

## **Key Success Factors in Implementing Business Process Re-Engineering (BPR) in Hospitals: Integrative Review**

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### **Abstract**

BPR is one of the most important ways for hospitals to make changes so that they can improve their efficiency and effectiveness. However, in practice, BPR in hospitals encountered many challenges and in the end did not achieve the expected results. Various studies have described the factors that lead to success or failure in the implementation of BPR projects so that the purpose of this study is to analyze the key factors that lead to success in implementing BPR in hospitals. This integrative review uses the Joanna Briggs Institute guidelines with primary research articles in English which are accessed through the PubMed, ScienceDirect, and Google Scholar databases for the last 10 years. The article search results obtained 311 articles and the remaining 10 articles were included in the study. The results of the study obtained nine key success factors in implementing BPR in hospitals, namely management commitment, employee empowerment, methods and tools, information technology, environment and culture, external organization, BPR projects, finance and strategy. These factors are only generally representative of various hospitals including public and private hospitals because there are many other factors that can affect the implementation of BPR depending on the type, characteristics, and heterogeneous hospital environment. It is hoped that this key factor will be a concern when the hospital wants to make changes through the BPR project and can assist the hospital in achieving results according to the organization's vision.

**Keywords:** Business Process Re-Engineering, Success Factors, BPR, Implementation, Hospital

### **Introduction**

Hospitals are one of the service industries with very complex and dynamic business processes, starting from the procurement system, data collection and distribution of medicines, involvement of clinical and administrative officers to the process of providing services to patients, which of course has the potential for significant optimization and efficiency improvements (Arinahaq & Achadi, 2019; Mmereki & Moruisi, 2013; Pujawan, 2007). Re-Engineering or re-engineering can assist the hospital in systematically overcoming work barriers that occur when the management strives to provide the highest satisfaction for internal and external customers of the hospital.

According to Hammer and Champy (1993), Business Process Re-engineering (BPR) is a fundamental rethinking and radical redesign of an organization's business processes that leads an organization to achieve dramatic improvements in its business performance both in terms of cost, time, service, and quality (Brennan et al., 2005; Elkhuizen et al., 2006; Grocott et al., 2017; Khodambashi, 2013; Patwardhan & Patwardhan, 2008; Sungau, 2013). BPR can be seen

as an operationally oriented process that is directly linked to products and customers, as well as; is actually a management-oriented process that is primarily based on organizational resources (Al-fawaer et al., 2019). BPR is a way for organizations to improve customer value proposition which consists of three variables, namely (1) product leadership (excellent product or speed), (2) operational excellence (low cost, high quality and excellent service), and (3) customer intimacy. (customization, long term and deep relationship) (Putra & Puspitorini, 2017).

A study in Egypt at six hospitals showed that there was a significant increase in the number of patient visits after the implementation of business process re-engineering, both recipients and service providers were satisfied after the implementation of BPR (Rateb et al., 2011). Several studies have shown that BPR is able to reduce service waiting times (Al Badi, 2018; Blouin-Delisle et al., 2018; Grocott et al., 2017) and able to improve the effectiveness of hospital information systems (Khodambashi, 2013; Ruffin, 2016). Research results by Helfert (2009) in Ireland stated that although process management in health care is very important, there are currently very few international guidelines available to introduce process management in hospitals. according to Kohlbacher (2010) It should be noted that business processes in health care are more difficult to manage and reform because they are limited to the service itself and often involve interactions with other groups and companies. This is supported by opinion Jamali et al. (2011) that BPR implementation is a difficult task.

Evidently several reports show that the failure rate of BPR implementation reaches 70% (Al-Mashari et al., 2001; Boudreau & Robey, 1996; O'Neill & Sohal, 1999; Rao et al., 2012). So that a deeper study is needed on the redesign process in health care, especially on how to choose the best operations management practices that are suitable for implementation (Sousa & Voss, 2008 in Feibert et al., 2019; Elkhuizen et al., 2006; Jamali et al., 2011). According to Caccia-Bava et al. (2013) further research is needed on the success factors of BPR and testing its application in hospitals. Research result Musa & Othman (2016) shows that research related to BPR in health services using the review method is still very low at only about 7%. The purpose of this study is to identify and conduct a mapping study of the key success factors of BPR so that hospitals can select and implement best practices in BPR implementation and be able to achieve success

## **Methods**

This study uses a review method with an integrative review research design. Researchers can use integrative review to answer a question by including various research methods and designs. The research guide used is JBI (Joanna Briggs Institute). The search for articles was carried out in two stages, namely through the Science Direct, Pubmed, and Google Scholar Advance databases, and secondly, tracing the reference list of the identified articles. The articles identified were in English which were published in the last 10 years from January 2011 to December 2020 and focused on the implementation of BPR in hospitals. The flow of literature selection will be presented in a chart according to PRISMA standards. Presentation of data from studies that have been included in the final results, will be extracted and then made in narrative form and presented in a data table consisting of: author, year of publication, research title, objectives, research design, population and research sample, country, and research results

## **Results and Discussion**

The search results of scientific articles in three databases obtained 934 articles (study selection flow in Figure 1). Then the articles were eliminated according to the year of publication from 2011-2020 and 311 scientific articles were obtained. The articles were then screened based on titles and abstracts that did not meet the criteria as well as duplicate articles in each database.

