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Alternative Approaches to Process Analysis and Modeling

There are a number of process analysis models that are designed to focus on more complex human interactions. One example is the Role Activity Diagramming (RAD) approach of Oulds and Harrison-Broninski and another is the Closed-Loop Business Interaction Model of Winograd and Flores. Both stress that knowledge workers do things that are more complex than workers who simply follow routine procedures. Both are useful in special circumstances, but neither replaces a basic workflow diagram.

BPTrends has published several articles by authors advocating alternative approaches to process analysis and process modeling. Alternative approaches emphasize slightly different aspects of analysis and modeling and may be useful in some circumstances. Generally speaking, however, we believe it is best to use one generic modeling notation. At the moment, we happen to prefer high-level BPMN diagrams or UML Activity Diagrams as they are the most universally accepted, but we aren't wedded to any specific notation. We simply think business process modeler-IT communication is best achieved when everyone agrees to a simple, common notation. Put another way, we think the use of multiple notations is confusing, particularly to business people.

In the past few months we published a BPTrends Column that pointed out the advantages of Winograd and Flores Closed-Loop Business Interaction Model and several articles advocating the use of RAD, a UK approach championed by both Keith Harrison-Broninski and Martyn Oulds. Both of these notations have interesting features and seem to make it easier to capture some specific aspects of processes. As we've considered both and thought about our own practice, we've developed a matrix to help sort out some of the issues involved.

Task Complexity

The first issue revolves around the complexity of the activities that make up a process. Clearly, there is a continuum that ranges from tasks that can be very precisely specified to those that cannot be precisely specified. Assembling subunits on a production line or filling out accident report forms are examples of tasks that can be precisely specified. At the opposite extreme of the continuum, there are tasks that cannot be precisely specified, in advance, and that call for considerable creativity during execution. Managing a major corporation, creating innovative new products, producing a movie, architecting a new corporate office building, or designing a complex new software

application are all examples of tasks that fall near this end of the continuum. In between, there is a range of tasks, moving from the simple to the more complex, requiring increasing human creativity to complete effectively. One of the variables that Winograd and Flores, and Harrison-Broninski and Oulds tend to focus on is communication. Less complex tasks can often be accomplished by individuals working alone. More complex tasks, on the other hand, often require communication among teams of individuals and the communication, with associated lags and joint decision-making episodes, adds to the complexity of the task.

Anyone with a background in expert systems is bound to focus on the nature and number of the rules that individuals need to use to make decisions required to accomplish specific tasks. A simple task may involve following a few rules. More complex tasks may require the use of hundreds or thousands of rules, which, in the most complex cases, like IT or biotechnology, keep changing as the technologies evolve.

Thus, one aspect of any analysis problem is the complexity of the work to be analyzed and modeled.

Process Hierarchies and Abstraction

Before deciding that more complex tasks require more complex models, consider why one models problems in the first place. We model to understand and communicate, and we model differently, depending on what we want to understand or communicate. To keep this discussion from getting too complex, let's suggest another continuum that stretches from enterprise level models down through mid-size processes, and finally, to specific activities or tasks. One usually thinks of this continuum as a vertical continuum, ranging from abstract, high-level business processes at the top, down to more detailed, decomposed and concrete activities at the lower levels of the organization.

At the highest level, we are simply trying to decide how many major processes or value chains a company has. Many companies only have one, and most only have a few. At Level Two, we often divide value chains into three to five major processes, with names like Marketing and Sales, Supply Chain, New Product Development, and Support Processes. At Level Three, the Supply Chain Council has found that four processes work well. They divide the Supply Chain Process into Source, Make, Deliver, and Return.

Even those who are committed to RAD would probably not argue that their models would help business executives conceptualize such high-level processes more effectively than a simple BPMN diagram like the one in Figure 1. At this level of abstraction, we aren't focused on individuals, or even departments, but only on major processes and basic linkages.

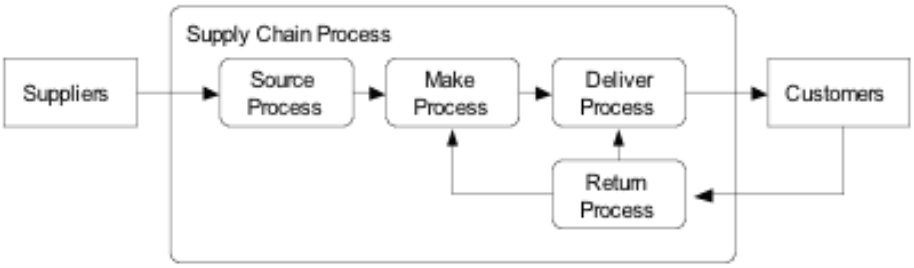

Figure 1. High-Level BPMN Diagram of a Supply Chain

All this leads us to the matrix shown in Figure 2. On the horizontal axis we describe a very general task complexity continuum. To the left we have simple, repetitive tasks. In the middle we have tasks that require more skill and flexibility. On the extreme right we have tasks that are very complex and require creativity.

