Business Process Reengineering in Healthcare: Literature Review on the Methodologies and Approaches

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Abstract

As global spending on healthcare increases and service improvement is not adequately reflecting on resource consumption, many healthcare organizations therefore resolve to improving their services by implementing Business process reengineering (BPR). BPR is a business strategy adopted by so many healthcare organizations in order to efficiently and successfully manage their business using currently available technology. BPR has been a hot topic in Information Systems discipline and extensive research has been carried out in different settings with numerous methodologies and approaches. As a result of ever changing nature of BPR this paper intend to provide additional knowledge exploring the current level of development of BPR in healthcare. To achieve this, a total of 27 articles from Science Direct database, 15 from IEEE explore, 16 from Taylor & Francis, 25 from SpringerLink and 8 from SAGE Hub database covering the period from 2005 to early 2014 were analyzed based on their setting and methodology. And finally the article concludes with suggestions for future research related to BPR in healthcare.

Keywords: business process, reengineering, healthcare, literature review, methodology

1. Introduction

The penetration of IT into healthcare organization has been rapidly increasing as a result of current technological advancement. So many healthcare organization has adopted IT in their core organizational process and thereby becoming integral component in performing daily activities. Healthcare institutes has since realised the value of IT and the role it can play in enhancing the total efficiency and quality of service of their business process through Business Process Reengineering (BPR). Apart from assisting healthcare organization to effectively and continuously improve on their business process, BPR also take care of the monitoring of new technological advancement that can be integrated for efficient business process development (Becker & Janiesch, 2008).

Healthcare organization are therefore continuously redefine their business process by means of IT, which satisfactorily place IT to act as enabler for BPR (Netjes et al., 2010). There are evidence from empirical studies pointing out that there are strong relationship between business process and success of that organization (Guha & Kettinger, 1993). As a result of this positive relationship the concept of BPR become more and more popular among healthcare organization. Against this background, we aim to review the series of literatures on BPR which has been published between 200-2014 in order to explore the knowledge on the current development on the area of BPR so as to provide us with future research directions. Furthermore, to the best of our knowledge there was no BPR review in healthcare previously published especially dealing within science direct database which is one of the largest, and widely recognized database in Technology, business and social science.

The finding of this review will pay more emphasize on the current development of BPR in healthcare and its application, approach and methodologies which at the end will contribute toward future research for both academics and practitioners. This is intended to be achieved by answering the following questions:

1) What is the current development level on BPR in healthcare within Science Direct database, IEEE explore, SpringerLink, Taylor & Francis, and SAGE hub?

2) What is the potential future research in BPR in healthcare for both practitioners and academicians?

The outlines of this paper goes as follows. The next section provides some background overview on the concept of BPR and the need for the concept, follows by the methodology that has been followed in this work that leads

to answering the research questions. This is follows by classification of the finding, with results and discussion. And lastly, this paper concludes with concluding remarks and provides future research directions.

1.1 BPR-Definition

Many authors comes out with the definition of changes applied to organization in order to improve efficiency and save cost, a typical definition of BPR by (Davenport & Short, 1990) is that BPR is a way of analyzing the workflow and process both internal and external to the organization. While (Hammer & Champ, 1993) suggested that BPR is about fundamental rethinking and radical redesign in order to achieve surprising improvement in important measures of performance like cost, quality and services. More examples of definitions of BPR is shown in table 1 bellow.

Table 1. Definitions of business process reengineering

	Definitions	References
	"Rethinking about business process and process improvement in terms of capabilities of information technology"	[4]
BPR	"the redesign of business processes to dramatically improve performance in terms of cost, quality, service, and speed"	[5]
	Rethinking, restructuring, and streamlines of business structures, process, methods of working, management systems and external relationship through which value is created and delivered"	[3]
	"Concurrent redesign of process, organization and their supporting information systems to achieve radical improvement in time, cost, quality and customers` regard for the company products and services"	[6]
	"top-down, process-driven approach managed by senior executives, which aims to improve the performance by radical changes in the system over the short term"	[7]
	Structured approach toward analyzing and improving major activities like manufacturing, marketing, communication and other major element of the company`s operations	[8]
	A radical redesign of process in order to gain significant impact in cost, quality and services	[9]
	A methods of changing internal business process in respond to external change requirement	[10]
	A computer based approaches to manage a supply change information flows	[11]
	Information systems development in order to automate the existing human based process.	[12]

