their business outside of Malaysia to regions such as Asia and Europe. This opportunity increases the requirement to integrate all business units; increasing the need to obtain a world renowned and used system like SAP that has standard functions which can facilitate the economic collection and processing of information from local or overseas business partnerships. SAP is one of the complete systems being used globally in the world, allowing organizations to customize the system to fit into their own business environment. As the operation of the SAP system is standard an organization that has implemented the system benefits from the standards built up throughout the organization; this enables users to share ideas and solutions to any problems they have encountered with any module (Tenkasi & Chesmore, 2003). SAP enhances an organizations' productivity through effective work flow that requires data to only be entered once, allowing data to then be used and forwarded to all the business units within the organization. Implementing SAP therefore gives the advantage of controlling the whole operation through one standard system.

Despite the many advantages that the SAP system provides there are still problems that have to be faced by an organization. There is strong evidence that many ERP system implementation projects are not completed on time and within budget (Rajan & Baral, 2015) and there are reports of complete ERP implementation failure (Yahya, Hasibuan, & Torong, 2018). Some of these problems may be due to poor cost and time estimation and changes in project scope (Chien & Tsaur, 2007). There are many stand-alone software systems available to handle accounting, sales, purchasing, manufacturing and production processes; however it is not possible to link them to one to another, as a result flow of information and reports to management are inconsistent. SAP as one of the latest systems available integrates one business unit to another business unit providing a fully integrated business real-time system, allowing organization to control the entire management and operational process. Global companies such as Microsoft, IBM and Nestle are among the many high profile organizations that have implemented SAP across the world (Somers & Nelson, 2001).

Syarikat Bekalan Air Selangor Sdn Bhd or better known as SYABAS was incorporated on 8 July 1996 under the Malaysian Companies Act, 1965 to undertake the privatization of water supply services in the State of Selangor and The Federal Territories of Kuala Lumpur and Putrajaya ('the Privatisation').SYABAS was an entity specifically incorporated as an implementation vehicle in respect of the privatization of the water supply and distribution systems in Selangor and Federal Territories of Kuala Lumpur and Putrajaya. Universiti Malaya, or UM, Malaysia's oldest university, is situated on a 750 acre (309 hectare) campus in the southwest of Kuala Lumpur, the capital of Malaysia.UM was established in April 1949 in Singapore with the merger of the King Edward VII College of Medicine (founded in 1905) and Raffles College (founded in 1928).The growth of the University was very rapid during the first decade of its establishment and this resulted in the setting up of two autonomous Divisions in 1959, one located in Singapore and the other in Kuala Lumpur. In 1960, the government of the two territories indicated their desire to change the status of the Divisions into that of a national university. Legislation was passed in 1961 and the University of Malaya was established on 1st January 1962. Professor Dato' Dr. Mohd Amin Jalaludin was appointed as the eleventh Vice-Chancellor of University of Malaya on 8th November 2013. Edaran Otomobil Nasional Berhad (EON Berhad) is one of Malaysia's largest conglomerates which were established in 1984 to distribute Proton cars - Malaysia's first national car. The main shareholders of the company are DRB-HICOM. Through one of its wholly owned subsidiaries, Automotive Conversion Engineering, it undertakes modifications on the Proton range of cars, converting the Perdana and Waja models to an executive and a limousine model. This research will specifically focus on the problems faced by Syarikat Bekalan Air Selangor (SYABAS), University of Malaya and EON Berhad (Edaran Otomotif Nasional) during the implementation of the SAP system and why some organizations are not willing to use the system. The result of this research may give benefit to an organization that is planning to implement the SAP system. The Malaysian Government has been supportive in developing technology infrastructure; all organizations should therefore be encouraged

to take advantage of this opportunity. This research will gain an understanding of the problems faced by SYABAS, EON Berhad and University Malaya when they implemented the SAP system; identify as well as evaluating factors that affect SAP implementation within a Malaysia organization. The research will also assist understanding of the reasons why some company's do not implement SAP into their operation (Sternad, Gradisar, & Bobek, 2011).

