

The Added Value of Process Mining 04-01-2014

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Should you be Using Process Mining and why?

Process mining (van der Aalst, 2011), just like data mining, is a generic technology and can be applied in many different ways. This is an advantage but at the same time it makes it difficult for you to understand what exactly the added value would be for *your* situation. Should you be interested in process mining and learn more about it? Which kinds of processes can be analyzed with process mining? What benefits would it bring?

In this Article, we give you a framework for the most common process mining use cases, so that you can see where you fit in.

Which Processes Can be Analyzed

One way to look at the processes that can be analyzed is to use Porter's Value Chain Analysis framework (Porter, 1985).

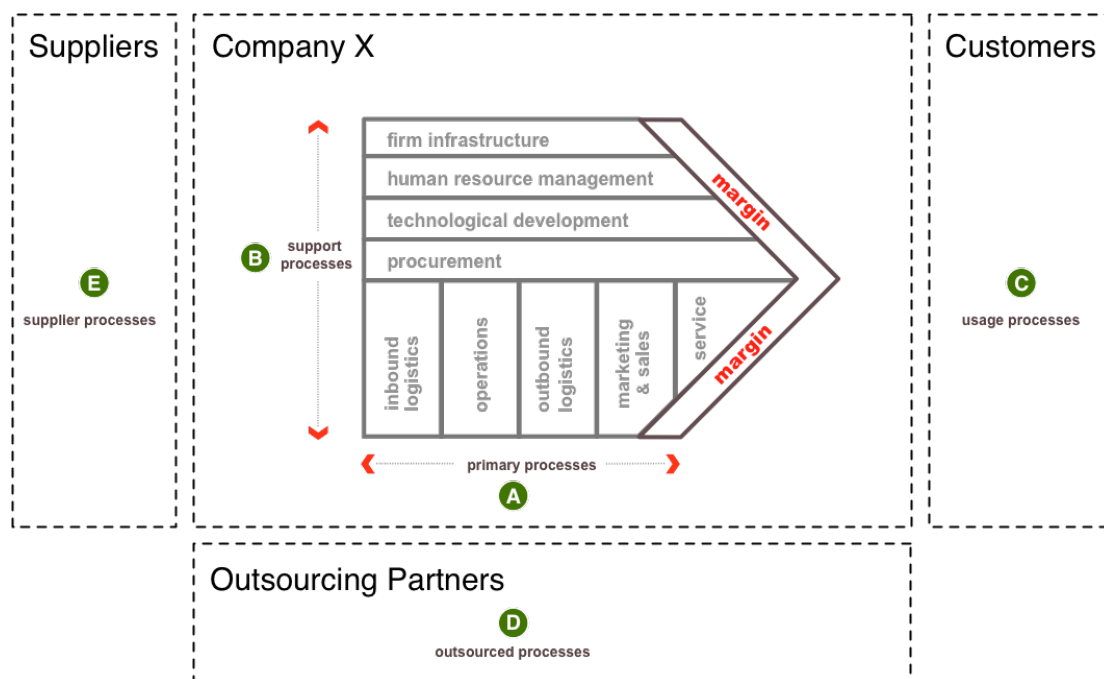


Figure 1: Processes inside and outside of an organization

Figure 1 shows an overview of the processes that exist within and outside of an organization. Any of these processes that are supported by an IT system can be analyzed with process mining techniques. The IT system must at least capture the following information about each activity that is performed: (1) a Case ID, (2) an activity name, and (3) a timestamp.

Here are a few examples of processes that have been analyzed with process mining:

A) Primary processes

There are several primary processes that many companies have in common, for example:

- Sales processes (e.g., supported by Salesforce system)
- Customer services (e.g., supported by Siebel CRM system)
- Material management (supported by a Warehouse Management System)

There are also core processes that are company or industry specific, for example:

- Loan application processing at a bank
- Regulation translation process in the EU
- Diagnosis and treatment processes in a hospital
- Claim processing in an insurance company
- Government handling subsidy applications
- Software development process for a software vendor

B) Support processes

Secondary processes are, for example:

- Human Resources processes (e.g., supported by a case management system)
- IT Service Management processes (e.g., supported by an ITSM system)
- Purchasing processes (e.g., supported by an ERP system)

C) Usage processes

If the company sells a product, it is essential to understand how their customers use the product. For example, a manufacturer of medical devices like Philips Healthcare wants to analyze the usage processes of doctor's using their X-Ray machines to improve the reliability and usability of the devices.

