A Systematic Mapping Study of Business Process Reengineering

Eriana Afnan, Iwan Sukoco, and Herwan Abdul Muhyi

ABSTRACT

Business Process Reengineering needs to be carried out in line with technological developments and environmental changes. The goal is to modify procedures, systems, structures, responsibilities, and skills. This article aims to classify, identify scientific publications, and conduct a thematic analysis of the current literature to create a broad and detailed understanding of Business Process Reengineering. The research method used is a systematic mapping study (SMS) to examine scientific publications produced from time to time, the focus, locus, the type of research that is most widely studied, and the most widely used research method. Based on the results of SMS research in the field of Business Process Reengineering, it is known that there are 40 studies that meet the inclusion criteria. We classified 40 articles in topic areas by category of paper type, method, focus, locus, and year of publication. Then, categorized, and quantified current studies are generated on various dimensions, topic summaries, and current research trends.

Keywords: Business Process Reengineering, Systematic Mapping Study, SMS, Systematic Review.

I. INTRODUCTION

A. Background

The era of global competition is marked by changes that occur very quickly in the business environment, changes require organizations to be able to adapt quickly, have the resilience to be able to make changes more quickly, and pay attention to the environment outside the company (Zhitlukhina et al., 2018). Therefore, changes in the organization have become indispensable along with increasingly rapid technological developments (Hamdi & Abouabdellah, 2018). In the era of globalization, Business Process Reengineering involves changes in the introduction of new technologies, the introduction of more automated systems, and new orientations from targeting new needs to customers (Lucena, 2005).

Business Process Reengineering is one of the tools for the best future management (Goksoy et al., 2012). This BPR aims to optimize organizational resources for the best end result (Rigby & Bilodeau, 2013). BPR is a way of redesigning business processes and related systems and organizational structures that aim to achieve improvements in business performance and organizational performance (Saleem, 2012). Business reasons for making changes include, among others, that changes can eliminate or improve things that are considered unfavorable such as poor financial performance, constantly changing external competition, emerging market opportunities, global competition, or some other pressing business problems (Radhakrishnan & Balasubramanian, 2008). Business Process Reengineering is not downsizing, restructuring, reorganization, automation, new technologies, etc. (Stoica et al., 2004). It is an examination and change of the five main components of a business (Davenport, 1993). The goal is to improve organizational performance to be more efficient and competitive. Business Process Reengineering can be applied to improve the performance of organizations, companies, agencies, and businesses (Wimpertiwi et al., 2014). One of the results of Business Process Reengineering is getting a significant increase in terms of cost, speed, and service (Attaran, 2018).

The phenomenon of Business Process Reengineering which is widely known today is related to how to manage a change in a company or organization, how technology is needed in changing a company or organization, and how important it is to improve the efficiency and competitiveness of an organization or company in the face of change (Kim & Ryu, 2017). The purpose of this systematic mapping study, among others, is to form a new background for further research in the future and to gain a deeper and wider insight into the study of Business Process Reengineering. This SMS study is a very accurate method as a literature study approach because this research is supported by 40 articles from searches in the Scopus electronic database. Overall, the researchers analyzed the search results of 40 studies with the main questions (Research Questions) in this study, including:

1. RQ1: How is the focus of previous research on the topics that have been studied in previous studies?
2. RQ2: What are the loci of research on the topic studied in previous studies?
3. RQ3: What are the types of papers in previous studies?
4. RQ4: What methodologies and approaches can be used in previous research?
5. RQ5: What is the distribution of paper types and methods used in previous studies?
6. RQ6: What is the trend of publication in each country and every year in this study?

II. LITERATURE REVIEW

A. Business Process Reengineering

Reengineering or system re-engineering is the process of changing a system that will be able to add functionality to both its performance and reliability and improve maintainability. A system needs to be re-engineered because the old system is not suitable for the conditions that have been used for a long time. A system needs to be re-engineered because the old system is not suitable for the changing business environment conditions, new needs arise when the system is used (Suropaty & Wahyuni, 2016). The term reengineering first appeared in the field of information technology (IT) in the 1990s and then evolved into a broader change process. Information Technology (IT) is a computer combined with telecommunications technology so that information technology (IT) is a technology related to managing data and becoming information. Information technology plays an important role in Business Process Reengineering because information technology is able to change the old rules that prevent people from doing their jobs (Indrajit & Djokopranoto, 2002).

