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SMEs ERP Readiness Success Factor Framework to Increase Implementation Successful Rate in Developing Countries – a Literature Review

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ABSTRACT IN ENGLISH

ERP is a helpful tool for firms to conduct their daily operations because it can automate business activities. This tool has become more popular among SMEs because of the important benefits like reducing operational cost that can save time and money. However, due to its complex and technical difficulties to deploy, ERP systems might have unexpected implementation difficulties and result in major failure of ERP implementations. Therefore, the primary objective of this study is to develop a complete framework designed to identify success and failure factors based on existing literature research focusing on ERP implementations and its challenges faced by Small and Medium Enterprises (SMEs) in developing nations. This literature research explores the complexities of ERP deployment by emphasizing critical failure factors (CFF) happened in developing countries as well as critical success factor (CSF) resulting in the alignment between each factor by using literature review method from several publishers ranging from 2019-2024 from several publishers namely IEEE, ScienceDirect, Emerald Insights, SAGE, and Springer. With this sample size, new framework is created based on recent studies that aims to improve the implementation success rate in the context of developing countries by linking the relation from existing literature between critical success factor and critical failure factor and divide it into complexity and capacity dimension. To further help SMEs differentiate which dimension can reduce or increase the chance of successful rate of implementation, researchers create a modified TOPSIS matrix that can be used in SMEs ERP Readiness Assessment Matrix.

1. INTRODUCTION

As digital technology develops, economic development is slowly affected by the readiness to adopt digital technology for economic growth [1]. So, to take advantage of digitalization for economic growth, a digital readiness model is needed to be able to conduct self-evaluation and keep up with digital technology trends [2]. This digital readiness is very important to do because it is a phase before an implementation is carried out to check the readiness of the Company whether it is possible to implement because implementation requires a large cost [3][4].

One system that is often implemented by companies but does not always run perfectly is the ERP system. ERP, also known as enterprise resource planning system, is a comprehensive and sophisticated system that incorporates all stakeholders and decision-makers in the company's business processes. Regarding the benefits to the organization, this system deployment must be in line with some established approaches due to the expanding needs and technological improvements in ERP. As such, every stakeholder unit needs to pay close attention to the adoption of such systems [5]. As a result, it's critical that SMEs weigh the benefits and drawbacks of implementing an ERP system before deciding whether to use one. The benefits and drawbacks of ERP systems are detailed in Table 2 as follows [6].

Table 2 – Benefits and Drawbacks of ERP System [6]

Benefits	Drawbacks
Well-designed data models	High in state result expectations
Centralized database	Catastrophic failure of ERP system
Reduced overall operation cost	High initial investment
Feasible information management	Expansive for newly emerging SMEs

With all the advantages and disadvantages of ERP systems mentioned above, it is clear from most of the disadvantages that they occur when the understanding of ERP systems is inadequate, and the organization is most likely unprepared to adopt ERP. There are several factors that influenced ERP implementation success rate which include organizational culture, top management support, training and support, and business process alignment with ERP system [7][8][9][10]. If an ERP system is assessed based on previous factors it will be beneficial by strengthening current business systems and ultimately delivering superior business results to increase the success rate of ERP systems [11].

Although ERP systems are growing rapidly, they still have problems in implementation for SMEs. SMEs must realize that ERP implementation can damage business systems because it causes massive organizational changes. Many SMEs are only enamored with the positives generated by ERP implementation where the most frequently mentioned are cutting the cost of redundant business processes, real time recorded data, and effective coordination between divisions [12]. But ERP implementation is complicated because it requires more time and money than expected. Many researchers agree that adoption of ERP systems can cause major problems because a stable amount of high investment which its poorly executed can cause disturbance in the organization's operational process [6][7][8]. The failure rate in ERP implementation may vary from each organization with several studies mentioning that most failures happened in ERP implementation with its unique reason which is detailed below.

Table 1 – Failures Main Cause in ERP Implementation

Failure Percentages	Author	Main Cause
90%	Ramesh and Delen, (2021) [16]	Wrong timing and ineffective leaders as communicator
84%	Saxena and McDonagh, (2019) [17]	Canceled and Complicated
70%	Alaskari, Cuenca, & Ahmad, (2021) [18]	Inappropriate selection of ERP
70%	Kara, Cherifi, & Ghomari, (2022) [19]	Output below expectations
60%	Alzahrani, *et al.,* (2021) [20]	Did not satisfy users expectations for usability dimensions

Based on Table 1, several existing research shows ERP implementation failure ranging from 60% to 90% with difference causes. But, from those main causes it can be categorized into organizational context due to poor decision of change management that lack of organizations unique needs and strategic management that didn't align with the organization's

goals[21], [22]. Thus, managers need understandings regarding standard operational procedure in the organization to assess the readiness and help the implementation process run according to as planned [23].

