# PUSH AND PULL FACTORS: ENTERPRISE RESOURCE PLANNING IMPLEMENTATION IN KLANG VALLEY SMALL MEDIUM ENTERPRISES

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**ABSTRACT**

Enterprise Resource Planning (ERP) is an integrated system that by businesses to improve internal business processes to provide greater efficiency, automation, and cross-functional support across all business functions. Although widely adopted by multinational corporations, Small and Medium-Sized Enterprises (SMEs) adoption of the system isn't as popular due to complexity of implementing such systems, resources needed to go through the process which SMEs are limited of, and failure factors that can inhibit the successful implementation of ERP. Therefore, this research aims to evaluate the push factors and pull factors that either enable or inhibit the successful implementation of ERP in SMEs within Klang Valley. The research will be employing qualitative methods as it intends do have in-depth discussion with a diverse set of experts from different walks of life. The research will also aim to provide the research community and IT industry a better understanding on the factors that contribute to a successful implementation of ERP in SMEs, as well as provide ERP implementers a model that will guide them through real-world ERP implementation project in SMEs.

**Keywords:** Enterprise Resource Planning, pull factor, push factor, enabler, barrier.

## 1. INTRODUCTION

Enterprise Resource Planning (ERP) is an integrated system that is implemented by businesses for various reason. Among the reasons are to improve internal business processes in various departments to provide greater efficiency, increased automation to its processes, and improved communication across the organization [1]. Widely adopted across many different markets and businesses, ERP systems are becoming an important part of organizational practices and business operations [2].

ERP bring a substantial among of values and benefits to businesses of all sizes. ERP allows employees in an organization to work efficiently as the system breaks down barriers between business units through the automation of business processes, improved customer service through single source for billing and relationship tracking, enhanced financial compliance through regulatory standards, and real-time data flow and view that helps in addressing operations issues effectively and efficiently [1]. This deliverables by ERP systems creates uniformity in an organization and allows the enterprise to generate optimal outputs whilst creating an efficient operation throughout the organization [3].

Small and Medium Enterprises (SME) has an important role in a country's economy as they contribute to the growth of a nation's economy and the generation of employment. According to the Department of Statistics 2016 economic census, it was revealed that there were 907,065 SMEs operating in Malaysia as of 2015, which

makes up 98.5% of total establishments of 920,624 firms in Malaysia [4]. Additionally, Malaysian based SMEs contribute 38.9% of the economy GDP in 2019 which is a substantial increase from 2018 where upon SMEs contributed 38.3% that year [5]. SMEs located in the Klang Valley which consist of Selangor and Kuala Lumpur, accounts more than one-third of the total SMEs in the country [4].

Although ERP systems is widely known in the business world and its adoption rate is growing at a rapid pace since its inception, ERP implementation can be a costly endeavour with complex elements that typically large businesses are able to invest in [2]. With budget constraints and the high complexity of its implementation process, ERP is usually an afterthought for most SMEs. However, ERP vendors in recent years are starting to offer affordable options to SMEs that are easy-to-install, and pre-configured [6]. As SMEs rapid growth continues, ERP systems ability to improve operation productivity and efficiency can further grow SMEs and increase their competitive edge in the market [7]. SMEs are also looking to adopt digital technology such as ERP systems to boost international competitiveness and digitalize most of their transactions and business procedures to ensure they are competitive and efficient [8]. Thus, a market for ERP systems is there.

ERP implementation is gaining traction among SMEs but adoption issues do exist. Among the issues is the misfit and misalignment of vendor's pre-configured ERP system and SME's business strategy [6]. Even though pre-configured ERP systems solutions by vendors feature best industry practices and standards, SMEs established business processes is hard to forgo for some SMEs as it's the reason that makes them unique especially when the SME is in a niche market with high market capitalization [9]. However, this isn't the only constraints. Many push factors or barriers exist that can inhibit the success of an ERP implementation in SMEs. But with all the potential barriers, SMEs can find solace with the fact that there are a substantial amount of pull factors or enablers that can enhance the implementation process and enable them to overcome the complexity of implementing such a complex system. Thus, this research will look into both the push and pull factor to provide ERP implementers, project teams, and vendors a model that can facilitate a successful ERP implementation in SMEs within Klang Valley by giving them an understanding of the barriers and enablers of ERP implementation.

## 2. RELATED WORK

### 2.1. Pull Factors

ERP implementation has its benefits which is why many organizations particularly multinational companies have adopted it. It is also true that SMEs are also starting to adopt ERP as it gives them a competitive edge in a highly competitive marketspace [2]. However, ERP implementation has risk factors that can affect the ERP implementation negatively [7]. Hence, these are several commonly cited pull factors or enablers that enhance the ERP implementation process in SMEs.

The first pull factor is change management. Employees are typically the ones impacted by new changes that effect the way they do their work which then creates resistance

towards the system when not addressed accordingly [10]. Thus, effective change management helps in reducing resistance towards the new system while maximizing the benefits of ERP implementation by preparing employees for the changes [11]. Change management would do this by providing proper training of the ERP system for the users and getting them more involved in the design and the implementation process to help provide them a better understanding and clarity of the usefulness of the system while the project team can get their feedback which can further enhance the system and the implementation process [12].

