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Business Process Re-Engineering: A Literature Review-Based Analysis of Implementation Measures

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Abstract: Business process re-engineering (BPR) is an approach to improving organizational performance. It evolved mostly within the private sector to maintain a successful business model despite increasing global competition. BPR presents a fundamental improvement in the essential organizational design. This paper investigates recent studies of BPR and identifies the success factors of BPR projects and their connection to the human–technology–organization (HTO) framework. By examining the relevant literature, we study various factors and their effects on the implementation of BPR and how these factors can affect process performance, successfully or otherwise. The aim is to study the literature to determine the success factors and challenges for BPR in the HTO framework. The article concludes by emphasizing the factors that will help to allow BPR to be implemented with a wider use in different sectors.

Keywords: business process reengineering; business process reengineering tools; business process re-engineering in HTO framework



Citation: Fetais, A.; Abdella, G.M.; Al-Khalifa, K.N.; Hamouda, A.M. Business Process Re-Engineering: A Literature Review-Based Analysis of Implementation Measures. *Information* **2022**, *13*, 185. <https://doi.org/10.3390/info13040185>

Academic Editors: Agnieszka Zakrzewska-Bielawska and Robert Stanisławski

Received: 24 February 2022

Accepted: 29 March 2022

Published: 5 April 2022

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1. Introduction

The sustainability of many business organizations depends on the adoption of new means that ensure the organization's survival when faced with increasing global or even local competition. This is often achieved by adopting business process re-engineering (BPR) as a proposed strategy to enhance the organization's success. This paper seeks to discover how the previous literature has described the success factors of BPR, in terms of the human–technology–organization (HTO) elements and what challenges BPR practitioners will face. An example of this could be the content analysis approach taken by Fasna et al. [1], where the authors analyzed the BPR implementation process used by organizations; they found that the lack of homogenous variables results in deficient organizational activities. Additionally, Tinaikar et al. [2] performed a content analysis on 248 articles about BPR and analyzed where the BPR constructions were redefined. Jurisch et al. [3] analyzed a collection of the literature and identified the success factors of the public and private sectors. BPR has been studied heavily by many researchers. It is an important tool to help improve the quality of services or products, cut costs, or compete effectively in an organization's domain. BPR is a significant tool for maintaining a continued competitive advantage and for ensuring efficiency in the private and public sectors. This paper introduces a collection of the relevant literature and reviews some of the research on the success factors of BPR.

2. Literature Review

BPR was first introduced to the American private sector by Hammer [4], who developed BPR as a tool for implementing major organizational changes with the view to successfully changing business processes for better productivity in the private sector in the United States. Starting in the 1990s, BPR came to challenge or mirror the concept of total quality management (TQM), a similar Japanese method. According to Hammer

et al. [5], the BPR approach thoroughly reshapes a business's practices to achieve better overall performance in terms of costs, quality of service, speed, and proficiency. Therefore, modifications to improve business productivity are necessary for a fast-changing global environment typified by intense competition and growing technological advancement. To achieve the best results, it is preferable for the management's agenda to adapt and plan according to these changes. Furthermore, BPR has also become an important tool for the public sector as it has been effectively utilized over recent decades; BPR has helped public organizations achieve more efficiency in the healthcare, education, and national economic project sectors.

BPR can potentially help practitioners meet their objectives [6,7] which might include an increase in effectiveness and efficiency and a reduction in overhead cost [8]. According to [9], BPR:

1. Involves a radical redesign of business processes;
2. Uses information technology to enable new business processes;
3. Attempts to achieve organizational-level strategic outcomes;
4. Tends to be inter-functional in its efforts.

The growing body of research in BPR has been recognized since it emerged as an academic field. Moreover, there has been a steady increase in the amount of research on BPR [10]. A reason for this stable interest is the high rate of failure of BPR implementation [11]. A second reason is that current research limitations encourage researchers to continue exploring this field. Despite the research done today, the field remains extremely broad, thus it is inevitable that the significance of BPR is only partially understood. It has been suggested that most BPR success factors have been extracted from the same pool, either a single source or a few articles [12,13]. Studies are performed on different elements and factors, which might not apply to all situations. For example, Ref. [14] found opposing results when investigating whether employee resistance is considered a failure factor or if it should be rejected.