Another type of process in this category is the so-called "customer journey", which looks at how customers interact with a company, possibly through multiple channels. Think, for example, of a customer using the online banking services through the website and then calling the helpdesk because she cannot find the credit card overview statement she is looking for.

D) Supplier processes

For manufacturing companies that have a high dependency on external suppliers, such as automotive companies, it is often important to collaborate with their suppliers already in the Research and Development phase and align their processes to be successful.

E) Outsourced processes

An increasing number of non-core processes are outsourced to specialized service providers who can offer these services more efficiently and at cheaper costs. For example, IT Services are often at least partly handled by external service providers. Other examples of outsourcing are callcenters, logistic processes, security services, etc.

Use Cases

To understand the added value of process mining for a concrete use case, one not only needs to look at the process that is analyzed, but also at who (see Figure 2 for typical organizational roles involved with process mining) is using process mining for what purpose. How are they working today? And what difference does process mining make compared to the old way of working?

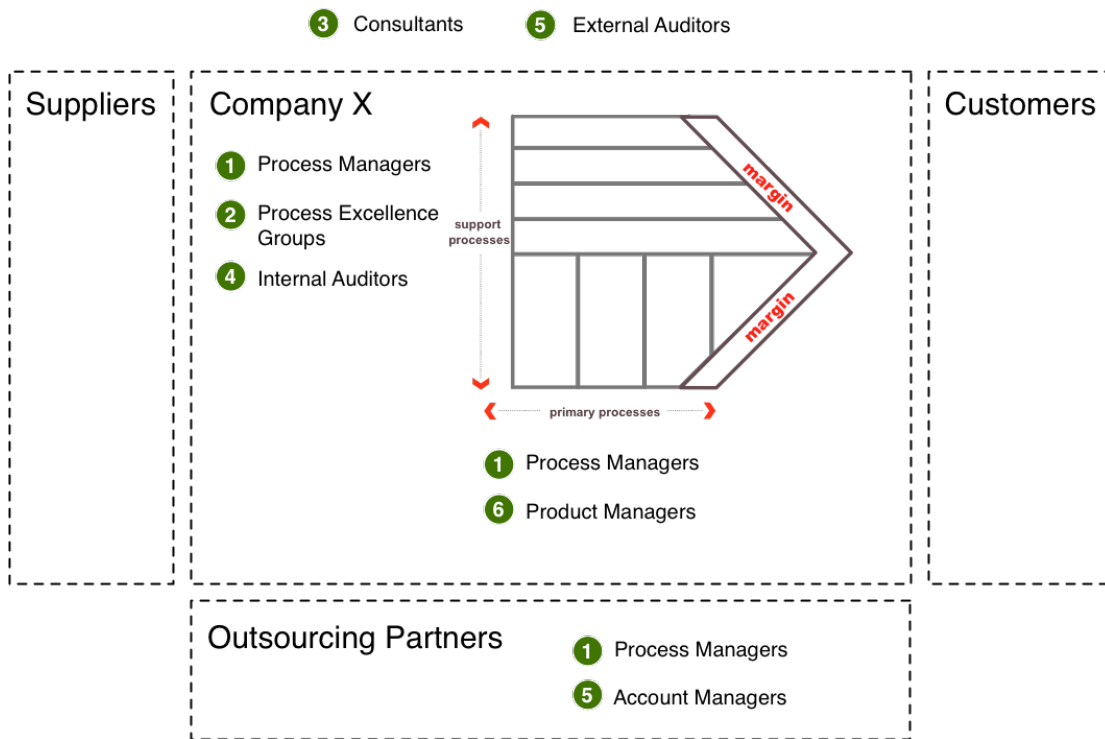


Figure 2: Organizational roles who can be involved in process mining

For example, take the use case of a Process Excellence group (Role 2 in Figure 2). A Process Excellence group employs process experts and internal consultants who help different departments in the organization to re-structure and optimize their business processes. The process improvements that are delivered by their projects in cooperation with the process owners have the goal to provide long-lasting cost savings and increased revenue for the company.