The second pull factor is top management support. Leadership plays a vital role in the success of the ERP system, and such role is driven by the commitment and strong support by top management [12]. The effects of such endorsement by top management to the organization is better resource allocation for the project, designation of the project as a major priority for the organization, and senior management will play a proactive role to solve implementation issues through strong leadership [7]. As a result, employees' acceptance towards the new system will be greater due to strong support by top management but also allocation to training for the system further improves employee commitment to the system and the implementation process [10].

The third pull factor is effective project management. ERP implementation success is based on the process of project management whose focus is on initiating, planning, implementing, and controlling project activities to achieve project goals and milestones [13]. Additionally, project management develops the project implementation plan which defines the project activities, establish roles and responsibilities to each activity, and encourage organization support throughout the implementation process [14].

The fourth pull factor is effective communication. Effective communication throughout the organization before, during, and after the ERP implementation phase is vital to inform all stakeholders of the project progress, its timeline, and the implementation strategy [7]. Furthermore, communication throughout the business functions and departments gets the word out about the benefits of the system and the changes to business functions that will come into effect as part of the changes that come with the new system which will greatly inform the users while also enabling feedback from them [11].

The fifth pull factor is training and education. Training ERP users is crucial to the success of the entire ERP implementation project as training provides effective understanding of the new business processes and practices that will come with the new system [14]. Training and educating the users also ensure the system is being effectively used which creates a more productive and effective workplace [11].

The sixth and last pull factor is competent project team. Forming an competent ERP project team is a critical pull factor as the team is in charge of achieving implementation success by meeting all expectations and goals that were visioned by the project team and top management [14]. Team composition is part of creating an effective team which means the team must consist of representatives from different departments, as well as ensuring involvement of all stakeholders [13]. ERP implementation success also depends on the competence of the team, which means experience and

knowledge of ERP implementation are positive attribute which bring a positive impact to the team and the project as a whole [11].

## 2.2. Push Factors

Although ERP is widely adopted by large enterprises, SMEs are not as convinced to adopt ERP systems due to push factors or barriers that can impact the implementation process negatively [6]. Hence, these are several push factors that inhibit the successful implementation of ERP in SMEs.

The first push factor is lack of commitment from top management. Top management provide leadership and allocate resources that are crucial to the success of the ERP implementation process [7]. Lack of that commitment will lead to lack of leadership which causes the vision of the project to collapse and resources would not be allocated sufficiently [6].

The second push factor is ineffective change management. The lack of a proper change management of the new processes and procedures leads to ERP implementation failure as employees suspect and behave against the implementation [7]. Training is a part of the issue as the change management process requires to provide training to ERP users as a way to improve acceptance for the system. However, inadequate training of ERP users leads to lack of confidence and anxiety among the users which then amps up the resistance against the implemented system [2].

The third push factor is poor ERP package. Choosing the wrong ERP package can cause implementation and customization issues that inevitably causes a failure to the entire project [15]. Misfits in ERP implementation is also a major issue as business processes that aren't aligned with the ERP package, will lead to business functions in the organization having operational issues [9].

The fourth and last push factor is employee resistance to change. Inadequate training, poor communication, lack of commitment and support from top management leads to resistance among employees towards the system, and poor adaptability leads to resistance by employees towards the new system [6]. Without proper knowledge and guidance of the new system, employees develop doubts with the new system, leading to them resenting it and attempting to sabotage the implementation efforts [7].

## 3. METHODOLOGY

Research design provides a framework for the research which sets out to determine what type of research approach will be undertaken [16]. Thus, this research utilized qualitative methods. Qualitative research investigates the phenomenon at a largely in-depth and holistic fashion through collection of diverse and rich materials with the aim of providing a more in-depth insight and understanding of real-world problems [17]. Furthermore, qualitative methods are used by researcher who wants to observe and interpret an environment with the goal of creating and developing a theory [18]. Hence, qualitative methods will provide this research a more in-depth and diverse look into

the factors that affect ERP implementation. This stems from the fact that the qualitative approach to research emphasizes the importance of the participant's view while stressing the setting and the context those participants expressed from which highlight their each personal view in regards to the issue [19]. Thus, those interactions between the interviewer and interviewee will lead to a deeper understanding of the issue in front us which can enrich the content of this research and satisfy the objectives it aims to achieve.

As part of the qualitative approach, this research utilized interviews as its main research method for this research. The purpose of conducting interviews is to extract the interviewee's experiences, perceptions, thoughts, and feelings that allows for a dynamic flow of ideas that can influence the research [20]. Interviews allows for the interviewer to listen and gain a better understanding of people's stories that provides a better context to issue that the research aims to study [21].

## 3.1. Semi-Structured Interview

Semi-structured interviews are an effective method for data collection as it collects qualitative and open-ended data by exploring participants thoughts and beliefs about the topic, while getting a more in-depth look into the personal and sensitive issues that is relevant to the topic [22]. With that, a set of questions were identified that aims to understand both the push and pull factors of ERP implementation. The questions were derived from the literature review conducted in this research which identified key push and pull factors that are worth looking further into. Figure 1 depicts the interview instrument utilized during the interview process of this research.



