Business Process Reengineering Using Intranets: A New Beginning?

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Abstract

The growth and popularity of e-commerce has both challenged and enabled public sector organisations to redefine their levels of service. In the early 1990’s BPR was proposed as a mechanism for change. However, after reports of successive BPR failures the momentum for BPR abated. This paper explores the relationship between Intranet Technology and BPR and, by means of case studies conducted in two organisations in the Irish public sector, investigates the potential of Intranet Technology to be an enabling technology for BPR. The research found that Intranet Technology was a key enabler of BPR. However, even with such enabling technology BPR was not achieved in either organisation. The main reasons for this was due to a lack of open senior management commitment, inadequate planning, limited project scope, lack of a high level project champion and inadequate planning of employees incentives to promote the provision of content for the Intranet.

Introduction

Competitive pressures and improvements in information technology constantly force organisations to re-evaluate their business strategies. Although public sector organisations may not operate in a competitive environment, changes in management philosophies are causing public sector organisations to think and act more like private sector organisations. This paper examines attempted reengineering projects in two public sector hospitals. Both organisations attempted to achieve process improvements by leveraging the advantages of intranet
technology. However, each pursued remarkably different approaches and consequently different results were seen to occur.

**Business Process Reengineering**

The demands on organisations today are numerous. They are required to produce at a low cost, with high quality and with fast and flexible responsiveness to customer needs. This puts pressure on organisations to redesign the way in which they conduct their business and build information systems to support new processes (Venkatraman 1994). Out of such pressures was born the idea of Business Process Re-engineering (BPR) (Davenport and Short, 1990; Hammer, 1990). Davenport and Short equated BPR with the ‘new industrial engineering’ in which IT capabilities would play a crucial role. The key aspect of BPR is the fundamental and radical redesign of business processes to achieve dramatic improvements. (Hammer and Champy 1993). In essence, BPR is a reinvention of a company’s processes. Inefficient elements are replaced, redesigned or obliterated.

While BPR promised radical change the attainment of true BPR remained illusive for most organisations. Up to 70% of BPR projects have failed (Hammer and Champy 1993). The reasons for these failures can be summarised into two categories: the lack of understanding of BPR and the inability to perform BPR (Chan and Choi 1999).

**Frameworks for Evaluating BPR**

In order to assess the extent of BPR achieved by organisations this paper uses two frameworks for evaluating IT enabled BPR, Venkatraman (1994) and Kallio et al (1999). Venkatraman evaluates on the basis of different levels of BPR, while Kallio et al evaluates BPR initiatives in terms of scope and depth. Both frameworks emphasise that the accruing benefits are a function of the level or degree of BPR achieved.

Venkatraman (1994) identified five levels of IT-enabled business transformation: localised exploitation, internal integration, business process redesign, business network redesign and business scope redefinition. These levels are then aggregated into two categories, the first two levels are evolutionary and the latter three are revolutionary. The central thesis of Venkatraman’s work is that only marginal benefits will accrue from superimposing IT on existing organisational conditions (Venkatraman 1994). Venkatraman stated that it was possible for an organisation to start at either the top or the bottom of the framework.

The organisation moving up the framework is seeking efficiency. Initially, this begins with localised exploitation and then moves up to internal integration. As the organisation moves up each level the range of potential benefits increases. However, each higher stage requires a greater degree of organisational change. Eventually, in order for the organisation to achieve more dramatic results, it will
need to move up to the first revolutionary level and engage in Business Process Redesign.

The organisation starting at the top of the framework is approaching its change effort from a strategic focus with the organisation attempting to redefine its scope. The focus is therefore on enhancing capabilities through IT. According to Venkatraman, to achieve this the organisation will identify the need to redesign the business network. However, before it can attempt this, the organisation will firstly have to engage in business process reengineering.

Kallio et al (1999) present a scope and depth framework for analysing the degree of change brought about by BPR projects. Scope is determined by number of organisational units involved and as such is comparable to the top level in the Venkatraman framework. While many early BPR projects were internal in focus, more recent BPR projects involve more than one organisational unit. The number of areas that the change affects simultaneously determines depth. This concept builds on the earlier work of Hall et al (1993) who present six crucial determinants of depth: roles and responsibilities, measurement and incentives, organisational structure, information technology, shared values and skills.