The starting point for any process improvement project is the so-called 'As-is' process analysis, in which the current state and all the deficiencies of the process are mapped out and improvement opportunities are identified. The traditional way of process discovery is carried out manually through interviews and workshops (also called "brown paper sessions"). The challenge here is that this manual approach is time-consuming, subjective and incomplete, and that it is typically not possible to

simply repeat the manual analysis after the process improvement project has been completed (see Table 1 for a checklist of questions to see whether you recognize these challenges).

Table 1: Checklist of challenges in manual 'As-is' process analysis

CHECKLIST		
	Question	Challenge
<input type="checkbox"/>	Does it take a lot of time to map out the 'As-is' processes?	Time-consuming
<input type="checkbox"/>	Are you manually walking through data (for example in Excel) to better understand the processes? Do you spend a lot of time on manual data collection?	
<input type="checkbox"/>	Are there many people involved in 'As-is' process discovery workshops to understand how the processes are running before you can even start focusing on understanding 'why' things are currently done the way they are?	Subjective
<input type="checkbox"/>	Have you experienced many discussions based on opinions about how people <i>think</i> the processes are performed?	
<input type="checkbox"/>	Have you ever been in a deadlock situation, because people could not agree on what the problem was, which lead to halting the complete project?	Incomplete
<input type="checkbox"/>	Do you sometimes have the feeling that people are not telling the complete truth, because they do not remember everything, or because they are uncomfortable revealing weaknesses?	
<input type="checkbox"/>	Are you afraid of the risk of missing an important problem area of the real process, or of focusing on the wrong process altogether in your process improvement project?	No way of measuring impact
<input type="checkbox"/>	Do you find it difficult to measure the effectiveness and impact of your process improvement projects?	
<input type="checkbox"/>	Do you see the risk that teams could slide back into their old patterns after the process improvement has been completed?	

The big advantages of process mining are the objective and quick diagnosis of process issues. Process mining significantly lowers the cost of understanding the current 'As-is' process by bypassing interviews and extracting the necessary information out of the existing data from the IT systems. This way, people can get together productively to focus on 'why' the processes are performed the way they are right now. Furthermore, iterative improvements with continuous assessment of the impact of changes become possible because the analysis can be repeated at any point in time at little cost. As Preben Ormen, a manager at PwC and process improvement practitioner of 35 years points out (Ormen, 2014):

"For the first time, we now have efficient tools that allow us to repeat process analysis without significant effort because once set-up for the first round of analysis, the mechanisms are in place for reuse anytime in the future."

All these challenges and benefits also apply to external consultants (Role 3 in Figure 2).

As another example, consider the use case of a process manager (Role 1 in Figure 2). The manager and her team are usually able to look at individual cases (for example the history of one particular incident in an ITSM system), and they may even have a dashboard measuring certain Key Performance Indicators (KPIs) for the process. But they do not have an actual overview about what is really happening in the process and where the bottlenecks are. Nobody knows how the real processes look because there are multiple people involved and complex interdependencies

exist. Process mining can be used to directly improve, monitor, and control their business process on a regular basis.

In the following, we describe a number of application examples to illustrate the spectrum of possibilities:

Finding bottlenecks

In a customer-facing service refund process customers complained that the process was too slow (Rozinat, 2012), but the process manager did not know where cause of this problem was. Process mining objectively and automatically detects wherein the process the biggest delays occur, on average and cumulatively calculated over all process executions. In the service refund process a bottleneck with one of the forwarding companies was detected (see Figure 3). In another process at an insurance company, the department head had to approve all claims, which he only did once per week, causing a significant delay for the process.

Once the bottleneck is discovered, you can then change the process or allocate resources to resolve this bottleneck. This practice can be repeated after the bottleneck has been addressed. The analysis then reveals the next-slowest process part as the new bottleneck, therefore allowing you to continuously improve the process performance.

