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# Process Modeling in the 21<sup>st</sup> Century

Jan Recker

*“Process Modeling is like turning a lot of light bulbs on in the minds of managers.”*



That is what a manager responsible for the portfolio of business processes in his organization answered when asked why he raised concerns about process modeling efforts. You would expect that after some two to three decades of Business Process Management that at least the modeling side of things is sophisticated and advanced enough not to cause any more trouble.

Problem is, though, the picture of where we are right now in terms of business process modeling is very lopsided. Most organizations have at least started BPM initiatives, but some are still blueprinting their processes on brown paper while others are building up sophisticated model repositories comprising thousands of process models in different variants and releases. Quite diverse, I'd say. On the other hand, countless academic proposals emerge for the next generation of Business Process Management, defining and providing means to measure different stages of BPM maturity, proposing governance structures for business processes, developing process-aware information systems, and so on and so forth.

Enter the next player in the game – standardization organizations. While the last two or three decades provided us with numerous techniques, methods, tools, and methodologies for the modeling and management of business processes, a very recent trend tries to consolidate these developments by streamlining Business Process Management, starting with a number of proposals for standardized business process modeling and execution.

How does all this affect process modeling efforts? What issues around process modeling have emerged from current and future BPM initiatives and which long-known issues have been resolved for good? I was keen on taking a snapshot of current and future approaches towards business process modeling and also of the perceived issues and pitfalls related to these efforts. Based on reported modeling issues and my own experiences from witnessing the developments around BPM and having accompanied organizations in their BPM efforts over the years, I consolidated typical characteristics of process modeling initiatives into a discussion of possible approaches, and concluded them with some recommendations for modeling practitioners.

## Modeling Strategy

How do you approach process modeling? Do you start with process architectures, with the big picture (*top-down*)? Or do you start in little defined spaces, documenting detailed compilations of transactions and manual tasks (*bottom-up*)? Or do you even model *inside-out*, starting with your key processes and continuously extending your process view around these core processes by complementing them with their adjacent support processes?

A bottom-up approach gives detailed insights about single processes. However, one may feel lost in detail and struggle while trying to find a comprehensive overview of the business processes and “how everything is glued together.” A common mistake is to start not deep, but deeper, driven by the desire to capture all scenarios and every exceptional case in the enactment of a process. Another issue arises when you try to establish and maintain the key objectives of modeling when modeling in low detail. How do you make sure that you adhere to corporate strategy and goals while trying to document your way through SAP transaction screens? A top-down approach would

give you the portfolio of your processes first. It also helps in spreading “process-thinking” across employees and getting the necessary buy-in from stakeholders. On the other hand, you might have to spend considerable effort in finding the big picture up-front only to find out that in reality your processes interact quite differently. The inside-out approach is usually complemented with a bottom-up approach, defining the key processes on a low level of detail and then circling around this process until in the end you arrive at the big picture. Here, too, the million-dollar question is where to start: What are your key processes? And how do you go on from there? This might turn out to be a strenuous effort with a high probability of getting lost somewhere...

Most organizations struggle defining and maintaining a clear-cut modeling strategy while admitting at the same time that a mix of approaches might be even more counterproductive to the initiative. Common issues are related to finding or defining the right scope of your processes or the right level of detail granularity. Firstly defining a coherent modeling strategy makes you think about these issues and, eventually, helps in clarifying them. So, while every single one of the possible strategies has its perils and potentials, it still is necessary to find agreement and maintain a modeling strategy throughout all initiatives – plus developing a modeling strategy may improve the link of your BPM initiatives to corporate and IT strategy.

- ⇒ *Establish and maintain a clear strategy for your process modeling initiatives. Make sure you align your modeling strategy to corporate and IT strategy and beware of the pros and cons of the different strategies.*

## Modeling Management

How do you take on modeling activities that span functional boundaries, or, on a larger scale, even regions, cultures, and continents? An issue I found to persist is related to the management of modeling activities. For example, how do you get everyone to use the same terminology, nomenclature, and modeling conventions? Or, how do you handle process model governance and ownership issues? Do you want to employ a centralized management supervising a single team of process modeling experts who travel around to model all the processes in various departments, agencies, and business units or even across regions and countries? Or do you favor a decentralized management approach, with various modeling teams across your organization, each with their own defined scope? Our experiences reveal that organizations approach this management question quite differently. Some favor centralized modeling, some distributed modeling. Some of the centralized modeling supporters then have thought about changing to a decentralized management, and vice versa. Again, it comes down to finding the right balance within your context. A single, centralized team provides consistency across all modeling projects, certainly ensures high syntactical quality of the models, and has defined governance and ownership structures, and training and maintenance costs are manageable. On the other hand, ever tried to model 27 procurement processes across all agencies of a large governmental body? Or tried to do the modeling for a global process standardization project as part of an international SAP roll-out? There are firm limits to what a centralized management approach to process modeling can and cannot do. Distributed teams increase the complexity of communication and management across the process teams. Consistency will be an issue and so may be model quality. Process model governance and ownership need to be defined. Depending on the size of your company, training may also be costly. On the other hand, efforts related to the actual modeling of processes across various departments and regions will be less strenuous, a lot quicker, and, most probably, a lot cheaper too. An issue, accordingly, is to find the right fit between speed and control of modeling. Depending on the size of your organization, its politics, and culture, there might simply be no other way than having multiple modeling teams.

