

## **The BPM Context Matrix – A Framework for Context-Aware Business Process Management (BPM)**

### **Abstract.**

Given the diversity of business processes, isn't it strange that BPM approaches aim at a unified management approach? We report on research challenging this common assumption: We present an approach to account for contextual differences of processes in BPM. Specifically, we report on research that has developed a matrix to classify business processes according to their contextual management requirements. This matrix results from both in-depth research, specifically with SAP, and a real-world project with Hilti, a globally operating company. Following a design science research approach, we identify two key contextual dimensions to distinguish processes: variability and frequency. As these two dimensions are present to different degrees (high versus low), we present four context clusters in which business processes can be organized: reliability, performance, agility, and innovation. The BPM Context Matrix provides several implications for BPM. It facilitates BPM approaches, which are sensitive towards contextual requirements and, thus, more likely to be adopted successfully. Specifically, the BPM Context Matrix can also be used to plan and scope the implementation of various digital technologies to advance BPM in organizations.

Keywords: Business Process Management (BPM), Context-Awareness, Information Technologies (IT).

### **Introduction**

In an earlier note, we have reflected on the role of context in process management, and based on research with SAP, we presented a BPM context framework to identify essential attributes to pinpoint the contextual requirements of business processes (vom Brocke, Zelt, et

al., 2016). Since then, we developed instruments to measure processes according to relevant contextual factors for BPM (Zelt, Recker, et al., 2018; Zelt, Schmiedel, et al., 2018). In this note, we report on the first project that has applied such instruments on a global level (vom Brocke et al., in press; Weber et al., 2021).

Our case company, Hilti, is a globally operating company in the construction and building maintenance industry, developing and providing services, products, and systems for business customers (vom Brocke, Schmiedel, et al., 2016). Hilti is well known as a success case for BPM, being one of the first and few organizations to have succeeded in global processes and data and operating on a single instance SAP System (vom Brocke et al., 2010; vom Brocke, Schmiedel, et al., 2016). In 2017, Hilti has been awarded the Global Award for Excellence in BPM & Workflow der WfMC.

Hilti has introduced a process repository based on MS Sharepoint. Like for many companies, however, the adoption of such models as well as their maintenance has proven challenging. Hilti decided to revisit their BPM approach according to state of the art in research. We have engaged with Hilti on their journey of revising their global process management system in a project called "GPMS next generation". In doing so, we have informed the essential directives for the process re-design by means of the ten principles of good BPM (vom Brocke et al., 2014b), which we also had presented in an earlier note here (vom Brocke et al., 2014a). Hilti decided to develop a context-aware approach to manage their processes.

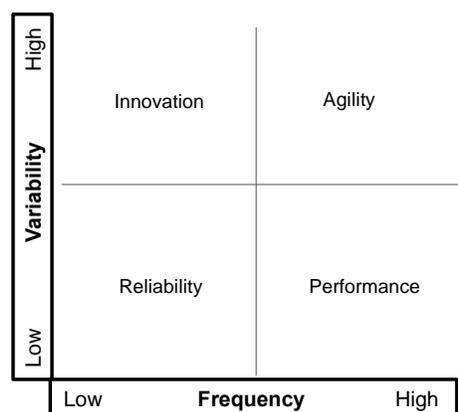
Context-awareness essentially states that there is no 'one-size-fits-all' approach to the management of processes. This is because processes are of very different nature and, thus, espouse different management requirements (vom Brocke, Zelt, et al., 2016). There are numerous advantages to context-aware process management, such as increased process flexibility, better decision-making, and better risk management (Rosemann et al., 2008; vom Brocke, Zelt, et al., 2016; Zelt et al., 2019).

In the following, we offer a comprehensive introduction into our approach and the results so far in a way that other organizations can build on. We present the BPM Context Matrix and discuss how organizations can use it to implement a context-aware BPM approach. More details regarding the case, the methodology, and the implications can be found in Weber et al. (2021) and vom Brocke et al. (in press). The global rollout of the "new GPMS" is planned for 2022.

## The BPM Context Matrix

The BPM Context Matrix is presented in **Figure 1**. Based on our extensive measurements and groupings, we discussed which dimensions were most salient to distinguish process types. Together with the company's management, we agreed on two key dimensions: variability and frequency.

- *Variability* is expressed as the degree to which a process can or should respond to internal and external dynamics (Feldman & Pentland, 2003; Mertens & Recker, 2020). We observed that some process groups need variability (e.g., R&D processes, which differ according to the goal, timeline, and people involved). Other processes such as those prevailing in Audit and Finance should not be variable at all.
- *Frequency* reflects how often the process is carried out (Lillrank, 2003). We observed that some processes are performed often, and others are performed once per month or year. Process executions may be more similar when they occur often (Goh & Pentland, 2019), and some processes need to follow a specific sequence of steps. Audit and finance processes, for example, need to conform to some defined standard in contrast to R&D processes, which tend to occur rather rarely but usually deviate from detailed guidelines and standards.