The objective of this literature research is to further improve the body of knowledge of ERP readiness by identifying and addressing several Critical Success Factor (CSF) and Critical Failure Factor (CFF) concerning the elements that affect ERP implementation in pre-implementation by divide it into complexity and capacity of the organization. Several existing studies already created the model, but it only addresses each factor of the CSF or CFF of ERP systems without creating the relation that affects each factor to achieve a successful rate of ERP implementation [17][18][26][27][28].

Therefore, studying the factors that contribute to effective implementation based on CSF and CFF must be investigated thoroughly. This study can contribute to increasing the rate of success when SMEs implement ERP systems in their management and operational process. Currently, there have been existing studies on the critical success factor (CSF) and critical failure factor (CFF) of ERP implementations. These studies have contributed a lot of valuable information for businesses that want to implement ERP systems. Unfortunately, these studies didn't convey the relation between each CSF and CFF into several domains that can have positive or negative effects on the implementation process. This unbeknown link can result in failed ERP systems for SMEs because each SMEs has different requirements, conditions, and business processes with other SMEs in the same industry. Therefore, a study is needed on the critical success factors linked to critical failure factors to mitigate each problem and map the factors to each domain for SMEs. To identify the factors affecting the successful implementation of ERP systems and ascertain the impact of ERP systems on successfully implementing ERP systems to improve business processes and SME performance, this study is based on a systematic literature review (SLR) of the critical success factor and critical failure factor of ERP implementation on SMEs.

2. METHOD

This research focuses on a literature survey that emphasizes failure factors in developing countries which will be mapped with critical success factors that can affect the level of readiness in SMEs in implementing ERP. The method that will be used is systematic literature review (SLR) to produce an ERP readiness model that can be used by SMEs. By conducting a systematic literature review, this method can assist in determining the issue that falls within the scope of research and increase the relevancy and reliability of the data from earlier studies. [5][29]. The following is a visualization of the research design used.

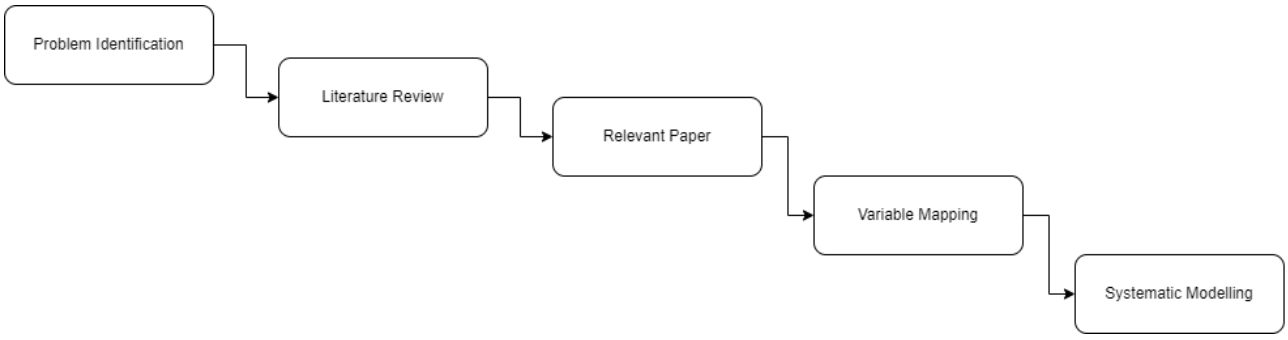

Fig. 1 – Research Design Adopted by Researcher [5][29]

Based on Fig. 1, the research designs are mapped into seven sequential stages. Below is the detailed process of each phase:

1. The first stage is creating a conceptual modeling research approach based on problem identification, which aims to analyze and evaluate frequent problems encountered by SMEs when implementing ERP. This identification phase is essential for identifying the objective of study and encompassing the researcher's approach to solve the problem.

2. The second stage is conducting a literature review to establish a strong scientific foundation for connecting ERP critical success elements and ERP critical failure factors. To identify the actual issue resulting in a credible foundation, a literature study is crucial. This stage can give a better understanding of the domain that influences most ERP readiness models, which may be classified according to their different factors.

3. The third stage is to compile relevant studies of papers that have made it after the screening stage of a literature review. Thus, to ensure the objectivity of the research conducted for this paper, a careful selection and selection of the publications that have been read based on several from several publishers ranging from 2019-2024 from several publishers namely IEEE, ScienceDirect, Emerald Insights, SAGE, Springer, etc.

