Business Processes – Attempts to Find a Definition

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Abstract

Definitions of business process given in much of the literature on Business Process Management are limited in depth and their related models of business processes are correspondingly constrained. After giving a brief history of the progress of business process modeling techniques from production systems to the office environment, this paper proposes that most definitions are based on machine metaphor type explorations of a process. While these techniques are often rich and illuminating it is suggested that they are too limited to express the true nature of business processes that need to develop and adapt to today's challenging environment.

1. Introduction

In the 21st century we are led to believe that the most valuable characteristic of an organization is its ability to adapt to the dynamic environment in which it operates. Much of the literature produced by the business process management and re-engineering (BPM/R) community would suggest that implementing process orientated structures will help organizations to be more responsive to an increasingly changing environment. It is essential then that those utilizing such techniques understand adequately the nature of business processes. This paper suggests that not only are there few attempts to define process adequately, but those definitions and corresponding models most widely used are confined to a mechanistic viewpoint of process. After briefly discussing business process definitions and models the paper will propose why these models are inadequate and where research should be focused to enhance BPM techniques.

Definitions of process are usually short and succinct. Ould's book Business Processes [17] had still not attempted to define the term 'business process' by the end of the first chapter but instead lists a few key features; it contains purposeful activity, it is carried out collaboratively by a group, it often crosses functional boundaries, it is invariably driven by outside agents or customers. The rest of his book expands on these features. Jacobson [12] on the other hand quickly describes a business process as; 'The set of internal activities performed to serve a customer', Bider [3] suggests that the BPR community feel there is no great mystery about what a process is - they follow the most general definition of business processes proposed by Hammer & Champy [11] that a process is a 'Set of partially ordered activities intended to reach a goal'.

So if a business process is so easily defined that it can be described in a simple sentence and most businesses understand what a business process is, why do we need so many different expertise to illustrate and model them? Why the shift towards BPR/M of the 90's? Jacobson though admitting processes are nothing new to companies explains the confusion surrounding them by their invisible nature, that they are neither named nor described.

2. Definitions and views of processes

2.1 A Brief History

Communities began when individuals specialized in order to trade or sell their skills and wares in exchange for other produce or currency. Industrialization took specialization a step further, with machinery automating those specialist activities that were well defined and repetitive. As the business world evolved it was no longer adequate for companies to merely offer their goods for sale, in order to stay viable they had to keep their competitive advantage.

- in the '60s industry concentrated on how to produce more (quantity),
- in the '70s how to produce it cheaper (cost)

- in the '80s how to produce it better (quality)
- in the '90s how to produce it quicker (lead time)
- in the 21st century how to offer more (service)

(Tersine, 2002)

Except for the last shift with its emphasis on service the above chronology is about improvements to aspects of production. From the start of the industrial revolution the onus had been on automating and improving production efficiency and costs. The previously quoted definitions roughly describing business processes along the lines of, 'A sequence of activities which transform inputs into outputs' and their corresponding models have their routes in the scientific management techniques of the early twentieth century. A production process was seen as a linear progression taking raw material and transforming it into a finished product. Activities were studied, broken down, standardized and those activities conducive to automation were transferred to machine production. Activities too complicated or variable remained in the hands of the human operators. The characteristics of the processes studied and the descriptions proposed are however more indicative of production processes than a generic description of a business process. This is not to say they do not have value and their 'limited' view of a process is a substantial area of research in itself. These techniques have been used in many fields from work study and operations management, process control, business modeling and systems engineering to name but a few and are central to the business process reengineering (BPR) and business process management (BPM). The advent of automation in the office meant that the spotlight in search for efficiency and cost reduction was to encompass not only the shop floor but the office too with the same principles applied to office work.