From the identification of publications, 37 duplicate articles were obtained and from 274 articles, 214 articles did not meet the criteria based on the title and abstract. The result is that there are 60 articles that were downloaded in full text to be analyzed according to the inclusion criteria. Finally, 9 articles were included in this integrative review study plus 1 article from the secondary search results through the reference list.

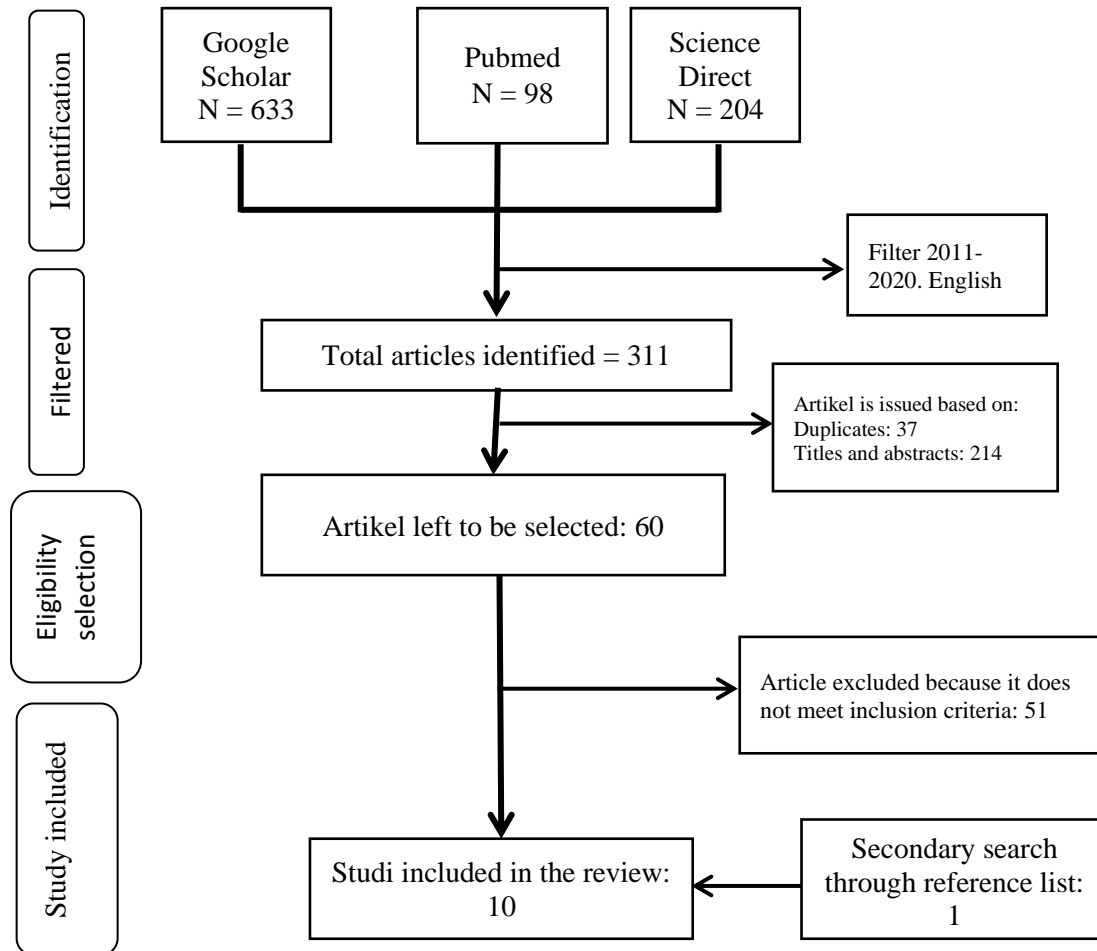


Figure 1. Study Search Algorithm

Articles are presented in a data table consisting of: author, year of publication, research title, research design and sample, data collection and analysis, quality, journal, research results, and grouping of BPR factors. In assessing the quality of the sources of research evidence included in this review study, it is carried out using a checklist of standard quality assessment criteria for evaluating primary research papers from a variety of fields.