From the above table 1 we have seen that the concept of BPR is rapidly changing from the idea of just process perspective to technological perspective in the process. BPR is a very old technique for reengineering organizational business process which primarily defend on the management`s wisdom, common sense and creative thinking. From the above definitions especially the one by Hammer and Champy is suggesting that the idea of BPR is to be entirely scrapping the existing business process and building new process from scratch using information technology as enabler. As most of the definitions above are suggesting using BPR for dramatic change in cost, quality and services, in practice organizations are still facing challenges in actualizing this dreams of improving business process. This is practically as a result of ever changing technology and external environment demands. As a result organizations has to further strive to stay relevant in the ever dynamic market forces and improve the quality of services they are currently providing (Tehraninasr & Darani, 2009). The traditional way of doing business are no longer having any competitive advantage and hence organization has to has to constantly update their business process based on what is obtainable in trending business environment.

Competition, customers and market changes have made so many organizations desperate to achieve excessive demand from customers by increasing productivity and service quality with short turnaround (Miao, 2010).

In order to meet these challenges, organizations has to look into aligning business with relevant IT techniques and also look into the core business process to meet the ever changing need of the environment. The idea behind BPR is just to redesign business process in such a way that it will help in developing business values for that organization, as IT is use as a tools for automating such business process (Miao, 2010).

A lot or organizations have already ventures into BPR programmes, for the purpose of redesigning their business process in order to compete favorably with the market forces. Healthcare in one hand is a service industry in recent times has also join the counterpart manufacturing industry and subsequently venture into BPR even though it is not 100% profit oriented organization. The following section will explain why the healthcare sector need to reengineers their business process as well.

1.2 Why Business Process Reengineering in Healthcare?

Healthcare organizations are currently facing several challenges such as providing services efficiently, achieving strategic and operational success, and improving their business processes. They are forced to make these improvements not only to compete and prosper, but also to merely survive strong external forces, such as technological breakthroughs, rapidly evolving customer needs, globalization trends and political or economic factors (Kotter, 1996).

Consequently, healthcare organization have to improve treatments, eliminate non value-added tasks, reduce waiting time and expenses, treat more patients, and implement new technological services (Christensen, Clayton, Grossman, & Hwang, 2009).

This situation is even worse when there is data indicating that cost and quality are not correlated, because some lower cost healthcare systems produce higher quality care, there are still long lines for specialty services and technologically advanced care, and some estimates indicate that a staggering 50% of healthcare consumed seems to be driven by physician and hospital supply, not patient need or demand (Christensen, Clayton, Grossman, & Hwang, 2009; Kaplan & Porter, 2011).

A frightening factor is that its expenditure accounts for 10% of the Gross Domestic Product (GDP) in developing countries, and there is an increasing trend. Other than that, there is data indicating that service cost and quality are not correlated by showing inefficiency in resource consumption, which is not reflected in improved quality of care. Consequently, quality of life may be affected because of a knock-on effect on the economy, increase in tax rates and insurance contributions, disinvestment in other public services, and increased difficulties to afford healthcare (Walshe & Smith, 2010; Kaplan & Porter, 2011).

Although the problem is identified as the need for healthcare organization to redesign its business process but still some authors argue that there is no single way for solving this issue and therefore is defend on types or organization in question (Dietz, Jan, & Hoogervorst, 2007).

One way of achieving a dramatic change in the business environment that will improve the total efficiency is Business Process Reengineering (BPR). The term BPR is defined as fundamental redesign of organizational process to provide radical improvement in very important areas like cost, quality, service and speed (Ozcelik, 2010). The BPR has been implemented in variety of organization both services industry like healthcare and manufacturing industries (Becker & Janiesch, 2008). Healthcare organization being one of the extremely complex sectors, there is always an increasing number of professions, therapies, specializations and equipments and often there are many services units' resolves around so many deferent organizations (Musa, Othman, & AL-rahimi, 2013).

