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Potential pitfalls of process modeling: part B

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Abstract

Purpose – This second part of the paper summarizes typical pitfalls as they can be observed in larger process modeling projects.

Design/methodology/approach – The identified pitfalls have been derived from a series of focus groups and semi-structured interviews with business process analysts and managers of process management and modeling projects.

Findings – The article continues the discussion of the first part. It covers issues related to tools and related requirements (7-10), the practice of modeling (11-16), the way we design to-be models (17-19), and how we deal with success of modeling and maintenance issues (19-21). Potential pitfalls related to strategy and governance (1-3) and the involved stakeholders (4-6) were discussed in the first part of this paper.

Research limitations/implications – This paper is a personal viewpoint, and does not report on the outcomes of a structured qualitative research project.

Practical implications – The provided list of intotal 22 pitfalls increases the awareness for the main challenges related to process modeling and helps to identify common mistakes.

Originality/value – This paper is one of the very few contributions in the area of challenges related to process modeling.

Keywords Modelling, Organizational processes, Process management

Paper type Viewpoint

The first part of this paper introduced the characteristics of contemporary process modeling initiatives. It also discussed six typical characteristics of unsuccessful process modeling related to strategy and governance and the involved stakeholders. This second part continues this discussion with a focus on pitfalls related to tools and related requirements (7-10), the practice of modeling (11-16), the way we design to-be models (17-19), and how we deal with success of modeling and maintenance issues (19-21).

7. Lack of realism

Companies tend to underestimate the number of relevant process models they have to design. A CIO of an Australian insurance company asked me once, how many processes do I have, 5, 50, 500, 5,000? It did not take long, and within a few weeks a number of analysts designed 50 + models. Think bigger, globally, allow more time,

and we have hundreds and often thousands of models in the repository. This complexity driver demands scalability in everything, i.e. the capabilities of the tool, methodologies, modelers' capabilities, communication strategies, model maintenance, etc. Thus, it is important that scalability finds its way into selection and evaluation procedures:

Do not under-estimate the number of models which you will have to maintain in your repository over the next three years.

8. The chicken and egg problem

The chicken is the modeling tool and the egg is the modeling language or framework. On the one side, organizations might have a desire to model in one specific way, but no tool in the world exactly supports this. An illustrative example comes from an American producer of chemicals. As part of their Enterprise Architecture modeling activities, this organization first consolidated the perceived advantages of a number of frameworks including Zachman, TOGAF, FEAF, Index and DoDAF. They consolidated all this into one framework and then approached the market in order to identify a tool which could be customized in a way that it was able to facilitate such a framework. However, we also see cases, in which organizations stick to a known approach (e.g. IDEF) and seek support for this methodology, without sufficiently considering more recent developments. On the other side, organizations tend to select tools based on recommendations of analysts and market studies, and then adapt the methodologies as facilitated by the tool. Such an approach often works better when the modeling maturity is rather low, and there is no capability to develop a tool-independent approach. It also minimizes the required tool modifications and benefits from an early exposure to actual practice. Whichever way you start, tool or method, you will eventually have to compromise:

Be aware of the Catch 22 related to selected tools and methods.

9. Lack of details

While the scope of processes which can be modeled seems to be endless, there are often annoying constraints about what parts of a process can be modeled. The most recently proposed Business Process Modeling Notation (BPMN), for example, has only limited capabilities to cater for modeling risks in the context of Sarbanes-Oxley, or tacit knowledge for knowledge management or cost drivers in an activity-based costing project. In many cases, such limitations derive from the history of these modeling techniques. IDEF and UML, for example, were originally developed for the purpose of systems analysis and design. Historically, their focus has never been on business modeling. An increasing number of application areas such as business continuity management or business rules management pose new challenges, which can hardly be satisfied by any comprehensive modeling suite right now:

Be aware of the limitations of the selected modeling language and tool.

10. Lost in translation

This pitfall has nothing to do with the English version of SAP's reference model or Bill Murray's "Enjoy your fright" (you will know what I talk about, if you saw the movie

"Lost in Translation"). It is about translating business models into system models, and let us assume we are really modeling for an IT purpose. Currently we observe a hype related to the translation of "easy-to-understand" business models into executable process models. A number of one-to-one as well as generally standardized interfaces between various business process management tools exist. Asking for such interfaces is a typical one line item in every significant tool selection process. However, there is a significant discrepancy between demanding an interface and actually using it. Different purposes (business or system models?) still vary in their information needs and we are far way from one standard way of modeling:

> While an automated translation of business models to system models is a nice feature, the capabilities of related interfaces but also the actual opportunities for a 100% translation are often (still) limited.