Tabel 1. Article Description in the Study

No	Researcher (Year)	Title	Design and Samples	Data collection	Methods of analysis	quality	Journal
1	Putro, F. X. A. N. S., & Dachyar, M. (2020) Indonesia	Hospital Surgical Services Design Improvement Using Business Process Re-Engineering and Relational Database Approaches	Qualitative (designing scenario)	Literature study and observation and interviews.	The surgical service process is modeled and simulated with the iGrafx software. Then design some scenarios.	17/22	International Journal of Advanced Science and Technology

No	Researcher (Year)	Title	Design and Samples	Data collection	Methods of analysis	quality	Journal
2	Olajide, O. T., Lawal, O. R., & Alaka, S. N. (2019) Nigeria	Effects of Business Process Re-Engineering on Performance of Selected Hospitals in Lagos State	Quantitative Survey, 46 private hospital staff and 157 public hospital staff	Questionnaire	Correlation analysis with the help of SPSS.	21/22	Annals of the University of Craiova, Economic Sciences Series
3	Manyazewal, T., & Matlakala, M. C. (2018) Ethiopia	Implementing health care reform: implications for performance of public hospitals in central Ethiopia	Cross-sectional study, 476 health workers	Questionnaire	Statistical method (Non-parametric analysis)	20/22	Journal of Global Health
4	Musa, M. A. (2017) Nigeria	Critical Success Factor in Business Process Reengineering In Healthcare: An Exploratory Investigations	Quantitative, 520 respondents	Questionnaire	Statistical method (Exploratory factor analysis)	20/22	Journal of Multidisciplinary Engineering Science and Technology (JMEST)
5	Leggat, S. G., Gough, R., Bartram, T., Stanton, P., Bamber, G. J., Ballardie, R., & Sohal, A. (2016) Australia	Process Redesign for Time-Based Emergency Admission Targets: Staff Perceptions of The Impact on Quality of Care	Retrospective Qualitative case study, 26 respondents	Semi-structured interview	Conventional Thematic Content Analysis	19/22	Journal of Health Organization and Management
6	Manyazewal, T., Oosthuizen, M. J., & Matlakala, M. C. (2016) Ethiopia	Proposing Evidence-Based Strategies to Strengthen Implementation of Healthcare Reform in Resource-Limited Settings: A Summative Analysis	Descriptive and exploratory design, 406 health professionals and 10 senior health policy experts.	Questionnaire	Summative Analysis	19/22	BMJ Open
7	Leggat, S. G., Bartram, T., Stanton, P., Bamber, G. J., & Sohal, A. S. (2015) Australia	Have Process Redesign Methods, Such As Lean, Been Successful in Changing Care Delivery in Hospitals? A Systematic Review	Systematic review, 41 studies	Literature searches from the Cochrane Register, Medline, PubMed, and CINAHL and G. Scholar	No statistical analysis	17/22	Public Money & Management
8	Caccia-Bava, M. C., Guimaraes, V. C., & Guimaraes, T. (2013) USA	Important Factors for Success in Hospital BPR Project Phases	Cross-departmental process and change study, 192 Administrator RS	Questionnaire	Statistical Method (Factor analysis using Varimax rotation)	20/22	International journal of health care quality assurance
9	Khodambashi, S. (2013) Norway	Business Process Re-Engineering Application in Healthcare in A Relation to Health Information Systems	Literature review, 5 studies	Open literature search	No statistical analysis (Manual analysis)	17/22	Procedia Technology

No	Researcher (Year)	Title	Design and Samples	Data collection	Methods of analysis	quality	Journal
10	Mmerekhi, R. N., & Moruisi, K. G. (2013) Botswana	Challenges in Implementation of Business Process Re-Engineering in Botswana Public Hospitals.	Case studies, some employees	Interview	Alternative analytic techniques (based on experience and literature)	17/22	International Journal on Customer Relations

Table 2. Research Results

No	Researcher (Year)	Research Results	BPR Success Factor
1	Putro, F. X. A. N. S., & Dachyar, M. (2020)	This study provides six scenario options for hospital surgery services. Each scenario results in a different service time. The scenario consists of three classifications of solutions: parallel, information systems and RFID technology. The sixth scenario uses parallel, information systems and RFID technology solutions which is the most complete scenario.	<ol style="list-style-type: none"> <li>1. Financial</li> <li>2. Human Resources</li> </ol>
2	Olajide, O. T., Lawal, O. R., & Alaka, S. N. (2019).	There is a positive correlation between business process renovation and operational effectiveness, also the second hypothesis shows that there is a positive relationship between process automation and competitive advantage and finally, management support has a significant positive effect on service quality in hospitals in Lagos State, Nigeria.	<ol style="list-style-type: none"> <li>1. Top Management Commitment</li> <li>2. Business Process Renovation</li> <li>3. Process Automation</li> </ol>
3	Manyazewal, T., & Matlakala, M. C. (2018)	The main obstacles to reform are the work environment (adjusted odds ratio (aOR) = 2.27, 95% confidence interval (CI): 1.15-4.47), financial resources (aOR = 3.54, 95%CI = 1, 97-6.33), management (aOR = 2.27, 95% CI = 1.15-4.47), and information technology systems (aOR = 3.15, 95% CI = 1.57-6.32).	<ol style="list-style-type: none"> <li>1. Work environment</li> <li>2. Financial Resources</li> <li>3. Management</li> <li>4. Information Technology System</li> </ol>
4	Musa, M. A. (2017)	The results showed that the measurement of IT effectiveness at BPR (UIT4) which has the highest validity coefficient of 0.89 is the most critical indicator for BPR implementation.	<ol style="list-style-type: none"> <li>1. Use of Information Technology</li> <li>2. Selection of Methods and Tools</li> <li>3. Strategic Alignment</li> </ol>
5	Leggat, S. G., Gough, R., Bartram, T., Stanton, P., Bamber, G. J., Ballardie, R., & Sohal, A. (2016)	There are four important findings. First, when asked to comment on the impact of implementing the LSS, staff were not asked to talk about the quality of care. Second, there was little agreement among the participants as to whether the project had been successful. Third, despite the recognition of the need for coordinated efforts across hospitals to improve ED access, the redesign process did not succeed in reducing the gaps that existed between physicians and between managers and physicians. Fourth, staff expressed tension	<ol style="list-style-type: none"> <li>1. Management Support</li> <li>2. Staff Participation</li> <li>3. BPR process indicators</li> </ol>