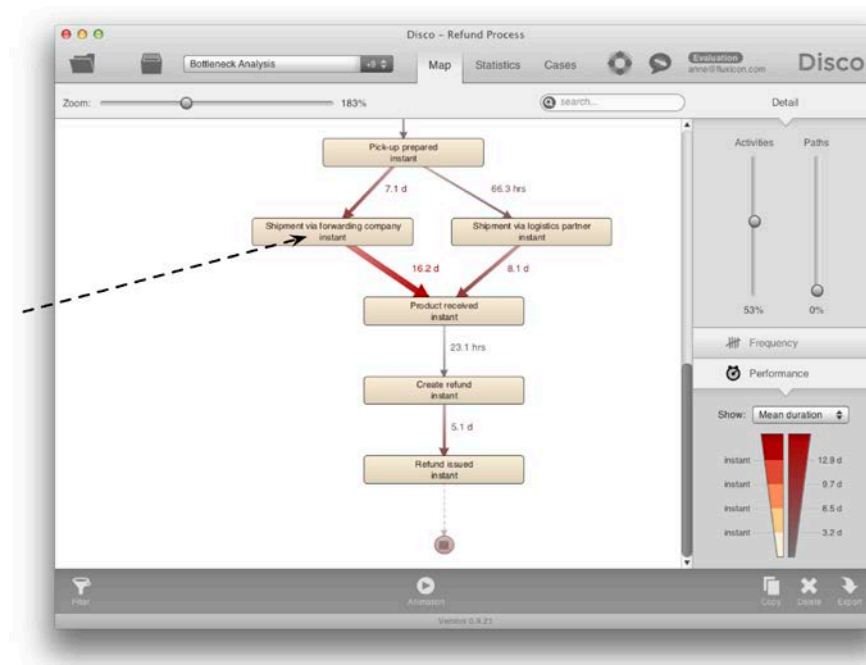


Figure 3: Screenshot of the Process Mining Software Disco in the performance analysis view. One can see that the shipment through the forwarding company causes a bottleneck

Reducing waste

There are often additional activities that are carried out but which actually should not occur, or at least not so often. For example, in the service refund process mentioned above, additional documents were requested from the customer as a result of

incomplete information at the outset of the process if it was started through a particular channel. Such hidden activities are sometimes called 'hidden factories' as they bind resources but nobody knows they exist. Another example of waste is rework, where certain process steps are repeated once or multiple times. Removing waste in a process provides opportunities for significant cost savings.

Process mining makes the actual process – including all the rework and ping-pong behavior - visible automatically by reconstructing the real process flows from the IT records of the IT systems. For example, Figure 4 highlights a dominant rework loop in a purchasing process, where existing requests for quotation are amended frequently.

