

## Identification and Indicators of ERP Implementation Success Factor – a Literature Review

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### ABSTRACT

Enterprise Resources Planning has become one of the business and management applications that are believed to be able to improve the performance of companies and or organizations to be more efficient and effective. However, based on much research, the success rate of ERP implementation is questionable. Although the success of ERP implementation is often published in research, the failure rate of ERP system implementation is relatively high. Therefore, this study is to find out the problems and challenges faced by organizations in implementing ERP, by reviewing the existing literature on research on factors that influence the success of ERP implementation. The approach taken is to review several related research articles published in the 2015-2020 period from several publishers, namely Emerald Online, Science Direct, IEEE, and SAGE. The sample size for the last 5 years is expected to show the up-datedness of the data taken from the research article. New ideas that will emerge from this discussion are the main factors causing the success of ERP implementation for organization, so that they can be used to reduce the failure rate of ERP implementation in the future by proposing an ERP implementation model.

#### Keywords:

CSF, Literature Review,  
 ERP, Failure, Success

## 1. Introduction

Enterprise Resource Planning (ERP) has become a necessity that must be implemented in companies in the face of competition in the business world and to apply the industrial revolution 4.0. Many organizations view ERP as a potential, vital and crucial solution for their business to gain efficiency, effectiveness, and become more competitive. Complex information systems such as ERP integrate data from all business areas in the organization. ERP implementation is a difficult process as it involves different types of end-users. ERP implementation has great benefits, but can be disastrous for organizations that fail to manage the ERP implementation process.

Information technology (IT) project failure is an unfortunate fact for many organizations, and ERP projects are no exception to many failures. Gartner estimates that 55% to 75% of all ERP projects fail to meet their goals. Whether the implementation is only a few months or a few years, whether it is an upgrade or addition of ERP functions or a new ERP implementation, the financial and cultural strength of the entire organization is at stake in ERP implementation [1]. On the other hand, a number of studies have looked at the success and or failure rates of IT projects in general including ERP projects [2][3]. These studies show that there are serious problems in almost all industries in implementing IT projects. A study of 5,400 large-scale IT projects (projects with initial budgets greater than \$15 million) conducted by McKinsey [4] found that emerging problems in IT project management persist. Among the main findings cited from the report are 17% of IT projects went so badly that they could threaten the very existence of the company and on average, IT projects implemented, 45% went over budget and 7% went over the allotted time, while 56% did not comply planned.

A few energizing considers on the insights of the victory rate of IT ventures, the Chaos Report from the Standish Bunch, which pulled in consideration beginning within the mid-90s, the detailed extend disappointment rate was exceptionally high (~ 90% unsuccessful). The foremost later information from their 2013 report appeared enhancement, but 39% of IT ventures were effective, with 61% falling flat or experiencing deterrents [5]. Concurring to statistics, most ERP usage fall flat. Disappointment implies the whole cancellation of the venture or disappointment to go live on time and inside budget constraints. Over the past 20 a long time, there has been a part of the investigation on ERP execution victory. Generally, few hypothetical articles proposing an ERP usage system [6][7][8][9] are found within the body of writing; more observational articles that degree the relationship between two or more basic victory components of ERP usage [10][11] are found, and a few cases ponders [12][13][14,15] highlighting a extend of Critical Success Factor (CSFs) based on encounter over distinctive sorts and sizes of organizations in several locales of the world. This paper is spurred to contribute to information by looking for and replying to investigate questions approximately the components that impact ERP execution.

## **2. Literature Study**

### **2.1 Enterprise Resource Planning**

ERP is an extensive, complex enterprise system or enterprise resource planning system that integrates all business processes in the company and involves all stakeholders or decision-makers. The terms “enterprise systems” and “enterprise resource planning or ERP” have been used interchangeably [16]. Researchers in academia and business practice have identified ERP systems as the most popular business software product in the last fifteen years [17] [18]. ERP investment is the highest IT expenditure for a company. ERP systems require a long-term commitment for the organization that can last for several years. ERP can be defined as a comprehensive and packaged software solution that seeks to integrate a complete set of business processes and functions to comprehensively view the business from a single information and technology architecture [19]. ERP is also described as a complex software system used to combine business modules such as sales, marketing, manufacturing, human resources, and financial management [20]. The definition by Davenport is commonly used in Information Systems (IS) research. It describes ERP as a commercial software package that promises seamless integration of all information flowing through an enterprise, including financial and accounting information, human resources, supply chain, and customer information [21].

