

FACTORS INFLUENCING ERP ADOPTION AMONG THE SME'S: AN EMPIRICAL STUDY FROM MALAYSIA

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ABSTRACT: *The main purpose of this study was to investigate the mediating link of Enterprise Resources Planning (ERP) in achieving competitive advantage on the relationship between user satisfaction, top management support, training and education, technical support and intention to use. One of the main drivers of this study was the inconsistency of results found in the literature concerning the relationship user satisfaction, top management support, training and education, technical support and intention to use, and unclear understanding of how this relationship might be explained. In order to achieve the objective of the study, 150 questionnaire papers about ERP had been distributed to SMEs respectively. The data were analyzed using Partial Least Squares Structural Equations Modeling (PLS-SEM). The results have confirmed the mediating effect of achieving competitive advantage on the relationships between user satisfaction, training and education, technical support and intention to use of ERP system. Finally, this revealed that user satisfaction, training and education, technical support have a positive and significant effect on intention to use. While, top management has a negative effect on intention to use.*

Keywords: Enterprise Resources Planning, SMEs, Intention to Use, User Satisfaction, Training and Education, Technical Support, Competitive Advantage, Top Management Support

1.0 INTRODUCTION

In the last few decades of competitive business world, enterprise resource planning (ERP) system has implemented in motive to manage an organization's data, problem solving and effective decision making. Managers related operations employees' related management as well as external and internal supply chain management, which were included in the suite application modules of ERP [82]. ERP system handles the business management such as improved profit margins, better customer service, reduced inventories, better data analysis and improved process flow [24]. An organization takes ERP in the daily operation such as interpret, manage and store the data regards any business activities.

According to [53], they mentioned that why ERP system well accepted business software in the last decade and one of the beings developed in the world. The integration in the regular transformation of organizational systems and anti-error production and transaction can be solved through ERP systems. Some firms the ERP system was successfully implemented and sometimes the ERP system never successfully implemented due to the timeframe and cost circumstances. Finally, these firms never able to receive any benefit from the ERP implementation. The averages of ERP projects are 178 percent (178%) more budget; it was consumed 2.5 times while projected and releases only thirty percent (30%) of benefits. [79] According to their survey and study, they recognize that the ninety percent (90%) of ERP system had been delayed and also requirement of additional budget amount. Regular question that always arises in here is "what does ERP implementation fail?" and "what factors that influence for successful implementation?" there are many methods have been used to analyze and the factors that contribute to the successful ERP implementation.

The most of the literature review and studies were gathered from the developed nation that is in the United States (US) [55]; [53]; [10], the UK [41] and Canada [43]. Moreover, the studies also conducted from the developing nations such as

China [14], Malaysia [56] and South America region [16]. The studies also conducted in the Middle East region by [4]. These studies do not only focus on organizational factors, but also analyze and examine the successful implementation of ERP system in Iran. According to [83] mentioned that Iran was declared as a powerful nation by United Nations and so, it is very important to give focus on Iran. Besides, there is another challenge that comes along, which is the context may alter from nation to nation [14]. The impact to organization by using the ERP system is the firm's productivity seem very good and control the level of cost more efficiently. Initially it felt like a very costly in term of investment, but after implementation the company's and small medium enterprise will feel the great benefit from it. ERP will make the routine business operation very smoothly due to accuracy in data recording and so on. Today's business are all about digital, globalization, information communication technology and others. This is also relevant for small and medium enterprises (SMEs) although they are relatively smaller compared to large corporations. Adapting Enterprise Resource Planning (ERP) for SMEs is heavily required in today's business era in lined with great challenges ahead.

One of the factors identified is time and resources because with rapid modernization requirements are getting bigger, more processes involved and increasing tasks. Thus, it is important to simplify the tasks to make things easier. Moreover, ICT literacy is getting more common, especially among the Gen Y group of people who makes up about forty percent (40%) of the population in Malaysia [59]. Another challenge is ensuring a good customer experience is also vital for sustainability. Customers would always expect a good, fast, and satisfaction when acquiring a service. Remaining competitive against rivals is highly crucial, especially with a digital pace of life.

Emergence of enterprise applications is driven by the challenges above noticing that rapid innovation is required to be competitive and better operating system. Using ERP shall create operational excellence. The application is capable to

organize and manage things efficiently with higher levels of productivity in business operations since there is a growing interdependence between an organization's information systems and its business capabilities. It is also relevant to changes in business rules, practices and management behavior. Sustainability of a firm is also measured by a firm's invention in new product and services as well as new business models. A firm should be ready to create change from time to time on its products and services, deliveries, and sales innovation to optimize profitability.

Decision making is another crucial aspect in business. Traditionally, business owners would be dependent on forecast figures, best guesses, estimation, and so on to put up orders with suppliers and producing a number of goods. However, ERP adaptation may help business owners to have improved decision with computed figures and past performance track records. Besides, the relationship with customer and supplier is an important aspect of a business. Customers would value a good service through rapid responses to their inquiries or orders and also easy reachability through information systems. In addition, customer retention planning, behavior pattern, and so on could be easily done with enterprise applications. Similarly, a supplier may integrate their systems with businesses to provide improved solutions and distributions.