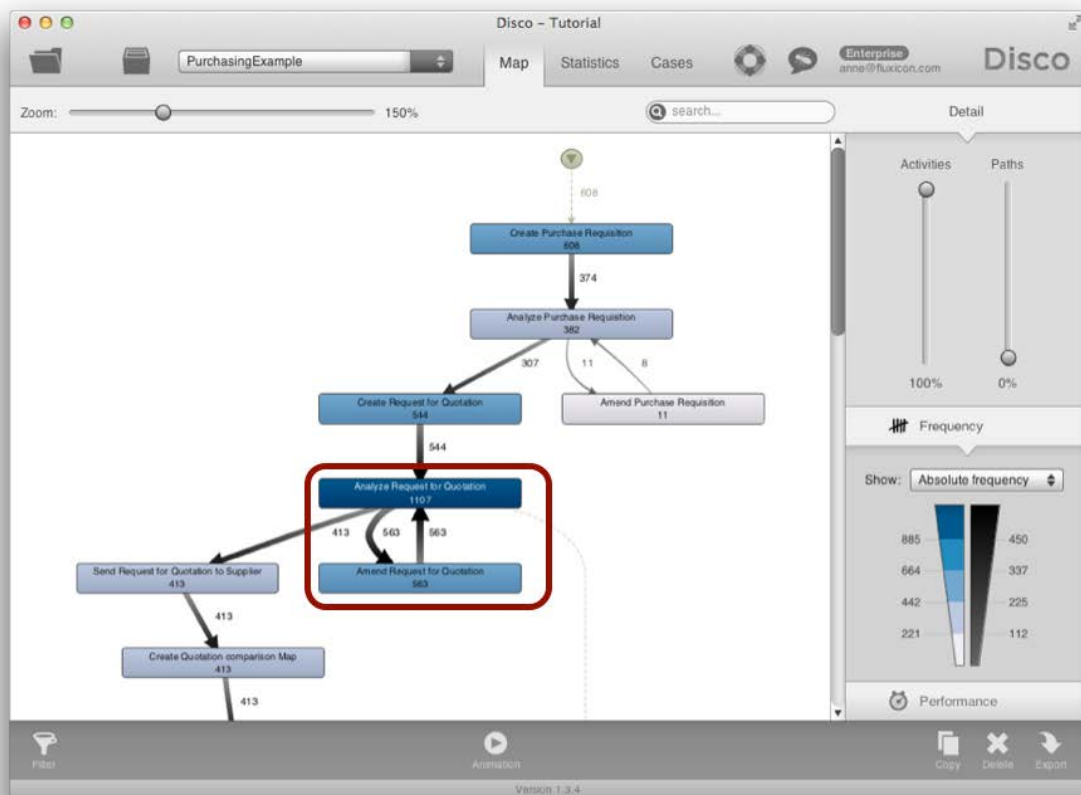


Figure 4: A purchasing process with many amendments (waste that should be prevented)

Verifying the effectiveness of process changes

To see whether process changes are actually effective, the process mining analysis can be repeated and performed in a regular manner. For example, Figure 5 shows a fragment of an incident management process before (left side) and after (right side) of a process improvement. To reduce lead times in the process, targeted training was given to a selected group of employees. The repeat analysis confirms that the time between the diagnosis and the resolution steps was reduced by almost five days on average. However, one can also see that the waiting times between other steps in the process have not been reduced.

The ability to verify the effectiveness of process changes provides a powerful tool for any process manager who wants to be in control of the process they are responsible for.

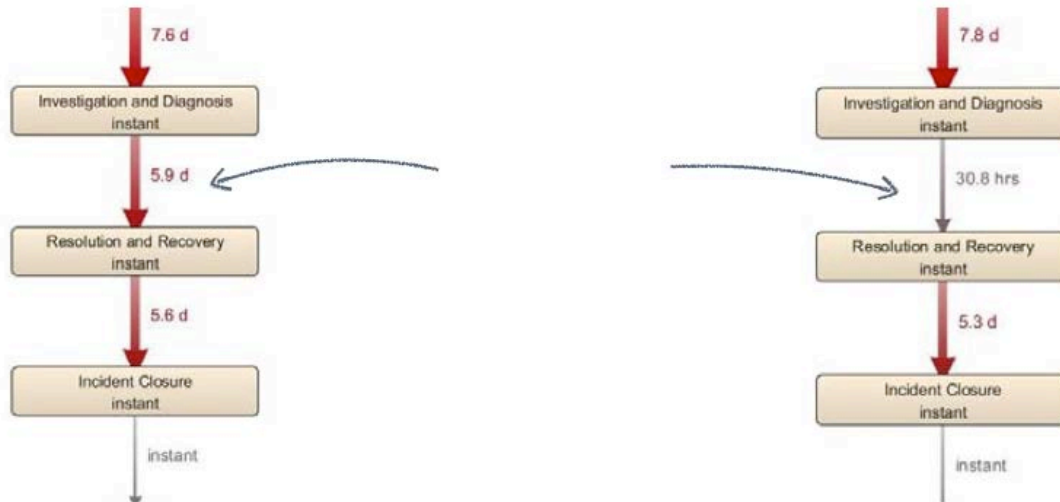


Figure 5: Incident management process before (left) and after (right) the process change was implemented

Ensuring compliance

It is difficult to check whether prescribed procedures that must be followed by law or based on company policies are adhered to in reality. Sometimes, IT systems enforce certain process flows but all too often there are necessary flexibilities that are necessary but that enable deviations from the prescribed process. How can you know that your process is compliant? And how can you prove it?