No	Researcher (Year)	Research Results	BPR Success Factor
		between the process of moving patients more quickly and their duty to care for patients as individuals.	
6	Manyazewal, T., Oosthuizen, M. J., & Matlakala, M. C. (2016)	The health care reforms evaluated were able to restructure hospital departments into case teams, with the aim of adopting a 'one-stop shopping' approach. The most important predictors influencing the implementation of reforms are financial resources, top management commitment and support, collaborative work environment and information technology (IT).	<ol style="list-style-type: none"> <li>1. Financial Resources</li> <li>2. Top Management Commitment and Support</li> <li>3. Collaborative Work Environment</li> <li>4. Information Technology</li> </ol>
7	Leggat, S. G., Bartram, T., Stanton, P., Bamber, G. J., & Sohal, A. S. (2015).	Success factors for the change include mechanisms to facilitate participation throughout the process, clearly documented protocols and expectations for health workers supported by education, mechanisms to audit and provide feedback on behavior and performance. The success of the process redesign methodology was found to be highly dependent on these performance-based human resource management (HR) practices.	<ol style="list-style-type: none"> <li>1. Health Professional Participation</li> <li>2. Health Worker Education</li> <li>3. Audit Mechanism</li> <li>4. Behavioral and Performance Feedback</li> </ol>
8	Caccia-Bava, M. C., Guimaraes, V. C., & Guimaraes, T. (2013)	The items identified in the literature as critical to BPR success fall into five separate groups that address: project team cohesiveness; the process used by the project team to implement BPR; the expertise available to the project team regarding the process being redesigned/reengineered; IT support extended to the project; and project leadership and motivation.	<ol style="list-style-type: none"> <li>1. BPR Project Team Cohesiveness</li> <li>2. BPR implementation process</li> <li>3. BPR Project Team Expertise</li> <li>4. Information Technology Support</li> <li>5. BPR Project Leadership and Motivation</li> </ol>
9	Khodambashi, S. (2013)	User involvement is an important aspect in the implementation of BPR. The participation of operational staff is important because they know the process best and it would be better if they were given ownership of the BPR. In BPR, it is important for software specialists and analysts or development teams to communicate effectively and work closely together as they have their own perspective, vocabulary and methods on the process. User training, management commitment, clear concrete objectives and sponsorship for BPR projects are important determinants of successful BPR implementation. The implementation of BPR before the implementation of the Health Information System (SIK) or even after	<ol style="list-style-type: none"> <li>1. Staff Engagement</li> <li>2. Effective Communication between BPR Staff and Consultants</li> <li>3. Cooperation between BPR Staff and Consultants</li> <li>4. Staff Training</li> <li>5. Management Commitment</li> <li>6. Clear Goal</li> <li>7. Sponsor for BPR Project</li> </ol>

No	Researcher (Year)	Research Results	BPR Success Factor
		implementation can help increase the effectiveness of the SIK.	8. Health Information System Implementation
10	Mmerek, R. N., & Moruisi, K. G. (2013)	The identified failure factors include organizational resistance, lack of organizational readiness to change, lack of training and education, problems related to commitment and leadership support, problems related to continuity, problems related to integration mechanisms, job definition and allocation of responsibilities, problems related to BPR resources, ineffective use of consultants, and improper integration of information systems.	<ol style="list-style-type: none"> <li>1. Organizational Readiness and Willingness</li> <li>2. Creating an Organizational Culture that is willing to Change</li> <li>3. Training and Education</li> <li>4. Commitment and Leadership</li> <li>5. Continuity</li> <li>6. Integration Mechanisms, Job Definitions, and Allocation of Responsibilities</li> <li>7. BPR Resources</li> <li>8. BPR Consultant</li> <li>9. Information System Integration</li> </ol>

Table 3. Mapping Study Results Based on Research Concept Framework

Key Factor Groups	factor	Research (Citasi)
Management Commitment	Top Management Commitment	[2], [3], [5], [6], [8], [9], and [10]
	Management Support	
	Organization Readiness and Willingness	
Employee Empowerment	Human Resources	[1], [5], [7], [8], [9], and [10].
	Staff Participation	
	Health Care Education	
	Bpr Project Team Cohesion	
	BPR Project Team Expertise	
	Staff Training	
Methods and Tools	Integration Mechanisms, Job Definitions, and Allocation of Responsibilities	[4]
	Selection of Methods and Tools	
Information Technology	Information Technology Support	[3], [4], [6], [8], [9], and [10].