Hence, small and medium enterprises (SMEs) with operational excellence, new products, services, and business models, improved decision making, and a good relationship with customers and suppliers are potentially having obtained a competitive advantage. This could be realized effectively with the adoption of enterprise resource planning (ERP). The system shall also help firms to adapt to changes, business regulations, innovations, managing resources efficiently, and high competency to secure the survival in the industry.

In this research, we intend to study on what factors have contributed to the intention to use of ERP system among SME organizations in northern states of Malaysia and their perceived benefits towards the system in terms of achieving competitive advantage. As far as we concern, the cost for adoption of ERP system is quite high because it is an integrated operating system. Not every SME can afford it and it may be a burden for them. Besides, ERP system requires skilled and professional technical personnel in order to implement it in SME organizations, which is still lacking of technical know-how in doing so. Furthermore, the perceived benefits towards an ERP system on whether it can assist SMEs to achieve competitive advantage may affect the status of ERP system adoption. Below is the research question which we have used in this study.

- (a) What are the factors that affect the adoption of ERP system among SME organization?
- (b) What are the perceived benefits towards ERP system adoption?

Firstly, this study objective is to identify the factors that affect the adoption of ERP system among SME organization. Secondly, to determine the benefits of adopting the ERP system. In the other way round, the significance of this study is to provide valuable insights to the owners and practicing managers of SME, who are planning to adopt the ERP system in their organization. However, the limitation of the study is

the findings from this research may not be generalized in other states of Malaysia, which pave way to conduct further studies. Furthermore, this study only examines all SME organizations in northern states of Malaysia, such as Kedah, Perlis and Penang.

2.0 Literature Review and Hypotheses Development

This section discusses and reviews the relevant independent factors to be considered in this research that will influence the adoption of ERP system among SME organizations. These factors are user satisfaction, top management support, training and education, and technical support implementation respectively.

2.1 User Satisfaction and Competitive Advantage

ERP implementation success depends on the viewpoint from which users evaluate it. The system users judge the success of ERP implementation by having smooth operations or "user friendly" environment which also describes user satisfaction over ERP system. According to [22], end-user satisfaction is defined as "the affective attitude towards a specific computer application by someone who interacts with the application directly"

More precisely, concerning the Information Systems such as ERP, "user information satisfaction refers to the extent to which users perceive that the information system available to them meets their information requirements" [72]. In the ERP system environment, user satisfaction refers to the extent to which users perceive that the ERP software accessible to them meets their needs [72].

User satisfaction is also closely related to the competitive advantage of an organization. In order to enable a competitive advantage on delivery to be created and sustained in SMEs that use ERP systems for production planning and control, it is important to understand the underlying principles of how change and uncertainty are managed and tackled, and the effect of uncertainty on product late delivery [42]. The study focused on how ERP could be used to the advantage of SMEs in creating a competitive delivery performance by managing change and uncertainty using a holistic approach. An uncertainty diagnosing business model [40] was applied for holistic uncertainty management.

Furthermore, user satisfaction has great influence on competitive advantage which consists of the impacts of an ERP system implementation of the company's operating cost, customer service level, overall productivity gains, and the realization of particular ERP implementation objectives. Implementing ERP software assists companies with standardized data formats, better customer service and retention, and enhanced management decision-making [42].

Moreover, [3] noted that the general goal of an ERP system is basically to advance business performance by integrating a variety of business processes across the diverse functional departments and beyond enterprise boundaries. This integration allows for well-organized information flow within the firm as well as between the company and its customers and suppliers. Although user satisfaction and organizational impact are viewed as separate measures by many, according to [37], customer satisfaction is a part of organizational impact. One factor that affects organizational performance is user satisfaction. ERP user satisfaction is positively related with ERP organizational impact [67].

In conclusion, the relationship between user satisfaction and competitive advantage can be hypothesized as follows:

H1: User satisfaction has a significant effect on competitive advantage.

.2 Top Management Support and Competitive Advantage

There has well communication between the top management is very important as a critical success factor for ERP software implementation. In case of this, there have three things have to consider that is good responsiveness and support in adopting ERP System, good shared vision on ERP adoption from top management and clear understandable guidelines of ERP system from top management. According to the theory of [74] & [80], the top critical factor can be found at the top management site often are including “best people” on team, anything possible team attitude, top management well communication, precise aims and objectives, agent support, effective communication, middle management commitment, top management involvement and experiencing consulting support and many more.

Besides, throughout the ERP life cycle, the significant matter is ERP teamwork and composition. According to [80], the ERP team should consist of very powerful people in the organization by critically observe the building of cross-functional team. However, [74] pointed out that to develop the technical skills to implement and design the team by mix the consultants and internal staff because both technical and business knowledge are very significant in the motive for success. The team should work together that make easier to achieve the competitive advantage [80].

Throughout the implementation, top management support is very pivotal by providing the clear, understandable guideline of ERP system and good shared vision can give strong competition environment which later will strive to achieve the goal of a company. Through the ERP system the company can increase the productivity and at the same time increase the revenue of the company. According to [64], in order to support major business process, the team should familiar with the functionality on business and products. In sustaining the partnership, trust, the sharing of information through the top management, especially between the partnering companies. As a result, this is become so easy to reach to the subordinate in the organization in motive to achieve the competitive advantage. The use of ERP system must get approval from top management and precisely execute it is the top priority for the top management [74]. Besides that, the top management such as those from a senior management position is to commit themselves in the involvement and the ability the implantation of the system by providing the valuable resources [35].