4. The fourth stage is to create a mapping based on identified CSF and CFF, this stage called variable mapping. In this study it will break down the ERP readiness into two variables which is ERP critical failure factor and ERP critical success factor. This process explores the importance and relevance of each component to gain insight into how the relationship between critical failure factors can be mitigated by the critical success factor.

5. The fifth stage is to create a systematic modeling which is the last step in this research. The output of this stage is to result a causal linkage between each CFF and CSF variables to comprehend and describe how variables interact with one another [6]. Systematic Modeling identifies each factor associated with a particular process and explores the relationships critical success factor and critical failure factor that will be divided by each dimension. With this conceptual model, it allows researchers to better identify and analyze various connections that can be used as hypotheses to explain a particular event or outcome.

2.1. Problem Identification

To help the formulation of problems happening regarding SMEs ERP readiness, it is necessary to formulate the problem by formulating several research questions (RQs). A strong research question (RQ) is the foundation of any good study, which is essential to solving problems [30]. RQ specifies the issue to be investigated and directs the approach. To help the creation of research questions, researchers adopted “FINERMAPS”.

The term "FINERMAPS," which stands for interesting, novel, ethical, relevant, manageable, appropriate, potential value, publish-ability, and systematic, is used to describe the qualities of effective research questions. The format of a research question can vary based on the component that has to be assessed. This allows for the creation of several RQ kinds, including those based on the existence of the phenomena, its description and classification, its composition, its relationship, its comparative nature, and its causation. Finding the topic of interest and conducting preliminary study on it are the first steps in developing a research question (RQ) which visualize below.

Fig. 2 – FINERMAPS approach [30]

From Fig. 2, FINERMAPS combines numerous features to generate a good research question. The first is feasible, which means that the researcher can carry out the research and must be realistic about the extent of the study. Second, RQs must be interesting enough to be supported by additional academic and intellectual study. Three, research must have a novelty in aims to validate or refute previously established conclusions, establish new facts, or discover new aspects of established facts. The fourth aspect is ethical, which requires minimizing the risk of injury to research subjects. Fifth, the relevancy should be based on issues raised in the current situation, literature, or practice. The last is manageable where it means the research must manage to finish its own research. Because of that, from this stage, three main points of RQs are obtained, namely:

1. RQ1: What are the challenges do SMEs face when utilizing ERP?
2. RQ2: What are the main causes of CFFs while implementing ERP in developing nations?
3. RQ3: What are the main CSFs that contribute to the ERP implementation?
3. RQ4: What are the strategies that may be employed to address each of the contributing factors to create an ERP Readiness framework that can be applied to SMEs?

2.2. Literature Review

Researchers using several academic databases consist of Google Scholar, Science Direct, IEEE Xplore, Emerald Online, and SAGE which are online resources. The search literature focused on using keywords consist of "ERP Readiness", "ERP Success Factor", "ERP Failure Factor", and "ERP in Developing Countries" to ensure a comprehensive search, this study has set several criteria to organize the literature findings that has been acquired. There are several criteria detailed, namely:

1. Ranging from 2019-2024
2. The Main topic is ERP readiness pre-implementation critical success factors (CSF), critical failure factors (CFF), or both
3. SMEs as the research objectives is main priority, but this does not rule out the possibility of other industries

The results of the study literature review findings are shown in Table 2.

Table 2 – Result of Keyword Based Identification

Keyword	Science Direct	IEEE	Emerald	SAGE	Google Scholar
ERP Readiness	250	100	322	40	351
ERP Success Factor	40	28	54	15	234
ERP Failure Factor	27	20	36	1	107
ERP in Developing Countries	20	34	3	10	57

2.3. Relevant Paper

From the search results above, the next step is to sort the appropriate existing literature study that will be used for this study. Below is the obtained appropriate existing study that has passed the sorting stage from each publisher and sources mapped into several keywords.

Table 3 – Relevant Paper Obtained for Systematic Literature Review

Keyword	Science Direct	IEEE	Emerald	SAGE	Google Scholar
ERP Readiness	10	13	15	17	9
ERP Success Factor	4	5	5	8	6
ERP Failure Factor	3	2	3	1	3
ERP in Developing Countries	3	6	7	8	5

Researchers found 78 studies from journals and conferences regarding ERP readiness consisting of 30 studies focusing on ERP Success Factor, 14 studies focusing on ERP failure factor, and 34 on developing countries case.