Key Factor Groups	factor	Research (Citasi)
	Implementation of Health Information System	
	Information System Integration	
Environment and Culture	Collaborative Work Environment	[3], [6], [7], and [10].
	Behavior and Performance Feedback	
	Creating a Culture of Organization that wants to Change	
External Organization	Communication and collaboration between BPR Staff and Consultants	[9]
BPR Project	Business Process Renovation	[2], [5], [8], [9], and [10].
	Automation Process	
	BPR Process Indicators	
	BPR Implementation Process	
	Sponsorship for BPR Project	
	Continuity	
	BPR Resources	
BPR Consultant		
Financial	Financial Resources	[1], [3], and [6].
strategy	Strategy Synchronization	[4] and [9]
	Clear Purpose	

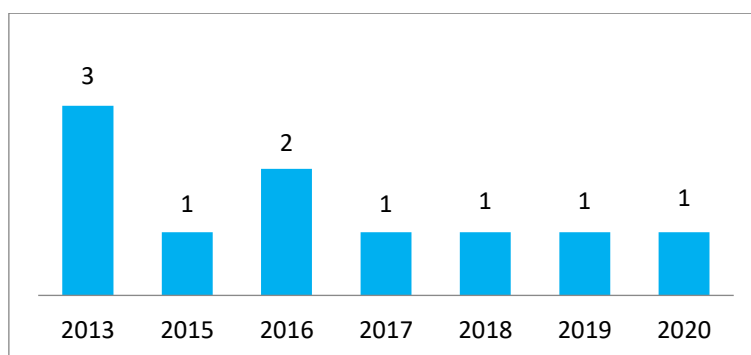


Figure 2. Articles by Year of Publication

Of the 10 articles analyzed in this study, the articles published in 2013 were the most with three articles. This means that there is still a lack of research articles related to the success factors of BPR in hospitals that have been published recently. The most articles were from Nigeria, Ethiopia, and Australia, which were two articles each (Figure 3) and the articles that conducted research on public hospitals were the most with five articles (Figure 4).



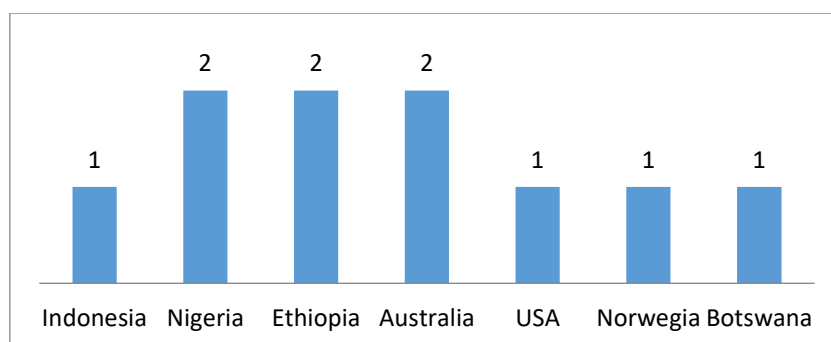


Figure 3. Articles by Country

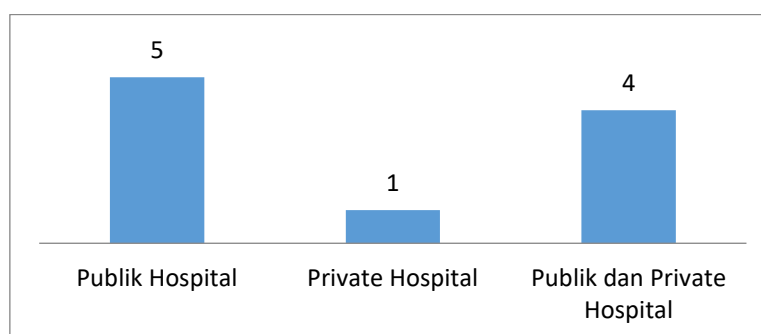


Figure 4. Articles by Hospital Type

In general, the main cause of failure of BPR implementation in public and private organizations is the lack of leadership involvement (Dennis et al., 2003). In terms of management commitment, hospitals can build efficient and accountable leadership and governance, provide stakeholders with a common understanding of BPR reform, and commit to continuous improvement in implementing BPR projects (Caccia-Bava et al., 2013; G. Leggat et al., 2016; Manyazewal et al., 2016; Manyazewal & Matlakala, 2018). Providing understanding is very important for hospitals to do because with the same understanding regarding BPR, it will be the starting point for setting the same targets and objectives and project execution will be more focused. According to Hammer and Stanton (1995) that organizational leaders who try to implement process improvement and reengineering efforts fail not because of employee resistance to change but because of how leaders manage and handle change and support or not support change efforts (Dell 'aquila, 2017). People and their behavior can influence the successful design and implementation of a process, redesign or BPR initiative (Xiang et al., 2014).