On the vertical axis, we describe a very general continuum that ranges from high-level, very abstract processes at the top, to low-level, very concrete activities at the bottom.

Consider the Supply Chain model in Figure 1. As long as we are only trying to provide a very high-level overview of the processes involved, we aren't concerned with the specific nature of the task. There could be a mix of simple, repetitive, complex, and highly creative tasks in each of the rectangles in Figure 1. At the level of abstraction where we work when creating a business process architecture and defining major process performance measures, we simply don't care about the numerous and various specific tasks that make up the high-level processes. The real Supply Chain may involve numerous loops and feedback cycles, but at the high level we are simply concerned with defining major processes that will need to be managed and measured and defining handoff points that will need to be coordinated. For this, conventional modeling with a workflow notation like BPMN will serve very well.

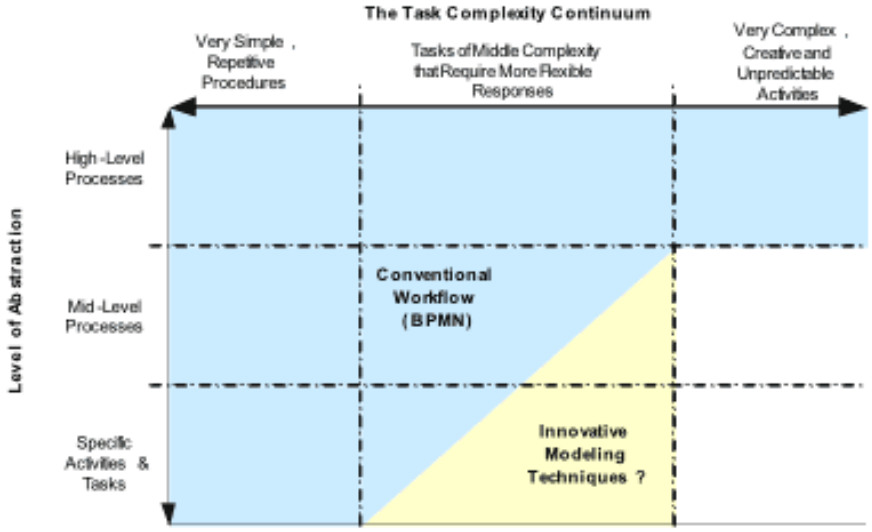

Figure 2. Levels of Abstraction and Task Complexity

Extending our analysis, we can also use a conventional modeling and workflow notation for simple procedural tasks at whatever level of abstraction. These tasks, by their nature, are straight

forward and easy to analyze. Indeed, depending on the industry, many, or most, of these tasks have already been automated.

At the opposite extreme, we aren't good at analyzing very complex cognitive and creative tasks. Expert systems engineers made an effort to capture expert knowledge in the mid-Eighties. Most of these systems failed for a very simple reason. Experts are individuals who are constantly learning and changing their mental models and heuristics as knowledge evolves and experience with specific new problems is accumulated. It turns out that, even if you could build an expert system that captured the knowledge of an expert, as of June 2006, you would have to revise it in July. It is simply easier to maintain the human expert than to try to create and maintain a software system. Put a different way, there are jobs you try to train people to do, and there are jobs you hire people to do, trusting that their previous experience will equip them for the tasks they will face. You don't try to train creative people; you hire them for their experience and expertise. Which is just a way of admitting we don't know much about analyzing those tasks - we simply know what successful output looks like. Thus, we don't need to worry about analysis models or notation for mid to lower level processes and tasks performed by senior managers, new product designers or movie directors. We analyze the high level tasks to get benchmarks and success criteria, hire the best people we can, and then get out of their way.

The challenges clearly lie in the analysis of mid-level and specific tasks of medium complexity. There are, of course, lots of companies working on the analysis and modeling of mid-level processes that lie in this range. I know many people who have worked in this area, myself included, who have concluded that, for most of these tasks, a workflow notation, especially one supplemented with swimlanes, notes, and business rules, works just fine. On those occasions when you encounter a task that involves people working together and exchanging emails, you usually don't analyze the task below the level at which a box indicates that the work is going on inside that box. Keep in mind, the goal isn't to model everything, but only to create such models as are needed by business people or IT folks to accomplish their daily tasks. We analyze to see if we can determine how to perform the process better, or to specify what needs to be automated. We usually don't need to try to analyze how a loan negotiator carries out each step of the negotiation.

Conceptualized in this way, most readers will probably decide that they are, in fact, working in an area in which conventional workflow diagrams will prove quite adequate. Some, however, will feel that the processes or tasks they are trying to analyze really do call for a more flexible, cognitive, knowledge-based, or creative approach.. These readers will want to explore the new notations and analysis techniques that some innovative consultants have begun to publicize.

Till next time,
Paul Harmon