

BUSINESS PROCESS REENGINEERING USING A CUSTOMISED MAPPING MODEL: A CASE STUDY IN A SME

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ABSTRACT

Increasing customer expectations in terms of cost, quality and services, together with competition in global markets has placed a premium on effective internal business processes. Companies are investing to streamline internal workflows, reduce costs and improve efficiency by re-engineering their business processes. Various mapping tools, such as Process Mapping and Value Stream Mapping, have been widely used as the vehicle for leveraging these improvements. However, in isolation any individual tool is often insufficient to achieve the desired results.

This article uses a case study approach to investigate a real business process re-engineering (BPR) project in a medium sized manufacturing and service company. Process improvement is carried out using a set of mapping tools that have been selected, simplified and combined for practice. It has been shown that human factors are also crucial to the success of a BPR project.

The case study illustrates the success of BPR with real practical examples of what works. Benefits include: increasing stock accuracy from 22% to above 95%; a reduction from about 40 reversed orders per month to zero, order fulfilment time reduced by 50%, and profitability improved 3 times at the end of the project. Non-quantifiable benefits include the elimination of a need for corrective actions, employees are more motivated, and the business stream is flowing smoothly allowing other business processes perform efficiently without disturbance.

KEY WORDS: Business Process Re-engineering (BPR), Process Mapping (PM)

1. INTRODUCTION

Business Process Re-engineering (BPR) is a familiar tool used in business today. It was first coined in the 1990s [1] and then became used throughout the world. Increasing customer expectation in terms of cost, quality and service, together with competition in global markets has placed a premium on effective internal business processes. Many companies are investing to streamline internal workflows, reduce costs and improve efficiency by re-engineering their business processes. BPR is an innovative method that provides visibility of business process, identifies hidden problems and waste, and helps companies to achieve lean operations.

The most famous example of a successful BPR project in the 1990s is the Ford Motor Company [1]. Ford achieved a 75% reduction in headcount in its accounts payable department, whilst maintaining the same performance levels, which exceeded significantly its original expectation [2]. Other sectors, such as the financial services, have been able to reduce time and cost by introducing BPR. First Direct, the UK's first 24 hour 7 day a week bank, and NatWest Life are both successful examples [3]. Successful BPR cases have been well published whilst

failures have not received as much publicity [4, 5, 6, 7]. It is suggested that between 70% and 80% of BPR projects fail [8, 9], and this may be even higher [10].

Implementing BPR successfully is a non-trivial exercise with companies having to embrace fundamental change, deal with risks and resistance, as well as embarking on strategic rethinking. For SMEs, there is the added complexity of various BPR software products and techniques. This paper explores a successful BPR project in a SME environment. The purpose of this paper is to introduce a simplified mapping model that could be adopted in BPR projects, customised for SMEs. A case study is used to illustrate how this technique can yield tangible benefits to companies. This paper also highlights the need for a process oriented strategy and the importance of quick wins and human factors in managing BPR projects.

2. BPR & MAPPING TOOLS

A business process is a series of steps designed to produce a product or service [11]. It can be contained within, across functions or along the value chain, which interface with external elements, such as suppliers and customers. This is further defined by Guha et al. [12] as interpersonal, interfunctional and interorganisational processes. Hammer defines BPR as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed” [4]. The differences between BPR and Business Process Improvement or Redesign are that BPR aims at fundamental change of the process and radical, dramatic benefits as a result, which seeks at least a 50% performance improvement rather than 10% [13].

BPR is welcomed in all kinds of situations. Organisations that are in danger or badly performing view BPR as their last chance; proactive companies seek improvement and change via BPR and industry leading companies introduce BPR to gain strategic competitive advantage [3]. Although these reasons are all laudable, many failures still result from internal resistance, political issues, adopting the wrong approach by amending rather than reengineering, mis-using consultancy, IT architecture misaligned with BPR objectives, lack of long-term commitment, etc [10, 14, 15, 16, 17]. For SMEs, with less money, human resource and knowledge, there is the added complexity of the various process mapping techniques which makes the journey of BPR even harder.