Just like other sectors, healthcare in recent years has been focused on tools that can effectively managed organization like BPR, total quality management (TQM) and activity based management. But some of these tools when applied to healthcare domain often gives contradictory result. This fact is backed by an imperial study carry out by (Lim, Tang, & Jackson, 1999) who found out that 80% of the total hospital available in Singapore has once adopted some aspect of business process improvement technique like quality management aims at improving general customer relationship management in the hospital. And another study conducted by the same author in 2000 concerning the quality of service expected by those customer found out that majority of the customers in Singapore hospital are not satisfied with the quality of service.

BPR was known historically with a lot of promises and expectation for huge improvement in business process (Guha & Kettinger, 1993). But notwithstanding, there are so many issues and problems associated with the programme implementation scenario. And therefore in the early history of BPR so many firm has benefited a lot

from it.

Despite these records of BPR failures, healthcare organizations still continue to embark on the programme, as they had no choice since the need for business process improvement is closely related to their organizational survival. In line with this so many hospitals has attempt to improve their business process in many way (Davenpor & Short, 1990).

A research conducted in Malaysia by (Musa, Othman, & AL-rahimi, 2013) also suggested that the failure in BPR was normally as a result of lack of understanding the organizational structure before reengineering including using ontology knowledge map.

Bedner (1993) stated that more that 40% of the hospital that are involve in Joint Accreditation on Healthcare Organization (JAHO) has undertaken one programme or the other related to healthcare improvement programmes. On the other hand, different survey concluded that majority of those hospitals are more or less unsatisfactory with the programme (Ozcelik, 2010).

Crowe, Rathi, and Rolfes (1997), after studying five US electronics firms, argued that choosing the right BPR project reduces the risk of failure. Two-thirds of BPR projects fail due to lack of poor planning. One of the problems why the BPR was not usually successful in healthcare is that the team may not have the theoretical and practical experiences on how to carry out the BPR programme.

Not all BPR techniques are applicable to healthcare organizations and the requirement may be differ from one organization to another. Another problem associated with the implementation is lack of sufficient knowledge on BPR projects by the team members (Mooney, Gurbaxani, & Kraemer, 1996). According to this author if the BPR team members do not have enough knowledge about the BPR project implementation there is every tendency they will fail. And one way to get this knowledge is by revisiting the previous BPR project been implemented in the field of healthcare organization which has been documented made available in the literature. One good example of this document is the literature review on the BPR programme in healthcare sector. This document will be useful to the intending healthcare organization willing to venture into BPR project, so as to get insight into the previous BPR undertaken in similar organization.

Caron, Jarvenpaa and Stoddard (1994) also argue that for successful implementation of BPR, visibility into previous BPR exercises is very vital and hence must intensify during the project. Therefore, the adoption of methodological approaches support is necessary (Davenport & Short, 1990). This study is therefore intend to provide those methodological approaches and guidelines for healthcare organizations willing to venture into BPR programme. The study is going to explains critically the previous BPR undertaken in healthcare and sufficiently analysis the methodology and approaches.

2. Methodology

To achieve our research questions above, we review a series of literatures published between 2004 and 2013. We have decided to focus on this recent publications despite the fact that the concept of BPR was introduced since 1970s, because the concept has been severally redefined from its inception and hence the recent publication will give us the latest trend and as such will help us in achieving one of our objectives which is finding the current development level in BPR. From our pilot study we faced with ambiguity in the sense that it's difficult to differentiate between successful innovations and otherwise. This is so because many publications has only little information on the study design, objectives and results. The reported results are somehow mutually incompatible as such the measured parameters are often unclear. Based on this pilot study we have to redefine our inclusion and exclusion criteria. Table 2 below shows the inclusion and exclusion criteria.