3. RESULT AND DISCUSSION

Based of previous research there are 3 out of 4 papers that conduct research on ERP readiness that are applicable for SMEs, but the results only mention the success factor without linking it with the main failure factor. It can be said that somewhat existing studies lack details about the items and development process. Below is the existing industry 4.0 model that can be adopted for ERP readiness framework.

Table 4 – Relevant Study on ERP Readiness Model

Advantages	Year	SMEs Applicability	Assessment Approach
IMPULS-Industry 4.0-Readiness [2]	2015	No	Assessment includes 6 dimensions and 18 items to determine readiness in 5 levels. Barriers to going to the next stage are identified and strategies for overcoming them are provided.
A Maturity Model for Assessing Industry 4.0 readiness and maturity	2016	Yes	This maturity model consists of 9 dimensions to determine the score of utilization, resource availability, communication and documentation, suitability, digital transformation, and

Advantages	Year	SMEs Applicability	Assessment Approach
of manufacturing enterprises [31]			compatibility with company strategies. But this maturity model is not intended as an easy route towards attaining Industry 4.0 maturity.
Three stage maturity model in SMEs toward industry 4.0 [32]	2016	Yes	This research only delivers 5 levels of maturity consisting of initial, managed, transform, and detailed business model without any detailes regarding the identification's dimensions used.
ERP systems selection in multinational enterprises: a practical guide [33]	2018	Yes	This study only illustrates the criteria to accept certain ERP software without defining the success and failure factor.

From the Table above, it can't mention the critical success factor and critical failure factor to identify the chance of the SMEs to successfully implement ERP system. Because of that, many SMEs face many challenges when transitioning to digital Industries including limitations on costs, the need for specialized manpower, and the lack of knowledge and experience required to determine the right strategy for implementing digital Industries from theory to practice [21] [22][23][34].

Based on the disadvantages mentioned above, those problems happen to be the main problem that make it difficult to implement ERP for developing countries. Researchers will divide these difficulties by adopting Leavitt diamond models. The reason why this model is suitable for this study is because it is assessing the readiness for ERP by emphasizes the interdependencies between four critical components namely process readiness, technology readiness, organization readiness, and people readiness [26] which visualized below.

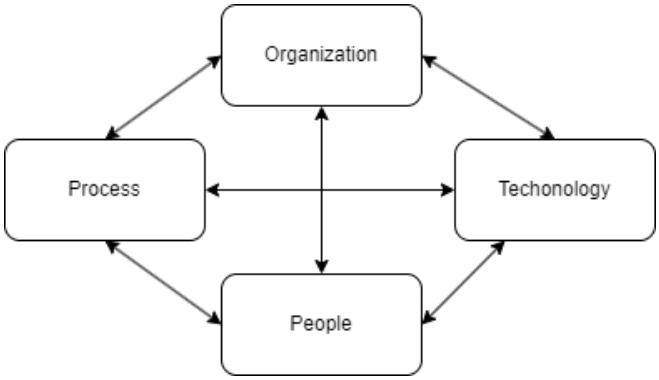

Fig. 3 – Leavitt Diamond Model [26]

By understanding these interdependencies, it can help SMEs to identify both success factors and potential failure factors in ERP implementation. There are several considerations why researchers adopted this model based on several benefits from existing studies which are detailed below.

Table 5 – Benefits Adopting Leavitt Diamond Model

Benefits	Descriptions
Holistic View [35]	Provides a comprehensive view of the organization by considering all critical elements that can impact ERP success
Interdependencies [36][37]	The model highlights the interdependencies between tasks, structure, technology, and people. Understanding these relationships is crucial for identifying how changes in one area can affect others, which is essential for successful ERP implementation.
User Needs Oriented [38]	Focusing on the balance of technology and people factors which will create a user-oriented approach that leads to a sustainable and effective ERP system.
Change Management [39]	It is emphasized on change management aligns with the challenges faced during pre-implementation phase which helps SMEs to prepare and manage the changes more effectively.

Based on Table 5, Leavitt Diamond model is flexible, balanced, and thorough which is a good choice for evaluating ERP readiness. Through the identification and mitigation of potential risks, SMEs can enhance their readiness for ERP adoption by acknowledging the interdependencies across process factor, organization factor, technology factor, and people factor. The usefulness of this model can improve ERP project outcomes which is highlighted in existing which supports its relevance and applicability in a variety of scenarios.

There are several existing studies on ERP failures experienced in each developing country. Each of these countries mostly have the same critical failure factor which is detailed in Table 6.