In this paper we introduce a customised version of Value Stream Mapping (VSM), Process Activity Mapping (PAM) and Process Mapping (PM). VSM is a visualisation tool oriented to the Toyota version of Lean. It “*outlines the current and future state of a production system, allowing users to understand where they are and what wasteful acts need to be eliminated*” [18]. PAM provides a far more detailed map, which should be used only on sub-processes where there are particular concerns [19]. It is a classical tool used by industrial engineers at a micro-level and helps identify wasteful actions, and documents the process completely [19, 20]. PM, introduced by General Electric, is a proven analytical tool to depict every vital step in business processes using workflow diagrams [21].

3. THE CASE OF MARRAKECH

Based in Haverhill, near Cambridge, Herbert Retail Ltd., part of Herbert Group, is a market leader supplying weighing, labelling and business solutions to the major UK supermarkets, such as Tesco, M&S and Somerfield. It is a SME with about £20 million annual turnover and 200 employees.

As one of Tesco’s suppliers, Herbert Retail Ltd uses the Marrakech system to accept Tesco’s orders and undertake invoicing. The value of each order going through Marrakech system is under £300, which represents a small business stream. Before BPR project started, the company had an impression that this business stream was under performing. At the beginning of the project there was little visibility of the process, the way in which costs accrued or how value was accounted for in the stream. A BPR project was initiated with the aim of improving the efficiency and profitability of the Marrakech business process.

3.1 Methodology of a BPR Project

Figure 1 illustrates the method used for this project. Defining the project scope, including objectives and time scale, ensures the project team know where they were heading. Ideally, the project deliverables should be achieved rapidly to maintain staff motivation and avoid the long wait for payback. In the Marrakech project gap analysis was carried out to answer two questions: ‘How good are we?’ (Current State) and ‘What do we want to be?’ (Future State). This also helps to identify the real need of a BPR project. The customised mapping model is a ladder to achieve the Future State (FS) from the Current State (CS). Risk is another factor that should be considered carefully. Many projects fail because of the passive resistance from stakeholders [17], many of whom have considerable power and impact. It is, therefore, crucial to identify relevant stakeholders, and understand their concerns by promoting open communication. The final stage is implementation and monitoring. In this BPR project, the workforce were more positive when early successes were acknowledged and celebrated- even if they were very small. Learning from both mistakes and successes can benefit the following stages of project and build confidence.

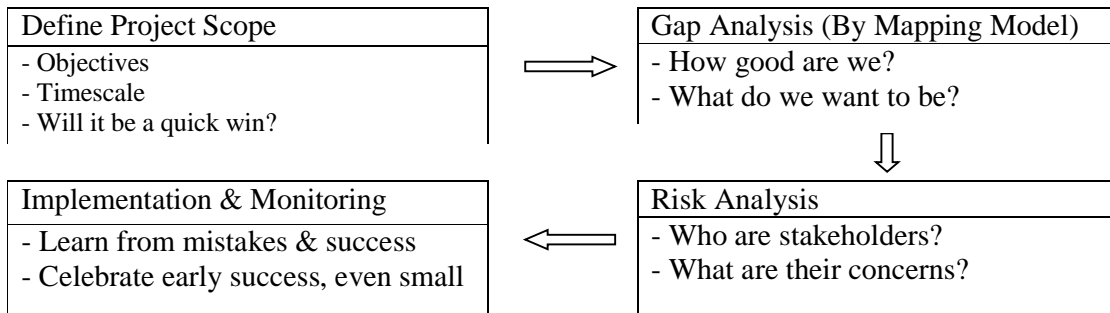


Figure 1. Methodology of a BPR project

3.2 Define Project Scope

The Marrakech BPR project scope was clearly defined at the beginning. It was driven by the Managing Director, discussed and agreed with Financial Director and the BPR Project managers (the authors). Based on the complexity and nature of this business stream, it was predicted that the Marrakech project could be completed within three months and achieve key objectives, including financial bottom-lines. It was viewed as a quick win amongst other BPR projects that were planned for the organisation.

