BOTS &
PEOPLE

AUTOMATION UNBUZZED

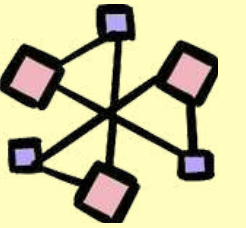# PROCESS MINING 1x1

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WHAT IS PROCESS MINING?

Do you know this? Sometimes work just isn't happening and the underlying problem is unclear. Normally you would spend hours searching in the depths of the process landscape, but there is a much simpler and more effective method: **Process Mining.**

With the help of this technology, real workflows are compared with theory, which leads to better transparency as well as insight into the processes. This is necessary because the reality of the processes usually does not correspond to the ideas of the process participants and the work steps in reality are usually much more complex. You can imagine this like the promo pictures of empty vacation beaches, which are then totally overcrowded in reality.
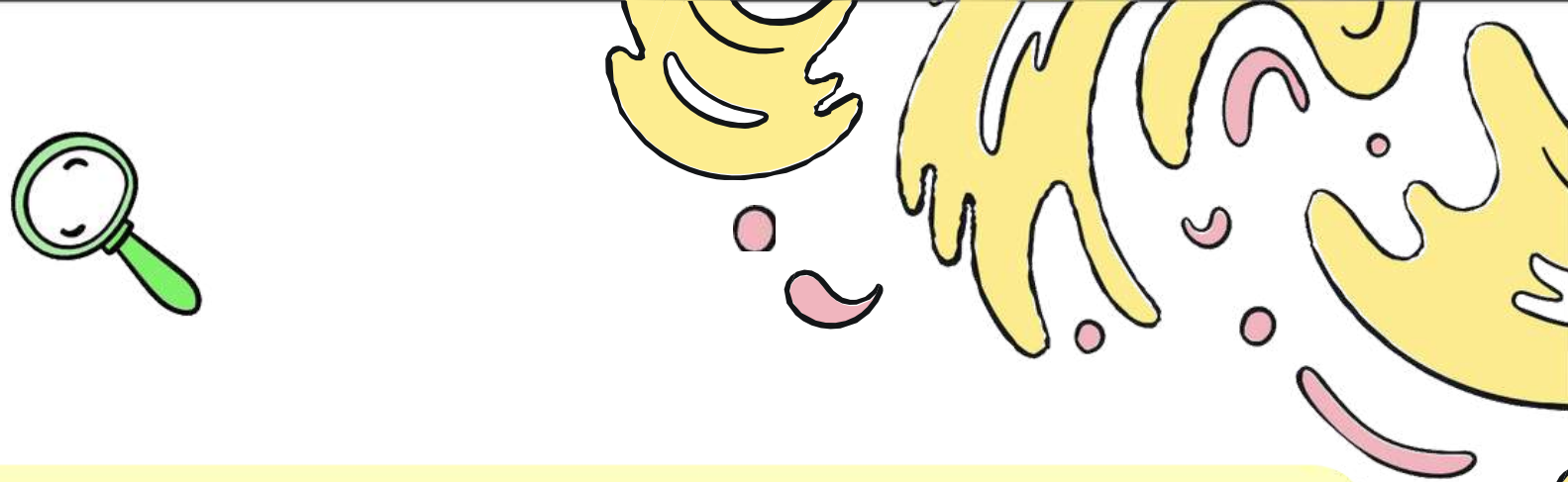
Why are processes often not transparent?

As mentioned in the introduction, in many companies there is a big difference between the corporate processes assumed by the employees and the reality of the processes. The main causes of this are as follows:

Differences in perception - employees usually do not go through a process as it is intended in the optimal case. They often spend time repeating certain work steps or incorporate additional steps that are not actually intended in the process described.

Subjectivity - Everyone has a subjective picture of a workflow, depending on their role and perspective. This is one of the reasons why it is so difficult to discover the "as-is" process in a classic workshop or interview-based setting.

Processes change - Processes are not a rigid construct, but change continuously. They are readapted for customers, have to comply with new laws or are reorganized due to reorganizations. These adaptations are occasionally not recorded in the process documentation.

Lack of overall view of process chains - Employees often only have insights into certain sub-processes. They do not know in detail which processes come before and after their work step or still follow. This often leads to a lack of an overall view of the process chain.

Exceptions prove the rule - exceptions in certain process flows play an important role. Not all processes follow the so-called happy path, where there are no special features in the process flow that could complicate it.

4

Process Mining creates transparency

Process mining is a process management technique. It aims to discover, monitor and improve process flows by extracting readily available knowledge from information systems event logs. Process mining provides companies with complete visibility into how processes really work. With these insights, companies can then identify opportunities for process optimization.