In conclusion, the relationship between top management support and competitive advantage can be hypothesized as follows:

H2: Top management support has a significant effect on competitive advantage.

2.3 Training and Education, and Competitive Advantage

Training and education are very important if want to success in competitive advantage. Sufficient ERP system training and on-going support will make the employees very experience and high skillful in handling the ERP system. [9] Claimed that it will be strong in competitive advantage like

automatically improve the company productivity, improve company revenue, helps companies to increase the operational excellence and finally achieving the customer satisfaction. For instance, [73] also highlight that customer satisfaction fulfill then the growth of an organization through the best execution of ERP systems will be immediately achieve in another part.

Besides, the involvement of active human resource position and the training were very important to deliberately coordinate the project management [25]. There has planed to properly and accuracy in providing the training and education. The rapidly increasing issues and argumentations seriously need to look after and solve before it disrupt the situation [64]. The measurement of early delivering success is very important [80]. Delivering contain and robust successive are significant in motive to focus on regular tracking and results of the schedule and budget against the target also important [80]. Employees also need to be very excellent in handling the objectives, updates and activities and allow the changes to be occurring [74].

In many MIS literature, there has been stated well in an easier way about the software implementation in the role of training [57] & [65]. The problem in the ERP implementations and the failure due to the lack of the training employees complete understanding about how to execute the changing of the enterprise applications. Therefore the transferring of the knowledge or education to the company’s internal employees from the consulting department is very critical that need taken into consideration. [18] & [81].

In conclusion, the relationship between training and education and competitive advantage can be hypothesized as follows:

H3: Training and education have a significant effect on competitive advantage.

2.4 Technical Support Implementation and Competitive Advantage

Technical support implementation refers to ERP’s various positive attributes that are attracting the users to adopt the system in carrying out or completing a task. These attributes such as easy to adopt, being compatible to business operations, less occurrence of error and others, has assisted SME organizations to gain competitive advantage by being more agile and responsive towards market change and uncertainty [42].

According to [45], an organization is said to be competitive advantage if it has achieve one or more of the business objectives which included operational excellence, create new product, service and business model, achieve customer and supplier intimacy, improve the quality standard of internal decision making and be able to survive in today’s competitive marketplace for a long term. These business objectives are achievable if organizations are adopting an information system (IS), particular the ERP system, in conducting their business.

In conclusion, the relationship between technical support implementation and competitive advantage can be hypothesized as follows:

H4: Technical support implementation has significant effect on competitive advantage.

2.5 Competitive Advantage and Intention to Use

Intention to use of ERP system is highly driven by competitive advantage that an organization may gain upon implementing the system. According to [69], even medium-size companies are facing many pressures and constraints due to the globalization of markets, but it only can successfully if sustained its competitiveness. [36] presented the case studies of two Indian SMEs who have implemented ERP. He provided insights into the adoption of ERP and best business practices to achieve competitiveness. These companies adapted the ERP processes along with business process reengineering and best business practices in their companies. Very few SMEs carried out performance measurement, though it is essential [28].

There are different advanced manufacturing technologies adopted by different companies to improve the productivity of their organizations. ERP implementation is one of the tools, but the reasons to implement it are different for different companies. Based on a study, 58% of 1,348 companies have implemented the ERP to integrate the existing information system. The reason was the opposition from the employees who wanted to continue with the existing system. The second priority was given to replace the weak existing information system. Besides that, replacement of legacy system and complementing the legacy system are also factors to adapt ERP [38].

Other competitive advantages of ERP that stimulates SMEs to use the system, including better inventory management, reduced planning cycle time, improved customer service, reduced error in ordering, increase in sales volume, and improved competitive position.

In conclusion, the relationship between competitive advantage and intention to use can be hypothesized as follows:

H5: competitive advantage has significant effect on intention to use.

2.6 The Mediating Role of Competitive Advantage

2.6.1 The Mediating Role of Competitive Advantage between User Satisfaction and Intention to Use

Based on studies, it shows that the intention to use ERP has significant impact from user satisfaction and competitive advantage. According to [78], the Unified Theory of Acceptance and Use of Technology (UTAUT) could be used as an alternative to Technology Acceptance Model (TAM).

Hence, the four key components in UTAUT have been identified, such as performance expectation, effort expectancy, social influences, and facilitating conditions. Performance expectancy measures the degree to which a person believes that using the system could help improve his or her performance, and this construct is similar to the usefulness construct in the TAM model. Effort expectancy measures the degree to which a person believes the system will be easy to use and this is similar to the ease of use construct in the TAM model. Social influence measures the degree to which a person believes that others who he/she cares about feel that he/she should use the system. Facilitating conditions measures the degree to which a person believes that organizational assistance is there to facilitate the usage of the system. Thus, as an extension to TAM, UTAUT takes into consideration the factor of voluntariness of usage, which plays an important factor in ERP implementation. [39].

To simplify, when users find ERP is a complementing tool for their daily operations, it creates a value on their performance. Among value adding elements are sales management, inventory controlling, financial management (cost effectiveness), fast delivery, efficiency in order management, well organized supply chain management, etc. Thus, these factors drive users to adapt ERP and to gain positive impact over the organizational performance.

In conclusion, the relationship between user satisfactions, competitive advantage and intention to use can be hypothesized as follows:

H6: Competitive advantage mediates the relation between user satisfaction and intention to use.