11. Lost in a drawing tool

The most popular tool to model is Visio (Davies *et al.*, 2004). And the question most often asked in the process of selecting a more advanced modeling tool is "Do you have an interface to Visio"? (the answer by the way is "no"). Visio is a representative example for a sophisticated drawing tool. These tools have the advantage that they are often already a part of the standard operating environment. Users tend to be familiar with the simple drag-and-drop approach. Increasingly, these tools additionally provide at least a pre-defined set of templates for the most common modeling languages. They are perceived as easy to use and can easily be customized. They are quite appropriate, when a few process models with a limited lifespan have to be designed for a specific purpose. However, have you ever tried to model the largest bank, utility provider or insurer of your country in Visio? Well, a number of attempts have been made. The lack of an advanced repository, analysis and reporting functionality, among others, significantly limits the scalability of such an approach. Sooner or later, every larger modeling application will reach the limits of drawing tools and look for a more advanced solution:

> Drawing tools have their raison d'être; however they might just not be appropriate for larger business process modeling activities.

12. Lack of complementary methodologies

A representative from an American brewery told me that they felt they picked the world-leading modeling tool, but were overwhelmed by its capabilities. How do I start? How do I use it in a modeling workshop? What functions are relevant for me?, etc. Unfortunately, many tool vendors do not provide a comprehensive, detailed, accepted and tested methodology which helps to use the tool and its plethora of modeling techniques. An American chemical company even went to the point to characterize a previous comprehensive modeling initiative as a failure, because its methods were limited to the tool capabilities. It was only until they derived comprehensive conceptual support for the entire business process lifecycle, that they were able to succeed. Consequently, it is necessary to find a methodology, which supports the entire business process lifecycle and together with the modeling tool facilitates sound model lifecycle management. This includes modeling conventions, guidelines for modeling workshops, quality assurance procedures, release cycle management, etc. One

related aim is to mitigate subjectivity in the modeling process, i.e. to make the actual model design as independent as possible from the person who is doing the modeling:

> Complementary methodologies are required to fully utilize the capabilities of modeling tools and techniques.

13. L'Art pour l'Art

When the artists in the process modeling team dominate, there is the inherent danger that modeling gains its own momentum. Rather than working for the purpose of understanding a process or satisfying the information needs of a specific project, it is the modeling process itself, which absorbs all energy. These are the cases in which organizations aim for enterprise-wide models and modeling is perceived as a very time-consuming activity. Completeness matters in these cases more than relevance. An Enterprise Architect of a Western Australian utility provider phrased it as "Modeling *just-in-case* that somebody might need the model." The opposite would be modeling just-in-time when the model is really required. A just-in-case approach might be beneficial to an organization, which is rather risk-adverse. Process modeling, however, is hardly an end in itself and is always conducted for a specific purpose:

> Process models have to be relevant, not necessarily complete.

14 Lost in syntactical correctness

On the other side, a dominating scientific approach towards modeling can lead to an over-engineered modeling initiative. I talked to owners of modeling guidelines who could argue for half an hour if a certain attribute of an activity in a process model should be mandatory or optional. Such an approach may be interpreted by some as forcing us into speaking Shakespearean English. It is important that both the selection and customizing of the modeling techniques consider the underlying current and future objectives. In the academic world this is known as striving for feasible correctness (Lindland *et al.*, 1994):

> Customizing of the modeling technique should strive towards applicability, not perfection.

15. Focus on models and not on modeling

If you ask participants of a modeling workshop at the end of the event what they enjoyed most, the typical answer is not that they will rave about the beauty of the final deliverables, i.e. the actual process models. Rather they will tell you how much they enjoyed the discussions which occurred while they modeled the current or future processes. They will tell you how stimulating these conversations have been and how much they learned. What do we learn from this? The very act of modeling triggers a change reaction and increases process awareness, even if only that those involved in the modeling will think differently about the processes and related organizational issues. The process of modeling is most likely more important (if this can be compared at all) than the final models. As a consequence, process modeling should be conducted in a highly interactive fashion. However, I recently met a business analyst from an American chemical company. They conducted some interviews with individual stakeholders and then consolidated all the feedback in process models sitting on their own in front of their modeling tool...:

> The experiences during the journey are part of the overall outcomes of process modeling.