- ⇒ *Balance out internal and external economies of scale related to process modeling. Pay attention to the related training needs for a selected management approach to business process modeling.*

## Modeling Technique

Modeling techniques are like sand on the beach. They seem to exist in millions of variants, fashions, and styles. One PhD student started the effort to compile a list of process modeling techniques in use and stopped at the count of 3,000. Many of these have been developed for a specific modeling purpose. UML activity diagrams can be used to model processes, sure, but they come from a software engineering background and were not designed for business modeling in the first place. Petri nets are fantastic when it comes to simulation and deadlock analysis. However, try to use a Petri net as a handout when it comes to negotiating collaborative processes with a senior manager from your industry partner. Quite to the contrary, Event-driven process chains are easily understood by CEx and business representatives. Yet, systems designers start to moan when it comes to inferring workflow specifications from these models.

So, the question of purpose drives the question of a suitable modeling technique. However, purposes change over time, both across and within BPM initiatives. How do you utilize models for new purposes for which the modeling technique has never been intended? Another issue is that modelers often struggle to make their models readily and intuitively appealing to various groups of stakeholders and diversified audiences. In one of our projects, a representative loudly called for efforts on model standardization. Well, lucky you. Recently, BPMI and OMG have merged to underscore a proposal for a single standard notation for all modeling activities: BPMN (BPMI.org & OMG, 2006) claims to be readily understandable to both business and IT stakeholders; even more, the idea behind it is to use it as a single notation all the way from documenting business requirements on a CEx level down to specifying and executing workflows – in short, a single technique for various perspectives and purposes. But, in reality, it doesn't quite look this easy as yet. What still often happens is that organizations start to model processes with a particular technique for, let's say, the business focus and then switch to other techniques for other purposes, e.g., for software design. In Australia, among the commonly used techniques used currently are EPCs, UML, BPMN, and IDEF. Interestingly enough, in the short time span between March and October 2005, the number of organizations changing their modeling environment to the newly proposed BPMN specification increased considerably. While they all had more or less good reasons for doing so, a common tenet was to "hop on the new train wagon while it's still accelerating." Nobody wants to be left aside if and when BPMN comes through as a standard.

⇒ *Be aware of the focus, scope, and purpose of your modeling initiatives when it comes to picking the right process modeling technique. Keep in mind the interplay between techniques and tools.*

## Modeling Tool

Finding the right technique doesn't do it. Talk about tool support for modeling. Even in the 21<sup>st</sup> century, where a seemingly unlimited range of sophisticated process design and execution solutions are available (Hommes, 1999), you would be perplexed by how many initiatives rely on the brown paper approach (or its Microsoft-sponsored digitalized version, MS Visio). Let's get this straight: Visio is *not* a process modeling but a drawing tool – even though a very handy drawing tool. But try using Visio or similar tools for a large-scale modeling initiative where the number of models in your "repository" easily exceeds a couple of thousands. And we haven't even talked about release management or versioning yet. Modeling tools should support the utilization of process models for various purposes – for instance, simulation, analysis, reporting, performance management, execution, and god knows what else. The following solutions are widespread in Australian organizations and serve as a good indication of where and how some of the process modeling efforts take place (listed in no particular order):

- CASEwise Corporate Modeler
- 4TQ Toolkit
- Microsoft Visio
- IDS Scheer ARIS
- Workflow Modeler

- Holocentric Business Modeler
- ProcessMapper
- SmartDraw
- Sparxsystems Enterprise Architect
- AllFusion Process Modeler
- ABC Flowcharter

As this list indicates, process modeling efforts may range all the way from pure documentation purposes (for which a SmartDraw tool might just be appropriate) down to workflow specification and enactment. Some of the issues I gathered from conversations closely relate to the role that the modeling tool plays in BPM activities. How do you approach model variant management when it comes to having hundreds of variants and releases of a single procurement process blueprint in 27 different agencies? How do you maintain your model repository in an organization with over 2,000 process models? How well does the toolset support decentralized modeling teams with differentiated access and modeling rights?

Some of the software solutions available today are more advanced than others, for instance, in terms of process model lifecycle management, user management, release management, execution, reporting, simulation and controlling functionality, repository management, support for different techniques, methodology, and so on. Obviously, they also differ in maintenance, technical support, customization, intuitiveness, and licensing costs. A good guide for picking the right type of tool can be found in the form of Gartner Research's magic quadrant analysis (Sinur, 2004).