Process mining involves several steps here:

The automated process discovery - extraction of process models from an event log

The conformity check - monitoring deviations by comparing model and protocol

The organization mining

The simulation models - simulation models are constructed automatically

The model repair

The case prediction

The history-based recommendation

Process Mining is the MRI for processes

Process mining technology could also be compared to magnetic resonance imaging (MRI) technology, which collects information from the body's cells to create an image - only in a business environment. Doctors then use this MRI image to diagnose health conditions. Process mining works on a similar principle: It collects data from the smallest part of process activities and assembles it into a picture that companies can use to diagnose the state of their workflows.

Process mining is changing the way companies operate and manage their business operations. In their quest for process quality, companies can use process mining to really get to know their process, evaluate it against the ideal process model, and optimize it as needed.
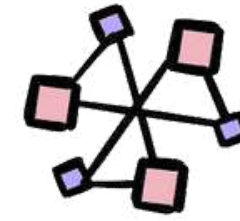
Risk of confusion

Process mining is often confused with task mining, although the two approaches are fundamentally different.

While process mining targets end-to-end business processes or parts of them, where different resources work together to achieve the process result, task mining focuses on the single task consisting of different actions or steps, such as a mouse click, a keystroke, a data entry, or a desktop operation like copy and paste.

How process mining works

It's all about event logs. When humans and software robots work with IT systems, their activities are recorded by those systems. Process mining reads this data, converts it into an event log, and then creates visualizations of the end-to-end process, along with insightful analytics.

An event log contains each step performed during the process (the activity), the time at which the event occurred (the timestamp), and for which instance of the process (the case ID).

Using this event log, algorithms generate a process model that shows the process as it really is - including the timing of each step and all variations in process flow, process deviations, and exceptions - bottlenecks, workarounds, and inefficient workflows - rather than as it is perceived to be.

Other data science methods can be applied to further improve this model. The result is then used for process discovery, conformance testing and process improvement.

The visualization capabilities built into advanced process mining tools help companies focus on what should be optimized, how to do it, and what the return on their efforts will be. Organizations are able to immediately understand the impact of proposed process changes or automation - including the cost saved and effort required. They can easily build and prioritize their automation pipeline or process optimization efforts.

Advanced process mining solutions continuously monitor and measure results, so companies immediately know if they are on track or off base. They also get a complete audit trail for compliance purposes.
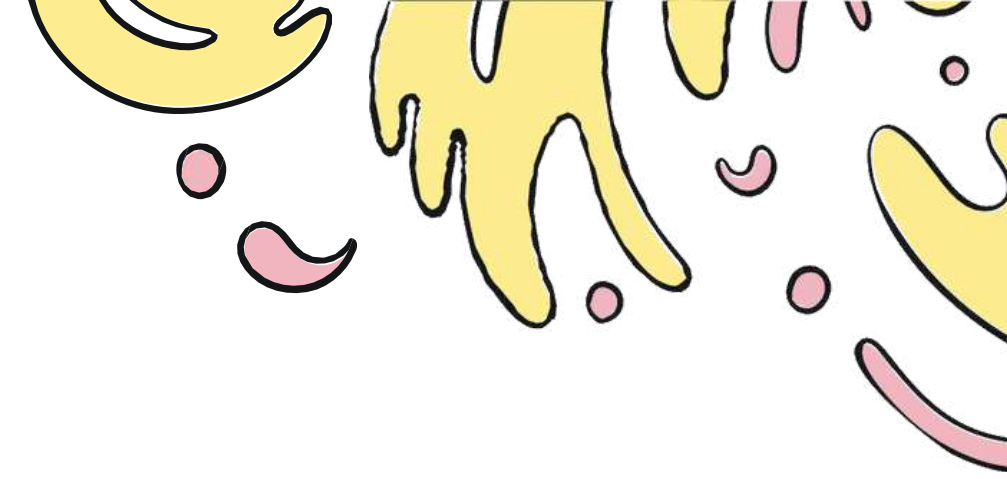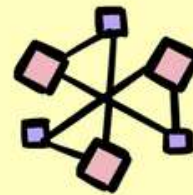
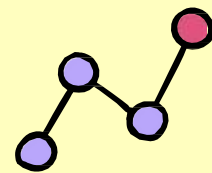# The Mining Algorithm - The Main Component of Process Mining

The mining algorithm determines how process models are created. The best known categories are:

Deterministic algorithms

Heuristic algorithms

Genetic algorithms

Deterministic algorithms: Determinism means that an algorithm produces only defined and reproducible results. It always delivers the same result for the same input.

The deterministic algorithm was one of the first algorithms capable of handling concurrency. It takes an event log as input and computes the order relation of the events contained in the log.