Table 6 – ERP Critical Failure Factor in Developing Countries

Country	Critical Failure Indicator	Critical Failure Factor	Disadvantages
Indonesia [40]	Insufficient comprehension of the company's operational and technical procedures, poor business processes reengineering, elevated system complexity, overly personalized system settings above budget, and conflict between organization and vendors	Undefined Technical and Operational Procedure, Business Process Reengineering Failures, Complex Training, Technical Challenge, Insufficient User Training, Complicated System, External Conflict with Vendors	Process Readiness, Technology Readiness, Organizational Readiness, People Process
India [15][41]	Insufficient backing from upper management, inadequate training and instruction, incompatibility of the system with corporate strategies, Insufficient project management practitioners, reluctance among users to utilize the ERP system, unrefined process flow.	Lack of Top Management Support, Insufficient User Training, Incompatibility with corporate strategies, Staffing Issues, Change Management Issues, Workflow Issues, Miscommunication	Process Readiness, Technology Readiness, People Readiness, and Organizational Readiness
Malaysia [42]	Impact on time and money, delayed approval, high cost, difficulty with flexibility, and unfriendly to users.	Budget Overruns, Schedule Delays, Lack of System Adaptability, Usability Issues	Process Readiness, Technology Readiness, and Organizational Readiness
Ethiopia [43]	Insufficient of cost allocation and poor time management	Financial management issues, Schedule Delays	Process Readiness, Organizational Readiness

3.1. Variable Mapping

Researchers map the ERP readiness elements that impact each of these components based on the research review. The mapping results are based on the hierarchy of ERP Readiness assessment [26]. With this mapping, it can help to see which element can affect the successful rate of ERP implementation which is called Critical Success Factor (CSF). Below is the detail where the factors have been evaluated and included in what domains.

Table 7 – ERP Critical Success Factors Based on Readiness Domains

ERP Readiness Domain	Critical Success Indicator	References
Process Readiness	Service Efficiency, Business Process Reengineering (BPR), Consultant Support, Digital Process Transformation, Time management, Escalation Control, Lean Process	[44], [45], [46], [47], [48], [49]
People Readiness	Training and Education, Skill Competence, Clear Role and Responsibility, User Acceptance, Inter-Departmental Cooperation, Employee Adaptability, Effective Communication	[36], [48], [50],[51], [52]
Organizational Readiness	Project Management, Change Management, Organizational Perspective, Organization Strategy, Organizational Culture, Organization Size, Top Level Support	[40], [42], [26], [45], [50], [53], [24], [54], [55]

ERP Readiness Domain	Critical Success Indicator	References
Technology Readiness	Technical Requirement, Operational Performance, Technology Sustainability, Technical & Operational Ready, Infrastructure Adequacy	[53], [56], [26], [54], [50], [57]

According to the table above, there are several components of each factor that contribute to ERP readiness which mostly contribute to organizational readiness and technology readiness. Based on the results of the literature analysis, an evaluation framework was developed that consists of four domains based on the ERP Readiness factor and was used in previous research to determine the complexity and capacity of each factor to measure the capacity of an organization's sector, which influences whether the deployment of an ERP system will be successful [46][58].

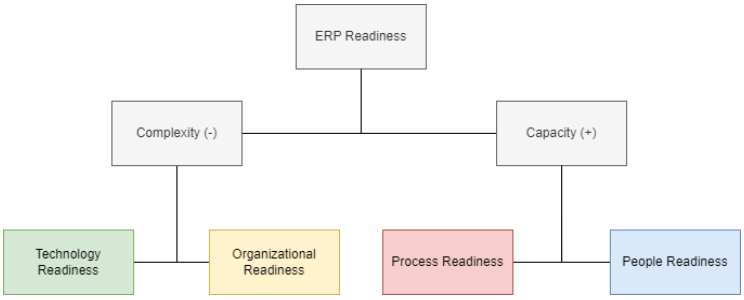

Fig. 4 – ERP Readiness Framework

Based on Fig. 4 The four key domains are separated into complexity and competence. The key domains are assessed to calculate readiness, which is a measure of both complexity and capacity. There is an inverse link between complexity and readiness, but a direct proportionality between capability and readiness. From the figure above, researchers can create a mapping of what effect specifically that contributes to failure factor in SME [46]. The model below visualizes the connection between critical failure factor and critical success factor for SMEs ERP readiness.