II. Literature Review

The information in this section was obtained from journals, articles and the internet; the information gained related to the problems experienced when organizations implement SAP ERP and the reluctance of organizations to implement the system. SAP ERP is a system that integrates all business unit functions within the organization. As Malaysia was one of Asia's fastest growing economies SAP was introduced here in 1992. According to the SAP website; due to the consistent growth in clients, Malaysia now has more than 130 employees in its Kuala Lumpur office and serves, services and supports more than 500 clients. The term "Enterprise Resource Planning" was initiated in the early 1990s as a software solution that integrates information and business processes to enable information sharing among the departments in an organization (Amoako-Gyampah & Salam, 2004). Inventory management this module allows the user to monitor their inventory flows on a real time basis, human capital management manages staffing changes and streamlines payroll processes, product development and manufacturing Improves the product life-cycle process and manufacturing operations, reporting and analytics plan, measure and control organizational processes, corporate services – reduces administrative costs; increases transparency of operations; and improves adherence to corporate, legal and regulatory requirements. Adoption of the SAP ERP system will centralize the organization activities into one system and enables the control of the business units within the organization. Several factors may affect ERP adoption in organizations (Huang, Hung, Chen, & Ku, 2004).

These factors include change management (Sedera, Gable, & Chan, 2003), lack of top management support (Shanks et al., 2000), business requirement gap (Liu & Seddon, 2009), user involvement (Abdullah, Rahman, Harun, Alashwal, & Beksin, 2010) and vendor support (Françoise, Bourgault, & Pellerin, 2009) which may result in ERP implementation failure.SAP ERP has a website that allows users to share ideas and knowledge about the system on a global basis. Users can also find many solutions to any problem they have, whether in term of functionality or a technical issue. SAP also provides professional consultants all over the world to support users.

The general opinion is that when those in an organization choose to implement ERP packages there will be a need for organizational change (Tarhini, Ammar, Tarhini, & Masa'deh, 2015). Within the context of reasons for SAP ERP adoption, it can be argued that people in organizations may choose to implement ERP packages with the explicit desire to force change, or use the ERP packages as the 'excuse' for change (Jarrar, Al-Mudimigh, & Zairi, 2000). Implementing SAP always requires changes to the workflow and business processes of an organization, this requires top management approval for the changes. Top management commitment and support is noted as a critical factor, having a positive impact on ERP implementation success (van Slooten & Yap, 1999), change is difficult to achieve and so some organizations fail to implement SAP ERP. Many ERP implementations have failed due to poor planning, management, and lack of business management support (Themistocleous et al., 2005). The systems that could not be completed on time, within budget and were unable to provide the benefits expected may lead to failure (McGinnis & Huang, 2007). The failure rate of SAP ERP system implementation is disappointing (Hasibuan & Dantes, 2012). The involvement of the users during the phase of defining organizational information needs may decrease the resistance of users towards ERP system implementation (Somers & Nelson, 2001).

The participation/involvement of user's may lead to system usage (Al-Mashari & Zairi, 2000) and user satisfaction (Žabjek, Kovačič, & Štemberger, 2009). User satisfaction is a critical factor for the successful ERP system implementation.