Intranets

The application of IT is not an absolute prerequisite for BPR; however, it is regarded as a powerful facilitator (Grover et al 1995, Teng et al 1996). The ability of IT to act as an inhibitor of BPR has also been documented (Broadbent et al 1999). Early BPR projects were initiated before Internet technologies became ubiquitous and as such, developers did not have the technology at their disposal for developing new systems to support BPR. Today there is evidence, which suggests that many corporations are using Intranets to rescue their business process reengineering, and that Intranet enabled BPR may provide a solution to surviving in the new economy (James 1996, 1998).

Since their introduction, Intranet Technology has been applied in four distinct waves 1) Information Publishing 2) Information Collaboration 3) Transaction Oriented Applications and 4) Formal Collaborative Applications. Thus, as the technology matured, IS professionals became aware of the potential of Intranets as a strategic tool (Curry and Stancich 2000). Intranet technology is proposed as an enabler of BPR because it addresses two of the main reasons for BPR failures: 1) Human resistance and 2) Delays in IS development (Stanton 1995).

From the organisational perspective, BPR has tended to be treated suspiciously by employees who fear job loss as a net result (Merriden 1996). Employees can be reluctant to work in a collaborative environment and to learn new processes (Grover et al 1995). In addition, a collaborative environment often requires the merger of different information systems. Intranets on the other hand enable user resistance to be overcome more easily because of the ease of use of web browsers. Intranets have further negated user opposition because: 1) Intranets tend to sprout from the grass roots within an organisation 2) Intranets are ideal for sharing the information
and ideas necessary for employees to learn new processes. 3) Intranets provide multi-platform access.

From the IS perspective Intranet technology offers formidable advantages over traditional technologies which tend to only support well defined tasks (Damsgaard and Scheepers 1999). These include: rapid scalable development across a range of platforms (Betts 1997), access to corporate legacy systems and data warehousing capabilities (Scott 1998), and development on existing networks with lower implementation costs compared to traditional client server solutions (Hill 1997). In addition to this, the relatively quick roll out time of an intranet, including design, development, implementation and end-user training is better suited to the timeframe pressures of a BPR project than traditional solutions (Stanton 1995). Thus, Intranets are providing organisations with far more flexibility than traditional information systems.

However, like many other technologies the anticipated benefits of intranets do not automatically occur and are dependant on the successful management of a number of factors. These factors can be divided into general IS factors and intranet specific factors. One of the key general factors is the presence of open senior management commitment to the project. Two other significant general factors are the quality of the team charged with driving the change and the quality of the planning process. Intranet specific factors include local ownership of content, and the existence of individuals to create the content. While intranet technology has familiarity, and ease of use advantages (Damsgaard and Scheepers 2000) individuals may be reluctant to generate content as the requirements include timely, up-to-date and maintainable web pages (Curry and Stancich 2000). In addition Intranets face the added problem of achieving a critical mass of both users and content at the same time (Damsgaard and Scheepers 1999). In other words the number of likely users is a function of the content and the creation of content is a function of the number of users.

Research Method

This research paper examines the role of Intranet Technology as an enabler of BPR in two public sector organisations. First the paper evaluates the extent of BPR achieved. Secondly, further analysis is conducted to ascertain the factors that influenced the degree of BPR attained.

In order to complete the research, a substantial in-depth analysis was required within the organisations that agreed to participate in the study. As a consequence, it was necessary to adopt exploratory research methods and the case study method of research was identified to be the most suitable method of research for the completion of this study. Two similar public sector organisations that had chosen to implement Intranet Technology were selected for the case studies. Data collection consisted of personal and telephone interviews with the IT Managers and Assistants in both organisations and with one of the medical doctors on the team in St. James’s. Onsite visits and a review of internal documentation were also
conducted. The interviews took place in June of 1997 with repeat interviews in June of 2000. The interviews were conducted according to a preformatted questionnaire and were recorded. While it would have been beneficial to survey the end users, it was not possible to obtain the necessary permission to do so and as such this is a recognised limitation of the research.