Heuristic Algorithms: Heuristic mining also uses deterministic algorithms. However, they refer to the frequency of events and traces to reconstruct a process model. A common problem in process mining is that real-world processes are very complex and their discovery leads to complex models. This complexity can be reduced by neglecting rare paths in the models.

Genetic Algorithms: They use an evolutionary approach that mimics the process of natural evolution. They are not deterministic. Genetic mining algorithms follow four steps: Initialization, Selection, Reproduction, and Termination.

The Godfather of Process Mining

The first attempts to establish process mining as an independent technology for the analysis of business processes came from the Netherlands. More precisely, from Dr. Wil van der Aalst, also referred to by many as the "Godfather of Process Mining". He started studying at Eindhoven University of Technology (TU/e) in the late nineties. During his studies, he learned about workflow and business workflow management, exploring the possibilities of automated process discovery based on event logs. His approach combines the strengths of process- and data-oriented analytics. For him, the technology bridges the gap between traditional model-based process analysis and data-centric analytics techniques, such as machine learning and data mining.

Wil van der Aalst first used the term 'process mining' in a research proposal he wrote in 1998. In 2011, van der Aalst published his first book on the subject, called 'Process Mining: Data Science in Action.' Until 2011, when the Munich-based company Celonis was founded, Wil van der Aalst's approach had little practical relevance.
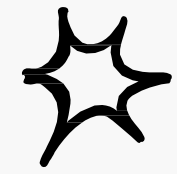
Also in the late 1990s, the IBM Almaden Research Center actively developed algorithms for determining process models from event logs. In December 1997, IBM patented a method for automated process model discovery.

In 2009, the Institute of Electrical and Electronics Engineers (IEEE) established the IEEE Task Force on Process Mining, which is supported by more than 75 organizations.

The biggest value accelerator for the technology has been the collaboration of process mining vendors with well-known enterprise applications such as SAP, Oracle, and Salesforce. These vendors have strongly promoted process mining to improve the efficiency of these applications. In 2019, the International Conference on Process Mining 2019 was held for the first time in Aachen, Germany.

Bots and People Tip

If you want to get more insights into the beginnings of process mining directly from Wil van der Aalst, listen to our podcast with the "Godfather" now!

How to start a process mining project

1 — Determine problem

- Identify the problem of importance to the business that can realistically be addressed with process mining.
- Determine the business value of solving the problem and what metrics to use to measure success.

2 — Identify the data

- Identify the data sources that need to be fully understood to address the business process issues under consideration.
- Identify the applications and systems that need to provide feeds of event data for continuous visibility into end-to-end processes.

3 — Setting up a pilot project

- Set up a pilot project to prove the potential value of a process mining solution.
- Ensure that the project can be executed relatively quickly and deliver specific, measurable results that everyone in the organization can understand.

4 — Accept truth

- Accepting the results of the analysis, as process mining provides, among other things, a clear picture based on facts. Process mining can be just the right tool to validate the uncomfortable realities of the business process environment, and also a constructive springboard to ask the right questions that fix the problems

APPLICATION, USE & ADVANTAGES

The following chapter deals with the numerous applications and uses of process mining.

You will also learn what the most important advantages of using process mining are.

These areas benefit from process mining!

Process mining is beneficial for many situations in large organizations. Areas where process mining can be actively applied include the following:

- Automation - This is about understanding the actual processes, variations and opportunities to be successful in RPA projects.
- The reporting of complete process KPIs and dashboards for a given process.
- The Digital Transformation to understand the "big picture" - how businesses operate, what needs to be prioritized and transformed.

- Auditing and compliance to promote adherence to agreed-upon procedures, rules, and regulations.
- Process improvement to identify bottlenecks and other symptoms of inefficient processes.
- IT and ERP development to support ERP consolidation, new deployments and major version upgrades.

The application of process mining is manifold

✓ Scaling optimization efforts across multiple business operations and locations and supporting process control through the use of Data.

✓ Capture processes anywhere in the enterprise with little human effort.

✓ Identify bottlenecks, deviations, and inefficient processes to be reconsidered or automated.

✓ Continuous monitoring and measurement of improvements.
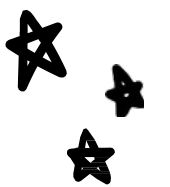
✓ Simplify compliance, with complete audit trails.

✓ Delivering the full context and end-to-end perspective required for process improvements.

✓ Identify the most valuable and effective processes for using automation.

Cross-industry use of process mining

Process mining can be used for business process management and process improvement in any application and any industry.

Production

In the manufacturing industry, timely and accurate delivery to a customer is the goal. When a company has multiple factories in different regions, there are usually differences between the reliability of deliveries. It is fairly easy to see that they exist, but it is more difficult to understand exactly where or why they are happening. Process mining can be used to compare the performance of different locations, down to individual process steps, including duration, cost, and the person performing the step. All event data available in the systems is suitable for use. In this way, facts can be generated.