16. Lost in detail

A large oil and gas company is currently conducting significant modeling efforts. Approximately 100 people access the globally centralized repository of more than 3,000 models. At a recent conference, a representative from this company reflected on the lessons learnt and stated "We did probably too much detailed process modeling." It is a common trap to go deeper and deeper when it comes to modeling. Involved modelers and business users tend to be driven by the desire to capture all scenarios. They also might be used to "the old way" of documenting step-by-step standard procedures. However, the more detailed a model is the longer it takes to design, review and maintain it. It will outdate more quickly and will often lack relevance as the detailed steps are intuitive for the involved employees. To avoid such situations, it is essential to agree on a number of conventions. The most important one being that a focus on the 80 percent case is often sufficient, if it is not the purpose for specifying processes to be automated. 80 percent means here both probability and resource consumption. Another possible approach is to not model activities which are conducted by just one organizational unit. Finding the right level of detail is one of the core challenges in process modeling. Being able to identify this appropriate level is a core capability of an experienced modeler. General process improvement, for example, requires high-level models, while executable models have to be much more detailed:

Define an appropriate level of detail in light of the underlying objectives.

17. Lack of imagination

I have seen a number of process improvement methodologies and techniques, which were designed around the classical three step methodology "understand the current process – find ways to improve it – action planning". Without any doubt the current performance of many business processes provides typically a number of ideas for business process improvement. However, the danger of only focusing on the shortcomings of the existing process is that the entire project concentrates very much on "*overcoming* problems" rather than achieving inspirational, new, strategic goals. As such, it has its constraints. We now observe an increased interest in business process innovation, i.e. scenarios without a corresponding as-is model. These projects require "out-of-the-box thinking" a good understanding of completely new ways of conducting a business process and dealing with uncertainty:

A good understanding of the existing process is important, but it should never be the only source of ideas for the new process.

18. Lost in best practice

Claudia Schiffer is one of the few recent German export success stories. She is without any doubt beautiful and consequently features in various advertising campaigns. As such she could be seen as an example for best practice. However, only one man in the world can be married to Claudia. What do we learn? Not every best practice is accessible for everyone. Let me give you another example. As part of a research project, the faces of the final male and female contestants of a beauty contest were artificially merged (www.beautycheck.de). The assumption was that the artificially derived final face expressed the ultimate beauty. However, it looked rather androgynous and was not beautiful at all. What do we learn? Be careful with best practices which consolidate a number of features from existing "good cases". Sometimes 2 + 2 is 3. Let me give you

a third example. Toyota is well known for its efficient operations management. Many companies have tried to adopt Toyota's secrets. The problem has been that Toyota is a huge, self-contained organism with a complex set of values, behaviors, assets, people, processes, policies, etc. It is not sufficient to just copy one part of Toyota. However, it is hard to know what parts have to be copied, and how they relate to the rest. Just a single focus on best practices (such as Toyota) can be dangerous, if selection bias matters (Denrell, 2005). With the "blinding light of success" as Denrell phrases it comes the increased difficulty to distinguish between important and unimportant factors. In our context: A successful company might have great processes, but it is not because of these processes that it is so successful. Finally, with best practices we are often only exposed to the final result, but we do not see the process which led to this recommended case. All these examples show that it comes down to applicable best practice. It is not about the existence of good cases. It is about pathways for the wider roll-out of these ideas. A number of reference models try to capture the current state of the art in the areas of IT service management, supply chain management, project management or customer relationship management. In most cases, however, they are not the complete cookbook to establish relevant best practice in your organization. They tend to exclude references to actual case studies and do not consider relevant context factors:

> So called best practice models can be useful in terms of structure, content, overall guidance and opening up more possibilities. The notion of best practice is, however, typically over-rated.