A common theme that appears in the literature review is Information Technology (IT), which is seen as a key facilitator of effective organizational redesign through process engineering. Moreover, researchers consider IT to be an initiator of change [4]. Therefore, it can be said that IT and BPR have an interdependent relationship, where either one cannot be implemented in isolation. It is also evident that BPR is often incorrectly considered to be a tool for downsizing organizations. Therefore, various organizational development concepts and theories have been created that focus on business processes needed to redesign organizations, including re-engineering. Re-engineering allows organizations to identify their flaws and resolve them by emphasizing the core business processes [15].

3. Research Methodology

This BPR was first introduced to the American private sector by Hammer [4], who came up with BPR as a tool for implementation. In this paper, the systematic literature review is focused on publications extracted from the ProQuest database. The content analysis method is used to mine the data found in the literature and produce a conclusion. Other researchers have also applied content analysis to assess the main characteristics of BPR, for example, in healthcare [16], or to improve understanding of the integration of BPR and innovation by reviewing 49 articles [17].

To conduct a comprehensive review [18], this paper used the following approach. Firstly, the review was planned. A search of the literature was then performed, followed by a screening of the selected studies. The data was then mined and the relevant data connected. The database was searched using the following keywords: business process re-engineering and success factors. In the search, a total of 4950 articles was reviewed, which included the following:

- The success factors, key factors, critical success factors, and constructs of the success of BPR;

- The context of reviewed literature covered manufacturing and services, and private and public sectors;
- Published articles in scholarly journals from 2000 to date;
- English published papers.

In accordance with techniques used by [19,20], the methodology used in this work follows a streamlined and systematic process, outlined in Figure 1.

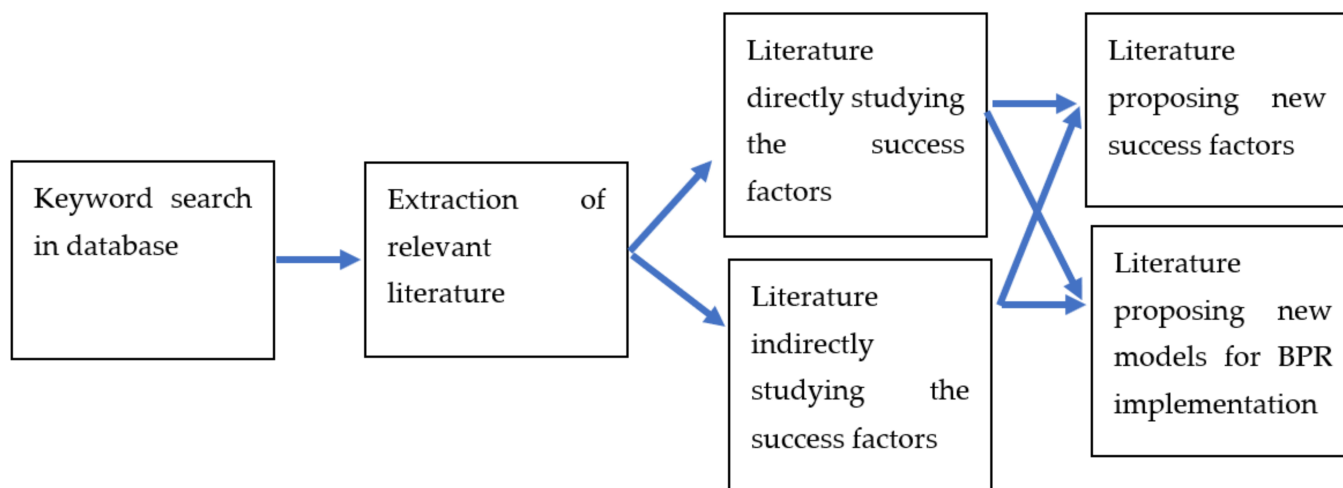


Figure 1. Methodology used for the literature review.