**Figure 1.** BPM Process Matrix.

Combining these two dimensions (*variability* and *frequency*), we developed a 4-quadrant matrix. We refer to this as the **BPM Context Matrix**. Each

quadrant represents a process cluster recognizing processes with a specific set of requirements to be managed successfully. We have assigned intuitive names to these process clusters (as shown in **Figure 1**): Performance, Innovation, Reliability, and Agility.

- *Performance Cluster*: Processes occurring with high frequency and low variability. This cluster is about processes which are performed very often (high frequency). Each performance should be more or less the same way (low variability). Consider a production process. Ideally, the outcome of such a process is always the same, and the way of production usually does not change. As an example, we can consider the production of nails, which are identical throughout the same batch, fulfill the same function, and therefore have a low variability. However, such a production process occurs frequently.
- *Innovation Cluster*: Processes occurring with low frequency and high variability. Processes that belong to the Innovation Cluster require a high degree of creativity. Much of what happens in these processes cannot be anticipated or prescribed. These processes occur rather rarely (low frequency). However, if such innovation processes are executed, they usually run differently after each iteration (high variability). An example of this are R&D processes. Since the outcome of such processes is usually uncertain and not clear in detail from the beginning, they exhibit a high degree of variability. However, the frequency with which such processes are performed is rather low.
- *Reliability Cluster*: Processes occurring with low frequency and low variability. This cluster is about processes which are performed very rarely (low frequency). When they are performed, however, the execution should be more or less the same (low variability). Consider the preparation of a tax return. This process is typically always structured in the same way and is usually carried out once a year. Consistency and reliability are key, not only for reasons of compliance but also to ensure that information is integrated when it is needed. Since tax returns usually have to be filed once a year (low frequency) and are usually always done in the same way (low variability), this type of process can be assigned to the Reliability Cluster.
- *Agility Cluster*: Processes occurring with high frequency and high variability. In the Agility Cluster, we find processes that run frequently (high frequency) and, at the same time, exhibit a strong potential to deviate across process executions (high variability). These processes are knowledge-intensive and draw on the experience and knowledge of those who are involved in the processes (Badakhshan et al., 2019). Process execution is characterized by improvisation. We assume that we often have to deal with complex issues in the Agility Cluster. One example is the talent acquisition process. The way in which new employees are acquired may be similar in its basic steps, but the exact

implementation varies depending on the applicant (the talent) and the open position

## Context-Aware Business Process Management

The BPM Context Matrix enables organizations to adopt a context-aware BPM approach. This means that not all processes are managed the same way, which often leads to problems, such as resistance. For example, it seems misplaced to impose the same management rules for processes with a high variability and low frequency, and processes that vary very little run very often and are basically the same way every time. We realized that allowing for different process clusters, which account for the actual requirements in managing such kinds of processes has been perceived as a relief for many process owners and process performers and contributes greatly to the usefulness, and thus also to the acceptance, of a BPM approach.

For each cluster, we identified the key challenges involved in managing these processes. Thereby, we clarify what is most critical in both running and managing processes as part of a specific context cluster. We then mapped our insights against BPM capability framework (Rosemann & vom Brocke, 2010; vom Brocke & Rosemann, 2015). **Table 1** gives examples for all context types and all capability areas. These results were obtained through close collaboration between researchers and key stakeholders from the company.