Table 2. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
The article should:	Article focused on:
Contain abstract	Description of methods without data
Be published and available in public domain	Review articles
Address process reengineering	Reengineering at organizational level
Contain some quantitative data	Without considering the process
Contain detail descriptions of methodology	
Have been published between 2004-2013	

Also to achieve the objectives all literatures review are related to BPR and its application. The search was done in databases proposed by senior scholars and suggested by previous reviewers in the area of BPR. The databases used are: Science Direct database, IEEE explore Digital Library, SpringerLink, Taylor & Francis and SAGE hub. These five databases were carefully selected considering the fact that they are the top databases the published recent research in the area of business process reengineering in healthcare.

And therefore by analysing these 5 database we can understand and examine the extent to which information field management has devoted to the concept of BPR in comparison with other filed of information systems research. We considers only peer-reviewed journal as our search inclusive criteria considering the fact that such journals are the major sources of obtaining information on new published findings (Ngai et al., 1995-2005).

Our literature search was based on the key word "Business Process", "Healthcare redesign", "Business Process Reengineering", "Reengineering in Healthcare" and "Business Process Reengineering in Healthcare". After performing the search with those selected keywords we then selected articles based on the title and abstract. Two reviewers were dedicated to go through the abstract in order to decides for studies of the complete article or otherwise. An article must be selected by at least one of the two reviewers before being evaluated by the third which is the main reviewer. The 3 reviewers together decides as to whether or not there is need to obtain the full text of the articles. This situation is applicable where the details of the objectives and methodology is not sufficient enough to be included in the criteria (Landis & Koch, 1977) criteria was used to reconcile the inter-observer variations between the two reviewers.

Full articles of the selected abstracts were obtained as electronic or printed copy for further studies of the full text. The main reviewer has to go through the all the selected articles together with the two other reviewers. Selections were compare and discrepancies were reconciles through discussion between the 3 reviewers. After several discussion on inclusions and exclusion of the articles we finally obtained 34 articles from Science Direct database, 32 from IEEE explore, 39 from SpringerLink 43 from Taylor & Francis and 34 from SAGE hub. After further review of these selected articles by the co-authors of this study some articles were removed based on the exclusion criteria and other relevancy shortfall. Finally we come out with 27 articles from Science Direct database, 15 from IEEE explore, 25 from SpringerLink, 16 from Taylor & Francis and 8 from SAGE hub.

3. Classification, Results and Discussion

In table 2 below, the classification of the articles based on the year of publication was shown. It is surprising to see that there was no any publication related to BPR in healthcare in all the databases in the year 2005. Until 2006 when publications starts to appear almost in all the databases. The databases of Taylor & Francis and IEEE Explore digital library has shown little publication throughout the period of 2005-2014. Database of SAGE Journals has shown the lowest publication of 11.7% follows by IEEE Explore digital library with 16%.

On the other hand the database of Science Direct has shown a lot of prominence with respect to the subject matter BPR where 27 articles were published representing 28.7% of the total publications in that period. This is follows by the database of Springer where 25 articles were published which represent 26.6% of the total publications.

Table 3. Classification based on the year of publication

Database	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	%
Science Direct	0	2	0	2	0	0	1	2	6	14	27	29.7
IEEE Explore	1	2	0	1	1	3	3	1	2	1	15	16.5
Springer	0	2	1	2	2	1	6	2	7	2	25	27.4
Tylor & Francis	2	1	0	2	0	0	0	2	6	3	16	17.6
SAGE Hub	1	1	0	2	0	0	0	3	1	0	8	8.8
Grand Total	**4**	**8**	**1**	**9**	**3**	**4**	**10**	**10**	**22**	**20**	**91**	**100**

Most of the articles were published in 2013, where we have 6 articles from science direct database, 7 from springer and 4 from Taylor and Francis, totaling 22 articles in 2013 which all together represent 23.4% of the entire publications for the period of 2005-2014. It's worth noticing that even though science direct has the highest number of publication in all the databases, but still there was no any publications from that database in