ERP system success is measured in terms of user satisfaction (Nanayakkara, Perera, & Perera, 2013). The success of the SAP ERP implementation also depends on vendor selection. Vendor support that best serves the implementation process is also an important aspect (Aarabi, Saman, Wong, Azadnia, & Zakuan, 2012). Vendors' support may be supportive in the implementation process of ERP systems. It includes software support, technical assistance, emergency maintenance, updates, and special user training. During the vendor selection process the past ERP system implementation experience of the vendor should be considered (Amoako-Gyampah & Salam, 2004). Sumner (1999) identified that the risks of ERP project failures may be contained by acquiring external expertise through vendors and consultants. Team Work people involved in the implementation should be chosen based on their skills, experience, reputation and flexibility. These people should be entrusted with critical decision making responsibility (Jarrar et al., 2000). In the companies researched, 49.30% of SAP ERP implementation success is because of team work. Organization maturity level previous research shows that the role of maturity level of an organization contributes 25.20% to the success of SAP ERP implementation. Clear Goals& Objectives - clear goals and objectives in accordance with time and cost contributes 30.70% to the success of the SAP ERP implementation. Business Process Reengineering business process re-engineering is recommended to be completed in order to gain a competitive advantage, but it depends on the maturity level of an organization and the budget & time available. It contributes 44.20% to the success of ERP implementation. Project Budget & Time – both factors are important to ensure that the implementations of the SAP ERP project will be a success. In the research it determines budget 31.50% and time 21.90% as role factors to the success of implementation. Top Management Support Successful implementations require strong leadership, commitment and participation by top management (Amoako-Gyampah & Salam, 2004). They will provide the necessary resources and authorization in order to achieve ERP implementation success (McGinnis & Huang, 2007). It has a 58% role factor in determining the success of SAP ERP implementation. Project Management this is THE important factor to ensure the success of SAPERP implementation, this includes a clear definition of objectives, development of both a work plan and a resource plan and careful tracking of project progress (Sternad et al., 2011).

It has up to 44.70% impact on determining the success of ERP implementation. Technology selection this include ERP software/application, database and the hardware used to support the ERP system, determination of the project team & steering committee, ERP consultant selection and choosing the ERP implementation strategy & methodology. At this stage Zainal Ariffin Hasibuan and Gede Rasben Dantes highlight. Use of a Consultant the consultant should have knowledge of the company's environment, this can help to develop and implement the system that best suits their business. Most of the consultants do not have enough experience in SAP ERP implementation. The research shows the right consultant has a 35.70% role in determining the success of ERP implementation.ERP Implementation Strategy-According to (Themistocleous et al., 2005), ERP implementation strategy can be divided into: clean sheets, customizing and best of bread. There is also a distinguished classification into: big bang, pilot project (by module) and parallel implementation (Françoise et al., 2009). The ERP implementation strategy has an up to 48.60% role in determining the success of ERP implementation. User Involvement user involvement refers to the psychological state of the individual and is defined as the importance and personal relevance of a system to a user (Žabjek et al., 2009). The users will be involved in the stage of defining the company's ERP system needs and also in the implementation of the system. User involvement has an up to 37.30% role in determining the success of ERP implementation. Change Management –SAP ERP implementation will change the company's management. The changes may significantly affect the organizational structures, policies, processes and employees. The organization must be flexible enough to take full advantage of these opportunities (Somers & Nelson, 2001). Change management has an up to 40.60% role in determining the success of ERP implementation.

Implementation/Development – the process of system configuration/customization enables the system running within the production environment. User Training – it has an up to 42.20% role in determining the success of ERP implementation. It is an important critical success component. ERP implementation requires knowledge to enable people to solve problems with the system. If the employees do not understand how a system works, they will invent their own processes using those parts of the system that they are able to manipulate. Similar research completed by CLG in 2014 for other IT/software systems highlighted the following issues that arise when implementing a new system poor system design: IT programmers and project team leaders are generally not proficient in assessing system designs from the viewpoint of multiple end users. As a result, when people in the field begin to use the new system, they are often initially discouraged. Resistance to standardization when IT systems are standardized the accompanying changes may be counter intuitive to end users. Lengthy learning curve all new systems come with learning curves; this means proper technical training is essential to initiate behavior change. Whilst coaching support by leaders after go-live is even more critical to ensuring those behavior changes stick (Tarhini et al., 2015). The employees aren't really resisting the change, but rather they may be resisting the loss of status, pay, or comfort (Sternad et al., 2011). They offered the following six primary reasons for resistance to surface: nature of the change is not made clear to the people who are going to be influenced by the change, the change is open to a wide variety of interpretations, those influenced feel strong forces deterring them from changing, the people influenced by the change have pressure put on them to "make it" instead of having a say in the nature or direction of the change, the change is made on personal grounds, and the change ignores the already established institutions in the group.