3.3 BPR Via Customised Mapping Model

The project started by interviewing key stakeholders to understand the Marrakech business stream. PM was the main tool used and other mapping concepts were also introduced to develop

a customised mapping model, which gave a better fit for this SME's needs. Figure 2 shows how the toolkit was formed. PM illustrates how good the process was. Drawing one process map at a higher level provides the understanding of the current state process, allowing a supplementary focus on Non Value-added Activities (NVA) and waste identification using the VSM concept [22]. When a clear understanding of the current state has been achieved, then a future state process map can be created. The coloured boxes in Figure 2 depict NVAs. PAM can subsequently be used for further analysing these concerns.

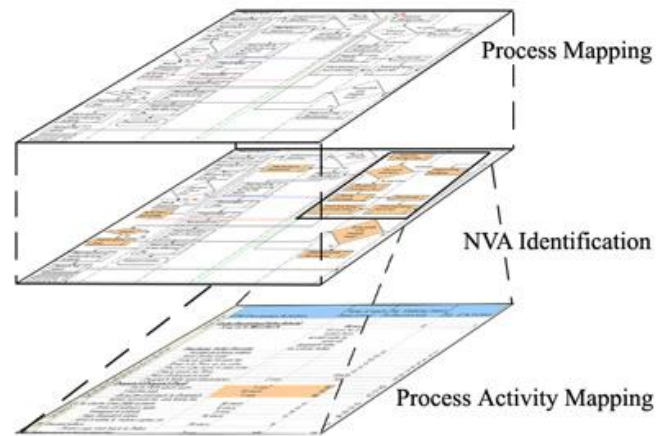


Figure 2. Concept of forming the Mapping Toolkit

Current State (CS)

The concept of the toolkit was applied in the Marrakech BPR project. The project team conducted a profit analysis by separating Marrakech orders from other business streams and calculated sales and costs to show how good this business process was. The result indicated that nearly a quarter of Marrakech orders were loss making after freight was deducted, whilst half of all the Marrakech orders made losses after all costs were deducted. The margin per order was low and analysis demonstrated the CS process was under performing and there was a real need of conducting this BPR project.

NVA Identification and Future State (FS)

The project team got to understand and map out the process by tracking a Marrakech order from the beginning (order placed onto Marrakech system) to the end (dispatch). Figure 3 illustrates the CS map by PM.

The complex process with a number of corrective steps (highlighted in red and yellow), meant that staff could not complete these actions Right First Time and needed re-working. For example, a high number of 'reversed orders' - dispatch notes, were generated and sent to dispatch department to ship goods. Due to inaccurate stock, staff in dispatch found there was no stock so that these orders had to be reversed and re-worked when new stock arrived. These NVAs were identified in current process and eliminated. It had been found that one department had no input into the process and were only involved because most Marrakech orders required stock items from their store. Whilst the company had a central store, in this case the department operated its own store with no controlled access to stock. Because of poor control, the physical stock was different from that showing on central Management Information System. This was one of the main causes of reversed orders. Consequently, purchasing department was required urgently to place orders and get the parts as soon as possible. Purchasing manager was not happy about this kind of emergency situations, so a secret 'emergency warehouse' had been set up in his office to fulfill some of the urgent orders (highlighted in yellow in Figure 3). Based on CS process, desired FS should only have the necessary value adding flows, with red and yellow coloured steps eliminated.