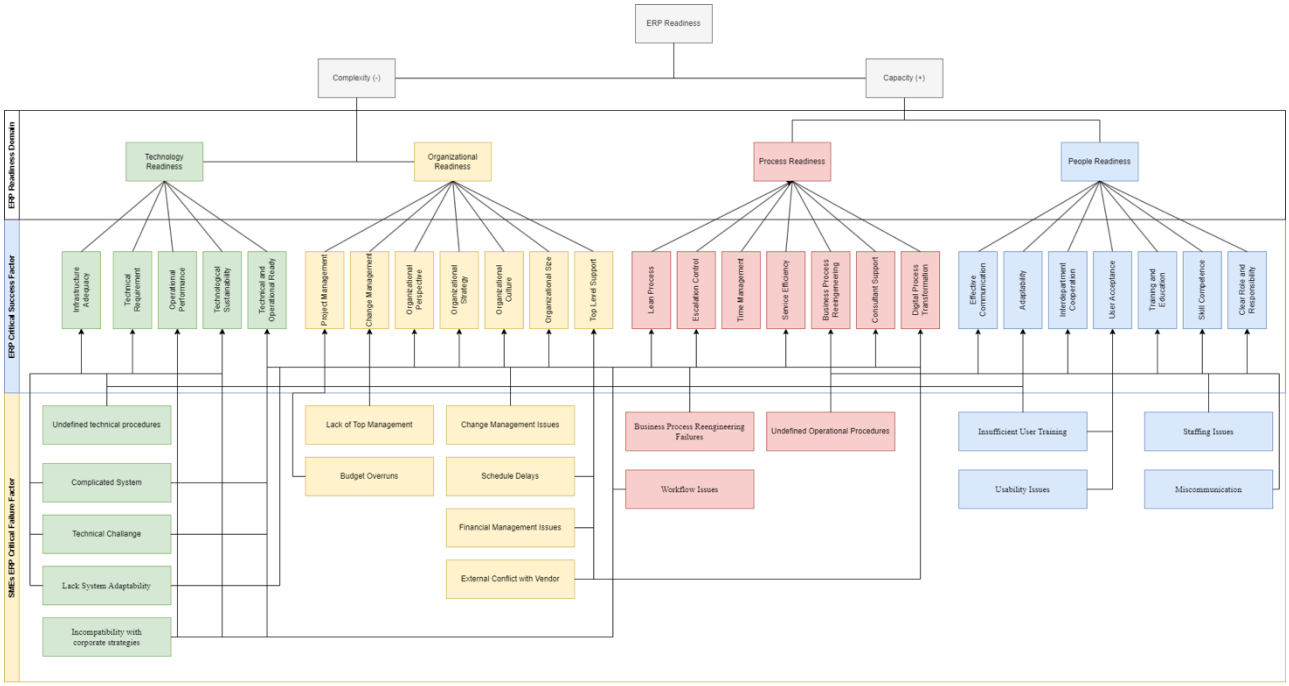

Fig. 5 – SMEs ERP Readiness Framework

From Fig. 5 above, the link between failure factors in SMEs can affect the success factor of ERP implementation resulting in the important success factor for SMEs. This study linked the CFF into CSF to map which failure factor that can affect the success factor. The color code is signaling that CFF is the main failure factor for each success factor, but that does not rule out the possibility it can affect outside of its main domains because ERP systems are highly integrated and interdependent as shown by Leavitt Models in Figure 3. Because of that, SMEs that want to implement ERP systems

need to assess the mentioned success factors above. SMEs can assess several test indicators based on the mapping of critical success factors grouped to certain ERP domains consisting of technology readiness (TE), organizational readiness (OR), process readiness (PR), and people readiness (PE). Below is the detailed CSF and CFF connections that can affect the ERP Readiness for SMEs.