In spite of the fact that ERP has gotten to be the favored framework and is broadly actualized by companies, numerous disappointments still happen. A few variables contributed to the disappointment of ERP usage, such as: (1) the usage choice prepare was not carried out carefully; (2) making off-base choices amid the execution handle; (3) not getting satisfactory association from sellers amid the usage prepare; and (4) not getting satisfactory data approximately the ERP framework amid the early stages of selection and execution; These components demonstrate the significance of the early stages within the in the general execution of an ERP framework [22].

Investigate on ERP frameworks covers different angles, counting execution choices, acquisitions, usage victory, and disappointment components, utilize, and a few other points. Considers on conventional ERP usage essentially center on expansive companies; this is often since there's a presumption that ERP is as it were reasonable for large-scale companies since of the tall taken a toll to embrace this framework.

### **2.2 Critical Success Factor**

Critical Success Factor (CSF) can be portrayed as a basic component that must be recognized. On the off chance that the comes about is palatable, it'll guarantee the fruitful competitive execution of the organization, the concept of CSF was created within the early 1960s. Ronald Daniel first examined the idea of CSF within the administration writing, expressing that information analysis ought to center on “success factors” as a modern approach to assist in accomplish organizational objectives [23]. The objective of any CSF approach is the assurance of a set of components that are considered basic to its victory. CSFs are exceptionally valuable, as they give clear insight and guidance and as resource considerations and planning for the successful implementation of ERP projects.

The current ERP success models are interpretations of success according to the perspective of certain stakeholders such as users, management, information technology, business processes, and others [24]. Based on the results of the literature study that many ERP success models were developed from the Delone and McLean (D&M) model, Technology Acceptance Model (TAM), Balanced Scorecard (BSC), Task Technology Fit (TTF), and Diffusion of Innovation (DOI).

Success is a subjective thing where success depends on who judges it [24]. Because of this subjectivity, success is very dependent on a certain point of view, causing an imbalance in assessing success. This is because one concept only represents one stakeholder. Whereas in the company there are many stakeholders with various interests. Each stakeholder wants their interests to be accommodated in the ERP system that is built. Therefore, a general model is also needed with generic indicators that can cover all interests. Until now, research on ERP success models still revolves around what results can be obtained from implementing ERP systems in companies that can be assessed based on various aspects such

as quality, user satisfaction, use, and benefits. However, the results of these studies still tend to be static without being able to explain what and how these successes can be achieved. Logically, success can be achieved if applying the right process. The process carried out is a methodology that is applied as a strategy to be able to meet all the demands that motivate the existence of an ERP system in the company.

### 3. Methodology

The research methodology used in this study is a literature review method, which was carried out using the theory of Kitchenham et al. [25,26].

The steps taken are as follows:

1. Performing an analysis of the results of a sorted literature search. The analysis was carried out by collecting and summarizing several literature search results related to the failure and success of ERP implementation. To make it easier to carry out the analysis process, the literature is grouped based on the type of content discussed according to the problem formulation and/or keywords. There are two types of literature grouping, namely regarding the factors that cause ERP implementation success and ERP implementation failure.
2. Understand the Search Results that have been carried out in the previous stage. So that at this stage the results of the discussion can be compiled, some of the literature obtained is used to discuss the main causes of successful ERP implementation.
3. Creating a framework in ERP implementation that increases the chances of successful ERP implementation, which can be used as a guide in

#### 3.1 Problem Identification

Formulate the problem of the factors that lead to the success of ERP implementation. The purpose of this literature review is to determine the influence of the factors that influence the success of ERP implementation. To achieve this goal, it is necessary to formulate the problem by formulating several research questions (RQs). From this stage, three main points of RQs are obtained, namely:

1. RQ1: What are the problems that arise in CSF ERP from 2015-2020?
2. RQ2: What are the factors that influence the ERP implementation process?
3. RQ3: What are the solutions that can be used in dealing with influencing factors in order to achieve successful ERP implementation

#### 3.2 Literature Research

Search for literature using a combination of academic search engines and academic databases. Google Scholar, Science Direct, IEEE Xplore, Emerald Online, and SAGE. The search for literature sources focuses on the keywords ERP implementation, ERP critical success factor, ERP Adoption, and ERP Failure. From the search results, the next step is to sort out the appropriate literature search results to get the literature that will be used in this literature review. The research objects consist of journal articles and conferences. Other papers such as thesis, final project, thesis, and doctoral dissertation that are not published are excluded from this research. Focus on the organizational context in the literature review of ERP implementation failures and successes. The literature review related to organization is the main object of this research, which does not cover ERP development and ERP technology.