Case Studies

Organisational Comparison

The organisations under study were Beaumont Hospital Dublin and St. James Hospital Dublin. Both organisations operate in the public sector and both began the planning and implementation stages of their respective Intranets within months of each other.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Beaumont</th>
<th>St. James’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatients</td>
<td>21,600</td>
<td>21,000</td>
</tr>
<tr>
<td>Outpatients</td>
<td>110,000</td>
<td>140,000</td>
</tr>
<tr>
<td>Day patients</td>
<td>20,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Accident &amp; Emergency</td>
<td>56,000</td>
<td>54,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resources</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>720</td>
<td>760</td>
</tr>
<tr>
<td>Specialties</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Budget</td>
<td>£100m</td>
<td>£110m</td>
</tr>
<tr>
<td>Staff</td>
<td>2,200</td>
<td>2,500</td>
</tr>
</tbody>
</table>

Table 1: Organisational Details

<table>
<thead>
<tr>
<th>Activity</th>
<th>Beaumont</th>
<th>St. James’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Conception</td>
<td>October 1996</td>
<td>February 1997</td>
</tr>
<tr>
<td>Pilot Project</td>
<td>Yes: Publishing and Distribution</td>
<td>No</td>
</tr>
<tr>
<td>Years in Operation</td>
<td>3 Years</td>
<td>2.5 Years</td>
</tr>
<tr>
<td>Main Uses</td>
<td>Theatre List</td>
<td>HIV Unit</td>
</tr>
<tr>
<td></td>
<td>On Call List</td>
<td>Cancer Unit</td>
</tr>
<tr>
<td></td>
<td>Staff Locator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Newsletter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Intranet Overview
Table 1 shows that both hospitals are approximately the same size as measured by their key activities. In addition, both organisations are public sector hospitals located in the same Irish city. Table 2 provides an overview of the main uses and the number of years that each Intranet has been in use.

Each organisation has web technology in place for an almost identical time period. Both identified the need for change in their systems. Inefficient processes were hindering the performance of key functions resulting in delays for the patient and inefficient use of resources. Several paper-based processes were identified as suitable for deployment in an Intranet environment. By reengineering these processes the IS departments were confident that they could achieve significant improvements in efficiency and effectiveness. Thus, both Beaumont and James’s recognised the need for change and the opportunity for BPR.

Each organisation acknowledged that IT would play a fundamental role in enabling change. In Beaumont, this was largely because it was the IS department themselves who were driving the change effort. By comparison in St. James’s the web development team was driving the change effort. Although, the decision to establish a team in the first place was made by the IS department. Both department managers classified the technology as an enabler of change and felt that only people and not technology could drive change.

Discussion

Was BPR Achieved?

Both organisations in the study identified the need for BPR. As a result of the change effort significant improvements in both efficiency and effectiveness have accrued to each organisation. The internal integration achieved in Beaumont is an attainment of e-business procedures in public healthcare. It illustrates the potential of the technology to revolutionise the level of service in public healthcare.

At present however, when comparing the achievements to the Venkatraman framework both fall short of what is possible, as BPR was not actually achieved. The Intranet in Beaumont has enabled business process improvement but not actually BPR. As the Venkatraman model suggests only marginal benefits have accrued as a result, because the actual process itself has not been reengineered. St. James’s have also achieved marginal improvements from localised exploitation. However, the reengineering of processes is required if either hospital is to achieve more radical results from Intranets. All the indications are that both organisations desire such radical results as both hospitals have plans for BPR projects.

Analysing the case in the Kallio framework it is clear that St. James adopted a strategy of wide scope which, would in time result in depth. On the contrary Beaumont clearly adopted a depth approach with no emphasise on scope in the sense of the framework.
While BPR has currently not been achieved, both organisations are planning further enhancements to their systems, which will result in BPR. Beaumont Hospital has plans for a patient diary system that will be distributed throughout the hospital via the Intranet. Thus, from the moment the patient enters the hospital to the cessation of their care the diary will track, monitor and record their treatments. St. James’s also have a similar concept, which they call the Electronic Patient Records System (EPRS). Functionally, there appears to be little difference between the systems except that from the planning stage in St. James’s the EPRS was to form the backbone of the IT enabled friction free healthcare value chain.