**Figure 1. Interview Instrument (Yellow Highlight = General Questions; Green Highlight = Questions related to Pull Factors; Blue Highlight = Questions related to Push Factors)**

### 3.2. Data Collection

Initially, 15 ERP experts were contacted to be interviewees but only 10 agreed to be a part of this research. Every single one of these interviewees has been involved in ERP implementation projects in SMEs within the Klang Valley area. A criterion was set where upon the interviewees had to have been directly involved with the implementation phase as part of the project team and played a critical role in its execution. The experts also had to have more than 5 years experience in handling ERP projects especially in SMEs.

Purposive sampling specifically judgemental sampling was the sampling technique utilized during the data collection process. Judgemental sampling is a sampling technique that relies on the judgement of the researcher when selecting the participant that are to be studied [23]. The judgement by the researcher as to who will participate will provide the best information for the objectives in the study to succeed [24]. There are several types of purposive sampling but this research will employ expert sampling that is used when the study needs to extract knowledge from individuals of a particular expertise that will be investigated to form the basis of this research [25].

As such, Table 1 details the interviewee characteristics in detail. Each interviewee was also given a unique ID for the researcher to easily identify them during the data analysis phase.

**Table 1. Interviewee Characteristics**

| No. | ID. | Position/Title (Currently) | Years of Experience | Total No. of ERP projects involvement |
|---|---|---|---|---|
| 1 | I1 | Senior Delivery Manager/ Assistant HOD | 15 Years+ | 10+ |
| 2 | I2 | Senior Assistant Director | 20 Years+ | 10+ |
| 3 | I3 | Statutory Lead | 8.5 Years | 10 – 12 |
| 4 | I4 | Principal Consultant | 16 Years+ | 6 – 7 |
| 5 | I5 | Solution Architect | 13 Years | 10+ |
| 6 | I6 | ICT Specialists Database Management | 18 Years | 5 |
| 7 | I7 | Senior Training Consultant | 15 Years | 5 |
| 8 | I8 | Consultant/Corporate Trainer | 30 Years | 4 |
| 9 | I9 | Service Manager | 18 Years | 5 |
| 10 | I10 | Senior Test Manager | 30 Years | 4 – 5 |

### 3.3. Data Analysis

Thematic analysis was chosen as the main analysis method of this research. Thematic analysis is flexible and accessible in its approach as it provides the researcher a way of conducting qualitative research through the mechanics of coding and analysing qualitative data systematically [26]. Thematic analysis enables the researcher to develop distinctive and meaningful answers to the research question [27]. As such, thematic analysis has six steps:

**Step 1: Familiarize yourself with the data**

This steps requires the researcher to dive into the data, understand it, and familiarize yourself with the data's content, with the goal of noticing things relevant to the research question and objective [26].

**Step 2: Generating initial codes**

The purpose of generating codes is to help the researcher understand the data, while allowing the researcher develop insight to the data which will lead to a thorough foundation for the analysis [27].

**Step 3: Searching for themes**

In this phase, the researcher will be searching for themes within the data by capturing patterned responses or meaning within the data that are relevant to the research question [26].

**Step 4: Reviewing the themes**

In this step, the researcher will be reviewing the themes alongside the dataset to ensure they work well together and that the answers are meaningful and relevant to the research question and objective [27].

**Step 5: Defining and naming the themes**

Defining the themes requires the researcher to distinguish what is unique and specific about all the themes, and naming the theme can provide an immediate sense of what the theme is on about [26].

**Step 6: Producing the report**

In the last step of thematic analysis, the researcher will produce the report from the analysis done in the previous steps, and move away from the analytic point in the research process to coming back to the overall picture of the project which was to answer the research question set in this research [27].

Thematic analysis will be utilized to uncover codes and themes in the dataset that was recorded and transcribed during the 10 interviews that were conducted during the data collection process. Table 2 shows an example of thematic analysis being applied to one of the respondent answers to Question 3 in the interview instrument.

**Table 2. Sample application of thematic analysis to a response to Question 3**

| Phase 2- Generating Initial Codes (Transcribed Data) | Phase 3 – Searching for Themes | Phase 4 – Reviewing the Themes | Phase 5- Defining and Naming the Themes |
|---|---|---|---|
| Budget, they need to ensure that in any implementation, there should be Plan A and Plan B. Budget should be dedicated for a plan which is properly planned and also the budget should be dedicated for the alternative plan. Apart from that, top management must have budget plan[1], strategies for recovery[2] in case this thing fails, or in case this thing is not fully implemented within the timeline, and they should have a strategic out, also called risk management[3]. There are many types of failure: not getting things done within the timeline is a failure, not getting things done with a great quality also is a failure, and not getting things done with correct competent of resources also is a failure. So, failures are various types of failures which can occur when implementing any project especially the complex and expensive projects such as ERP. So, top management need to have budget dedicated for all the strategies and plan, which is agreed before kicking off this ERP Implementation. Very important, they should have this risk management. This is what we call that the recovery process. (I1) | Top Management Support is an enabler.<br><br>Top management must have budget plan.[1]<br><br>Top management must create strategies for recovery.[2]<br><br>Top management should have a strategic out, also called risk management.[3] | **Enabler:**<br><br>Top Management Support<br><br>**Enhancements:**<br><br>1. Provide the budget plan.<br><br>2. Create Strategies for recovery.<br><br>3. Have a strategic out/risk management. | **Enabler:**<br><br>Top Management Support<br><br>**Enhancements:**<br><br>1. Allocate sufficient budget.<br><br>2. Develop the strategies.<br><br>3. Develop risk management strategies. |

## 4. RESULTS

This section reveals the findings from the semi-structured interviews that were conducted during the data collection process. The findings consist of a list of enablers and enhances as well as a list of barriers and inhibitors that was identified from the thematic analysis conducted during the data analysis phase of this research.