Sorting literature search results by filtering journals and conference results that have been obtained based on established standards with the year of publication in the search results being the last 5 years, namely from 2015 to 2020. The literature obtained is filtered based on the year of publication and the criteria for sorting the results. literature search.

The results of searching the literature areas are in table I.

**Table 1 - Result of Keyword Search**

Keyword	Science direct	IEEE	Emerald	Sage
ERP Implementation	261	55	340	34
ERP CSF	11	1	22	0
ERP Adoption	48	11	83	11
ERP Failure	15	2	20	2

From the search results, the next step is to sort out the appropriate literature search results to get the literature that will be used in this literature review

### 3.3 Literature Search Selection

This stage is the stage of sorting search results by filtering journals and conference results that have been obtained based on predetermined standards. The literature obtained was filtered based on the year of publication and the criteria in sorting the literature search results. Next, eliminate duplicate journals or papers. Thus, from the search results of several kinds of literature consisting of journals and conference results, 85 literature have been found. The results of literatures that have been found are used as a reference in conducting the analysis.

**Table 2 - Selection Result Table**

Sources	Candidate	Reject	Accept
Science Direct	13	5	8
IEEE	24	8	16
Emerald	14	4	10
SAGE	2	0	2
Others	32	12	20

Of the 85 literatures that have been found, then a sorting process is carried out based on the suitability of the methodology used. The results of the disaggregated literature are used as the main reference in conducting this review. The results of the literature sorting process obtained a number of 56 literatures consisting of journals and conference results.

### 3.4 Analysis

The next stage is to analyze the results of the literature search that has been sorted in the third stage. The analysis was carried out by collecting and summarizing some of the results of a literature search related to the factors that influence the implementation of ERP. To make it easier to carry out the analysis process, grouping is carried out based on the type of content discussed in accordance with the formulation of the problem. The factors that influence ERP implementation obtained from journal articles and proceedings are grouped and coded as shown in table 3.

**Table 3 - ERP Implementation Factor**

Implementation Factor	Code
ERP Selection	ES
Implementation Purpose	IP
Budget	CO
Organization Scope	OS
External Factor	EF
Organizational Readiness	OR
Support Management	SM
Support of User	SU
Business Process Knowledge	BK
Implementation of ERP Model	IM
BPR	BP
Project Management	PM
Transfer of Knowledge	TR
Vendor Support	VS
Risk	RS

At this stage, it can be done to prepare the results of the review of the factors that influence the implementation of ERP. This literature review can be seen from three points of view, namely the influence of management on ERP implementation in terms of several case studies, influencing factors in ERP implementation, and solutions.

## 4. Result and Discussion

### 4.1 Search Results and Grouping

From these groupings, the appropriate articles are searched based on the ERP selection group, implementation objectives, budget or costs, company scope or organizational size, external influencing factors, organizational readiness, management support, user support, business process understanding, ERP implementation model, Business Process Reengineering (BPR), project management, knowledge transfer including training, consultant or vendor support, and existing risks. The results can be seen in Table IV.

Then the ERP success factors are recapitulated to find out the highest-ranking of each influencing factor. This highest rating will be used as a reference for developing the implementation model. Table III shows the ranking of factors that affect ERP implementation. Based on the existing articles, management support is the main thing while the size of the organization is not the main thing, this is because the size of the organization is only an object, and standard ERP standards do not affect ERP implementation at the size of the organization.