2.6.2 The Mediating Role of Competitive Advantage between Top Management Support and Intention to Use

According to [11], clearly highlight that, top management helps in making the policies to establish a new ERP system which will lead the firm towards cost effectiveness, improve companies' revenue, productivity, meets customers' requirement and to have a competitive edge against rivals. Therefore, using an ERP system to improve the overall performance of the firm will increase the intention to use the ERP system.

[25] focus on effective communication because it is very important in the implementation of ERP. The effective communication must be swung in the every corner of top level management within the organization [80]. In fulfilling the customer expectation, the first thing needs to be taken into consideration is the strong, supportive environment from the top management for the implementation of ERP. The approval from the top management is vital [9]; [11] & [74] and strategy business alignment goals [74]. The top management needs to be precisely work on it as a first priority in motive to achieve the competitive advantages and the intention to use (Wee, 2000).

In the implementation effort, senior management commits to them in ability to assign valuable resources to it [35]. The managers should be stand strong in the moment of conflict between the parties and also should be approved and establish the roles and responsibilities, and new organizational structures in order to achieve in the competitive advantages.

In conclusion, the relationship between top management support, competitive advantage and intention to use can be hypothesized as follows:

H7: Competitive advantage mediates the relation between top management support and intention to use.

2.6.3 The Mediating Role of Competitive Advantage between Training and Education, and Intention to Use

As mention earlier, training and education is very important in handling the ERP systems and the linkage between the competitive advantages and intention to use. Proper education need to develop and execute so that the users will use it more effectively and efficiently [17]; [10]; [85]. Thus, the level of knowledge would extend or enhance the quality of the usage by the individual through the training and education. [55] also state that this helps to increase the probability of ERP system implementation success.

Besides, the proper education and training would increase the intention to use the ERP system among other individuals. If the users themselves seems to have proficient and familiar

with ERP system through the proper education and training than it will increase the user's intention to recommend the system to the other individuals [17]; [10] & [85]. Therefore, the lack of adequate training with making the implementation of ERP systems become difficult.

Furthermore, the positive feeling in using the system would provide great assistance to the company through the appropriate education and training. It straight gives deep impact on the competitive advantages such as improve the company's productivity, improve the company's revenue, help company achieves the operational advantages and also helps the company's to achieve the customer satisfaction. Besides, the more significant is it will help the ERP users to face the transformation adjustment within the organization.

Moreover, the training and education also will reduce the obstacles of use and less the resistance of the users which later enhance the ERP system usage and success [10]. It will give bad consequence if the implementation of the ERP system without the proper education and training [71]. Thus, the formal training, adequate skills and education in the IT field is very pivotal, the emphasizing of user training with allocation of investment to develop the software design and methodology are very significant in this matter [23].

In conclusion, the relationship between training and education, competitive advantage and intention to use can be hypothesized as follows:

H8: Competitive advantage mediates the relation between training and education and intention to use.

2.6.4 The Mediating Role of Competitive Advantage between the Technical Support Implementation and Intention to Use

In order to achieve competitive advantage in doing business, many SME organizations have adopted ERP system. Therefore, competitive advantage is being viewed as a mediator in encouraging the intention to use of ERP system among SME organizations in carrying out their daily business operations.

The main attribute of an ERP system that is clear, easy and understandable to adopt has contributed with the intention of use among SME organizations. This is due to the availability of standardization ERP software that is supplied by different vendors in the market such as SAP, Oracle, Microsoft and others, has made the system less complexity and easy to adopt [54]. [29] also argued that the ERP system customization should be avoided by organizations as it can increase errors during implementation stage and unable to take advantage of upgrading to the newest version from the ERP vendor.

ERP system, which enable its users to perform customization that is compatible to business activities, has increase the intention to use among SMEs. According to [45], ERP system enables an organization to make modification on some of its software in accordance with the needs of different business processes. Besides, [84] highlighted several reasons an organization chooses to customize ERP system, which is due to the differences in organizational context among SMEs such as ownership type, uniqueness of business processes and level in varies organizational stage of growth.

Thirdly, ERP system that has good function of process configuring and backup data tends to encourage the intention

of use among SMEs. [80] stated that ERP system has a good system configuration that allow its users to integrate the ERP system with other business system such as payroll system, accounting system, production system and others, in becoming one (1) single system. For backup data functionality, [55] found that ERP system has the ability to consolidate various data sources from different departments into one single enterprise database that can help organizations to backup their daily data and prevent data loss due to virus and bug attack.

Furthermore, the implementation process of an ERP system can ease through system testing and data from the old system can be easily converted into ERP system. Since ERP is a complex system for SMEs, the testing process of ERP system requires the involvement of different departments in an organization and cover various business processes, which help to reduce the possible error that might occur during the ERP implementation stage [3]. Apart of this, the ERP system has the functionality to assist users in converting old data into new or upgraded ERP system during the implementation stage and allow users to select on the type of data that they wish to transfer into the new system [74].

The less occurrence of error from the usage of ERP system has simulated the intention to use among SME organizations. According to [29], there is less error occurring during the implementation stage of ERP system except for troubleshooting error, which is viewed as a critical problem for ERP users. [41] also support this idea by claiming that ERP system has the ability to correct major errors during the configuration process.