2005, 2007, 2009 and 2010. The highest publications from that database appears in 2013 and 2014, this indicate that the research in the area of BPR in healthcare in increasing in that database.
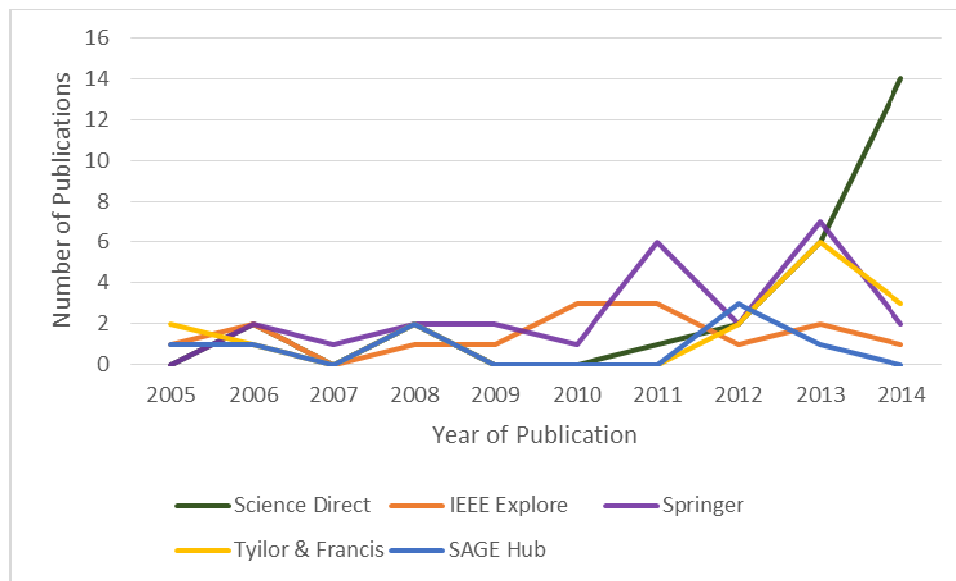

Figure 1. Trends of the publications

From the above figure 1 it's clear that generally the trends in publications in science direct and springer databases are showing a promising research in the area of business process reengineering in healthcare. Even though there was sudden declines in the publications for both the 2 databases between 2007 to 2010 but the trends gradually goes up from 2011 and upward. IEEE Explore digital library initially began with promising publication in 2016 but gradually declines after that, until 2010 to 2011 where the statistics shows increase in publications. SAGE journals shows poor publication among all the databases, where there was no single publication for the period of 2006 to 2007 and from 2009 to 2011. The database only began to publish research in the area of BPR from 2012 to 2014 with some inconsistencies and this indicate that there is every tendencies that the research in that database will gradually increase in the future. It is worth noticing that generally for all the database the research in BPR only get significant publications from 2010 and above.

Table 4 gives a clear summary of the publication in the area of BPR in healthcare based on the regions. The table shows that most of the publications comes from Europe with 31 publications out of the total of 94 publications within the period of 2005 to 2014.

Table 4. Classification based on region of publication

Database	Number of Publication in each region					
	US	EUROPE	ASIA	CANADA	AUTRALIA	OTHERS
Science Direct	9	6	7	2	3	0
IEEE Explore	4	2	9	0	0	0
Springer	6	11	5	1	1	1
Tylor & Francis	8	4	3	1	9	0
SAGE Hub	1	4	0	2	0	1
Total	28	27	24	6	4	2

This represent 32.9% of the entire publications for all the database. This is follows by US with 28 publications out of 94 which represent 29.7% of the entire publications. Asia is averagely scoring 25.5% of the total publication and the least comes from Australia with only 4 publication representing only 4.2% of the total

publications.

This finding from table 4 is showing that most of the publications in the field of BPR in healthcare comes from Europe and US. The study is in line with that of Dwivedi and Kuljis (2008) on their study they carry out in information systems where they found out that most publication in the area of BPR comes from UK follows by US respectively. It is surprising to see that most of European publication in this area comes from Springer database and follows by Science Direct database, but had only little in IEEE explore digital library database. The highest publication in from Europe comes from Springer with 11 articles out of total of 31 published in that database which represent 35% of the total articles published in Europe.

There are several classification of healthcare organizations by various scholars. They can be classify based on length of stay as short stay, traditional acute cure or long-term cure. Healthcare can be as well classify based on types of ownership as Governmental or Non-Governmental. Another classification is based on services they offer which can be classify as Primary healthcare, Secondary healthcare or Tertiary healthcare. For the purpose of this research we intend to classify to draw our classification based on this last class.