### 4.1. Pull Factors/Enablers

**Table 3. List of Enablers and Enhancements identified using thematic analysis**

| Enabler ID | Enablers | Enhancements |
|---|---|---|
| E1 | Top Management Support | - Allocate sufficient budget.<br>- Develop the strategies.<br>- Develop risk management strategies.<br>- Define the business plan and vision.<br>- Allocate resources and deadlines.<br>- Improve employee acceptance.<br>- Informs the priorities of the project. |
| E2 | Communication between Business Units | - Knowledge transfer.<br>- Inform everyone about the progress.<br>- Sense of transparency.<br>- Users understand the changes. |

| E3 | Training and Education | - Users adapt to the ecosystem.<br>- Improves acceptance.<br>- Improves efficiency and productivity.<br>- Encourages and motivates users.<br>- Gives awareness to the changes. |
|---|---|---|
| E4 | Project Management | - Understand the needs of the project.<br>- Reports consistently to top management.<br>- Monitor and control the project development.<br>- Closes the gap between top management and project team.<br>- Identifies key experts and resources needed. |
| E5 | Change Management | - Improves employees' mindset.<br>- Communicates the importance of ERP to all stakeholders.<br>- Define the parties' new roles and responsibilities.<br>- Help communication between business units. |
| E6 | Suitable ERP Package | - Identify the areas needed to be improved.<br>- Scalable and customizable package.<br>- Aligned with the cost.<br>- Meets the requirements.<br>- Value for money.<br>- Suitable for the organization's environment. |
| E7 | Competent Project Team | - Consistent communication from project team to all stakeholders.<br>- Able to persuade the top management.<br>- Trained well.<br>- Oversee the implementation.<br>- Eager to learn and work. |
| E8 | Business Plan and Vision | - Employees willing to contribute more.<br>- Clear vision improves employees' acceptance.<br>- ERP must be in line with the business objective and vision. |
| E9 | Employee Acceptance | - Acceptance is required before going live.<br>- Reward system to gain acceptance.<br>- ERP makes their life easier.<br>- Provide ideas and insight to top management. |
| E10 | Project Champion | - Knows the in and out of the project.<br>- Supports the team and users.<br>- Lead the project success.<br>- Influence all parties. |
| E11 | Data Management | - Knowledge for the organization.<br>- Proper data management needed before execution of project. |
| E12 | Architecture Paradigm | - Understand the existing infrastructure.<br>- Ensures if the current infrastructure allows for change. |

## 4.2. Push Factors/Barriers

### Table 4. List of Barriers and Inhibitors identified using thematic analysis

| Barrier ID | Barriers | Inhibitors |
|---|---|---|
| B1 | Lack of Top Management Support | - Lack top to bottom and bottom to top communication.<br>- No budget and resource support.<br>- Project team less motivated. |

| B2 | Poor Communication between Business Units | - Won't understand what went wrong.<br>- People aren't informed.<br>- Poor understanding of requirements. |
|---|---|---|
| B3 | Lack of Training and Education | - Reduce efficiency and effectiveness.<br>- Lack of understanding.<br>- Rejection. |
| B4 | Ineffective Project Management | - Waste to budget and resources.<br>- Project delays. |
| B5 | Ineffective Change Management | - Negative mindset among employees.<br>- Resistance to change.<br>- Project hiccups.<br>- Reduced trust. |
| B6 | Poor ERP Package | - Implementing in wrong areas.<br>- Requirements aren't defined. |
| B7 | Incompetent Project Team | - Impact and risk will not be identified early.<br>- Project stalling and delays.<br>- Unable to persuade stakeholders. |
| B8 | Poor Business Plan and Vision | - Roles and responsibilities aren't defined.<br>- Objectives aren't articulated down.<br>- Top management distracted.<br>- Unrealistic expectations. |
| B9 | Employee Resistance | - Lack of contribution.<br>- Poor understanding of the benefits.<br>- Lack of education.<br>- Poor adaptation to the system. |
| B10 | Weak Project Champion | - Project lack priority.<br>- Lack of communication.<br>- Won't understand the progress. |
| B11 | Over-reliance on Costing | - Too cost centric.<br>- Lack innovation. |
| B12 | Poor Data Management | - Inability to apply data analytics.<br>- Lack historical data. |
| B13 | Lack of Domain Expertise | - Lack of understanding of the organization environment.<br>- Unable to provide the limitation to existing infrastructure. |

## 5. DISCUSSION

### 5.1. Pull Factors/Enablers Discussion

From Table 3, there are 12 pull factors or enablers that have been identified by the researcher after extracting the data and themes from the semi-structured interviews conducted.