**Table 4 - Grouping of Influenced Factors Based on Author**

Authors	IP	CO	OS	EF	ES	SM	SU	BK	OR	BP	PM	TR	VS	RS	IM
W <i>et al.</i> (2020) [27]						V	V		V	V					
Islami <i>et al.</i> , (2020) [28]		V				V	V								
Prasetyo <i>et al.</i> , (2019) [29]						V							V		V
Syafiera <i>et al.</i> , (2019) [30]				V			V								
Syafirialiany <i>et al.</i> , (2019) [31]		V					V	V							
Hajj and serhan, (2019) [32]	V					V	V					V	V		
Seres <i>et al.</i> , (2019) [33]							V				V				
Kiran and Reddy, (2019) [34]		V			V	V	V	V	V	V		V			
Aboabdo, <i>et al.</i> , (2019) [35]						V					V	V			
(Barth and Koch, 2019) [36]	V			V	V	V	V	V	V	V	V	V	V		V
Ibrahim, <i>et al.</i> , (2019) [37]											V				
Fernandi W. and Ervina J.E, (2019) [38]	V														
Abu Ghazaleh, <i>et al.</i> , (2019) [39]						V	V		V						
Osman and Sahraoui, (2018) [40]	V	V		V		V	V	V	V	V	V	V	V	V	V
S.Mala , <i>et al.</i> , (2018) [41]	V					V	V	V		V	V	V	V		
Reitsma and Hilletoft, (2018) [42]			V		V	V	V		V	V	V	V			V
Robert <i>et al.</i> , (2018) [43]						V		V	V				V		
Chaveesuk and Hongsuwan, (2017) [44]						V	V		V						
Govindaraju <i>et al.</i> , (2016) [45]	V					V									
Alsulami, <i>et al.</i> , (2016) [46]						V							V		
Ramadhana, <i>et al.</i> , (2016) [47]						V			V						V
Chatzoglou <i>et al.</i> , (2016) [48]	V			V		V			V	V	V	V	V		
Venkatraman and Fahd, (2016) [49]						V				V					
Chatzoglou, <i>et al.</i> , (2016) [50]							V		V		V				V

Abdelmoniem, (2016) [51]						V		V	V	
Rabaa'i and Gammack, (2016) [52]			V	V	V			V		V
Hou, Chen, and Shang, (2016) [53]			V		V	V				
EREN, (2016) [54]		V								
Nofal and Yusof, (2015) [55]	V			V		V		V	V	V
Jameel Q. and M. Abdulkhalaq, (2015) [56]	V				V			V		V
Leyh, Gebhardt and Berton, (2017) [57]	V			V				V		
Eka Widjaja <i>et al.</i> , (2018) [58]			V			V			V	V
Tamimi and Mohammad, (2019) [59]	V		V		V		V	V		V
Mayaram, Dussoye and Cadessaib, (2019) [60]		V	V	V					V	V
Abu-Hussein <i>et al.</i> , (2016) [61]				V		V		V		V
Almahamid, (2019) [62]					V			V		
Ouiddad <i>et al.</i> , (2020) [63]						V				
Li, Chang and Yen, (2017) [64]								V		
Bokovec, Damij and Rajković, (2015) [65]			V				V	V	V	
Ağaoğlu, Yurtkoru and Ekmekçi, (2015) [66]		V	V	V	V		V	V		V
Jameel Q. and M. Abdulkhalaq, (2015) [67]					V					V
Hartijasti and Septian, (2015) [68]						V	V			
Tarhini <i>et al.</i> , (2015) [69]	V			V		V	V	V	V	V
Costa <i>et al.</i> , (2016) [70]			V	V	V				V	
Al-Sabri, <i>et al.</i> , (2018) [71]			V			V	V			
Jagoda and Samaranayake, (2017) [72]							V		V	V
Shatat and Dana, (2016) [73]								V		V
Hwang and Grant, (2014) [74]			V			V				
Misita <i>et al.</i> , (2016) [75]				V					V	
Huang and Yasuda, (2016) [76]	V	V	V		V	V			V	V
Cahyadi, (2016) [77]					V				V	
Gupta and Misra, (2016) [78]			V		V		V			
Baykasoğlu and Gölcük, (2017) [79]										
Gupta <i>et al.</i> , (2018) [80]			V			V				V
Saeed <i>et al.</i> , (2017) [81]				V			V			
Phaphoom <i>et al.</i> , (2018) [82]			V				V	V	V	V
Gupta <i>et al.</i> , (2020) [83]		V				V	V			

**Table 5 - CSF Grouping Frequency**

<b>Influence</b>	<b>Amount</b>
Support Management (SM)	31
Organizational Readiness (OR)	25
Support User (SU)	24
Project Management (PM)	22
Knowledge Transfer /Training (TR)	20
Pemahaman Proses Bisnis (BK)	15
Seleksi ERP (ES)	15
BPR (BP)	15
Dukungan Konsultan (VS)	13
Tujuan Implementasi (IP)	13
Model ERP Implementasi (IM)	8
Risiko (RS)	8
Anggaran (CO)	6
External faktor (EF)	6
Scope perusahaan (OS)	4

## 4.2 Model Implementation Development

From these results, an implementation model was developed with the assumption that ERP implementation is influenced by three main components, namely ERP Selection, Organizational readiness, External Factors, Consultant support, and risk. External factors can be ignored because the desire for ERP implementation tends to be stronger than the interests of management itself. From the group, the ERP implementation model was made as follows. For ERP implementation, Organizational Readiness is required, then the appropriate ERP selection, Consultant or vendor support, and calculated risks. So that the proposed model is illustrated as shown in Figure 1.