The provision of healthcare services within a regional or national health system can be usefully categorized and analyzed through the classification of three main subsystems: primary, secondary and tertiary care. Each of these sectors can be modeled and analyzed as subsystem of the whole industry, though in many countries boundaries between these classes are often ambiguous or blurred, and frequently shift as health services provision moves from one to another. A typical patient journey should start with contact with primary healthcare for an initial diagnostic consultation, and might then involve the patient being referred to secondary care for more specialized diseases or treatment, or a tertiary service for even more specialized follow-up. However, these classes overlap and it is frequently true that an individual patient may receive services within more than one sector at the same time (Walshe & Smith, 2010). Table 5 below shows the volume of publication done for the period of the review in all the 3 classes of healthcare setting and those publications that targets the combination of both the classes. It is found that in almost all the databases most of the researches were done in the area of secondary healthcare with the exception of Springer which concentrated in combination of both. 51.9% of publication from Science direct come from secondary healthcare. Almost 50% of all the publication from all the databases come from secondary healthcare with exception of springer. This is due to the fact that secondary healthcare is sometimes called "hospital care" which is a healthcare services provided by medical specialist and other professional in the area of health. Majority of patients goes straight to Hospitals without necessary consulting primary healthcare centers as a result the target population are only available mostly in secondary healthcare except for advanced medical investigations in a specialty which require tertiary healthcare.

Table 5. Classification based on settings

Settings	DATABASES									
	SD	%	IEEE	%	Springer	%	Tyl. & Frnc.	%	Sage Hub	%
Primary HC	3	11.1	0	0	0	0	0	0	0	0
Secondary HC	14	51.9	9	60.0	10	40	9	56.25	4	50
Tertiary HC	5	18.5	2	13.3	3	12	1	6.25	2	25
Combination	5	18.5	4	26.7	12	48	6	37.5	2	25
Total	27	100	15	100	25	100	16	100	8	100

Note. SD=Science Direct, Tyl. & Frnc. Teylor & Francis

It's surprising to see that there is virtually no research conducted in primary healthcare centres for all the databases with the exception of science direct which has 11.1% of its publication in that area. There is also little research in tertiary healthcare as shown in table 5 above although science direct has 18.5% of its publication in that area but the rest of the database shown only little work in that area. From the above table we can conclude that 50.5% of the entire publication come from secondary healthcare centers and only 3.3% of the total publication come from primary healthcare, and leaving the 46% of the remaining publication to tertiary and healthcare and then combination of both. Almost 32% of the entire publication come from combination of the 2 or 3 healthcare classes this is as a result of the fact that good number of the researchers takes a case studies from different classes of healthcare in order for the to draw conclusion on the applicability or otherwise of the their

propose finding in different healthcare classes.

Classification based on methodologies adopted for all researchers is summarized in table 6 below. The result has shown that case study approach was dominant in the entire databases. Out of 27 publication from science direct 10 researchers adopt case studies approach which represent 37% of the total publication from that database.

Table 6. Classification based on methodologies

Methodologies	Science Direct	%	IEEE	%	Springer	%	Tayloy & Francis	%	Sage Hub	%
Review	2	7.4	1	6.7	3	12	1	6.3	0	0
Survey	5	18.5	1	6.7	3	12	0	0.0	1	12.5
Case Study	10	37.0	4	26.7	9	37	11	68.8	2	25
Experimental	3	11.1	5	33.3	4	16	2	12.5	1	12.5
Data Analysis	5	18.5	2	13.3	4	16	2	12.5	3	37.5
Others	2	7.4	2	13.3	2	8	0	0.0	1	12.5
Total	**27**	**100**	**15**	**100**	**25**	**100**	**16**	**100**	**8**	**100**

The same is applied to Springer database with 36% of its publication focusing on case study methodology. The case is reverse for IEEE explore digital library where 33.3% of its total publication adopted experimental approach, followed by case study approach with 26.7%. It's surprising for Taylor & Francis having 68.8% of its total publication adopting case study and none of its publication looked into survey approach. Generally, experimental approach is second most adopted approach after case study in all the databases, with IEEE toping in the list having 33.3% of its publication worked in that area. Survey and data analysis were virtually getting an average participation in almost all the database which come third and fourth respectively after experimental research.