Table 8 – ERP Critical Success Factors Based on Readiness Domains

Code	Critical Success Factors	Critical Failure Factor	Domain
TR01	Infrastructure Adequacy	Undefined technical procedures, Complicated System, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies	Complexity
TR02	Technical Requirement	Undefined technical procedures, Complicated System, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies	Complexity
TR03	Operational Performance	Undefined technical procedures, Complicated System, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies	Complexity
TR04	Technological Sustainability	Undefined technical procedures, Complicated System, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies	Complexity
TR05	Technical Operational Ready	Undefined technical procedures, Complicated System, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies	Complexity
OR03	Project Management	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor, Miscommunication, Staffing Issues	Complexity
OR04	Change Management	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor, Incompatibility with corporate strategies, Lack System Adaptability	Complexity
OR05	Organizational Perspective	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor, Workflow Issues	Complexity
OR06	Organizational Strategy	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor	Complexity
OR07	Organizational Culture	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor, Lack of Top Management, Undefined Operational Procedures	Complexity
OR08	Organizational Size	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor	Complexity
OR09	Top Level Support	Lack of Top Management, Budget Overruns, Change Management Issues, Schedule Delays, Financial Management Issues, External Conflict with Vendor	Complexity
PR01	Lean Process	Business Process Reengineering Failures, Workflow Issues, Complicated System, Undefined technical procedures	Capacity
PR02	Escalation Control	Business Process Reengineering Failures, Workflow Issues, Complicated System, Undefined Operational Procedures	Capacity
PR03	Time Management	Business Process Reengineering Failures, Workflow Issues, Undefined Operational Procedures, Complicated System, Financial Management Issues, Schedule Delays, External Conflict with Vendor	Capacity
PR04	Service Efficiency	Business Process Reengineering Failures, Workflow Issues, Undefined Operational Procedures, Complicated System, Incompatibility with corporate strategies	Capacity
PR05	Business Process Reengineering	Business Process Reengineering Failures, Workflow Issues, Undefined Operational Procedures, Complicated System, Change	Capacity

Code	Critical Success Factors	Critical Failure Factor	Domain
		Management Issues, Budget Overruns, Schedule Delays, Lack of Top Management	
PR06	Consultant Support	Business Process Reengineering Failures, Workflow Issues, Undefined Operational Procedures, Complicated System, External Conflict with Vendor, Miscommunication	Capacity
PR07	Digital Process Transformation	Business Process Reengineering Failures, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability, Incompatibility with corporate strategies, Change Management Issues	Capacity
PE01	Effective Communication	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity
PE02	Adaptability	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity
PE03	Interdepartmental Cooperation	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity
PE04	User Acceptance	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity
PE05	Training and Education	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Complicated System, Technical Challenge, Lack System Adaptability	Capacity
PE06	Skill Competence	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity
PE07	Clear Role and Responsibility	Insufficient User Training, Staffing Issues, Usability Issues, Miscommunication, Workflow Issues, Undefined Operational Procedures, Complicated System, Undefined technical procedures, Technical Challenge, Lack System Adaptability	Capacity

From Table 8, it shows every main failure factor will affect its main success factor domains and can affect other domains because ERP implementation benefits are influenced by system quality, information quality, and service quality [59]. This finding is different from existing research which only focuses on one aspect of factors that do not cover the big picture of the main problems of SMEs, namely identifying existing problems to avoid ERP implementation failures. This study viewpoints focuses on what difficulties the SMEs have so that the company can reevaluate their process to get a successful impact from implementing the ERP system which is mentioned in CSF.

To further improve the readiness factor of ERP implementation for SMEs, researchers suggest the adoption of TOPSIS analysis method to create a decision analysis. The reason why TOPSIS is a sound option is because it has been used in over 13000 studies because of its simplicity and ease of use. TOPSIS has been widely used in many industrial sectors, including vendor selection, manufacturing decision making, financial performance analysis, service quality assessment, educational selection, and technology selection [11][40][60][61]. But because this research still has limitations becasuse its mainly uses literature review as the main data to create an ERP CSF framework linked to CFF, this study did not conduct the quantitative analysis. For future research to help identify the status of SMEs readiness, researchers created a readiness matrix diagram that can be used to score the readiness of SMEs based on CSF and CFF above.

Readiness Assessment Matrix				
	Capacity			
Complexity	1 = Small	2 = Small-to-Medium	3 = Medium-to-High	4 = High
A = High	Not Ready (0 - 20%)	Not Ready (0 - 20%)	Partial Ready (21 - 59%)	Almost Ready (60-80%)
B = Medium	Not Ready (0 - 20%)	Partial Ready (21 - 59%)	Almost Ready (60-80%)	Ready (81-100%)
C = Low	Ready (81-100%)	Ready (81-100%)	Ready (81-100%)	Ready (81-100%)

Fig. 5 – SMEs ERP Readiness Assessment Matrix

From Fig. 5, it can be implied that the result from decision analysis by using TOPSIS can be categorized based on the readiness assessment matrix above. First, if the assessment score for the SMEs falls below or equal to 20%, they can't implement the ERP technology yet and must improve all the given areas. Second, if the score equals or in between 21-59% the SMEs have several issues in certain areas that need to be improved. Third, when the score reaches 60-80%, the SMEs may have small issues left that need to be addressed with. The last is when a SMEs assessment score is equal or between 81-100%. It is considered the SMEs ready in all aspects so it can implement the ERP system.