The explanation of the proposed ERP implementation model is as follows:

### 1) ERP Selection

In this world, a lot of ERP software is offered, so that the implementation is right and as expected, it is necessary to select ERP software. Factors that influence ERP selection are the objectives of the ERP implementation itself, the budget that is acceptable in ERP implementation and the size or scope of the company, the many ways used for ERP software selection (look for references). The results of the selection that are appropriate and in accordance with the company will further increase the success of ERP implementation, in addition, it minimizes the risk of an inappropriate ERP system and consequently projects failure.

### 2) Organizational Readiness

Organizational readiness is important in the success of ERP implementation, it can be seen that the factors that constitute organizational readiness are ranked high. These factors are top management support, user support, and understanding of business processes. From the readiness of this organization, if it is going to implement ERP, it can be determined whether the organization is ready or not, so that later the organization needs to do BPR, how long is project management and what is the right method, and what knowledge transfer is needed is it sufficient? transfer of application use only or transfer of knowledge ranging from ERP concepts to how to use applications. Each organization can be different depending on the readiness of the organization.

### 3) Consultant Support

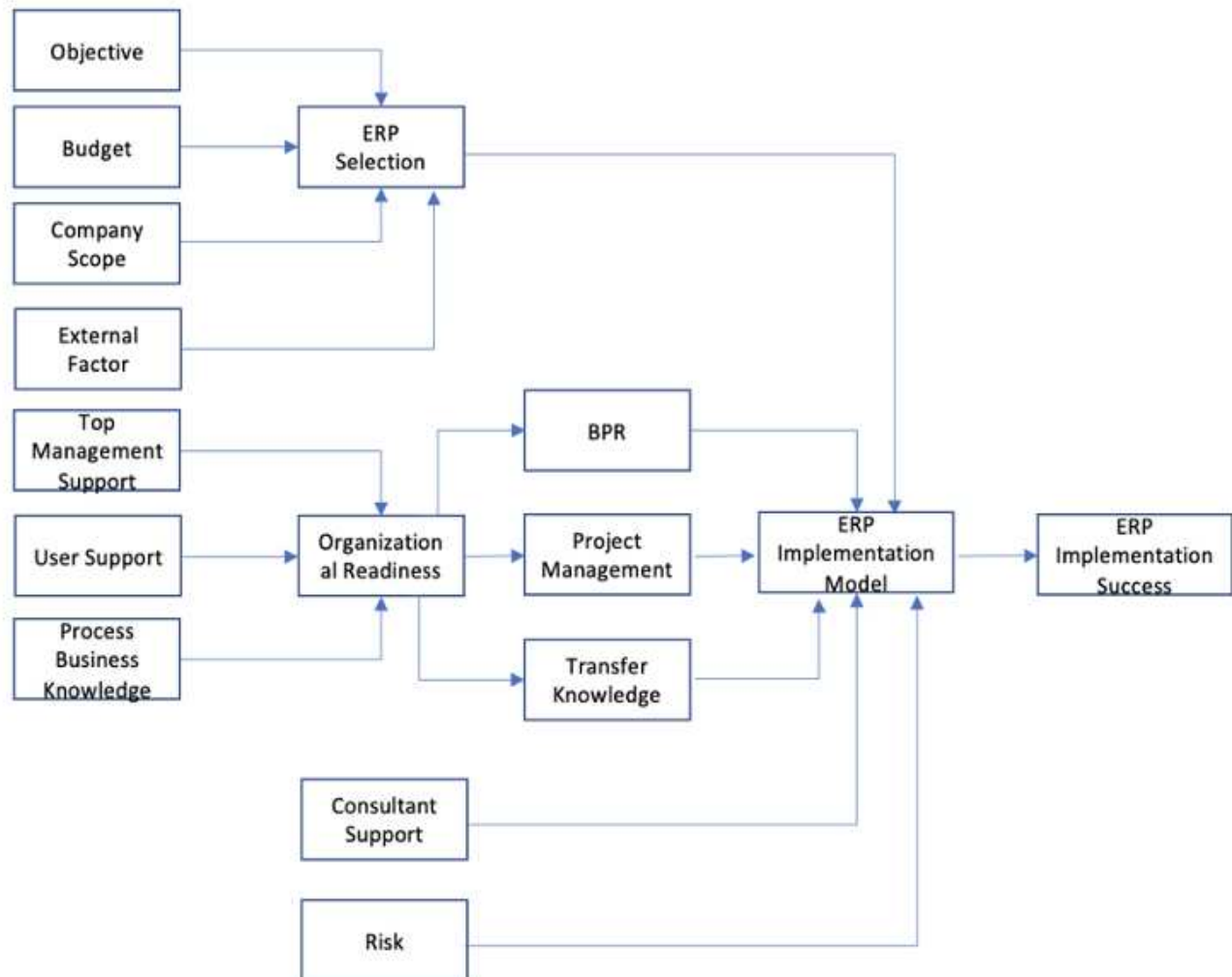
Consultant support in ERP implementation is very necessary, because ERP implementation is very complex and involves many experienced workers, this will be difficult for companies to fulfill. The selection of a consultant who understands the ERP system and business processes of the user company is very important because this will be able to bring the ERP system together with the company's business processes, this will also affect the implementation time and implementation success.