Another *raison d'être* for modeling tools is their support for various modeling techniques. The ABC Flowcharter might just be the best representative of flowcharting tools, but it doesn't offer support for, or interfaces with, other techniques. The ARIS tool suite, on the other hand, offers support for a wide range of different techniques. Just consider the example of BPMN. It was officially released in May 2004, and just a year later its website ([www.bpmn.org](http://www.bpmn.org)) lists more than 30 implementations of BPMN in various Business Process Management tool suites, including most of the above.

- ⇒ *Be prepared to think about the right technique and tool for some five minutes. They will heavily impact your modeling efforts and the outcomes. Think long-term: What if you don't have to manage tens but thousands of models? Keep in mind what you are trying to achieve with your BPM initiative – currently and in future – and select the tool accordingly.*

## Modeling Reference

Companies strive for best practices. How beautiful it is then that a range of industry best practices is already documented in so-called reference models. They are like a blueprint of how you act "best" in a certain domain. A number of reference models try to capture the current state of the art in the areas of IT Service Management, Supply Chain Management, Customer Relationship Management, or in various industry sectors like retailing or production planning and control. In Australia, there is a huge momentum circling around the IT Infrastructure Library (ITIL), a set of seven books defining and explaining best practices in the area of IT service management (CCTA, 2000, 2001). Other popular reference models include the Andersen Consulting Utility Model or TeleManagement Forum's eTOM model (TeleManagementForum, 2001). In Germany, a popular reference model captures details of retail information systems in 600+ data and process models (Becker & Schütte, 2004).

The big question here, however, is how many of these best practices are really applicable to your organization and your business environment? It is not about the fact that good cases exist (and they do!); it is about finding the right level of adoption and compliance. Often, reference models don't capture best but merely common practice. So, which parts of these practices really denote best practice for your organization? And, how suitable are these blueprints in your context? Some ideas sound fancy and logical but just do not apply to your organization.

Yet, it is quite common to refer to reference models as a “cook book” for modeling initiatives. While the level of compliance to such reference should carefully be observed and reviewed it still is a pretty good idea to start with at least a broad idea of what you are trying to achieve. Even if reference models may not depict best but merely common or selected practice, they definitely aid the modeling process in terms of providing a template of consistency, completeness, and communicability.

⇒ *The use of reference models may very well aid and structure your modeling initiatives, but their content may just not be the best thing to follow in your situation. Carefully analyze and observe the extent of compliance that you aim for.*

## Taking Process Models Where No One Has Taken Process Models Before...

What can we learn from this loose compilation of issues and approaches to business process modeling? I guess we need to take our efforts a step further. Process modeling per se is not a hot deal anymore; simply everyone is doing it (well, almost everyone). Some issues haven't changed much over the years. Interestingly, however, recent trends finally seem to approach some of these issues. The question of picking a modeling technique that is accepted across various stakeholders and supports both business engineering and workflow specification may be resolved shortly. The diffusion of BPMN as a standard notation is, at least in Australia, carried forward by a huge push from industry – both BPM vendors and users. While standards do not necessarily denote best-of-breed solutions, I gather it is a step into the right direction to agree at least on a standard approach on a reasonably wide basis. Other old-fashioned issues, however, are simply slow to be resolved, for instance, the question of the economic value of modeling. What's the business case for business process modeling? Well, try to standardize or harmonize your IT systems across various business units without documenting the processes first. Or try to facilitate process governance schemes or measure process performance without relating them to process models. The act of modeling is of tremendous help, as many success stories reveal. It may, however, also be just a costly pastime if you do not know (or don't care) why you model at all.

Yet, not all issues are old. Some issues point to the high level of process management maturity that a significant number of organizations have achieved by now. Who was talking about model lifecycle management, model portfolio management, and the support of modeling tools for sophisticated workflow execution a decade ago when Business Process Management related to some twenty process models and an Enterprise Architecture? Process governance and process model ownership denote severe issues for large, global organizations, such as maintaining an up-to-date model repository. Where is the solution to keep over 1,000 business processes accurately and timely modeled in an integrated repository?

I guess we have to see what else is in the box: Current research tries to tackle some of the issues, both old and new. For instance, factors critical for process modeling success have been identified (Bandara, Gable, & Rosemann, 2005). Other research has compared popular process modeling notations as to their capabilities of expressing relevant facets of a domain (Rosemann, Recker, Indulska, & Green, forthcoming). Furthermore, process models can now be configured and tailored to suit different contexts and perspectives ([www.bpm.fit.qut.edu.au/projects/moco](http://www.bpm.fit.qut.edu.au/projects/moco)). Or, modelers can refer to a number of primitive and composite workflow patterns ([www.workflowpatterns.com](http://www.workflowpatterns.com)) to guide their modeling methodology.

So, I guess process modeling in the 21<sup>st</sup> century means that while some of the “old” issues are still reluctant to leave the stage for good, quite a number of new ones have just entered the stage. So, let's take process models where no one has taken process models before and see if they show us the truth that must be somewhere out there.

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**Jan Recker** is a PhD student at the Business Process Management Group at Queensland University of Technology Brisbane, Australia. The best way to contact Jan is via email ([j.recker@qut.edu.au](mailto:j.recker@qut.edu.au)).