Other ERP attribute such as its system functionality is good and achievable, has contributed to the intention to use among SME organization. According to [55], the ERP system is equipped with various enterprise software that use to support all business functional areas of an organization, which in turn will increase business efficiency and help management staff to improve decision making. The ERP system can assist an organization to achieve operational efficiency through better respond towards different customers request in terms of product and information [45].

ERP system attributes in terms of fast and efficient in analyzing business transaction is another factor that increases the intention to use. The database of ERP system, which collect real-time data from various departments in an organization, has the ability to analyze each business transaction into meaningful information through its analytical tools, which in turn will enable the management team to make better forecasts and decision [45]. According to [24], ERP system helps organizations to perform better business data analysis than others enterprise system.

The ability of the ERP system to work well through collaborating with other customer system such as customer relationship management (CRM) system and supplier relationship management (SRM) system has encouraged the intention to use among SMEs. [29] stated that ERP system that integrate with other customer system has successfully help organizations to interact with suppliers and provide customer service efficiently, which has reduced the cost of business operations. [58] also argued that an ERP system has the functionality of tying customers and suppliers into one (1)

system along the entire supply chain management (SCM) process, which proved to be useful for organizations that operate in an international and dynamic business environment. Finally, the security features of the ERP system that enable the protection of a company's data, privacy and confidential information effectively has increase the intention to use among major SME organizations. According to [62], issues related to the security of an ERP system can be overcome through security policy and administration, user authentication and authorization, separation of duty between users, time restriction in accessing the system at certain periods, log and trace of relevant events in preventing the breaching of log files, as well as continuously improve database security.

In conclusion, the relationship between technical support implementation, competitive advantage and intention to use can be hypothesized as follows:

H9: Competitive advantage mediates the relation between technical support implementation and intention to use.

2.7 Intention to use

The Enterprise Resource Planning system is a system which makes an organization to integrate and automate their business operating process, information sharing and enables norm across the organization and generate an effective and reliable information in a real time environment [52]. According to [5], they have confirmed the ERP business case in organization's IT investments. Therefore, the acceptance of advance technology of information such as ERP system plays an important role in [77] research. According to [47] finding, the most influence models to determine the acceptance of Information Technology (IT) by the system user is Technology Acceptance Model (TAM).

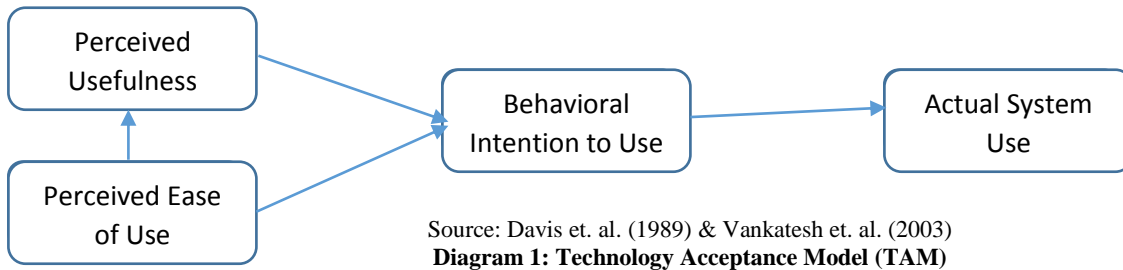
In order to influence an individual to use ERP systems, a person's behavior is important as it involves judgment whether his or her attitude is good or bad, alongside that whether it is into it or against using it [48]. According to [21,49] confirm that it has a straight impact on one's intention to use ERP systems. ERP adoption is a type of IT investment. In addition, [44], theorized that perceiving usefulness is highly important where this concern and awareness which related to a user's future advantages, including extra benefit after performing tasks and getting higher performance. As a result, this confirmed that the ERP system with higher levels of perceived usefulness is will achieve a positive relationship to end user believes. According to [1,20,26] mention that earlier theories dominating user behavior research were defined from the theory of reasoned action, planned behavior and Technology Acceptance Model (TAM) model. Also, [1] also defined that theory of planned behavior proposes a direct relationship between a person's intention and his or her actual behavior. In short, most of the research has found that actual usage of ERP systems is influenced by the empirical support from direct positive behavioral intention [76]; [68].

[20] mentioned that the developer of Technology Acceptance Model (TAM) has identified the usage through perceiving usefulness and perceived effort of use. The intention to use Enterprise Resource Planning (ERP) system also defined by Technology Acceptance Model (TAM) is a user's voluntary.