Organizations which underestimate change management, fail in ERP system implementation. For successful ERP system implementation, the organizations need to manage two types of change. One, the way the organization does business will need to change and the other, the way people do their jobs will need to change. Power Distance used to indicate the dependence relationship in a particular country, individualism and Collectivism - Collectivism is more concerned with group interest rather than individual interest, uncertainty Avoidance – the extent to which the members of a culture feel threatened by uncertain or unknown situations, masculinity & Femininity – the extent to which dominance is used and perceived in a society. The concept of cultural influences on work practices in the university are portrayed by findings gathered by Beekhuyzen, 2001 as; "There's an overall general social culture that people get on with each other but then a work discipline culture that is focused around the areas that people are interested in". Therefore, these limitations will need to be borne in mind as we consider the potential cultural impact on the use of information systems, particularly ERP systems (Liu & Seddon, 2009). Successful ERP implementation has been influenced by the ERP implementation approach and the Organization Maturity Level (Rajan & Baral, 2015). Technology is only one aspect of ERP implementation, as people and processes also have to be considered. The ERP system will have a high possibility of success in situations where the organization does the minimum change to the organization's business processes and software. Clear goals and objectives should support the implementation strategy to ensure that the direction the project must be steered in is known (Tarhini et al., 2015).

In project management three often competing and interrelated goals that need to be met are mentioned: scope, time, and cost goals. Project Management coordinates the use of skills and knowledge. The formal project implementation plan defines milestones as; project activities, personnel planning of activities and organizing the ERP project process (Sedera et al., 2003). The implementation of an ERP system is a complex project which involves a possibility of occurrence of unexpected events. Therefore the management of risk is needed to minimize the impact of unplanned incidents by identifying potential risks before negative consequences occur (Sedera et al., 2003), (Jarrar et al., 2000). The ERP implementer vendor partnership is a key success factor influencing ERP implementation success. Every enterprise has its own ideas on how to implement and

adopt a system, which may mean the ideas of the ERP and vendor can contrast with the customers' wishes. Synthesizing these differences is hard work (Huang et al., 2004).

H1: There is a significant relationship between implementation development and SAP implementation success

H2: There is a significant relationship between deployment methodology and SAP implementation success

III. Research Methodology

The conceptual framework is the foundation on which the whole research project was based upon. It logically describes, elaborates and developed the association network between all the variables that are relevant to the research. The diagram explains the relationship between independent and dependent variables in which the hypotheses can be easily postulated and aides the clear understanding of the dynamic situation. These models consist of two factors that have an effect on SAP project implementation.