Other success factors in terms of employee empowerment are improving the performance of the BPR team in terms of process expertise, appointing and empowering a champion as a project manager, and involving supervisors in the reengineered department to work with the champion (Caccia-Bava et al., 2013; Leggat et al., 2015; Mmereki & Moruisi, 2013). Employee skills can be improved through adequate training and education. according to Kruger (2017) the role of a champion is very important in ensuring the success of a BPR project. Champion who will be responsible for helping stakeholders (in this case people affected by process changes) to understand the project and advise them on the expected results. Then choosing a champion or project manager will also make it easier to control the BPR project because it is the champion who will be directly responsible to the leadership regarding the project changes made.

In terms of information technology (IT), the hospital can work closely with the IT department, maximize innovation and use of health technology, information systems must be integrated during the BPR program so that there is no duplication of activities, the effectiveness of information technology is adequately measured, ensuring that the information technology infrastructure is aligned with BPR strategy (Caccia-Bava et al., 2013; Manyazewal et al., 2016; Musa, 2017). According to Chen (2001) BPR is known by many names, including core process redesign, new industrial engineering and working smarter. They all imply the same concept that focuses on integrating business process redesign and using IT to support reengineering work. Therefore, it is very important for hospitals to ensure the integration of information technology during the BPR project.

A hospital that will make changes and run a BPR project must pay attention to how its environment and culture accept it (Leggat et al., 2015; Manyazewal et al., 2016; Manyazewal & Matlakala, 2018; Mmereki & Moruisi, 2013). One of the things that hospitals can do is foster a healthy and respectful work environment and build a culture to want to change to be more advanced. The business-as-usual process culture needs to be overcome if the success of the BPR project is to be guaranteed, as the old culture has proven to be inadequate. Without cultural change, the breakthrough changes required for a successful BPR project would never occur. Cultural change is the single most significant dynamic affecting the achievement of BPR project objectives (Kruger, 2017). If the culture remains unchanged, employees will return to their previous business processes.

In addition to the internal environment, one of the factors that the hospital focuses on is the hospital's external environment. Hospitals should focus on market demands and involve some outside people even customers if possible who know the full process (Khodambashi, 2013; Musa, 2017). According to Dennis et al. (2003) it is important to ensure horizontal participation in BPR projects (ie, actively involve the "customers" and "suppliers" of the process, both external and internal), as they will be affected by change. In addition, hospitals must also understand the service areas that still often lead to patient dissatisfaction such as lack of medicines and supplies, poor information provision, long waiting times, poor hygiene, lack of privacy and inadequate visiting hours so it is necessary to plan for delivery. better service through process redesign (Assefa et al., 2011).

BPR projects are known as high-cost and high-risk activities, including in the hospital industry. Study by Manyazewal et al. (2016) identified limited financial resources and a poor health financing system as the main factors influencing the implementation of health reform. Adequate financial conditions will certainly make it easier for hospitals to make business process changes. So from a financial perspective, hospitals should secure resources for BPRs and make efficient use of hospital financing (Manyazewal et al., 2016; Mmereki & Moruisi, 2013) especially for public hospitals which in general always experience limitations in terms of funding sources and have inefficient service processes.

The implementation of BPR projects in hospitals is indeed quite complicated and not easy to carry out. Hospitals must select professionals in the field of BPR in carrying out their practice, appoint a BPR team, train them and then make the team a benchmark with other public sector organizations, not reengineer several processes at once, choose BPR projects that have strategic importance, mapping program results Regular BPR (Caccia-Bava et al., 2013; Leggat et al., 2015; Manyazewal & Matlakala, 2018; Mmereki & Moruisi, 2013; Musa, 2017). The BPR process should also be carried out in stages and not all at once because each process requires maximum attention and implementation. Likewise, with methods and tools, hospitals should choose the best methods and tools that can distinguish productive activities from non-value-added activities. and simulate tradeoffs between the dimensions of time, cost, quality and

flexibility, because an increase in one factor can adversely affect the other (Khodambashi, 2013; Musa, 2017). For example, this tradeoff simulation can evaluate the cost or time for a redesigned process (Jensen-Vullers & Reijers, 2005).

## Conclusion

Based on the results of the research above, the key success factors in implementing Business Process Re-Engineering (BPR) in hospitals are management commitment, employee empowerment, methods and tools, information technology, environment and culture, external organization, BPR projects, finance and strategy. These factors are only general of the many other factors that can affect the implementation of BPR in hospitals because hospitals are heterogeneous and of course influenced by various different factors.