The first pull factor or enabler is top management support. The involvement of top management determines the priority and allocation of resources of the entire ERP project [12]. This is a vital truth as without the proper support, top management won't give the go ahead and resources needed for the project. I7 had the opinion that, *"Top management usually provide the necessary resources and budget so if you have strong support, you can guarantee those resources for the implementation"*. I8 also had the opinion that, *"Top management set priorities, and they will give the deadline"*. Furthermore, it is required for people at the top to be involved in strategic decision making if there was to be any hiccups during the project [12]. I1 has the opinion that, *"Top management must have budget plan, strategies for recovery in case this thing fails, or in case this thing is not fully implemented within the timeline, and they should have a strategic out, also called risk management"*. Besides strategizing, the top management has to set out the vision of the company which was strongly pointed out by all the respondents. I9 states that, *"The top management is the one who decides the vision"*, with I6 saying, *"The top management need to have a clear vision why they need the ERP and they have to be persistent to make it happen"*. Additionally, strong support from top management can improve employee acceptance in which I8 stated, *"When we talk about employee acceptance and fear of change, there will be a lot of push back from certain departments and all that. So, if they know top management is involved, things will be much easier"*.

The second pull factor is communication between business units. Effective communication is needed to disclose progress to all stakeholder [7]. I8 opined that, *"Whether it's good news or bad news, people will like to hear because it's always good news that people say we are progressing"*. This is essential as, even if its good news or bad news, the entire staff can learn and progress ahead. I1 had the opinion that, *"In each incremental stage of delivery, there will be learning lesson, and all these must be shared across the business units so that this can be used as a lesson for improvement for the next small incremental delivery"*. Additionally, communication with employees about the objectives, scope, activities, and changes that will happen should be prioritized [13]. I9 had the opinion that, *"Communication is a key factor as this allows each unit of departments to understand their roles and responsibilities, and what is their involvement in making the project successful from their scope of support"*. Effective communication can also reduce people's fear of change as some might have doubts about their new roles and responsibilities. I8 again opined that, *"You can cut a lot of negative things, or fear, or people being anxious about what's happening, all through transparent communication"*.

The third pull factor is training and education. Training and education allows the employees to be effective and efficient with the new system [11]. I8 had the opinion that, *"Proper training would ensure how effective and how efficient they use the ERP*

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*system, and how people can actually pick up and run by themselves"*. Proper training and education could also help the employees adapt better to the new changes to the ecosystem. I1 had the opinion that, *"Strategizing this training and education, can help the employee adapt to the ecosystem of the organization"*. Improving acceptance is another key indicator of proper training and education. I2 stated that, *"They need to come out with ways to train and educate the staff as some of them are oldies and some have that sense that they don't want changes"*. I5 also had the opinion that, *"You need to encourage them and motivate them because most of the time, employees are not motivated for something new"*. With thorough education, employees would also be well aware with the benefits of ERP which means better acceptance. I7 opined that, *"It gives awareness to the employee on what is ERP, and what is the benefits"*.

The fourth pull factor is project management. Project management main focus is to initiate, plan, implement, and control different project activities to meet the goals of the project [13]. I6 had the opinion that, *"You have to have a clear process of project management because it's used to manage, to monitor, and to control the project development or implementation"*. I9 also stated that, in regard to role of project management, *"Good planning, resource allocation, and the identification of the expertise within the team, and relevant training"*. Furthermore, project managers play a key role in the entire project management. I7 opined that, *"Project managers is the middle man to bring the gap from the top managers and project team"*. In regards to project managers as well, I3 stated that, *"Project manager is the key person who is reporting to top management, whatever is happing in the project"*. This goes back to the project manager playing a vital role in closing the gap and communicate to all stakeholders.

The fifth pull factor is change management. The goal of change management is to avert resistance and support acceptance by generating understanding with the employees, and making them desire the changes [10]. To generate the understanding, it is vital to communicate the importance of ERP to all stakeholders. I6 had the opinion that, *"Communication between the ERP project team and all the stakeholder that are involved in that project is very important because when you don't implement change management, it will affect all the parties"*. Change management also help the stakeholders by defining the scope of the project. I6 emphasized that, *"You define the parties that are involve in your change management program, and also the rules and responsibilities"*. Furthermore, the process of change management requires time and patience in order the employee can slowly adapt to the changes that will come into effect when the system is implemented. I8 opined that, *"You should not introduce things too fast to employees because the changes are going to affect them so they require time"*. I8 also imply that, *"Make sure that this change is going to change for the betterment of the people, not the organization"*. This means that top management should only implement this system if it will seriously improve the effectiveness and efficiency of their workers.