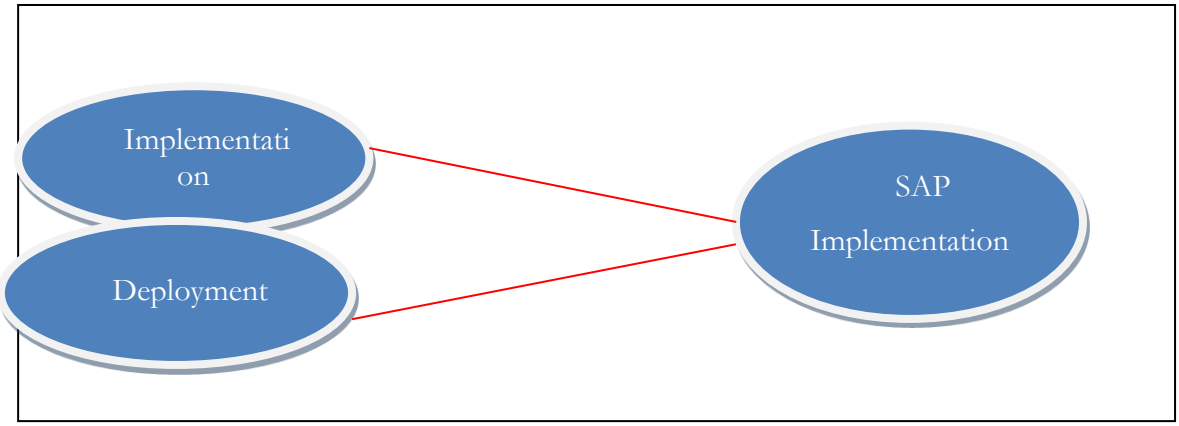

Figure 1: The Research Model

This research needs to identify the implementation success of SAP with the relevant attributes of project preparation, technology selection, project implementation, implementation development and deployment. The proposed research framework for this study and each of the variables has a different impact on the determinant factor that could lead to the success of SAP implementation.

Data Collection Approach

The purpose of this study is to understand what problems were experienced by SAP users and vendors during the implementation stage within three Malaysian Companies and to identify the major causes of these problems. This research also helped to determine if there was a co-relationship between competence of the SAP partners and the problems. The three major Malaysian companies selected are; Syarikat Bekalan Air Selangor Berhad (Syabas), University Malaya (UM) and Edaran Otomotif Berhad (EON Berhad). These three major government linked companies (GLC) are very important in Malaysia. This study will there for focus on Syarikat Bekalan Air Selangor (SYABAS) who have currently implemented SAP ERP but users still struggle to operate it. The study examines The University of Malaya issues and problems since they implemented SAP ERP and then EON Berhad who implemented SAP quite some time ago but the performance results remain inconsistent. In this research data was collected by the use of an online survey tool called Survey Monkey; questions were prepared online and distributed to target respondents via email.

IV. Data Analysis and Findings

Correlation Analysis

Correlation is a statistical measure of how two securities move in relation to each other. Correlations are computed into what is known as the correlation coefficient which ranges between -1 and +1 while the scale that describes the strength of relationship between the independent variable and the dependent variable. In this analysis also, hypotheses are tested to distinguish the significant relationship between two variables.

Pearson r	Indication
Between (-)(+) 0.80 to (-)(+) 1.00	High correlation
Between (-)(+) 0.60 to (-)(+) 0.79	Moderate High correlation
Between (-)(+) 0.40 to (-)(+) 0.59	Moderately correlation
Between (-)(+) 0.20 to (-)(+) 0.39	Low correlation
Between (-)(+) 0.01 to (-)(+) 0.19	Negligible correlation

Correlation coefficient (r) is computed to investigaing the strength of association among the variable. The level of significance is set at .05 or less.

Table 1: Correlation between all variables

Correlations						
		SP	TS	PF	ID	DT
SIS	Pearson Correlation	-.227**	.630**	.352**	.619**	.596**
	Sig. (2-tailed)	.027	.000	.000	.000	.000
	N	71	71	71	71	71
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

The results reveal that there is an existence of significant value between these two dimensions as the p value is smaller than the significant value (p = 0.027 which < 0.05). The results revealed that there are 2.7 percent of respondents that did not agree that project preparation impacts SAP implementation success. This is simply because the low correlation between these two dimensions as a correlation coefficient is at (r=-0.227). The results revealed that there is a positive relationship between the two dimensions as the p value is smaller than the significant value, (p=0.000 which is <0.05) and correlation coefficient stand at (r=0.630) and is considered a moderate high correlation. The results reveal that there is a positive correlation between these two dimensions with the results for the p value smaller than the significant value, (p = 0.000 which is < 0.05). However, there is a low correlation between these two dimension as the correlation coefficient is (f=0.352). The results state that there is a significant value between these two dimensions as the p value is smaller than the significant

value, (p=0.000 which < 0.05). Furthermore there is a moderate high correlation between these two dimensions as the correlation coefficient is (0.619). There is a positive correlation between deployment and SAP implementation success with a significant value of 0.000 which is <0.05. There is a moderate correlation between these two dimensions as the correlation coefficient is (0.596). As a conclusion of the hypothesis testing results, project preparation, technologies selection, project formulation and implementation development all significantly influence SAP implementation success.