2.2 Shifting the Emphasis to Office Environments

The principle separating office process from production process is often based on the hypothesis that production workflow is traditionally analyzed by attention to the activities being performed whereas office systems are more goal based and people do whatever is necessary to attain a goal. The Workflow Management Coalition [20] proposed classifying processes as manual process activities and workflow process activities. The work of Gulla and Lindland [10] distinguishes between production processes and coordination processes, with traditional approaches of modeling, input – process – output, suited to modeling the chain of production processes but lacking concepts for modeling coordination activities which involve actors, information exchange and coordination structures. Ellis and Wainer [7], Bussler and Jablonski [4], Yu and Mylopoulos [21] have all suggested that analysis of activities is not appropriate for modeling office workflows or management decision-making. Yu [21] separates office processes from processes executed by machines; the latter are simply a progression of tasks whereas office workflows are about actors in social systems collaborating to achieve a goal. Joosten [13] extends this for workflow to 'a system whose elements are activities, related to one another by a trigger relation, and triggered by external events, which represents a business process starting with a commitment and ending with the termination of that commitment'.

ActionWorkflow [9] divides process into material process, information process and business process. Informational models include ERM (Entity Relationship Model) and OO (Object Orientated) models, material modeling is dataflow and process models, business models are viewed as networks referred to as workflow with interactions the main focus of attention. ActionWorkflow have worked on merging these three types of process definition into one workflow architecture. Continuing in the workflow arena other dimensions that have been analyzed are methods to help organizations specify, execute, monitor and coordinate flows of work. Finally Yu's paper [21] distinguishes between process as executed by machine and process as performed by humans. Curtis et al [5] also made this distinction, noting that mathematically structured process programs could be used to described machine based processes whereas more flexible process scripts are used for manual tasks performed by humans who are able to interpret and enact ambiguous process descriptions. They looked at the processes employed in the software development industry and their interest was to extend traditional software modeling of data flows and transformations to the challenge of process representations that incorporated communication and coordination. Looking at a software development environment extends our enquiry of process structures into another discipline where the nature of processes is a creative, problem-solving environment. This still omits a great deal of the

activities that go on within organizations to do with creative problem solving and decision making, to mention just two.

Many of the differences distinguishing office processes from production processes focus on actors, their coordination and communication roles in the activities of a process. Typical representations of these agent-related views of process are used by Role-Activity Diagrams [17] and UML collaboration diagrams, or the DEMO methodology using Business Oriented Petri Nets [1].

2.3 BPM & BPR Additions to Business Process Definitions

The fields of BPM/R strive to better understand a business's key mechanisms in order to improve, and in some cases radically change, the business performance by identifying opportunities for new business opportunities, for outsourcing, for improving business efficiency and for areas within the business where technology can be used to support business processes.

BPM/R methods have developed over the last 20 years from a variety of disciplines and as with software modeling techniques before them, have suffered from a lack of standard techniques and notations, with every BPM method using its own notation. The argument of this paper is that this lack of standardization in representing a business process is in part caused by the absence of an adequate definition of a business process.

Champions of BPR, Hammer & Champy [11] state, 'A business process is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer. A business process has a goal and is affected by events occurring in the external world or in other processes'. This contradicts slightly a later definition given by Eriksson and Penker's [8] who say that a business process emphasizes how work is performed rather than describing products or services that are a result of a process. The confusion here is whether a description of a process includes any information about the end product or service; surely in the customer focused ethos ascertaining whether a customer's requirements have been served needs repeated reference back to what is required in the first place. Another founder of the BPR movement, Davenport [6] seems to support Eriksson and Penker's view when he describes a process as; 'simply a structured set of activities designed to produce a specified output for a particular customer or market'. It implies a strong emphasis on how work is done within an organization, in contrast to a products focus on what is done. A process is thus a specific ordering of work activities across time and place with a beginning, an end and clearly identified inputs and outputs: a structure for action.

Jacobson [12] describes processes as cutting across traditional hierarchies and in order for them to succeed they involve collaboration between individuals or groups to achieve a goal. Jacobson says a customer-orientated process is expressed in terms of meeting an individual customer's needs, by concentrating on processes that provide value to customers and not merely to other parts of the business we arrive at what the organization should be doing.