4. Discussion: BPR Success Factors

Hall et al. [21] defined three essential elements to run a successful BPR initiative:

1. Breadth: the reason for the initiative is to improve performance among different sections and departments;
2. Leadership: the degree of commitment among management;
3. Depth: the measurement of change in six essential elements in an organization: structure, individual/team responsibilities, incentives, IT, common values, and skills.

Mauil et al. [22], following on from the work of Hall [21], identified the key issues that underpin a BPR initiative:

1. Scope of changes;
2. Strategy;
3. Performance measure;
4. Human factor;
5. Business process architecture;
6. IT.

Moreover, a further six BPR factors have been described [23]:

1. Strategy;
2. Management commitment;
3. Information technology;
4. Customer focus;
5. Continuous improvement;
6. Performance outcome.

There are seven critical areas that must be practiced to achieve a successful BPR [24]:

1. Top management commitment;
2. Education and training;
3. Teamwork;
4. Project of BPR;
5. Employee cooperation;

6. Information technology support;
7. Levers and results.

Six domains have been recognized that might be problematic for BPR implementation [25]:

1. Management support;
2. Technological competence;
3. Process delineation;
4. Project planning;
5. Change management;
6. Project management.

Ref. [26] discussed the failure reasons of BPR from a different point of view. They stated that considering the tactical rather than strategic process is a failure. Ref. [27] mentioned other reasons for BPRs not meeting expectations, which include expecting too much too soon [5], not carrying a comprehensive cost–benefit analysis before deciding on BPR, a lack of expertise on redesigning a set of related activities [28], and missing internal communication between the IT department and other parts of the firm [29].

It has been recommended that businesses should make use of a cross-functional team at the organizational level to work on process designing [30]. This cross-functional team, considered to be a group of experts, are talents across the organization with different backgrounds, ranks, and lengths of stay [30]. The cross-functional team will guarantee a different point of view when discussing BPRs, thereby producing the most suitable process design [31]. Successful implementation of BPRs needs talents that can make decisions strategically or an owner of the process who has the full authority to take such decisions [32]. The author encourages hospital administrators and BPR project leaders to focus attention on the success factors in each project. The success factors are gathered under five groups:

1. The cross-functionality of the project team;
2. The process used by the project team to implement the BPR project;
3. The expertise available to the project team regarding the processes being redesigned/re-engineered;
4. The quality of the IT support extended to the project;
5. The project leadership and motivation for the project.

The extreme importance of cross-functional work in hospitals and the clarity of everyone's duties and tasks within every process has been highlighted [33]. When studying BPR projects in hospitals, the important factors affecting success have been studied [34]. The success of a BPR was defined as the extent to which, after being operational for at least one year. Nineteen success factors important for each BPR project phase were studied in this work, which covered the HTO aspects. The project phases were divided into inception, process definition, process redesign, and change implementation.

Other factors that can affect the result of BPRs are less reliant on implementation tools and rely more on the environment, management style, and structural aspects within the organization. According to [12], the incentive to implement a good BPR strategy needs to be based on the management's vision which could later become an actionable plan. The business environment supports change advocated for by the management that makes sure that employees are rewarded instead of distressing them when they are taking calculated risks.

Moreover, Ref. [35] investigated minimizing the risks of BPR implementation by looking at whether the organization is ready for BPR implementation or not and putting forward an assessment to measure readiness. This readiness will allow the organization to have a better understanding to assess whether BPR will be a success or a failure. The assessment looks at readiness indicators, which include six categories, which include five positive categories: egalitarian leadership, collaborative working environment, top

management commitment, supportive management, and use of IT. The final category is classified as a negative role, which is resistance to change.

Handoko [36] emphasized the importance of creating an innovative and empowering culture to improve employee performance. In addition, empirical research has demonstrated a group of findings that determine how important the culture is for enhancing organizational performance [37].

4.1. The Absence of Some HTO Elements

Throughout the literature review, it was noted that some studies did not take any consideration of IT at all. Ref. [38] introduced four requirements for a BPR project to succeed:

1. Consistency between the organization's business strategy and a clear understanding of its market, industry, customers, and rivalry;
2. Leadership's commitment to implementing new ways of running the business;
3. A business case that is founded on proven analytical approaches;
4. A capable team to take the new concept into implementation. The author neglected the IT factor in the success of projects.