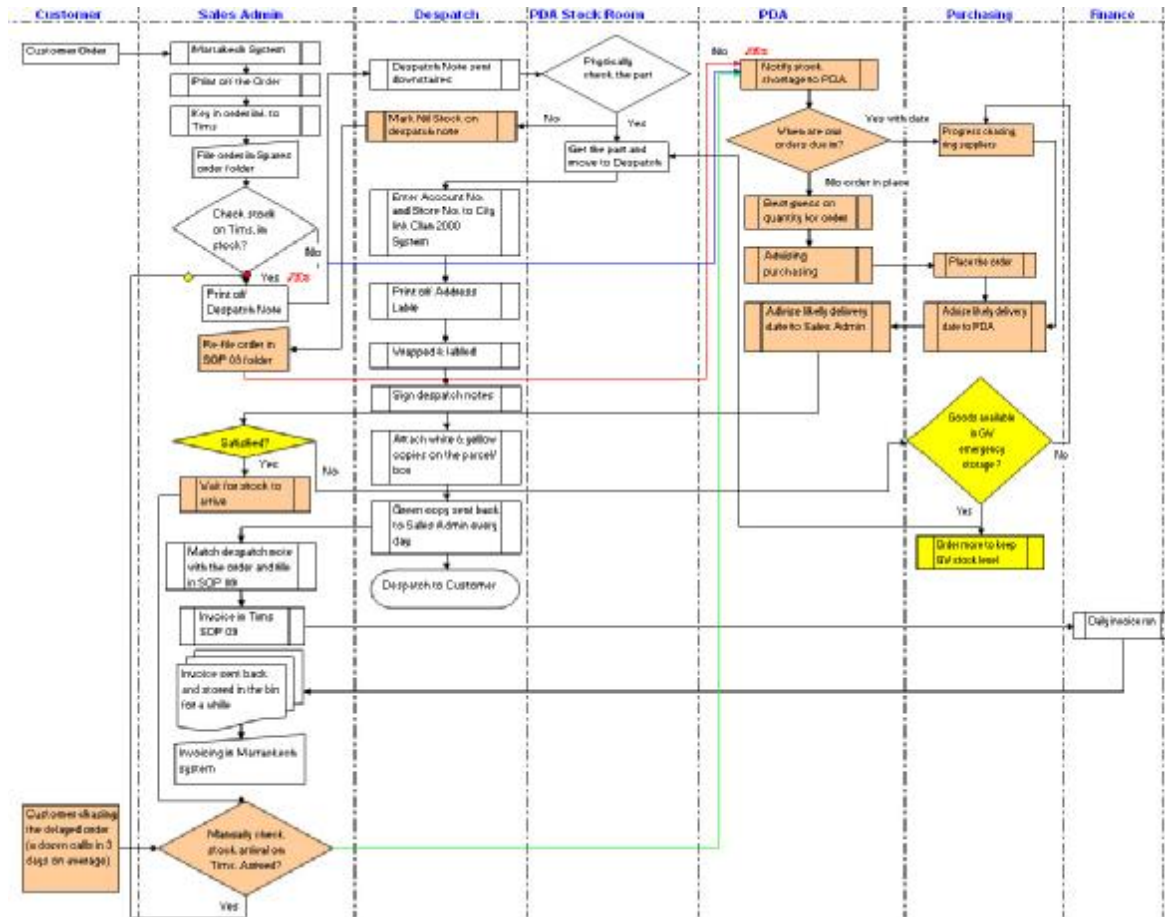


Figure 3. Marrakech Orders Process Mapping (Current State)

Process Re-engineering

Stock was highlighted as an issue that caused a considerable reworking and waste. One department was released from the Marrakech process and all Marrakech related stock in their store was transferred to main store and placed under closer physical control. Min/Max was set up to limit stock level into a certain range, which means that stock is hardly exceed the Max level and below the Min level. Stock re-order was set to be triggered when the stock level is under the Min figure. Stock accuracy was controlled by counting the physical stock weekly for 8 weeks and reducing to every fortnight or monthly thereafter. The ‘emergency warehouse’ was eliminated, as it added complexity, reworking, double entry of stock control and generally wasted time in the process without any value adding to end customer.

Process Activity Mapping

By analysing the process map and identifying NVA, the dispatch sub-process was a suspected deficiency. PAM (Figure 4) was conducted with a specific focus to evaluate the efficiency of dispatch. Three activities in dispatch sub-process were repeated about 10 times a day with long walking distances, which were due to inefficient way of picking up stock. After re-engineering, dispatch staff used a parts picking list, generate by Sales Admin, to pick up all parts *in one go* by using a trolley, which reduced the process time by 20 mins (50% of the original order fulfillment time).