When Taylor developed his theories of scientific management and refined the work activities in order to simplify, deskill and specialize, workers still carried out a process to achieve a goal. That goal was just a subgoal of BPR/M movements customer orientated goal. What was lost was the holistic view of the process from commencing with a customer and returning to the same customer when complete with someone responsible for achieving that goal for a specific individual. Thus we lost the person or group responsible for delivering the objectives of the process. Scientific management techniques segmented the process into the functional departments in the call for economies of scale and work standardization.

Perhaps here we can stop briefly to point out what the BPR/M movement adds to the scientific management view of a process. The characteristics of a process in a traditionally structured organization share many of the same attributes, but BPR/M by always keeping explicit the customer focus supports changing the organizational structure to cross-functional working practices or team structure. What is reflected here is that in the modern business world some organizations find that functional structure impedes their efficiency. This may be caused by the operators of the system, or the parts of the machine, illustrating the inadequacy of the machine metaphor when related to them, i.e. they don't work efficiently when treated as

machine parts. Alternatively it may be that the rapidly changing environment that modern companies find themselves in cannot respond adequately with a functionally structured organization.

To continue, Jacobson's [12] discussion of process explains the need for the different structure for a customer-focused process to deliver to a customer; the various players operating parts of the process collaborate to achieve the goal. Jacobson maintains traditionally structured organizations are not conducive to this way of working, and that issues such as internal politics and personal goals hamper the smooth running of the horizontal nature of a customer-orientated process. Jacobson's description concentrates on the interface between the internal business process and the customer. This gives an external view of the business, how the external actors use the business.

BPR in essence represents a repackaging of traditional techniques, the objectives of which are improvements in the measurable performance of identifiable work activities. The true nature of the BPR frame of reference is indicated by its 'slash and burn' reputation, in essence the same as Taylor's scientific management technique. Attempts have been made to soften the often heavily criticized BPR with BPM adding a humanist, team working, shared values and quality of work-life approach. However, the models capturing the detail of a BPR/M project, illustrating decomposition of tasks, linear progression, concurrent processing, are the stalwarts of IDEF3, UML activity diagrams, etc.; these are essentially flowcharts developed to show machines/computer operations can be utilized to shape and structure human activities. The literature uses the language and techniques of costs, profitability and competitive advantage failing to address the complexity and non-linear nature of much of the work carried out in organizations. BPM additions to the definition of process attempt to recognize the involvement of humans in the execution of processes but they assume the existence of crucial notions such as perfect knowledge, human participants as rational decision makers cooperating together to achieve agreed and clearly defined goals. These methods concentrate on the internal structure of the process and organization and although they often mention the need for a holistic approach the models used often don't reflect this. These models are concerned with past knowledge and promoting standardized or 'best' practice.

It has been suggested here that the definition of a business process has been constrained by objectives that seek to determine the most efficient way to carry out work, whether in a production or office environment. Not surprisingly perhaps the view held of a process, by those aiming to exact such improvements, is similar to that of a machine, especially as many of the operations subjected to such study might eventually be automated. Metaphors are often used to describe characteristics of something we don't fully understand in terms of something we are more familiar with. In describing different aspects of organizations Morgan [14] distinguishes eight metaphors to illustrate organizations. These metaphors can be further categorized into three groups: the machine group, the organism group and the mind group.

2.4 Further Dimensions to Process

Melao & Pidd [15] recognize the limitations of Morgan's machine metaphor to describe business processes. Morgan used metaphors to describe organization structure, Melao & Pidd use metaphors to specifically describe business processes and give four perspectives on business process to develop a conceptual framework with which to understand business processes more fully. The four categories:

- Business processes as deterministic machines
- Business processes as complex dynamic systems
- Business processes as interacting feedback loops
- Business processes as social constructs.