	PERFORMANCE	AGILITY	INNOVATION	RELIABILITY
<b>Key Challenge</b>	<ul style="list-style-type: none"> <li>Keep people motivated</li> <li>Manage efficiently and the first time right</li> </ul>	<ul style="list-style-type: none"> <li>Enable people</li> <li>Be sensitive and adaptive for change</li> </ul>	<ul style="list-style-type: none"> <li>Find innovative solutions to largely unknown challenges</li> <li>Focus on effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Ensure knowledge transfer</li> <li>Improve by incorporating new insights</li> </ul>
Strategic alignment	<ul style="list-style-type: none"> <li>Orient towards efficiency KPIs</li> </ul>	<ul style="list-style-type: none"> <li>Consider the number of variants and the process time</li> </ul>	<ul style="list-style-type: none"> <li>Be aware of the uniqueness of the solution</li> </ul>	<ul style="list-style-type: none"> <li>Act result-oriented according to measures like time, budget, quality</li> </ul>
Governance	<ul style="list-style-type: none"> <li>Constantly monitor roles and responsibilities</li> <li>Take instant countermeasures</li> </ul>	<ul style="list-style-type: none"> <li>Reduce variability to a favorable level</li> </ul>	<ul style="list-style-type: none"> <li>Question the status</li> <li>Involve experts and their network</li> </ul>	<ul style="list-style-type: none"> <li>Appoint expert groups</li> <li>Appoint a Center of Excellence (CoE)</li> </ul>
Methods	<ul style="list-style-type: none"> <li>Standardize process steps</li> </ul>	<ul style="list-style-type: none"> <li>Use decision models</li> <li>Deploy reference cases</li> </ul>	<ul style="list-style-type: none"> <li>Apply a stage-gate and cook-book approach</li> </ul>	<ul style="list-style-type: none"> <li>Use checklists</li> <li>Utilize best practices</li> </ul>
Information Technology	<ul style="list-style-type: none"> <li>Standardize applications</li> <li>Automate processes whenever and wherever possible</li> </ul>	<ul style="list-style-type: none"> <li>Deploy an event-based architecture</li> <li>Deploy specific functional apps</li> </ul>	<ul style="list-style-type: none"> <li>Promote knowledge management</li> <li>Deploy collaboration tools</li> <li>Apply and pursue a project management approach</li> </ul>	<ul style="list-style-type: none"> <li>Make use of workflows and templates</li> </ul>
People	<ul style="list-style-type: none"> <li>Employ reliable and hard-working people</li> </ul>	<ul style="list-style-type: none"> <li>Focus on continuous learning</li> <li>Apply an agile approach</li> <li>Set the focus on rapid implementation</li> </ul>	<ul style="list-style-type: none"> <li>Look for and encourage problem-solving skills</li> <li>Enable and promote agile solutions</li> <li>Enable and encourage "out-of-the-box" thinking</li> </ul>	<ul style="list-style-type: none"> <li>Challenge existing processes</li> </ul>
Culture	<ul style="list-style-type: none"> <li>Stick to the standard</li> <li>Establish a disciplined and continuously improving environment</li> </ul>	<ul style="list-style-type: none"> <li>Enable a functioning and inspiring teamwork</li> </ul>	<ul style="list-style-type: none"> <li>Give and receive feedback</li> <li>Commit to the extraordinary</li> </ul>	<ul style="list-style-type: none"> <li>Establish an "Excellence Culture"</li> </ul>

**Table 1. Description of the process cluster according to six core elements in BPM (Rosemann & vom Brocke, 2010).**

Illustrating the impact further, the BPM Context Matrix can also be used to inform and guide the selection of relevant digital technologies, such as process mining and robotic process automation (RPA).

To give a few examples, process mining has been identified as a promising means to advance companies' process management approaches (Grisold et al., 2021) but many organizations find it challenging to find value-adding applications areas where to start. Using the BPM Context Matrix, it becomes obvious that it is about the high frequency processes that would allow for meaningful results from process mining as these processes provide a sufficient amount of digital trace data to be analyzed. Further, the cluster particularly interesting for process mining is the agility cluster; if we have sufficient data, we can pinpoint the high variability of process executions. According to our study, managing processes in the agility cluster should actually aim at "challenging" the variability, meaning to further investigate variability regarding its value creation. Guiding questions can be: Is it necessary?, Is it value-adding?, Or is the variability avoidable and preventable?

To give another example: Robotic Process Automation (RPA) can have immediate implications for processes associated with the performance cluster. Given the high frequency and low variability, standardization and automation are management imperatives in this cluster in order to make processes more efficient and effective. Hence, RPA can be particularly useful to automate recurrent steps in the performance cluster (van der Aalst et al., 2018). In the innovation cluster, on the other hand, standardization and automation might actually limit people's capabilities in finding solutions to new problems. Hence, we do not consider it necessary to document detailed steps of a process belonging to the Innovation Cluster. This would also restrict the process users in their creative work. An example can be a product design process where designers take new actions which respond to the specific needs of a given project (Seidel et al., 2010). Support can be provided by means of project management or messaging systems, which afford knowledge sharing and process transparency. For the reliability cluster, it is key to "reinforce" the desired process performances, as it occurs fairly seldom but – when it occurs – standard procedures need to be followed. Here, for instance, workflows and templates can guide process performers.

## Summing Up - Lessons learned

Processes have contextual management needs. Our **BPM Context Matrix** builds on long-standing research and has been developed and evaluated in an on-going global project with the Hilti Corporation. The Matrix identifies four different types of business processes –

performance, innovation, agility and reliability – and they depend on different principles and tools to be managed effectively and successfully. We also show how promising digital technologies, such as process mining and robotic process automation, can be adopted in an organization following a well-targeted value-adding strategy.

## Get in touch

For many organizations we are working with, the four clusters identified, provide a very well-fitting template. Organizations may feel free to use and adapt these clusters, alongside the principles of how to develop the BPM capabilities for each of these clusters.

Get in touch with us. We are excited to learn more about your processes and how to make your BPM approach most successful.

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