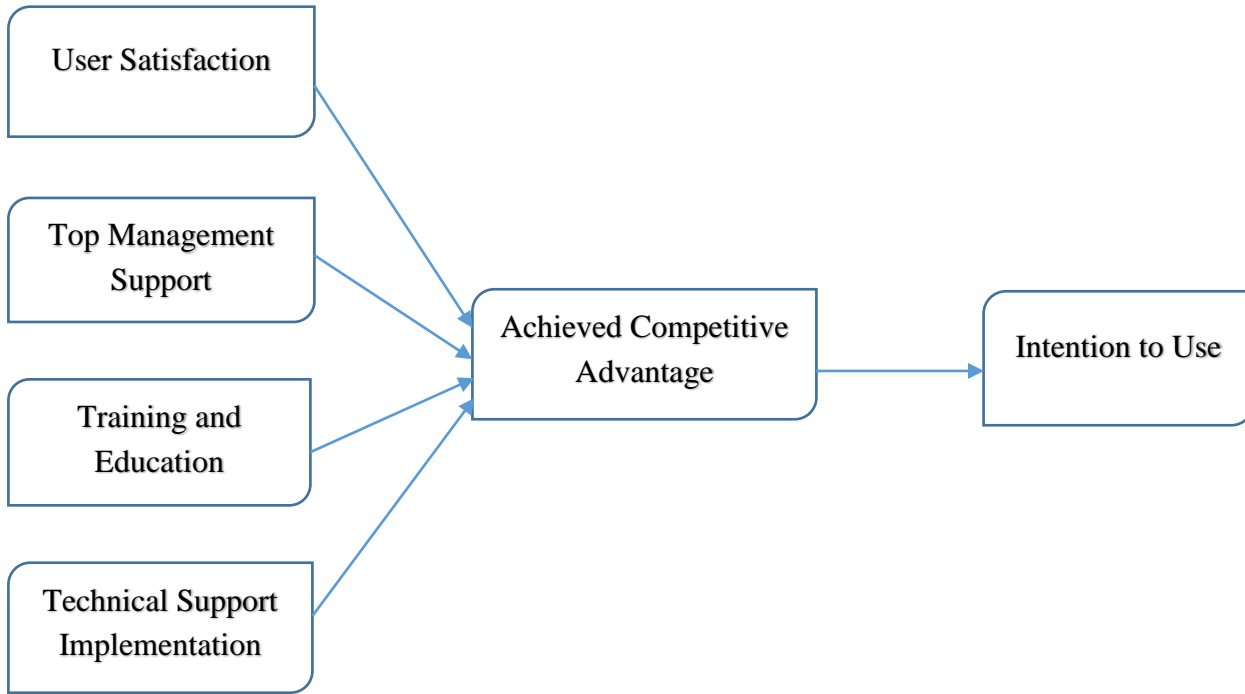
Meanwhile, the intention to use the system in day-to-day business operation in [61] research which it discover that apart from perceiving usefulness, subjective practices, voluntariness and compatibility were discovered from significant determinants of intention of user's acceptance on the system. [34] confirmed that the test achieved high reliability. However, in order to achieve the competitive advantage by using the ERP system, TAM's usage considers mandatory throughout the organization. TAM suggested that the usage of the system is caused by the behavioral of one's intention, whereby it indirectly jointly form by a person's behavior such as satisfaction and technical support implementation on its perceived usefulness.

Thirdly, whether an user would depend on ERP system in his or her business directly to [60] research with showing the perceived usefulness was determined by the influential driver if compare with forecasting of intention to use. In short, the more in perceiving the usefulness of technical support implementation by using the ERP system, the more possible ERP system may accept and rely by its user [77]. However, in order to get attention to ERP's users to know more and explore ERP systems in depth, [78], mention that social influence not playing a role in constructs which are significant in voluntary contexts. It is subjective practices where the influences are from the perceived usefulness. It is through internalization such as top management make an effect into their own usefulness interpretation and identification and gaining status while influence the work group to use using ERP system in order to increase organization's performance. This normative pressure from top management will attenuate over time as being a basis medium of influence to enable an individual to adopt the system. [78,46,66].

In today's information technology world, [78] has defined social influence from others is a medium which may influence a person's intention to use the system. The influence of ERP's user may spark one's perception of life by their beliefs, roles, behaviors, experiences, common practices and values. In addition, social influence includes pressure or influence of top management, co-workers and various trusted parties who satisfied from using an ERP system. The concept of social factors is proposed from two (2) theory. First, the theory of Reasoned Action (TRA) by [26] and second, theory of Planned Behavior (TPB) by [1]. According to [31] defined that social influence plays an important role to influence behavioral of an individual using the technology. [8,13,75] found that most research has the positive relationship existing between individual's perceptions on theirs behave and usage of information technology. In [51], [19] research found that accounting staff's intentions to use technology are influenced by social factors. In short, an individual's intention to use the ERP system has a positive effect by recommendation from other ERP users.



2.8 Theoretical Framework



Independent Variable

Mediating Variable

Dependent Variable

Diagram 2: An overview of the theoretical framework which consisted of independent variables, mediating variable and dependent variable of the study

3.0 Research Methodology

This research methodology section consists of four sections, which are research design, sampling design, questionnaire design and proposed data analysis. The first section provides a detailed summary of the research variables for the overall study. The second section discusses the sampling method, while the third section emphasizes the questionnaire design. Finally, a detailed description of the data analysis is provided in section four.

3.1 Research Design

There are four (4) types of research purposes, which are exploratory, descriptive, hypothesis testing and case study [12]. Besides, the approach that used in carrying out this research is quantitative method. This research regarding

3.2 Questionnaire Design

factors influencing on the ERP adoption among SME organizations is a hypothesis testing research and using quantitative method. In quantitative method, survey in a form of questionnaire is adopted based on review of previous literature in a different geographical setting and send to the respondents in order to gather feedback from them. This research involves gathering numerical data by using a structured questionnaire to collect primary data from individuals. Quantitative method has been chosen due to the results that collected can be generalizations to the population at large. Besides, this approach is time saving and be able to capture a large number of respondents.