Business process reengineering (BPR) is a subset of reengineering. Business Process Reengineering is a concept to change business processes that have weak points in the process. The goal is to improve an organization's performance to be more efficient and competitive. Business Process Reengineering can be applied to improve the performance of organizations, companies, agencies, and businesses (Wimpertwiv et al., 2014). One of the results of Business Process Reengineering is to get a significant increase in terms of cost, speed, and service (Attaran, 2018).

The embodiment of BPR itself is stated in four keywords (Hammer & Champy, 2009). The first keyword is “fundamental” which relates to basic statements of what the organization has done such as: why do we do it? What are we doing now? Why do we do it? To answer these fundamental questions, businesses need to look at the rules that underlie the way a company conducts business. Often the rules feel outdated, wrong, and inappropriate.

The definitions and some statements above show that BPR is a process that can help to solve various problems to date. In addition, one of the functions of BPR is to become one of the important methodologies for introducing changes that occur in organizations or in large companies. By using this BPR methodology, aspects related to business processes can be analyzed, simplified, and redesigned. This is often the case because BPR involves thinking through all the business processes used to radically reduce the costs of manufacturing a product or providing a service. Since 1990, BPR has been recognized as one of the boldest business management strategies and is able to help organizations analyze workflows and processes that occur. Equally important, BPR also plays a very important role in helping organizations look back on their day-to-day activities by improving customer service, reducing operational costs, and becoming first-class competitors.

Previous studies have shown that the general BPR methodology that is often used in many business processes is the methodology proposed by Hammer and Champy. However, the last few years have shown that the Davenport methodology is becoming more general and can be applied in various organizational conditions, this is because at this time the use of Information Technology continues to be the main driving factor for change. In addition, some experts, such as Aslina (Zaini & Saad, 2019), argue that the use of BPR cannot be generalized to all business situations, because every type of business encounters unexpected and different difficulties. Patwardhan (2008) agrees with the opinion above, which states that the approach to finding relevant sub-processes deemed suitable for BPR involves a “door-to-door” mapping process which helps to improve its usability. Furthermore, the approach can help organizations identify appropriate activities and bad activities. In particular, the latter activities can be measured and analyzed to determine their negative impacts and methods of disposal.

The results of this study provide a comprehensive research approach to business process reengineering as well as implications and guidelines for academics and other practitioners.

III. METHODOLOGY

A. Research Methods

This study uses a systematic mapping study (SMS) which is included in the secondary study. The SMS method has its roots in the Study Literature Review (SLR), which is often known as the medical research (Kitchenham et al., 2010). The application of SLR itself is to be able to evaluate, interpret and identify all existing literature relevant to the research question or domain of interest (Kitchenham et al., 2010). This SMS method describes research at a level that is more often discussed, and the most common research for conducting SLR, its purpose is to summarize existing topics, identify activities in current and future research, to provide background and position new (Kitchenham et al., 2010). The aim of this research is to synthesize existing studies on usability techniques in agile methodologies and identify what is the current scope of work in what areas require attention for future research (Salvador et al., 2014).

1) Research Questions

Research questions (Research Questions) in the SMS method are much broader than the SLR in terms of discussing a broader research (Kitchenham et al., 2010). This research question concentrates on grouping topics related to Business Process Reengineering. The main purpose of this SMS is to map the frequency of publications from year to year to see research trends. The next goal is to identify the forums where research in a field has been published. This goal is reflected in the question (RQ) as indicated (Castaner & Oliveira, 2020).
2) Research Step

To increase the level of accuracy in this SMS research, the search and analysis process must be as accurate and detailed as possible. Thus, this section characterizes the data source selection process, aims to implement strategies for generating search strings, and defines exclusion and inclusion criteria. This study also adopted a search process starting from the research (Petersen et al., 2008). In carrying out this process, each step has a result and a systematic map (Systematic Mapping) which can be referred to as the final result of the mapping process. In the table, we describe the process of sending SMS and searching online through an electronic database, namely Scopus database. The search string is created using a strategy (Banaeianjahromi & Smolander, 2016). Then, the last step is to use a Boolean operator that functions to synthesize into a search string (Ferrari et al., 2019).

1) Classification Scheme

There are three aspects to Paper Type based on classification. In addition, classify studies. One side identified 22 categories of focus (Goncales et al., 2015). Here is their research. The second side is determined in Fig. 1 of the classification process.