Processes Activities Mapping	Time of complete the activity	No. Walking Steps	No. of Activities
Despatch (Despatch Dept)			
- Go to PDA stock room	1 min	56	12
- Find the part	10 secs	10	
- Bring the part back to Despatch	1 min	56	
- Enter Account No. and Store No. to Citylin Clan 2000 system	30 secs	0	13
- Print off Address lable	5 secs	0	14
- Wrapped & Labled	2 min	5	15
- Sign despatch notes	15 secs	0	16
- Attach white & Yellow copies on the parcel/box	15 secs	5	17
- Green copy sent back to Sales Admin once or twice everyday	2 min	105	18
- Despatch to Customer		0	19
Total order fulfillment time: 20.4+10*2.16 =20.4+21.6 = 42.06 mins			

Figure 4. Process Activity Mapping for Marrakech BPR project

3.4 Results & KPIs

Within three months of starting the project the results had exceeded expectations. Five Key Performance Indicators (KPIs) were established early on in the project. The *number of 'reversed orders'* reduced from about 40 per month to zero; *stock accuracy* increased from around 20% to above 95%; the *stock level* was visible and under control; *order fulfilment time* was reduced 50% and *profitability* per order increased approximately threefold. KPIs should be simple, effective and measurable and implemented early on in the BPR project so that staff know that these will be used for monitoring purpose. In this case, *number of 'reversed orders'* is the main KPI to flag problems, as it reflects *stock accuracy*, affects *profitability* and provides an early indication that something may have gone wrong in the process.

4. DISCUSSION

This small case study within a SME demonstrates a successful BPR project by applying the customised mapping model (Figure 5). In order to carry out PM, PAM and NVA identification, information is needed from departments' stakeholders. The arrows in figure 5 depict an exchange of knowledge between functional departments and key players responsible for carrying out the BPR project using the customised mapping toolkit. The toolkit consists of tailored elements of PAM, NVA and PM, which are used to reveal process detail and inadequacies, identify and eliminate waste, and maximise value to customers. Knowledge will be exchanged across functions,



Figure 5. Customised BPR Mapping Model

which is illustrated by dashed lines. Human factors were crucial in this case study, which is also supported by some scholars [10, 14, 17]. Equally, a successful BPR project will comprise of a project team that includes *stakeholders* from across the organisation, a *champion*, and ideally, members of the *senior management board* (e.g. Managing Director). Many of the key

stakeholders will be department and line managers who hold information that is needed for BPR project, or will have concerns or suggestions. They will also be the very people who that a BPR project will require to act on changes. By understanding their thoughts and getting them involved at an early stage, they are more likely to be motivated and drive to success. In this project, the key players included six managers who were involved throughout the project and contributed significantly. A champion is essential to lead the BPR project, who plans the project, makes suggestions, motivates project team, holds review meetings regularly with stakeholders, and deals with difficulties, etc. Review meetings make sure the project team know the progress, celebrate success, and learn from early mistakes. Suggestions and problems can be discussed thoroughly and decisions made without delay with senior management's supports.

Some researchers believe that multiple processes reengineering, applied in a broad scope, could eliminate handoffs between processes and provide radical benefits [16]. However, it has been found that in this SME case, tackling first a small badly under performing business stream can yield quick results and demonstrate early benefits, building confidence and reducing some of resistance to change. Incremental process reengineering is a positive approach which allows low and medium risk takers to work together and is easier to be accepted by stakeholders.

Quite often, VSM, PAM, PM and other techniques or software in markets have been adopted in isolation within BPR projects. In this article, a customised mapping toolkit is introduced as a new BPR approach to be used in SME environment. This model was designed in terms of combining the strength of several different mapping techniques to cover most mapping needs in SMEs and tested with a real BPR project in a SME, which showed success. Table 1 compares the toolkit with other conventional mapping techniques in several aspects.

Mapping Tools	Focus	Scope	Visualisation
VSM	Lean & eliminate wastes	Interfunctional	High
PAM	Sub-process problem identification	Interpersonal	Low
PM	Logic of business process	Interorganisational	High
Customised BPR mapping model	Logic of business process, NVA identification, value adding to customers, radical performance improvement	Interorganisational	High

Table 1. Comparison With Conventional Mapping Tools

5. CONCLUSION

BPR, aiming for radical process change, requires organisations to promote strategic rethinking, minimise risks and resistance. This paper has introduced the concept of a customised mapping model which adopts PM as the main mapping technique as well as merging and simplifying concepts from VSM and PAM for SMEs to facilitate BPR projects. Apart from having a process oriented strategy together with a technical mapping toolkit, the importance of project management, human factors, and demonstrating quick wins are highlighted. The case study demonstrated that this customised mapping model is feasible to use and has yielded tangible benefits in a BPR project in SME environment.

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