Most of the techniques mentioned in this paper fall into the first categories given by Melao & Pidd. . The second two concepts deal with a process's interaction with its environment and ways to capture the variable or unpredictable nature of these interactions. Finally Melao & Pidd cover the human aspects of business processes offered from soft systems methods. While some of the above techniques often mention human factors of perceptions and motivation they are rarely illustrated in the corresponding models.

So far we have traveled from the production process to the office process, and we've briefly touched on the more complicated nature of processes shown in Melao and Pidd's classification. Ould tries to show that processes cover the whole spectrum of business with his core, support and management processes and his area of interest is the interactions between the people operating the process, but he fails to make the leap needed for the true complexity of what business processes could entail.

The characteristics of Morgan's machine metaphor closely correspond to those characteristics of a process modeled by such techniques as: input/output flow diagrams (IDEF0), workflow type diagrams (IDEF3, UML Activity Diagrams). That is 'machines are made up of interlocking parts that each play a clearly defined role in the functioning of the whole' [14]. Even the agent-related view of Ould's RAD diagrams demonstrate the same principles. These models are also strongly rooted in the premise that processes have a clearly defined start and the process progresses in a step wise fashion towards a define end point. Modeling methods have tended to concentrate on production and office systems. Davenport [6] spoke of a process having start and end points. In a production environment, it might be correct that we start with raw materials and end with a finished product, but this is often not the case in none production environments. Bider[3] recognized that this production line approach is not always satisfactory. Bider considers a view of process as a trajectory in a multidimensional state space where progression can be up and down, back and forward. Bider's view helps us to understand the flexibility that we must build into many of the business processes that we study today but it still assumes known start and end points and a measurable goal. Mintzberg's [16] early work on the nature of managerial practices does not fit easily into the structure of a process that has been described so far. Mintzberg's discussion of management practices speaks of the open-ended nature of management. Management processes according to Mintzberg are never ending tasks without clear milestones at which a goal could be said to have been reached or concluded. It would be a mistake to assume that management processes alone suffered from this issue. The process structures of software development have long been realized to not fit well to the linear structure often attributed to them by software development practices. Some of societies most crucial processes: in health, policing and education will not so easily fit our start and end point, flow type process description. However, they probably more than even most production or office processes need to conform to a set of auditable steps and procedures. Their goal may be indefinable; must we cure all patients, lock up all lawbreakers and ensure full examination passes for all students for the measurable goal to be achieved? These processes illustrate more vividly perhaps than office processes a characteristic that most processes exhibit but which we fail to demonstrate in the modeling techniques described so far. Effective processes not only adhere to planned actions to deal with known goals, they also encompass another essential element that deals with not only the unpredictable but the unknowable.

3. Conclusion

Meloa and Pidd's [15] conceptualizations of process were efforts to deal with some of its other aspects that restrict the effectiveness of current modeling techniques. Models are simplifications in order to bring clarity and understanding to some aspect of a problem where there is complexity, uncertainty, change or assumptions. The problem in reality is complex and more variability exists than can be modeled. Both the environment the process must operate in and the process itself are not static, and changes in either one could affect changes in the other. Underlying the mechanistic view of process is also a number of assumptions, such as perfect knowledge of the human actors involved, that humans work in a rational and logical way and that problems have a solution. Melao and Pidd's conceptualization recognizes that whilst the mechanistic/deterministic view of process gives a rich opportunity to model its tangible aspects failure to appreciate the limitations of these models can be dangerous.

Modeling gives a snapshot of what is perceived at a point in time. Sustainable business processes carried out by human operators are a balancing act between learning from the past and experimenting with and adapting to the future, and between rules and constraints versus freedom and flexibility. BPM definitions and models described here have all depended on past knowledge, what is already known, and the attempt to impart this knowledge through best practice. Process models are currently best used to represent the internal elements of business processes; for example the activities needed and their dependencies, the dataflow, the roles and actors involved, and the goals. None of the techniques described above can

incorporate what Senge [18] refers to as 'The learning organization' but if organizations are to survive in the long term their processes have to be responsive and adaptable.

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