With process mining, deviations from the prescribed process are made visible and can be quantified. Conversely, you can use process mining to prove that your process is compliant based on an exhaustive data analysis. For example, in a hospital in Portugal deviations from medical guidelines (where patients in an emergency process should not be forwarded by the physician) could be automatically detected through process mining (Rebuge, 2012). Figure 6 shows another example, where during the process mining analysis of a change management process at ANA Airports (Manuel 2012) a violation of the widely accepted ITIL practice was detected: Change requests went directly to implementation although it is required that each request be analyzed and explicitly approved before being implemented. Eventually, it turned out that the compliance breach was due to a misuse of the ITSM system, which was less severe but still had effects on the KPIs and reporting platform.

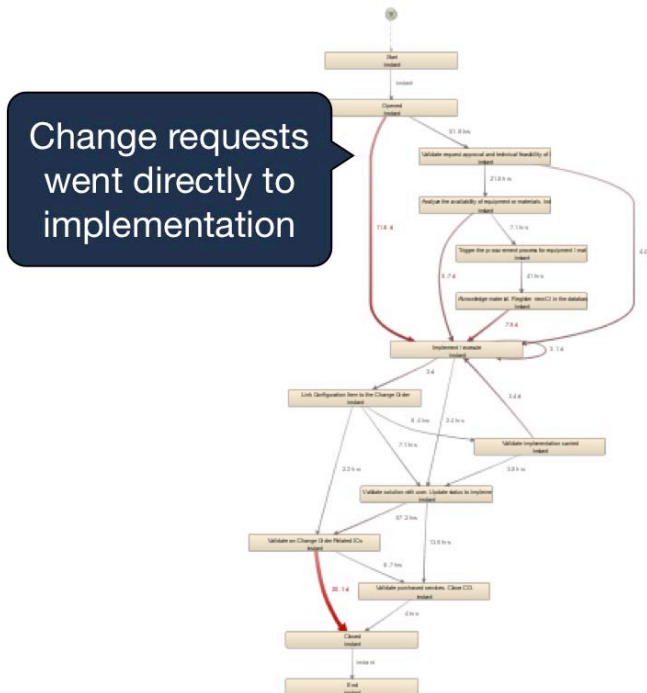


Figure 6: In a Change Management Process change requests were directly implemented, which is not allowed

Reducing maintenance costs

Sometimes, the maintenance of the IT systems that are used to support the execution of the business processes can be a challenge in and of itself. For example, highly customized SAP systems are a burden if they need to be upgraded to the newest version and IT managers would want to know which of the customizations are actually used in practice and which are not really needed. Process mining can show the actual usage of the system and help to move towards more standard-compliant processes.

Figure 7 shows the process map of a change management process at a subsidiary of a large IT Service provider, where a specific path was added to the system at the urgent request of the employees. The system change cost money and continues to cost money for every new release of the system, because it needs to be tested and maintained. Process mining showed that the path was rarely used.