Regression Analysis

The model summary shows that the R correlation of five independent variables, Implementation Development (ID) and Deployment (DT) with the dependent variable SAP Implementation Success, is equal to 0.729. After inter-correlation, R square is generated - actually the square of R $(0.729)^2$. This means that 72.9 percent of five independent variables have an impact on the dependent variable. In other words, 72.9 percent of the variance in SAP Implementation Success was explained by the independent variables. Based on rule of thumb, the remaining 27.1% was not explained by this regression analysis.

Table 2: Regression analysis on Model Summary

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.729[a]	.532	.506	.50874	.532	20.225	5	65	.000
a. Predictors: (Constant), DT, SP, PF, ID, TS									

Regression analysis of ANOVA test

The ANOVA table shows that the F value is 20.225 and is at the significant 0.000 level. This result confirms that 72.9 percent of the variance (R-square) in SAP Implementation Success has been significantly influenced by the five independent variables.

Table 3: Regression Analysis of ANOVA te

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.173	5	5.235	20.225	.000[a]
	Residual	23.035	89	.259		
	Total	49.208	94			
a. Predictors: (Constant), DT, SP, PF, ID, TS						
b. Dependent Variable: SIS						

Regression analysis of Coefficient

The five independent variables explain 78.2 percent of the variance in SAP Implementation Success. The results from the table show that the Beta of Implementation Development (ID) is 0.188 and Deployment (DT) is 0.312. It means that every 1 percent increase of independent variable will be affected by the Beta for each variable. Based on the results, Technology Selection and Deployment have the highest impact on SAP Implementation Success. The results show that Project Preparation has the least impact on SAP Implementation Success. While Deployment has a moderate score and Project Formulation a low score. In addition, Technology Selection and Deployment p value score is less than 0.05 (p=0.032- technology selection, p=0.01 - deployment) and is a significant predictors of SAP Implementation Success. Others, such as Project Preparation (p=545), Project Formulation (p=0.161) and Implementation Development (p=0.156) are not predictors of SAP Implementation Success.

Table 4: Regression Analysis Result of Coefficient Test

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.013	.577		.023	.982
	SP	-.060	.098	-.047	-.607	.545
	TS	.374	.171	.282	2.180	.032
	PF	.158	.112	.116	1.413	.161
	ID	.252	.176	.188	1.430	.156
	DT	.319	.091	.312	3.511	.001
a. Dependent Variable: SIS						

The five (5) factors proposed earlier have been tested. Using a sample of 95 respondents, data was obtained from selected respondents within Syarikat Bekalan Air Selangor Berhad (Syabas), University Malaya (UM) and Edaran Otomotif Berhad (EON Berhad); all the companies are located in Kuala Lumpur. The main objective was to examine the strength of Implementation Development (ID) and Deployment (DT.

V. Recommendations and Conclusion

In this research, some elements of the independent variable were investigated, the researcher feels that there are still other elements that can be added to the variables in order to improve future research. The sample size and physical coverage to some extent has influenced the quality of the research findings and its ability to generalize. Due to the time constraints and some other limitations, the coverage of this research was a relatively small sample size consisting of 95 respondents from Bekalan Air Selangor (SYABAS), University of Malaya (UM) and EON Berhad (Edaran Otomotif Berhad) in Kuala Lumpur. Therefore, the findings may lack accuracy and be less representative. In order to improve this, the scope of physical coverage should be widened and the aspect of representation should be addressed if the findings are to be generalized to the whole population. In regards to the collection methods, the present research only utilizes the quantitative method, where questionnaires are used to collect data. Research of this nature may benefit from a more rigorous method as it involves

subjectivity in opinions, perceptions and feelings towards SAP implementation success, and the questionnaire approach did not fully capture these values. Researchers need to complement this study with other methods including interviews and discussion focus groups in order to get a fuller insight into the responses. By developing this approach the credibility of the findings and discussions will be enhanced and more effective.

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