Moreover, Ref. [39] identified six main constructs of BPR implementation in any organization:

1. Process changes;
2. Goals and objectives planned;
3. Goals and objectives accomplished;
4. Implementation problems;
5. Derived benefits;
6. Organization performance.

The reasons behind the manager's eagerness to accept business process re-engineering has also been investigated, with the observation of the probable essential factors that impact the aims of accepting a BPR [40]. What is interesting about this paper is that it was more focused on the factors that affect less developed countries, specifically Bahrain. The paper presented some structural factors including effective project management experiences and the ability to build an organizational-wide need for change, which are seen as fundamental for achieving significant support in an organization for a BPR. Additionally, the paper stated that the managers' cognitive style and level of education have important effects on a manager's intentions to adopt the BPR approach. The results also advise that additional factors such as competitive pressures and managers' beliefs about BPRs are important qualifications to make the implementation process more successful.

Indeed, IT is one of the most important complementary features of BPR because it has shown that it can effectively facilitate the success of process engineering in organizations. IT is essential to successful change. Moreover, it is an important enabler since it supports new or redesigned business engineering due to its fast and innovative implementation [41]. Correspondingly, ambitious practitioners are encouraged to use IT capabilities to implement BPRs [42]. However, process redesigning without implementing IT is likely to fail, so many companies have undertaken re-engineering efforts only to abandon them with little or no positive results. Table 1 introduces more studied papers that covered the success factors of BPR.

Table 1. BPR success factors in additional literature based on HTO elements.

Paper	Success Factors of BPR
Gideon Nkurunziza, John Munene, Joseph Ntayi, Will Kaberuka (2019) [43]	<ul style="list-style-type: none"> – Authors studied institutional adaptability, and leadership was found to be the main predictor of BPR success. – Results: A predictive model of 61 percent based on structural equation modeling for the selected variables. – Human and IT factors are missing as success factors.
A. ALBADVIy, A. KERAMATI and J. RAZMIz (2007) [44]	<ul style="list-style-type: none"> – The paper presents a tool to study the role of some dominant factors, including organizational infrastructure and BPR. – The paper gathered information from around 200 manufacturers in automobile industry through a survey. The exploratory effort showed that built measures validate important psychometric properties, such as validity and reliability, facilitating the role of BPRs on the relationship between the use of IT and organizational performance. – The defined criteria of different IT aspects: communications, operation and production, administration work, and taking decisions.
Noha Ahmed Bayomy; Khedr, Ayman E; Abd-Elmegid, Laila A (2021). [45]	<ul style="list-style-type: none"> – The paper identified BPR success as depending on four performance measures: process time, cycle time, quality, and resource cost. – The paper did not focus on the HTO elements.
Guimaraes, T., & Paranjape, K. (2013). [46]	<ul style="list-style-type: none"> – The paper tested BPR success factors in manufacturing projects through the five project phases: project inception, processes definition, processes redesign, change implementation, and project benefits. – All 19 factors cover the three HTO elements.
Asikhia, UO; Awolusi, DO (2015). [47]	<ul style="list-style-type: none"> – The paper proposed a model for the effect of BPR efforts on performance. – The model elements are management change, management competency, organizational structure, BPR planning and management, and IT infrastructure. – Non-human-related factors were studied.
Zuhaira, Behjat; Ahmad, Naveed (2021). [48]	<ul style="list-style-type: none"> – The paper identified IT among the core elements of business process management.
Sikdar, Arijit; Payyazhi, Jayashree (2014). [49]	<ul style="list-style-type: none"> – The paper provides a framework for managing organizational change in a structured manner during BPR implementation. – The model suggests the sequence of alignment of the 8-S dimensions: strategy, shared values, structure, systems, style, staff, strategic performance, resources.
Syed Ibrahim M, Hanif A, Jamal FQ, Ahsan A (2019). [50]	<ul style="list-style-type: none"> – The paper studied 13 critical success factors in the telecom sector needed for BPR projects. – IT was missed as a success factor.
Al-Anqoudi, Younis; Al-Hamdani, Abdullah; Al-Badawi, Mohamed; Hedjam, Rachid (2021). [51]	<ul style="list-style-type: none"> – The paper studied the success factors, methods, and tools of BPR projects. – The paper included all HTO elements but concluded that the human factor is dominant.
Park, Kwang O (2018). [52]	<ul style="list-style-type: none"> – The paper identified six constructs: depth of BPR, change management, adaption to change, IT practice, information management practice, and information behaviors and values.
Bang-Ning Hwang; Ta-ping Lu (2013). [53]	<ul style="list-style-type: none"> – The paper identified 15 factors via four dimensions: strategy, process, organization, and technology. – The paper studied e-based supply chain management projects.
Xiang, Junlian; Archer, Norm; Detlor, Brian (2014). [54]	<ul style="list-style-type: none"> – The paper generated a new research model for BPR projects. The model studied formative constructs based on socio-technical theory, including change management, process redesign, and information and communication technology infrastructure improvement.
Gharib Hashem (2020). [55]	<ul style="list-style-type: none"> – The paper investigated the success factors of BPRs in the Egyptian banking sector. – The studied factors are management commitment, IT infrastructure, people management, change readiness, centralization, and formalization.