**Role of Intranets in Facilitating BPR in the Case Studies**

The focus of IS support in each organisation prior to the advent of web technology was to support hospital functions largely on an individual departmental basis. IS support for collaborative information sharing consisted primarily of using bar code systems to share minimal patient data. While the need for better methods of information sharing clearly existed the IS departments felt restricted by the complexity, cost and suitability of the available technologies to support new processes. However, Web technology and Intranets were quickly identified as a cost effective technology that was capable of supporting new processes.

The significant features of the technology highlighted by both organisations was the ease of use of web browsers, the level of familiarity that end users had with these browsers, the low cost of the technology and the ability to implement the technology on the existing network infrastructure. Thus, each IS department felt confident that any new system using web browsers as the interface would enjoy greater acceptability amongst senior management and the end-users than any other available technology. It was also felt that intranets could be leveraged to access existing legacy databases.

Furthermore, both organisations were confident that Intranet technology was sufficiently robust for deployment, given its capability of supporting many different processes and its scalability. In terms of particular process requirements both organisations were confident that Intranet technology would enable process integration & communication, process co-ordination & control, information storage & access and documentation & documentation management. As such, Intranet technology was chosen by both organisations as a technology that would enable their BPR effort.

Having reviewed the Intranet implementations in both organisations no evidence was found to suggest that the technology chosen inhibited BPR. In fact evidence of business process improvements enabled by intranets were found in both organisations. Beaumont has removed the paper based Theatre and On Call lists and replaced them with electronic equivalents, which are distributed via the intranet. This has resulted in significant improvement in the timeliness and certainty of delivery as well as the accuracy of the content. The improved process has also resulted in additional security, as access to the lists is now password
controlled. Both hospitals are also making extensive use of the technology for supporting information distribution. In particular staff directories, policy and procedure documentation and newsletters have been moved from paper to electronic formats. In St. James the HIV and Cancer units were found to be leveraging the advantages of the technology to support best practices in clinical care.

Both hospitals have plans for implementing an electronic patient records system, which will be enabled by intranets. The key reasons why the technology was deemed to be suitable for this are its proven ease of implementation, ease of use and range of applications and in particular the ability to access legacy systems. Therefore, inadequate information systems, does not explain the non-occurrence of BPR.

Factors Impacting on the Success of BPR

Table 3 summarises the similarities and difference found between the cases in regard to the main factors that influence the BPR effort. The table highlights the fact that although both organisations are very similar as shown in Table 1 above, their approaches to intranet enabled BPR followed very different paths. The remainder of this section seeks to explain the emergence of these divergent paths and the degree of success achieved by analysing each of the factors that influenced the change effort.

<table>
<thead>
<tr>
<th>Factors influencing the BPR effort</th>
<th>Beaumont</th>
<th>St. James’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Members</td>
<td>IS Department</td>
<td>Cross Functional</td>
</tr>
<tr>
<td>Planning Process</td>
<td>Evolutionary</td>
<td>Formal</td>
</tr>
<tr>
<td>Management Commitment</td>
<td>No evidence</td>
<td>Some evidence</td>
</tr>
<tr>
<td>Scope</td>
<td>Incremental</td>
<td>Strategic</td>
</tr>
<tr>
<td>Project Champion</td>
<td>IS Manager</td>
<td>No clear champion</td>
</tr>
<tr>
<td>Ownership of Content</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3: Summary of Factors Influencing the BPR Effort.

A key difference found in the cases was the composition of the project team. The project team in St. James was headed by a clinical specialist and included team members from clinical, administration, management and information systems departments. In contrast the members of the intranet project team in Beaumont consisted entirely of IS staff. It was found that the multidisciplinary team in St. James was one of the main factors influencing the adoption of a broad scope for the project. As each discipline was keen to exploit the technology in both an individual and collaborative manner. The smaller single discipline team in Beaumont resulted in a very narrow focus. No presentations were made to management to win support or funding. In the words of the project manager it was a “Skunk Works Project” in
other words entirely within the IS department. Essentially the Beaumont team regarded themselves as missionaries who had to prove the capabilities of the technology before it could be leveraged to its full potential.

A factor closely related to the project team is the planning process. Again, it was found that the multidisciplinary team in St. James resulted in an extensive and exhaustive planning process, which included mapping a friction free e-healthcare system onto Porters Value Chain. In addition to this four core customer groups consisting of patients, GP’s, healthcare professionals and management were identified and their needs were to be addressed by leveraging the advantages of web technology. In contrast there was little evidence of any formal planning or modelling process conducted by the Beaumont team. In Beaumont the team was primarily driven by its desire to implement the technology in a few areas that had been identified as suitable as quickly as possible.