![Fig. 1 Systematic Mapping Study.](image)

### TABLE I: DATA SEARCH RESULTS

<table>
<thead>
<tr>
<th>Source database</th>
<th>Search interval</th>
<th>Detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scopus</td>
<td>Search string &quot;Business Process Reengineering&quot;</td>
<td>189</td>
</tr>
<tr>
<td></td>
<td>Select Research</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>Paper yang Relevant</td>
<td>40</td>
</tr>
</tbody>
</table>

### TABLE II: INCLUSION AND EXCLUSION CRITERIA

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research that focuses on Business Process Reengineering research. English</td>
<td>A paper that does not discuss Business Process Reengineering.</td>
</tr>
<tr>
<td>Papers that have passed Peer Reviewed.</td>
<td>Papers that have not passed Peer Reviewed. Duplicate Research.</td>
</tr>
</tbody>
</table>

### TABLE III: PAPER TYPE AND METHODS

<table>
<thead>
<tr>
<th>Paper Type</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validation Research</td>
<td>New investigative methods have never been applied in practice (observation).</td>
</tr>
<tr>
<td>Evaluation Research</td>
<td>The investigative method is implemented in practice and presented in the evaluation method.</td>
</tr>
<tr>
<td>Solution Proposal</td>
<td>The solution to the problem posed, this proposed solution can be a new approach or an existing approach.</td>
</tr>
<tr>
<td>Philosophical</td>
<td>Research that introduces a new perspective on something that exists by using a conceptual framework.</td>
</tr>
<tr>
<td>Experience Paper</td>
<td>Research-based on the author's personal experience of what and how something has been done in practice.</td>
</tr>
<tr>
<td>Case Study</td>
<td>Research on a single phenomenon in one or more organizations over a reasonable period of time.</td>
</tr>
<tr>
<td>Constructive Study</td>
<td>Research that intends to build a new framework, software artifact, or conceptual model.</td>
</tr>
<tr>
<td>Literature Study</td>
<td>Research that analyzes and expands on the existing literature.</td>
</tr>
<tr>
<td>Discussion Paper</td>
<td>Research that discusses arguments or phenomena.</td>
</tr>
<tr>
<td>Grounded Theory Survey</td>
<td>This research aims to develop theory through data analysis.</td>
</tr>
<tr>
<td>Delphi Study</td>
<td>Research consisting of two or more rounds of questionnaires answered by experts.</td>
</tr>
</tbody>
</table>
IV. FINDINGS AND ANALYSIS

A. Research Results

In this section, the results of the mapping are based on the research questions and based on the results of mapping 40 Business Process Reengineering articles that have been grouped using Microsoft excel through focus categories, methods, and types of research. Research Focus (RQ1)

To answer RQ1, through 40 articles have been mapped on research topic areas with categories of Business Process, Change Management, Performance, Enterprise Resource Planning, and Business Process Reengineering.

The topics that are widely researched are Business Process Reengineering with 46 articles, Business Process on Business Process Reengineering with 22 articles, Performance with 9 articles, Enterprise Resource Planning with 8 articles, and Change Management with 5 articles.

1) Research Locus (RQ2)

To answer RQ2 in this study by going through 40 articles that have been mapped to the research locus area with the category of company, organization, business, manufacturing, and public sector. Fig. 3 is the number of articles at the loci in the article under study. The loci that were widely studied were Organization with 16 articles, then Company with 12 articles, then manufacturing with 6 articles, Business with 4 articles, and Public Sector with 2 articles.

2) Paper type (RQ3)

Research is grouped into three categories, namely: Validation research, evaluation research, and solution research. To provide answers from RQ3, we categorize 40 studies resulting from the classification mapping.

The distribution of article types (Paper type) is described based on the results of systematic mapping (systematic mapping study), the type of article that is most often used is validation research with a total of 20 (50%) studies. The next most frequent type of article is Evaluation research with a total of 18 (45%) studies. The next most frequent type of article is Solution Proposal; with 2 (5%) studies, while Philosophical was not found in this study.

3) Research Methods and Methods (RQ4)

This research can be grouped into six categories, namely case studies, constructive studies, discussion papers, grounded theory, literature studies, and surveys. To provide answers from RQ4, we categorize 40 articles from the classification mapping results. Fig. 5 is a diagram illustrating the percentage distribution of research methods on Business Process Reengineering.

The result of the systematic mapping study that has been carried out is that the article method that is often used is a survey with a total of 21 (53%) studies. The next most frequently used article method is the Literature Study with a total of 14 (35%) studies. Next is the Discussion Paper method with 3 (7%) studies and the last is a case study with a total of 2 (5%) studies.