## References

- Al-fawaeer, M., Ridha, M. B., & Yousif, A. S. H. (2019). An investigation into The Relationship between Business Processes Re-engineering ( BPR ) and Employees ' Performance : An Empirical Study at The Jordanian Public Shareholding companies. *Review of Applied Socio-Economic Research*, 17(1), 5–17.
- Al-Mashari, M., Irani, Z., & Zairi, M. (2001). Business Process Reengineering: A Survey of International Experience. *Business Process Management Journal*, 7(5), 437–455. <https://doi.org/10.1108/14637150110406812>
- Al Badi, K. (2018). Discrete Event Simulation and Pharmacy Process Re-engineering. *International Journal of Health Care Quality Assurance*, 32(2), 398–411. <https://doi.org/doi.org/10.1108/IJHCQA-05-2018-0105>
- Arinahaq, A., & Achadi, A. (2019). Factors Associated with Business Process in Hospital: A Systematic Review. In *6th International Conference on Public Health 2019*, 270–278. <https://doi.org/10.26911/the6thicph.04.30>
- Assefa, F., Mosse, A., & H/Michael, Y. (2011). Assessment of Clients' Satisfaction with Health Service Deliveries at Jimma University Specialized Hospital. *Ethiopian Journal of Health Sciences*, 21(2), 101–109. <https://doi.org/10.4314/ejhs.v21i2.69050>
- Blouin-Delisle, C. H., Drolet, R., Gagnon, S., Turcotte, S., Boutet, S., Coulombe, M., & Daneau, E. (2018). Improving Flow in The OR: How Lean Process Studies Can Lead to Shorter Stays in The Recovery Ward. *International Journal of Health Care Quality Assurance*, 31(2), 150–161. <https://doi.org/https://doi.org/10.1108/IJHCQA-01-2017-0014>
- Boudreau, M. C., & Robey, D. (1996). Coping with Contradictions in Business Process Re-engineering. *Information Technology & People*, 9(4), 40–57. <https://doi.org/10.1108/09593849610153421>
- Brennan, A., Sampson, F., Deverill, M., & Court, R. (2005). Can We Use Routine Data to Evaluate Organizational Change ? Lessons From The Evaluation of Business Process Re-engineering in a UK Teaching Hospital. *Health Services Management Research*, 18(4), 265–276. <https://doi.org/doi.org/10.1258/095148405774518651>
- Caccia-Bava, M. C., Guimaraes, V. C. K., & Guimaraes, T. (2013). Important Factors for Success in Hospital BPR Project Phases. *International Journal of Health Care Quality Assurance*, 26(8), 729–745. <https://doi.org/10.1108/IJHCQA-01-2012-0007>
- Chen, Y.-C. (2001). *Empirical Modelling for Participative Business Process Reengineering*. University of Warwick, United Kingdom.

- Dell 'aquila, M. E. (2017). *Factors Contributing to Business Process Reengineering Implementation Success*.  
<https://search.proquest.com/dissertations/docview/1867020905/60CCB10BA7EE47AEPQ/35?accountid=28547>
- Dennis, A. R., Carte, T. A., & Kelly, G. G. (2003). Breaking The Rules: Success and Failure in Groupware-supported Business Process Reengineering. *Decision Support Systems*, 36(1), 31–47. [https://doi.org/10.1016/S0167-9236\(02\)00132-X](https://doi.org/10.1016/S0167-9236(02)00132-X)
- Elkhuizen, S. G., Limburg, M., & Klazinga, N. S. (2006). Evidence-Based Re-engineering : Re-engineering The Evidence. *International Journal of Health Care Quality Assurance*, 477–499. <https://doi.org/10.1108/09526860610686980>
- Feibert, D. C., Andersen, B., & Jacobsen, P. (2019). Total Quality Management & Business Excellence Benchmarking Healthcare Logistics Processes – A Comparative Case Study of Danish and US hospitals. *Total Quality Management & Business Excellence*, 30(1–2), 108–134. <https://doi.org/10.1080/14783363.2017.1299570>
- G. Leggat, S., Gough, R., Bartram, T., Stanton, P., Bamber, G. J., Ballardie, R., & Sohal, A. (2016). Process Redesign for Time-Based Emergency Admission Targets: Staff Perceptions of The Impact on Quality of Care. *Journal of Health, Organisation and Management*, 30(6), 939–949. <https://doi.org/10.1108/JHOM-08-2015-0114>
- Grocott, M. P. W., Plumb, J. O. M., Edwards, M., Fecher-jones, I., & Levett, D. Z. H. (2017). Re-designing The Pathway to Surgery : Better Care and Added Value. *Perioperative Medicine*, 6(1), 1–7. <https://doi.org/10.1186/s13741-017-0065-4>
- Helfert, M. (2009). Challenges of Business Processes Management in Healthcare Experience in the Irish healthcare sector. *Business Process Management Journal*, 15(6), 937–952. <https://doi.org/10.1108/14637150911003793>
- Jamali, G., Abbaszadeh, M. A., Ebrahimi, M., & Maleki, T. (2011). Business Process Reengineering Implementation: Developing a Causal Model of Critical Success Factors. *International Journal of E-Education, e-Business, e-Management and e-Learning*, 1(5), 354–359.
- Jensen-Vullers, M. H., & Reijers, H. A. (2005). Business Process Redesign at A Mental Healthcare Institute: A Coloured Petri Net Approach. *Proceedings of the Sixth Workshop and Tutorial on Practical Use of Coloured Petri Nets and the CPN Tools (PB-576)*, 21–38. <https://doi.org/10.7146/dpb.v38i590.7187>
- Khodambashi, S. (2013). Business Process Re-engineering Application in Healthcare in a Relation to Business Process Re-Engineering Application in Healthcare in a relation to Health Information Systems. *Procedia Technology*, 9, 949–957. <https://doi.org/10.1016/j.protcy.2013.12.106>
- Kohlbacher, M. (2010). The Effects of Process Orientation : a Literature Review. *Business Process Management Journal*, 16(1), 135–152. <https://doi.org/10.1108/14637151011017985>
- Kruger, D. (2017). Application of Business Process Reengineering as a Process Improvement Tool : A Case Study. *Proceedings of PICMET '17: Technology Management for Interconnected World*.
- Leggat, S. G., Bartram, T., Stanton, P., Bamber, G. J., & Sohal, A. S. (2015). Have process redesign methods, such as Lean, been successful in changing care delivery in hospitals? A systematic review. *Public Money and Management*, 35(2), 161–168.