Table 1. Cont.

Paper	Success Factors of BPR
Nkomo, Aphelele; Marnewick, Carl (2021). [56]	<ul style="list-style-type: none"> – The paper defined a framework to ensure the improvement of BPRs in financial institutions. – The framework was built on the following success factors: defining project expectation, proper gap analysis, change management, good communication, clear documentation, and leadership commitment.
Caccia-Bava, M. C., Guimaraes, V. C., & Guimaraes, T. (2013). [34]	<ul style="list-style-type: none"> – The paper studied the important factors affecting the success of a BPR. – BPR success was introduced as the extent to which, after being operational for at least one year. – Nineteen success factors important for each BPR project phase covered HTO aspects. The project phases were divided into inception, process definition, process redesign, and change implementation.
Brandon, Bransford & Guimaraes, Tor. (2016). [57]	<ul style="list-style-type: none"> – The paper studied 276 banks and identified factors of BPR success and studied the relationship between them during each project phase. – BPR project managers should increase the chances for success in each phase by ensuring that the corresponding success factors are in place. – The result of the paper can help the banks managers to increase the success rate of BPR projects by paying attention to the corresponding factors in each phase.

4.2. The Interaction between HTO Elements in BPR

Challenges associated with BPRs can sometimes be due to implementations that overlook the consequences that people working within the business face. When studying the human aspect effect, especially when implementation involves information technology (IT), it was found that resistance to change could be a particular issue [58]. Indeed, most of the challenges that face BPRs in the literature are known to be generally structural and human aspects, not technological. Therefore, it is essential to completely rationalize the human side of BPRs, according to [58], to apply and complete the BPR and make it work successfully. In this study, they suggested starting a particular group support system (GSS) to support the soft side of the BPR and minimize resistance to change during the course of IT implementation.

5. Conclusions

Research on BPR has been conducted since its development, resulting in new models, frameworks, definitions, and the development of a body of knowledge. However, many studies are still investigating the reasons for the success or failure of BPR implementation. This study aims to determine whether the success factors that have been identified in recent years are comprehensive. All researchers look at the organizational aspects as the main factors of BPR success. However, it was very rare when a paper missed the human aspect of the study. In addition, as seen from the extracted information, some researchers still do not see technology as the main factor in a BPR's success or failure. It is worth mentioning that the absence of IT as a factor in recent years became less prevalent since the time of the introduction of BPRs. Therefore, this paper also serves as a collection of the recent understanding of BPR success factors [59].

Author Contributions: Conceptualization, A.F., K.N.A.-K. and A.M.H.; methodology, A.F., G.M.A., and A.M.H.; formal analysis, A.F., G.M.A. and A.M.H.; investigation, A.F.; resources, A.M.H. and K.N.A.-K.; data curation, A.F. and G.M.A.; writing—original draft preparation, A.F., G.M.A. and A.M.H.; writing—review and editing, G.M.A., K.N.A.-K. and A.M.H.; supervision, A.M.H., K.N.A.-K. and G.M.A.; project administration, A.M.H. and K.N.A.-K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The Authors declare no conflict of interest.

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