Table 1. Influencing factors of ERP Intention to Use

SI No.	Variable	Source
1	Intention to Use	Al-Twairsh & Al-Mudimigh (2011)
2	User Satisfaction	Shahin Dezdar & Sulaiman Ainin (2011)
3	Competitive Advantage	Keong, Ramayah, Kurnia & Chiun (2012)
4	Top Management Support	Sumner (1999), Wee (2000)
5	Training and Education	Zhang, Lee, Huang & Zhang (2005)
6	Technical Support Implementation	Garg (2010), Zach & Munkvold (2012)

The questionnaire consists of 3 sections, which are:

(a) Section 1 was designed to obtain specific details about the personal background and job function of respondent.

(b) Section 2 was designed to study about the current status of ERP system adoption in the respondent's organization.

(c) Section 3 was designed to obtain information regarding respondents' perception towards various factors that influencing the adoption of ERP system and their expected outcome from it.

According to [33], there are 4 types of scales that can be used in measuring respondents, which are nominal scale, ordinal scale, interval scale and ratio scale. For section 1 and 2 which contain eight (8) questions are applying nominal scale and ratio scale that assign to certain categories. Whereas in section C which contain thirty one (31) questions, five point Likert scale is used to test the degree of agreement or disagreement among respondents, which is ranking from strongly disagree to strongly agree.

3.3 Sampling Design

The population for this research is all SME organizations located in the northern states of Malaysia, namely Kedah, Perlis and Penang, that have already adopted or planning to adopt an ERP system in their day to day business operations. The total number of population is 7,500 SMEs and the sampling frame of this population is obtained from the SME annual report Malaysia 2014/2015 [70], which is the official annual report that consist of complete and update information regarding SME development in Malaysia. For the sampling method, the random sampling is used to select the respondents, where not all respondents are selected and the sample size in this research is 150 respondents in total. The respondents are targeting either the owners of the firm or managerial, executive in order to ensure a higher response rate. Out of distributed set of questionnaires, 150 completed and usable questionnaires, representing a response rate of 100%, were returned and used for statistical data analysis.

3.4 Data Analysis

Since the research is using quantitative approach, the data that we collected from the respondents will be converted into number and arrange them into a tabular form. Thereafter, these data were analyzed by using SmartPLS 2.0 package.

The analysis was first to establish the measurement model and prove that the model has the required reliability and validity before undertaking the model testing. Furthermore, Partial Least Square Structural Equations Modeling (PLS SEM) was employed and the results were reported as in the following sections.

Prior to hypothesis testing, the Partial Least Squares Structure Equation Modelling (PLS-SEM) was employed to assess the measurement model, outer model. The following phases,

suggested by [6] were followed. This confirms construct validity. Construct validity can be assessed through the construct's content validity, convergent validity and discriminant validity.

4.0 Statistical Data Analysis

4.1 Construct Validity of the Measurement

Based on the Structural Equation Modeling (SEM) literature, construct validity is defined as the extent to which the set of items meant to capture the concept of the construct is efficient in performing their designed objective [32]. In more details, the instrument used to measure a specific construct is generated based on the literature to make sure that the generated items are a comprehensive and appropriate in measuring the construct. Later, to ensure the content validity, the loadings of all the items on their respective constructs should be higher than their loading on other constructs. The factor analysis performed showed that items were correctly assigned to their constructs and they showed higher loadings on their respective constructs in comparison with their loadings on other constructs [15].

4.2 Convergence Validity of the Measurement Model

The convergence validity of the measures is assessed based on composite reliability (CR) and average variance extracted (AVE). The composite reliability values for all the constructs ranged between 0.876 and 0.949 which exceed the recommended value of 0.7 [27]; [32]. Alongside that, the average variances extracted (AVE) values for all the constructs ranged between 0.586 and 0.861 indicating an adequate level of construct validity of the measures [7]. Collectively, these findings confirm the convergence validity of the outer model.

4.3 Discriminant Validity of the Constructs

To confirm the discriminant validity of the construct, [27] criterion was deployed. As depicted in Table 3, the results presented at the diagonal of the correlation matrix are the square root of the average variance extracted (AVE) for all the latent constructs. The results clearly showed that the variance shared among the sets of items comprising their respective constructs is higher than the variance they share with other items measuring other constructs. They reflected on that the diagonal elements of the correlation matrix were found to be higher than the other off-diagonal elements of their respective rows and columns in which they were located.

4.4 Prediction Relevance and the Quality of the Model

The quality of the model is assessed back on the R^2 values of the endogenous variables and the validated redundancy. The model accounts for 58% and 40% of the variance in achieving competitive advantage and intention to use constructs respectively. In addition, the main results of SEM, goodness of fit which indicate for the measurement model.

The results regarding the predictive quality of the model are reported that goodness of fit of intention to use was 0.58. These values were more than 0.35, indicating an adequate predictive validity of the model based on the criteria.