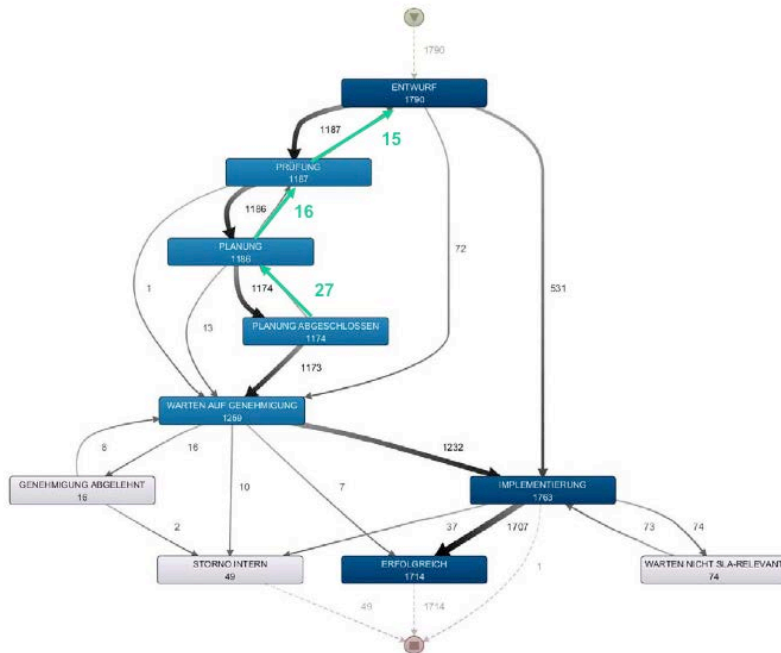


Figure 7: Example of a change management process at subsidiary of a large IT service provider, where a specific path was added to the system on request but rarely used afterwards

There are many more use cases for process mining. Here are a few additional scenarios that may be worth a look in your company as well:

Promoting best practices

Often, the same process is performed differently in different parts of the organization. This is particularly true after a merger or acquisition. Aligning these processes is important to reduce overhead brought about by the many variations of the same process.

For example, at the chemicals company Akzo Nobel the purchasing process was performed differently in 16 different countries (Vethman, 2012), initially even using different IT systems. After moving all purchasing departments to the same IT infrastructure, they were still performing the process in different ways. Process mining was used to analyze the different purchasing processes of the company and to compare them in detail. Traditional workshops and interview sessions at each of these 16 countries at the "As is" analysis phase, would have involved considerably more time and effort. By using process mining, it was possible to start with the 'As-is' process analysis based on the SAP data and then go back to the individual teams for further questions and to understand why they were working in the way they were working.

KPIs and outsourcing

For processes that are moving up the maturity ladder, often a process-based performance management must be established. What are the relevant KPIs that we should measure? And if we have already defined KPIs, are they the right ones? Process mining can be used for a first assessment of the process. The process-oriented analysis helps to understand how the process works in detail, and which

KPIs should be measured, and where exactly the measure points should be placed to control and monitor the process on a long-term basis.

Process mining can help to standardize processes to a level, so that they can be outsourced as Donna Stewart, an Executive Manager at Suncorp reports in an interview (La Rosa, 2013). Furthermore, contractual service level agreements (SLAs) can be monitored to maintain in control of outsourced processes.

Replacing legacy systems

Legacy systems often represent a major challenge in many organizations, since often the developers are long gone when changes to these systems must be made to maintain these often mission-critical systems. Process mining can be used to understand the actual system behavior (Kilner, 2013).

In an Interview, a developer shared his experience of how process mining helped to map the process flows of an in-house legacy system at an Australian government authority with a 400% increase of scope, higher accuracy, and in half of the time that was estimated for the manual redocumentation (Truffet, 2009).

Auditing

Internal and external auditors (see Role 4 and Role 5 in Figure 2) are responsible to assess processes independently to identify risks and prevent fraud. However, traditional auditing tools are not analyzing the data in a process-oriented way and analyses are usually limited to samples.

Process mining is a complementary tool for auditors (Jans, 2012) (Jans, 2013) that enables them to directly analyze the processes with all their variations. This way, they can find out whether the internal controls are working. For example, it can be checked whether the segregation of duties (4-eyes principle) was adhered to based on an exhaustive analysis of all the IT logs.

Conclusion

Process mining is a new technology that enables many exciting application scenarios. Most business areas perform their business processes with the support of IT systems, which makes process mining possible because the data already exists. Often there is already manual work being carried out to look at these data, with dashboards, or with statistical tools like Excel. However, process mining makes it easy to analyze the data from a process-oriented perspective. The results are fact-based, visual, and enable exploration in a way that creates a process transparency at a whole new level, and much more quickly compared to manual approaches.

The concrete benefits will vary depending on your process and the purpose of the analysis. We recommend getting started with a small project and building experience by analyzing one of your own processes. If you can, just get some data and import them in a process mining tool like Disco (Disco, 2014) or ProM (ProM, 2014). If you need assistance, we can help you get started and can also give you a list of service providers who are active with process mining.

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