The sixth pull factor is suitable ERP package. The gap between the organizational needs and the extent an ERP package can meet is called a misfit [9]. The gap between the organizational vision and the ERP system can create a significant impact if not addressed. I9 had the opinion that, *"Top management need to have some*

*understanding on the scope of the ERP that they're looking forward, which sees them making a decision and define the vision of the organization".* This means that the ERP solution should meet the vision and requirements of the organization. I6 stated that, *"It is very important to make sure that the ERP package that we have chosen can meet the requirements of the organization".* To develop those requirements and form the vision, SMEs need to identify their needs before implementing any technology [28]. I1 noted that, *"SMEs need to be in calculative mode to know why they need to identify the areas that need to be improved in their ecosystem".* Furthermore, the respondents emphasized the importance that the ERP solution should not be rigid. I4 had the opinion that, *"Technology evolve, market evolve, everything evolves. So, you need to actually have an ERP that allows you to do a lot of modification, a lot of changes, a lot of additional new modules".* I6 also chime in by stating, *"Make sure that the ERP package that you have chosen can be scalable because in the future, there will be more requirements added".* Moreover, cost is a factor in choosing an ERP solution especially for SMEs due to cost constraints. As noted by I5, "*Cost needs to be aligned with the scale*". This means implementing a system that aligns with your budget and the scale you wish to implement the system in your organization.

The seventh pull factor is competent project team. Achieving implementation success requires a project team that meets expectations and objectives set forth by the company management [14]. Communication is a major factor when talking about a competent and effective project team as they are the ones in charge of getting the buy in from both top management and the users. I1 had the opinion that *"Project team should have consistent communication with everybody that is impacted through this ERP implementation".* Additionally, the project team need to be competent and trained well that they are able to handle such a complex project. I2 emphasized that, *"If you don't train well, you can't be in a team, and you can't persuade the top management with the project, and if you don't have a competent team, you don't have the champion".* This means composition is important and the team need to be set up with people who are willing to learn and work hard to achieve the goals of the project. I10 provided an example stating, *"The business identify that this guy has potential, he's quite quick to learn, and he's eager to find out about the system".* Thus, the project manager needs to get people who are qualified, competent and willing to learn to form a competent and effective project team.

The eighth pull factor is business plan and vision. A clear business plan and vision should have clarity of the business model behind the implementation of the project [29]. I6 emphasized this point clearly by saying, *"When you develop ERP, you must be in line with your business objective or business vision".* As top management has defined the vision of the business and the ERP project, it's vital to communicate it to all stakeholders in the organization. I4 had the opinion that, *"If you do not communicate your vision clearly from the top, you do not tell people why, and what's the outcome and outputs going to be, people are not going to see the picture as the same way you see it".* The business plan and vision should also be meaningful and communicated well to the users to ensure they accept it and contribute more to its success. I1 had the opinion that*, "The company need to take responsibility, map this vision, strategies this vision, where even the fresh juniors know what he or she will contribute this*

strategy". I4 also stated that, *"I think if you have a very good vision then people will see the bigger picture and they would try to contribute more"*.

The ninth pull factor is employee acceptance. Higher ups and vendors need to take into consideration the acceptance of the ERP solution among employee in order to read the tangible benefits and avoid implementation failure [30]. As such, it is vital that the employees warm up to the idea and understand that the ERP solution will not negatively impact their work. I5 had the opinion that, "*You need to educate them, tell them that is actually a good thing"*. The ERP solution should also be implemented to make the employee life easier, not harder. I4 stated that, *"If the processes are easier, the processes have streamlined, ERP supposedly would make your life easier"*. Compensation is also a vital component as it gives an initiative to accept the changes and the additional task that may come with the implementation of the ERP system. I5 had the opinion that, *"If people take additional roles, additional tasks, enabler definitely should be the compensation in terms of financial or non-financial"*. Moreover, getting the feedback from the employee can definitely improve the acceptance level. I7 opined that, *"They can give some ideas or insight to top management on how to increase their ROI, and they can earn some bonus from the implementation of the ERP"*.

The tenth pull factor is project champion. Project champion is a person who makes decisions with a practical and innovative approach to uplift the organization during critical moments [31]. The project champion needs to possess leadership traits and influential throughout the organization. I6 had the opinion that, *"The project may need a project champion that can lead the project success, and can influence other parties, all stakeholder for the success of the projects"*. The project champion should also understand the organization scope and requirements to champion the project. I2 stated that, *"They need a champion who is a person who knows the in and out of the project"*. Additionally, I2 emphasized that, *"The moment you have the champion, this project will go on as you have somebody as reference, somebody who is looking into the implementation"*. This implies that the project champion needs to be a leader who can be someone to seek advice and help which is especially needed when employees are worried and reluctant to change. Hence, the project champion needs to be the figure to facilitate the acceptance among all stakeholders.

The eleventh pull factor is data management. Proper data management is needed as issues with data accuracy can lead to functional issues within an organization, and would lead to the ERP losing credibility [32]. I7 had the opinion that, *"Only when we have the proper data management, then only we can successfully execute the project"*. The justification for this statement by I7 was, "*When we have the correct data, the knowledge is the main resource to all SMEs"*. This implies that proper data management is considered essential knowledge for the SMEs which is why its accuracy needs to be of high quality to ensure the ERP project is a success.

The twelfth and last pull factor is architecture paradigm. In regards to this factor, I9 had strong views about this. I9 had the opinion that, *"We failed to understand the nature of existing infrastructure that is available on the current organization"*. I9 continues and implies, *"How far this architecture of the current infrastructure or current system allow for this change? That is another key factor they need to understand"*. The implication being is, SMEs need to understand the existing infrastructure of the

organization to ensure that the changes ERP bring is compatible with their current environment and whether the output they're seeking is realistic.

## 5.2. Push Factors/Barriers Discussion

From Table 4, there are 13 push factors or barriers that have been identified by the researcher after extracting the data and themes from the semi-structured interviews conducted.