3.2. Hypothesis Analysis

To further optimize the ERP readiness framework model, a hypothesis is made based on research questions that has been made. The following is how the theories are put forth:

RQ1: What are the challenges SMEs face when utilizing ERP?
H1: SMEs face significant challenges in ERP utilization due to undefined technical procedures, complicated systems, and technical challenges.

H2: SMEs experience higher failure rates in ERP implementation compared to larger enterprises due to lack of system adaptability and incompatibility with corporate strategies.

RQ2: What are the main causes of CFFs (Critical Failure Factors) while implementing ERP in developing nations?
H3: The main causes of CFFs in ERP implementation in developing nations include undefined technical procedures, complicated systems, and technical challenges.

H4: Lack of top management support, budget overruns, and change management issues significantly contribute to the failure of ERP projects in developing nations.

H5: Schedule delays, financial management issues, and external conflicts with vendors are critical factors leading to ERP implementation failures in developing nations.

H6: Business process reengineering failures, workflow issues, insufficient user training, and staffing issues are significant CFFs in ERP implementation in developing nations.

H7: Usability issues and miscommunication are major contributors to ERP project failures in developing nations.

RQ3: What are the main CSFs (Critical Success Factors) that contribute to the ERP implementation?
H8: Key CSFs for successful ERP implementation include robust infrastructure, clear technical requirements, and high operational performance.

H9: Technological sustainability, effective project management, and strong change management strategies are crucial for successful ERP implementation.

H10: Top-level support, lean processes, and effective escalation control significantly impact ERP project success.

H11: Time management, service efficiency, business process reengineering, and consultant support are vital for ERP implementation success.

H12: Digital process transformation, effective communication, adaptability, and interdepartmental cooperation are essential for ERP implementation success.

H13: User acceptance, comprehensive training and education, skill competence, and clear roles and responsibilities are critical for ERP success.

RQ4: What are the strategies that may be employed to address each of the contributing factors in order to create an ERP Readiness framework that can be applied to SMEs?
H14: Developing a tailored ERP readiness framework for SMEs that includes strategies such as phased implementation, incremental training, and ongoing support will significantly improve the success rate of ERP projects.

H15: Implementing robust change management strategies and ensuring continuous top-level support enhances ERP readiness and reduces resistance to change among employees in SMEs.

H16: An ERP readiness framework that incorporates infrastructure adequacy, technical requirements, and operational performance will effectively address the unique challenges faced by SMEs in developing nations.

H17: SMEs that adopt an ERP readiness framework designed to address specific CFFs and leverage key CSFs, such as organizational strategy, culture, size, and top-level support, will achieve higher success rates in ERP implementation compared to those that do not utilize such a framework.

H18: Integrating effective communication, interdepartmental cooperation, and adaptability strategies into the ERP readiness framework will improve user acceptance and overall project success for SMEs.

ERP Readiness Framework Hypothesis
H19: An ERP readiness framework that incorporates financial planning, comprehensive training, skill competence, clear roles and responsibilities, and consultant support will effectively address the challenges faced by SMEs in developing nations.

H20: SMEs that implement an ERP readiness framework emphasizing lean processes, escalation control, time management, service efficiency, business process reengineering, and digital process transformation will achieve better operational performance and project success.

4. CONCLUSION

In this study two novelties are acquired and one novelty that still needs to be tested. The first novelty is created by creating a mapping of critical success factors of ERP deployment to divide it into complexity and capacity of the organization which were determined using a literature review. These success factors are classified into four groups based on ERP readiness domains. The second novelty in this study shows that most failures are caused by unpreparedness of SMEs which are interconnected with other readiness domains. Because of that it can be implied that most failures in ERP systems, especially for SMEs in developing countries, are caused by the primary causes of ERP implementation failures in developing nations include undefined technical procedures, complicated systems, and technical challenges. These issues are compounded by a lack of top management support, budget overruns, and change management issues. Financial management problems, schedule delays, and external conflicts with vendors also play significant roles in ERP implementation failures. Furthermore, business process reengineering failures, workflow issues, insufficient user training, staffing issues, usability problems, and miscommunication are critical factors leading to unsuccessful ERP projects. Third novelty which still needs to be tested is using the TOPSIS matrix model with the help of ERP assessment matrix to decide the condition of the SMEs which need more data to conduct a quantitative approach.

This research is limited to literature review based on three several developing countries and only resulting from the systematic model. In the future, the model can be tested using real data by using TOPSIS and developed to evaluate CSF and CSF in several SMEs based on their sector in developing countries. Further research also can continue how ERP implementation is carried out in companies that have many business units with different lines, what methods should be used, and what tips need to be implemented.

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