#### 4) Risk

Implementation risk needs to be taken into account, both during the implementation process and after implementation or during go-live. These risks include risks that can cause slow ERP implementation or implementation failure. Risk mitigation needs to be listed properly and risk management also needs to be anticipated beforehand.

#### 5) Implementation Model

The ERP implementation model for each company can be different depending on the conditions of each company. Input from ERP Selection, BPR, Project management, knowledge transfer, consultant support and risk will be able to determine the implementation model that is suitable for the company in ERP implementation. This framework is proposed to be able to determine the ERP implementation model which will later be optimized, so that it will be known what ERP implementation model is appropriate and suitable for the company. An appropriate ERP implementation model will open up opportunities for successful ERP implementation.



**Fig.1 - ERP Implementation Model**

### 4.3 Hypothesis Analysis

To further optimize the ERP implementation model, a hypothesis is made for each variable. A hypothesis is a statement that contains a smart guess or an educated guess (Salkind, 2000) which will be proven in the research [Insap Santosa]. Hypotheses generally reflect the problem or research question that drives the research. Later this hypothesis will be used as a reference in determining the ERP implementation model

The hypotheses are formulated as follows:

H1: Implementation objectives affect the selection of ERP software selection.

The objectives of ERP implementation are the goals to be achieved, how many modules are implemented, the expectations of the implementation, and the extent to which these goals will be achieved will affect the software used.



**H2: Budget affects ERP software selection**

Adequate budget to buy ERP software, pay consultants, buy hardware platforms, implement according to the desired scope and to anticipate scope changes.

**H3: Realistic scope influences ERP software selection**

Scope that must be in accordance with the organization, setting a realistic completion date, available human resources, and adjustments to the company's business processes that make sense.

**H4: External factors affect the selection of ERP software selection**

Availability of software and hardware, rules or regulations, strength of the internet network.

**H5: Top Management support affects organizational readiness.**

The presence and involvement of top management in the implementation project and always reviewing periodically and providing incentives to the project, and giving clear directions.

**H6: User support affects organizational readiness.**

Involvement of users in helping and providing data or information as well as being directly involved in the project either as a giver of information or as a recipient of information.

**H7: Understanding of business processes will affect organizational readiness.**

Understanding of business processes now and in the future at all levels involved in the project, in addition to the standards that have been built, and SOPs that have been made or implemented.

**H8a,b,c: Organizational readiness affects whether or not Business Process Reengineering, Project Management and the type of knowledge transfer are required**

ERP Implementation Model is influenced by:

H9: ERP selection.

H10: Business Process Reengineering.

H11: Project Management.

H12: Knowledge Transfer.

H13: Consultant Support.

Consultants who understand ERP must also understand the company's or customer's business processes.

H14: Risk.

Project implementation risks must be clearly defined according to internal and external factors.

H15: ERP Implementation Model affects ERP Implementation Success.

## **5. Conclusion**

ERP implementation is very complex and if not managed properly will lead to failure. ERP implementation, especially for critical success factors, is mostly done by analyzing all the factors that cause success and failure in ERP implementation. This study analyzes the ERP success factors contained in the study between 2015-2020. Of the 56 selected articles, the main factors that influence the success of ERP implementation were determined, which were then grouped into 15 factors. From these 15 factors, an ERP implementation model or framework is designed which will later be useful and can be a reference in ERP implementation to further increase the chances of success and reduce the risk of failure. This research is still preliminary research, the proposed implementation model still needs to be tested and proven its usefulness for actual ERP implementation in various types and sizes of companies or organizations..

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