The first push factor or barriers that inhibits the successful implementation of ERP in SMEs is lack of top management support. Lack of support from top management has numerous negative impact and one of the key effect is less allocation of resources [6]. I7 stated that, *"Lack of support means they won't give the budget, resources, and the training cannot be conducted because we lack of budget and support"*. Lack of support also causes the project to stall or even halted. I3 had the opinion that, *"They don't support, the project will be halted and you can't continue as the budget, planning and all this comes from top management"*. Top management lack of communication is another issue. I1 opined that, *"They don't implement top-to-bottom and bottom-to-top communication which brings huge failures"*. The lack of communication and support could also affect the project team morale. I6 had the opinion that, *"Lack of focus from the top management will affect the motivation of the project team because sometimes they feel that the ERP project is not very high and very important"*.

The second push factor is poor communication between business units. Poor and ineffective communication has detrimental effects and one of them is parts of the organization will not be able to assess the impact of the changes as they aren't informed of the progress [6]. I1 stated that, *"You won't understand what went wrong. If you don't know what went wrong, I don't think so in the next incremental stage when you're implementing, you're going to learn any lesson"*. Another negative inhibitor of poor communication is the build of fear across the organization. I8 had the opinion that, *"Poor communication means something is not right. That's what people will interpret"*. Furthermore, poor communication between business units will lead to poor understanding of each functional unit requirements which will severely impact the processes in each unit. I9 opined that, *"Poor communication means poor understanding of the requirements, no acceptance, and failure in achieving objective on time"*.

The third push factor is lack of training and education. SMEs typically like to spend less so typically training isn't a priority for them due to the high amount of cost training incurs. I1 note that SMEs don't want to take the risk of spending on training as there's "*no guarantee*" that the employee will "*stay or goes off somewhere else*". The consequences of lack of training and education is noted by I5 who said the employees "*cannot take advantage of the full benefits*" of the ERP system which means reduce efficiency and effectiveness. Lack of understanding of the changes the system brings will lead to rejection. I9 had the opinion that, *"They won't start involving in terms of the implementation of new changes, they won't be sharing any information in the requirements analysis or gathering"*.

The fourth push factor is ineffective project management. The impacts of ineffective project management are poor risk management, scope creep, and poor resource

allocation [13]. I2 said it best, *"They can't manage the project well and maybe the budget will burst and resource will burst as you don't have proper planning under project management"*. Proper planning is key as delays and stalls will happen if proper project management isn't in place. I7 had the opinion that, *"I would say the project will delay. The project will also face hiccups as top management will not support the project, and employees will resist"*.

The fifth push factor is ineffective change management. Ineffective change management leads to employee resistance and causes users to behave against the system as there's no adequate procedure to facilitate the change [7]. Employee resist change when they aren't adapted to those changes. I2 had the opinion that, *"Some of them have these negative thoughts as their working environment change"*. Change management procedures are relatively absent in SMEs. I4 stated that, *"The culture of change management does not exist in SMEs because people do not see the importance of it"*. As such, without proper procedures in place, people will not accept the changes as top management does not deem it essential. I8 opined that, *"People will resist, people do not buy in, and people don't trust"*.

The sixth push factor is poor ERP package. Most SMEs define functional requirements poorly and they do not analyse the ERP solution according to their organization environment and culture [6]. When the requirements aren't properly defined, a misfit between the ERP system and the functional areas will occur. I1 had the opinion that, *"You might be implementing into the wrong areas which don't need any improvement"*. This happens when proper requirement gathering isn't conducted. I9 note that, "*requirement gathering need to be thorough because they need to understand what module is really required for them"*.

The seventh push factor is incompetent project team. The effects of an incompetent project team will cause the entire implementation process to fail. I2 had the opinion that, "*You can't persuade the top management*". This is because the project team is incapable of communicating and getting the buy in from top management. Furthermore, incompetent project team can cause the project progress to incur losses especially if they aren't ready or focused. I1 had the opinion that, "*The issue that can be created is the impact and risk are not identified early, it will be identified very late in the project which will impact the entire project timeline, budget, quality, customers, and entire ecosystem"*.

The eighth push factor is poor business plan and vision. The impact of a poor business plan and vision can be detrimental especially to those who will be affected by the changes. For one, if the vision isn't communicated well, and isn't aligned with the overall business strategy, employees will resist. I4 had the opinion that, *"There is a problem of the vision being articulated down to the people that actually uses the ERP so they do not see why I should use this"*. Furthermore, unrealistic expectation can hamper the vision of top management. I10 opined that, *"They might have not met the right understanding what ERP is to them"*. The causes of a poor business plan and vision also stems from top management not being focused. I6 had the opinion that, *"The top management will get distracted with other initiatives and they don't persist with the ERP project"*.

The ninth push factor is employee resistance. Resistance to change stems from change in the job roles and lack of trust with the new system [33]. The main reason for the lack of trust is poor communication and lack of understanding. I4 had the opinion that, "*You need the people to understand its there to not make their life worse*". I5 also quoted as saying, *"Its misunderstanding, they don't understand the benefits of it"*. Lack of training and education is a factor for the lack of understanding. I8 firmly believes, *"This ERP project will fail if we do not train, you do not do that intro, slowly making sure that they actually can embrace"*.