($\beta=0.330$, $t=2.992$, $p<0.01$). With regards to the relationship between user satisfaction and competitive advantage, this study found that user satisfaction significantly and positively effects achieving competitive advantage at the 0.01 level of

Table 2. The Results of Hypothesis Testing (Inner Modeling Analysis)

NO	Hypothesized Path	Path coefficient	Standard Error (STERR)	T Value	P Value	Decision
1	Ach-compit -> Intention-to-use	0.635	0.050	12.696	0.000	Supported
2	TOP-Man -> Ach-compit	0.134	0.107	1.255	0.105	non-Supported
3	Technical-Support -> Ach-compit	0.330	0.110	2.992	0.001	Supported
4	User-Sat -> Ach-compit	0.255	0.096	2.652	0.004	Supported
5	training-Edu -> Ach-compit	0.150	0.106	1.416	0.079	Supported

***: $p<0.001$; **: $P<0.01$; *: $P<0.05$

4.5 Hypotheses Testing

The statistical results in Table 2 showed that achieving competitive advantage has a positive and significant effect on the intention to use at the 0.01 level of Significance ($\beta=0.635$, $t= 12.696$, $p<0.01$). Similarly the results showed that technical support has a positive and significant effect on the

significance ($\beta=0.255$, $t=1.416$, $p<0.01$). Also, this study has identified that training and education have a positive relationship with achieving competitive advantage at the 0.01 level of significance ($\beta=0.150$, $t=1.416$, $p<0.01$). Therefore, these testing results supported the hypotheses H₁, H₃, H₄, and H₅ as developed in the study.

Table 3. Testing Mediation Effect of Achieving Competitive Advantage

Hypotheses	Paths	Path Coefficients	a * b	St. Dev (a*b)	T.Value	P.Value
H6	user_Sat → Ach-Cpt-Adv	0.225	0.172	0.067	2.599	0.0048
	Ach-Cpt-Adv → Inten-to-use	0.635				
H7	Top_Man → Ach-Cpt-Adv	0.134	0.086	0.067	1.283	0.1002
	Ach-Cpt-Adv → Inten-to-use	0.635				
H8	Training-Edu → Ach-Cpt-Adv	0.15	0.099	0.068	1.458	0.0427
	Ach-Cpt-Adv → Inten-to-use	0.635				
H9	Technical-Support → Ach-Cpt-Adv	0.33	0.205	0.076	2.679	0.0038
	Ach-Cpt-Adv → Inten-to-use	0.635				

***: $p<0.001$; **: $P<0.01$; *: $P<0.05$

competitive advantage at the 0.01 level of significance

4.6 Testing the Mediating Role of Achieving Competitive Advantage

The mediating role of achieving competitive advantage was examined with the help of Smart PLS 2.0. The results of the test are displayed in Table 3, where it is evident that after employing the bootstrapping method, achieving competitive advantage partially mediates user satisfaction and intention to use at the 0.01 significance level ($\beta=0.172$, $t=2.599$, $p<0.01$) and thus H₆ is supported. Alongside that, achieving competitive advantage partially mediates training and education, and intention to use at the 0.01 significance level ($\beta=0.099$, $t=1.458$, $p<0.01$) have positively supported H₈. Lastly, achieving competitive advantage also partially mediates technical support and intention to use at the 0.01 significance level ($\beta=0.205$, $t=0.076$, $p<0.01$) and this result supported H₉.

5.1 CONCLUSION OF THE RESEARCH ANALYSIS

From the research, it can be concluded that there are three (3) factors that assist an SME organization in northern states of Malaysia to achieve competitive advantage, which has a

positive relationship with intention to use. These factors are user satisfaction and technical support implementation which have strong significant effect with competitive advantage, while training and education generate a weak positive relationship. This is in line with previous research studies by [42] and [67], who claimed that ERP attributes and user satisfaction towards the system have assisted an SME to increase business success rate and encourage the adoption of ERP system. However, training and education shown a weak significant effect is due to the lack of training, resources and time being, provided to ERP users to familiarize themselves with the system functionality.

As of the mediating effect of competitive advantage, the result supported the existence of the mediating impact of competitive advantage between 3 ERP adoption factors and intention to use at the significance level of 0.05.

On the other hand, the finding led to the rejection of the hypothesis that top management support has a significant relationship with both intention to use and competitive advantage as a mediating effect. This is in contradiction to the studies of [74]; [80]; [9] and [11], who stated that top

management support plays an important role in the success of ERP implementation.

5.2 Recommendation

From the conclusion that we have made, it is clear that top management support has not had any effect on the ERP adoption among SMEs in northern states of Malaysia. This is due to the lack of workable support being provided and taken by top management in encouraging ERP implementation. Therefore, top management is recommended to take several steps as suggested below in making their support become workable and responsive to the system user.

Firstly, top management should provide proactive responsiveness and support to all users in adopting an ERP system in their daily work. This can be done through the allocation of necessary resources (financial and non-financial) to increase the ERP adoption rate among users. This will prove to the users that top management has a strong commitment and sincerity in providing their support to encourage ERP adoption in the organization [71].

Besides, a good shared vision should be clearly defined by top management as it helps to sharper the direction of ERP adoption. This shared vision should align with the strategic planning of the organization in terms of cost and perceived benefits that it planned to achieve from the adoption of ERP system [30]. Once approved, it should be broadcast to the entire organization to make all users aware of this shared vision and understand the rational, objective on why the organization is adopting an ERP system in daily business activities.

Finally, top management is encouraged to provide clear and understandable guideline in adopting the ERP system. In doing this, top management should personally involve in the ERP adoption process by themselves along with other system users, but should not just stop at the initial or planning stage only [3]. This will be valued by users as top management is providing leadership in guiding them to familiarize with the system.

In conclusion, top management support is viewed as a critical factor in determining the success of intention to use, as they are the most influential people in an organization [30]. As ERP adoption involves a huge sum of money and time to invest, therefore, top management should concern wisely by emphasizing on ERP system adoption in order to gain the maximum benefits and create transformation to the current practices in this dynamic business world.

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