19. Design to-be models solely centered on new IT
Some of our modeling-related projects had a timeframe for the to-be model of one year, sometimes even two years. In discussions about how we can overcome the current problems in such a timeframe, the most popular answer is – "With new IT". These people also believe that SAP as an abbreviation means "Solutions to All Problems" and with enough patience, IT can fix anything. It is a bit like the strong believe of my son in the endless capabilities of Bob the Builder. Such an attitude can lead to a number of problems. First, it can be used as an excuse to not search for non-IT related solutions. I may have great solutions for routing all my incoming phone calls within my call centre, but why do I receive these phone calls in the first place? Second, it can lead to an attitude that nothing gets done until the new system is in place. Third, it might express the naïve believe that the IT vendor really meant it when (s)he said that the expected feature will be available in the next version. A CIO described this to me as the "process management dilemma of IT": IT is not in charge of the process, but if the deployment of IT fails in this process, it is their fault. In light of the classical application development backlog in many organizations, it is in fact quite healthy to ask for process improvement ideas which explicitly do not utilize IT changes at all:

> Business process models stimulate an integrated organizational and IT view on process change. An exclusive focus on IT solutions ignores other potentials resulting from non-IT improvements.

20. Modeling success is not process success

In literally all process modeling sessions, we see an enormous satisfaction with the newly designed business process blueprints, the so-called to-be (or should-be) models. There is a great tendency to be too satisfied with the created process models. A first wave of enthusiasm can often be observed when a to-be model is created. However, this remains just a model. It looks great, but does not change the world. Or, as Tom Davenport phrases it: "After all, it was easier to create detailed models than it was to create real change within organizations" (Davenport, 2004):

> Appreciate the ideas which went into the new process design, but be aware that only the implementation matters.

21. Lost in model maintenance

The next issue is related to modeling in the large. The oil and gas company mentioned earlier has 3,000 models in their repository, the Australian utility provider has 4,800 models. How do those organizations keep the models up-to-date? Do they have to? How many of these models are not current anymore? We call outdated models in a repository, "pollution". With increasing size of the model repository, it becomes essential to establish sound practices for model lifecycle and review management as part of an overall quality assurance. Such an approach must be scalable and should be owned by a central process group. The responsibility for the actual correctness of the model, i.e. its semantic quality, however, should rest with a business representative and has to include a clear model ownership, which should rest with the business (see also governance):

> Establish sound, but appropriate procedures and ownership for maintaining an increasing model repository.

22. Lack of measuring modeling performance

We model processes to improve process performance in the hope that this positively contributes to increased business performance. It is important, therefore, to have, right from the start, a good understanding of the parameters we are seeking to change and the nature of the change we seek. Such parameters must be measurable and the measurement process should be well understood before we start so that we can create a baseline against which our changes can be assessed. Understanding the nature of the improvements that we are trying to make and maintaining a credible record of outcomes as we progress, can only happen if we develop appropriate plans for process performance measurement before we start making changes. Companies have different attitudes in terms of the evidence they require before they believe in actual process improvement. The actual measures may vary and go far beyond the obvious processing time. In a recent project in an insurance company in the area of processing claims related to personal injuries in car accidents, it was the minimization of the average payout, which was far more important than the processing time. In a loan application example, the focus was on "maximizing face-to-face time spent with the customer." Measuring the cost of a process is another interesting challenge. The discussions related to activity-based costing have shown that any measurement of process costs has to be very much aware of the characteristics of direct and indirect

costs, and the correlation of fixed and variable costs with the timeframe of the project. Something not every business process analysts truly understands:

> If you can't measure it, you can't manage it – and, more importantly, you can't claim it as a success.

23. Summary

In the light of 22 pitfalls, the reader might ask for the actual motivation to do process modeling at all. Process modeling has proven essential for achieving business benefits in a large number of cases. In the American brewery mentioned above, for example, a related case study states that a project which utilized modeling saved the organization more than $3 million. The list above, however, hopefully increases the awareness for the current challenges we face when we approach process modeling to the extent that it is required in larger organizations.

References

Davenport, T. (2004), "Modeling in moderation", *Process Innovation. A Business Process Trends Column*, June, available at: www.bptrends.com

Davies, P.G., Rosemann, M. and Gallo, S. (2004), "Conceptual modelling – Why do we do it?", in Atzeni, P. *et al.* (Eds), *Proceedings of the International Conference on Conceptual Modelling (ER 2004), Shanghai, 8-11 November*, pp. 30-42.

Denrell, J. (2005), "Selection bias and the perils of benchmarking", *Harvard Business Review*, Vol. 83 No. 1.

Lindland, O., Sindre, I. and Sølvberg, G. (1994), "Understanding quality in conceptual modelling", *IEEE Software*, Vol. 11 No. 2, pp. 42-9.