The tenth push factor is weak project champion. A weak project champion can have negative ramification to the project especially in terms of garnering support from top management and the users. I6 had the opinion that, *"If the project champion is weak, the employees, all the external organization's that related to the project will not give priority to the project"*. Furthermore, a weak project champion will not display leadership traits. I8 opined that, *"If they are not championing, or if they are not discussing, or finding out whether everything is working smooth, everything is integrated to one another, and manage the cost, this ERP will fail"*.

The eleventh push factor is over-reliance on costing. Respondent I4 believes that SMEs are overly reliant on maintaining their cost instead of looking at the long-term strategies of the company. I4 had the opinion that, "*People tend to prefer cost over function, prefer cost over outcome*". I4 gave an example of how SMEs would rather invest in more cheap labour for cheaper cost but with higher error rate, instead of a robotic arm that cost more but lower error rate. The implication is that, SMEs don't want to take massive risk, and are too cost centric instead of embracing innovation.

The twelfth push factor is poor data management. Respondent I7 emphasised that, *"Without proper data management, the business cannot use data analytics to predict their business in the future or even expand their business"*. Furthermore, I7 states that, *"Bad data management means the project can't run as the company data is not managed well"*.

The thirteenth push factor is lack of domain expertise. Respondent I9 had the opinion that, "*We need to have an in-house domain expertise or subject matter expert, who have visibility of what is the limitation of the current environment*". The implication here is that SMEs don't have these subject matter experts that understand the limitation, and understand how the organization works. Lack of it provides low visibility to the company's infrastructure which can be detrimental for the project management who needs experts giving the scope and requirements of the organization before initiating such projects.

### 5.3. ERP Implementation Success Model for SMEs within Klang Valley

Taking into account the findings from the data collection and analysis process, the ERP Implementation Success Model for SMEs within Klang Valley was formulated. The model details the list of pull factors/enablers as well as the push factors/barriers that either enhances or inhibits the successful implementation of ERP in SMEs within Klang Valley. Figure 2 details the model that has been formulated.
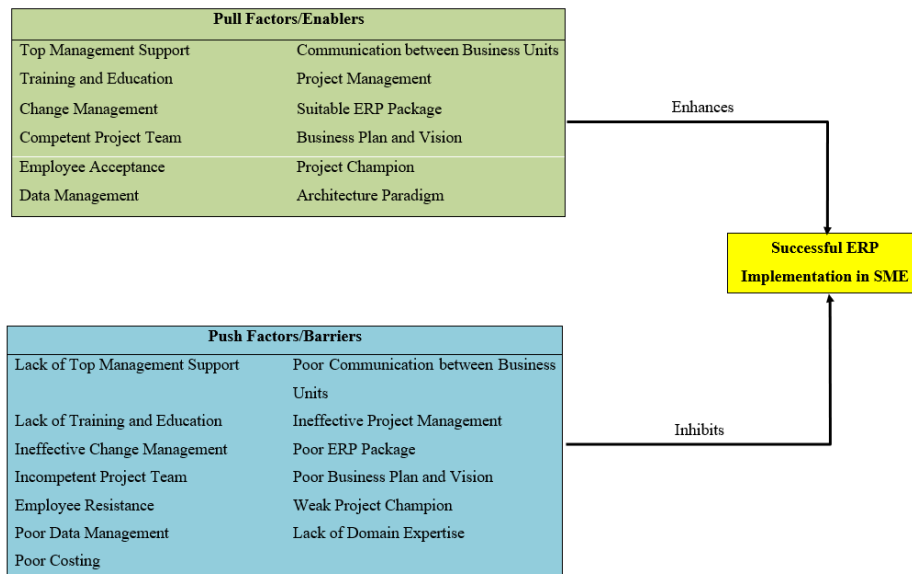
**Figure 2. ERP Implementation Success Model for SMEs within Klang Valley**

## 6.   CONCLUSION & FUTURE WORK

This research paper carried out a study on identifying a list of pull factors that enhances the successful implementation of ERP implementation in SMEs and also a list of push factors that inhibits that success using semi-structured interview. A total of 10 highly qualified ERP experts were interviewed where upon they opined on those key factors that can make or break an ERP implementation project. The data collected were analyzed using thematic analysis which allowed the researcher to fully understand the reason as to why those factors enhances or inhibits the ERP implementation project in SMEs. As such, the enablers, barriers, and its key enhancements as well as inhibitors that were identified, formed the basis for the formulation of the ERP Implementation Success Model for SMEs within Klang Valley. The model will provide ERP implementers as well as academians an understanding of the enablers as well as barriers that affects an ERP implementation project. By taking into account the positive and negative factors, ERP implementers can take decisive action when conducting such complex projects to ensure the success of the project as a whole.

In the future, we hope to expand the pool of experts to get further feedback on these key factors that were identified to provide further validation as well as relevancy to current ERP implementation projects in SMEs within the Klang Valley area. Furthermore, the ERP Implementation Success Model for SMEs within Klang Valley will be tested and evaluated in SME environment to assess its usefulness in ERP implementation projects.

## ACKNOWLEDGEMENTS

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