<https://doi.org/10.1080/09540962.2015.1007714>

- Manyazewal, T., & Matlakala, M. C. (2018). Implementing health care reform: Implications for performance of public hospitals in central Ethiopia. *Journal of Global Health*, 8(1). <https://doi.org/10.7189/jogh.08.010403>
- Manyazewal, T., Oosthuizen, M. J., & Matlakala, M. C. (2016). Proposing evidence-based strategies to strengthen implementation of healthcare reform in resource-limited settings: a summative analysis. *BMJ Open*, 6(9), e012582. <https://doi.org/10.1136/bmjopen-2016-012582>
- Mmerekki, R. N., & Moruisi, K. G. (2013). Challenges in Implementation of Business Process Re-Engineering in Botswana Public Hospitals. *International Journal on Customer Relations*, 1(1), 31–37.
- Musa, M. A. (2017). Critical Success Factor in Business Process Reengineering In Healthcare : An Exploratory Investigations. *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, 4(7), 7597–7605.
- Musa, M. A., & Othman, M. S. (2016). Business Process Reengineering in Healthcare : Literature Review on the Methodologies and Approaches. *Review of European Studies*, 8(1), 20–34. <https://doi.org/10.5539/res.v8n1p20>
- O'Neill, P., & Sohal, A. S. (1999). Business Process Reengineering a Review of Recent Literature. *Technovation*, 19(9), 571–581. [https://doi.org/doi.org/10.1016/S0166-4972\(99\)00059-0](https://doi.org/doi.org/10.1016/S0166-4972(99)00059-0)
- Patwardhan, A., & Patwardhan, D. (2008). Business Process Re-engineering – Saviour or Just Another Fad ? One UK Health Care Perspective. *International Journal of Health Care Quality Assurance*, 21(3), 289–296. <https://doi.org/10.1108/09526860810868229>
- Pujawan, I. N. (2007). *Aplikasi Lean Thinking Pada Instalasi Rawat Inap Rumah Sakit Semen Gresik*.
- Putra, C. A., & Puspitorini, S. P. (2017). Pemodelan Business Process Reengineering IKM Batik Menggunakan Value Chain Untuk Meningkatkan Locational Advantage. *Majalahhit Techno*, 6(2), 1–8.
- Rao, L., Mansingh, G., & Osei-Bryson, K. M. (2012). Building Ontology Based Knowledge Maps to Assist Business Process Re-engineering. *Decision Support Systems*, 52(3), 577–589. <https://doi.org/10.1016/j.dss.2011.10.014>
- Rateb, S. A. H., El Nouman, A. A. R., Rateb, M. A. H., Asar, M. N., El Amin, A. M., Gad, S. abdel A., & Mohamed, M. S. E. (2011). Re-engineering Pre-employment Check-up Systems: A Model for Improving Health Services. *International Journal of Health Care Quality Assurance*, 24(6), 484–497. <https://doi.org/10.1108/09526861111150734>
- Ruffin, T. R. (2016). Quantitative Analysis of Business Process Reengineering Deployment in Health Information Technology. *Advanced Health Care Technologies*, 2, 31–42. <https://doi.org/10.2147/ahct.s101946>
- Sungau, J. (2013). Business Process Re-engineering: The Technique to Improve Delivering Speed of Service Industry in Tanzania. *Independent Journal of Management & Production*, 4(1), 208–227. <https://doi.org/10.14807/ijmp.v4i1.68>
- Xiang, J., Archer, N., & Detlor, B. (2014). Business process redesign project success: The role of socio-technical theory. *Business Process Management Journal*, 20(5), 773–792.