The research is grouped into three categories, namely Quantitative, Qualitative, and Mixed methods. we categorize 40 studies from the results of the classification mapping. The result is that the quantitative approach is the most superior with 20 studies with a percentage of 50%, followed by a qualitative approach with 19 studies with a percentage of 47%, and then mixed methods with 1 study with a percentage of 3%.
4) Distribution Research Type and Methods (RQ5)

After being disseminated, it can be seen that validation research and survey research as many as 18 articles occupy the highest position for research methods that have been widely carried out by previous research. As many as 3 articles, then Research Evaluation and Discussion of papers as many as 2 articles, and at least occupied by Research and Discussion Validation papers, validation research and case studies, solution proposals and case studies and solution proposals as well as literature studies with 1 article each.

5) Trend Publication (RQ6)

Based on the mapping results, it has been found that various countries have produced the most research on Business Process India with 7 publications, followed by Sri Lanka and Italy with 3 publications, followed by Australia and Florida with 2 publications and followed by Arab, Canada, China, France, Greece, Iran, Japan, Jordan, South Korea, Malaysia, Mexico, New York, New Zealand, Norway, Pakistan, Qatar, Serbia, Slovenia, Spain, Taiwan, Thailand, Ukraine, and the US with 1 publication in each country.

Fig. 8 is a research trend published on electronic database media starting in 2014-2021. In 2015 there were 9 articles occupying the highest number, then followed by 2020 with 8 articles, then 2019 with 7 articles, then 2014 with 5 articles, then 2016 with 4 articles, then 2018 with 2 articles, and the smallest is 2017 with 1 article.

Based on the mapping results mentioned above, the Systematic Mapping Study (SMS) provides a comprehensive overview of Business Process Reengineering. Researchers from academics and practitioners can use this research as initial research. In this systematic mapping, we have traced 189 research articles from the Scopus electronic database. After doing the mapping, 40 relevant articles were found, and then a classification scheme was developed which categorizes the articles based on the research focus, type of research, and research methods.
In this study, it is known that research on Business Process Reengineering uses survey methods more, the second research and takes cases from an organization or several organizations in certain locations, and the third largest in Validation Research being the prima donna temporarily in 2020 while evaluation research is the prima donna in the year 2019. The survey, Literature Study and Discussion Paper are the most widely used research for Business Process Reengineering research in organizations in general and profit-oriented companies. The results showed that the type of research Validation Research used a lot of survey methods, followed by the type of research Evaluation Research using survey methods. This means that Validation Research uses a lot of survey research methods, both with a quantitative approach and cases in certain organizations. The dominance of evaluation research data using the method mentioned above shows that research is still based on an ex-post factor approach that is based on problems that have occurred and or events that have occurred. Meanwhile, validation research tends to be scientifically measurable. Therefore, it is not surprising to use a quantitative approach. In terms of processing the systematic mapping carried out in this study, there are limitations and obstacles, namely the search for journals that only comes from one database, namely the Scopus database, so it cannot cover all existing journal and conference databases. In addition, we only take several categories of articles from English that are included in international journals and conference papers.

V. CONCLUSION

Changes in the business environment, including rapid technological changes, require changes in the company to improve company performance in various aspects. From change, new skills can be learned to find new business opportunities as well as to train creativity.

This study maps the existing Business Process Reengineering literature by searching for articles from the scientific literature database. The main motivation of the mapped study is to provide an overview of the existing literature on Business Process Reengineering as a solution for organizational or company sustainability. Based on 40 research journals that have been systematically mapped and classified based on research methods with topics discussed regarding Business processes, Change Management, Performance, Enterprise Resource Planning, and Business Process Reengineering. Research is grouped into six types of research, namely: Validation research, evaluation research, solution research, Philosophical papers, and experience papers, as well as mapping trends in the country of origin of publications in the period 2014-2021. Although research on Business Process Reengineering has been done a lot, it seems that the development of technology and training still has its own problems. The focus of the limited number of research in the last three years is on organizational resilience to change.

According to the researchers in this study, there are many shortcomings in the research due to the limitations of the articles obtained. Recommendations from the Business Process Reengineering study with a focus on Business Process, Change Management, Performance, Enterprise Resource Planning, and Business Process Reengineering, can still be developed in further research. And it can be seen from the country of origin that publications are still limited, allowing for further research to develop in various countries so that the topic of Business Process Reengineering is increasingly developed.

REFERENCES