As a result of the nature of continues organizational changes, economy and IT, the concept of BPR especially in healthcare sector remain virtually theoretical. Therefore, it is most appropriate to adopt case study approaches as this will allow the theories adopted from previous researches to be introduced into this case studies. Review approach was generally fairly adopted by the researchers in all the databases apart from Springer having 12%. It is worth noticing that SAGE Hub has no publication adopting review approach in all its publication but is focusing more on data analysis having 37.5% from that. Considerable number of researchers are looking other approaches like action research, ethnography and etc. with IEEE having 13.3& and SAGE Hub having 12.5% coming from that direction and most of those articles are focusing on action research approach.

4. Conclusion, Recommendation and Future Direction

Analysis and discussion of 91 articles selected from 5 database was made in the previous section. The analysis was done based on publication region, setting and methodology adopted by each article. We have seen from the analysis that although the concept of BPR was introduced long time ago, notwithstanding the database of SAGE Hub has shown only little contribution to the idea of BPR in healthcare having only 8 article representing 8.8% of the total article published within the period of 2004 to 2014. Generally, the publication in all the database were not consistent for the period of 10 years we have considered. There was little research in early 2005 to late 2009 with only 24 publications out of 91 which represent only 26% of the entire publication. It's only in 2010 and upward that most of the database started showing considerable publication in BPR with regard to healthcare sectors.

Most of the publication come from Science direct database having 27 publication out of 91 which represent 29.7% of the total articles published in all the database for that period. It again surprising that even in that database most of the publications were done in 2014 having 14 publication. This number alone represent about 15% of the entire publication in all the databases throughout the period under consideration. This is indicating that there is bright future for more publications in that database in the coming years ahead.

This research is limited in scope as such as a recommendation there is to look into specific component being reengineered like changes in physical structure, changes in process sequence, changes in service delivery, capacity planning, medical record systems, communication, introduction of new concept or case management.

This will now give clear understanding of which specific component of healthcare agencies a database is targeting at reengineering programme for future studies. As part of future direction there is need for researchers to data analysis and review approaches as their methodologies as these approaches shows only little contribution to BPR in healthcare as against case study approach. By so doing, the quality of such approaches will be considerably increased. Future studies in the field of healthcare BPR also need to venture deeply into primary healthcare section as currently the research in that section is not adequate so much so that all the databases shows no research work in that area with the exception of science direct having 11.1% of its articles in that area.

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Appendix A: References Based on Healthcare Settings

Settings	Databases and References				
	Science Direct	IEEE	Springer	Taylor & Francis	SAGE Hub
Primary Healthcare/ Home care	42,44,45	–	–	–	–
Secondary Healthcare	31,32,34,36,37,40,41, 43,46,47,48,50,53,54	60,58,64,61,65,62 ,70,71,72,	80,75,76,78,81,84,86, 88,94,95	100,103,105,109,1 10,106,113,104,99	114,116,11 8,121
Tertiary Healthcare	33,35,38,39,55	68,69	79,90,87	107	117,120
Combination	49,50,51,56,57	63,67,66,59	74,77,83,92,85,89,73, 96,97,91,73,82	98,101,102,108,11 1,100	119,115

Appendix B: References Based on Methodologies Employed

Methodologies	Databases and References				
	Science Direct	IEEE	Springer	Taylor & Francis	SAGE Hub
Review	43	66	83,92,73	108	_
Survey	39,44,53,54,57	71	78,90,94	_	117
Case Study	53,36,38,40,41,45, 7,37,55,56,35	69,61,62,5 8	80,75,76,77,81,84, 85,87	89,100,102,103,105,110, 101,112,109,107,113	119,120
Experimental	50,49,33	65,63,64,5 9,60	74,86,89,93	99,104	114
Data Analysis	34,42,46,48,51	67,72	79,96,97,82	_	116,118,121
Others(Action Research etc)	31,32	68,79	91,95	_	115

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