Another highly significant factor highlighted in the literature was senior management commitment. Neither case showed any real open commitment by senior management to the BPR effort. There was evidence to suggest that senior management were in favour of BPR, which manifested itself in their willingness to allow the implementation of the technology to proceed and in St. James by participating in the planning team. However, no serious open commitment backed up by increased funding was present in either organisation. This lack of senior management commitment and lack of funding could be a function of the organisations operating in the public sector; although they operate as autonomous units they are dependant on the Department of Health for strategic funding.

The defined or assumed scope of the project significantly impacted the deliverables actually achieved. In St. James’s the team focused on the continuum of care and identified the three technologies of Intranets, Extranets and the Intranet as playing a vital role in the provision of seamless patient care in an e-healthcare environment. Thus, the overall emphasis of the project was strategic as opposed to incremental. As a result the actual deliverables consisted primarily of the infrastructure that would be used in this environment. Conversely, Beaumont approached their project with an almost exclusively internal focus and thus the scope was incremental rather than strategic in nature. Consequently the actual deliverables went beyond infrastructure implementation to the achievement of process improvements that the Venkatraman model classifies as internal integration.

There was no project champion identified in the St. James’s case. In other words, there was no individual actively promoting the use of the Intranet to automate or improve existing hospital wide procedures. The exact opposite was the case in Beaumont. The drive towards internal integration was strongly championed by the project manager who assumed total responsibility for implementing the theatre and on-call lists processes on the Intranet.

The literature review highlighted human resistance, inadequate information systems and lack of open commitment by senior management to a BPR effort as the three most common reasons for BPR failure (Hammer & Champy 1993, Carr & Johansson 1995, Stanton 1995). There was no evidence of human resistance
towards using the intranet itself once the content was present. Furthermore, there was no evidence in either case of human resistance to the proposed BPR. However, resistance was apparent primarily concerning the ownership of intranet content with only a few people willing to assume the responsibility of local content ownership. The reasons cited to explain this resistance were, existing workloads and possible legal implications. Another related issue was the lack of people to actually create the content. This combined with the content ownership issue explains the low levels of localised exploitation.

Conclusion

While the case studies show clear differences in the approaches adopted by both organisations they also illustrate that intranet technology was successfully implemented in each organisation. Furthermore, the same reasons; an enabler of change, ease of use, low cost, variety of applications and access to legacy systems drove the adoption of the technology in each organisation. The difference in the team makeup and the planning process lead to very different project scopes being defined in each organisation. St. James’s attempted a strategic focus that equates with the Business Scope Redefinition level in the Venkatraman framework. In contrast Beaumont pursued an incremental strategy by attempting to achieve the localised exploitation and internal integration levels in the Venkatraman framework. Alternatively classified according to the Kallio et al framework the St. James’s approach focused on scope and depth while the Beaumont approach focused entirely on depth.

While evidence of process improvements exists in both cases neither organisation to-date has actually achieved BPR. Furthermore, at this point it is not possible to state which organisation is closer to achieving BPR. While the Beaumont project has delivered more measurable results, the attainment of BPR is still some way off and may require a more rigorous planning process incorporating input from non IS personnel. From a planning perspective the St. James’s project is better prepared for the achievement of BPR however, the lack of similar current utilisation of the technology may be an indicator that the plans are not becoming a reality.

The inability of either of these public sector organisations to obtain senior management commitment in the form of either funds or time is one of the key reasons why BPR was not achieved. This factor is compounded by diffused departmental structures - each clinical department operates as a relatively autonomous unit. As such, the ability to bring about radical change using intranet technology requires considerable change management skills and incentives, neither of which is evident in the case studies. In addition, such departmental autonomy results in the projects requiring individuals or departments to volunteer to provide content. The lack of an enthusiastic take-up on content provision results in a smaller scope system, which in turn negatively impacts the systems ability to reach critical mass, a position from which it is easier to orchestrate BPR.
References

Betts, B. (1997). Intranet’s: Let’s see what it can do, Computer Weekly, 16/1/97


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