Banking and finance

In the financial sector, it is important to comply with rules and regulations and to be able to provide evidence of this. By using the event data from the systems, individual cases can also be visualized as a process flow. It can be shown how often deviations occur and what the reason for this non-compliance was.

Telecommunication

Telecommunications is a highly competitive sector worldwide. The ability to improve operational processes is key to success and profitability. Process mining helps telecom companies gain visibility into geographically dispersed operations, identify bottlenecks, and ensure that customers receive products and services on time.

Cross-industry use of process mining

Sales

The success of retail companies is based on efficient business operations. Logistics, warehousing, forecasting, order management, and supplier management are the foundation for an excellent customer experience throughout the customer lifecycle. Process mining provides visibility into all of these interconnected processes and offers an understanding of bottlenecks and faulty interfaces. Data-driven fact-based process mining results focus development efforts on the areas that matter most and deliver the highest business results.

Services

The business logic of service companies is to achieve higher operational excellence, i.e. lower costs, than their customers for the processes outsourced to them. Process mining is an important tool for improving the efficiency of a service company by ensuring harmonized processes and finding causes for process problems and inefficiencies.

Healthcare

As data about patient experiences and outcomes increases, so do the risks around maintaining population health and individual patient outcomes. For healthcare organizations facing an exponential increase in data, process mining helps deliver efficient and high-quality end-to-end patient journeys, from before the first doctor visit, through treatment, to completed treatment cases.
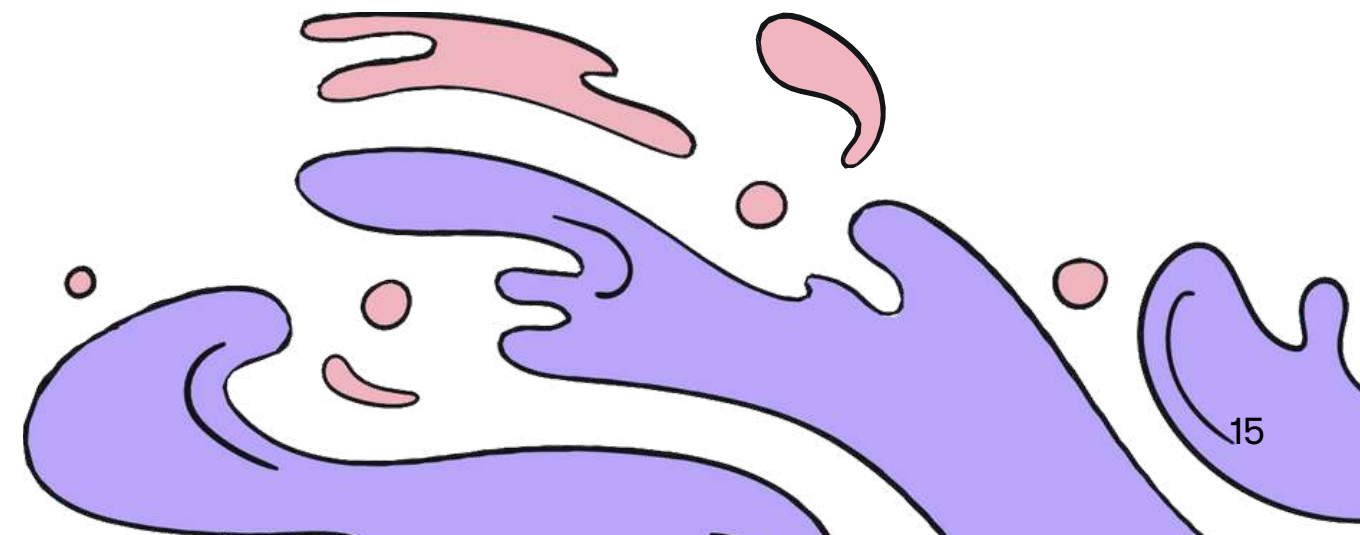
Benefits of Process Mining

Save time and increase work capacity

Traditionally, the management and optimization of business processes is a very labor-intensive area that requires a lot of time from experts in the organizations.

The growing demand for efficiency and the ability to clearly present results requires modern technologies. Classic BPM approaches are often overwhelmed here because the data they use to support their assumptions has already changed by the time their situation analysis is complete, which in turn renders the analysis useless. When optimizing processes, the most time-consuming part is data collection. Process mining gives companies a head start by automating the data collection part. The basis for understanding the operational situation in an organization is to understand what is actually happening, not what is assumed to be happening. That's what you find out with process mining.
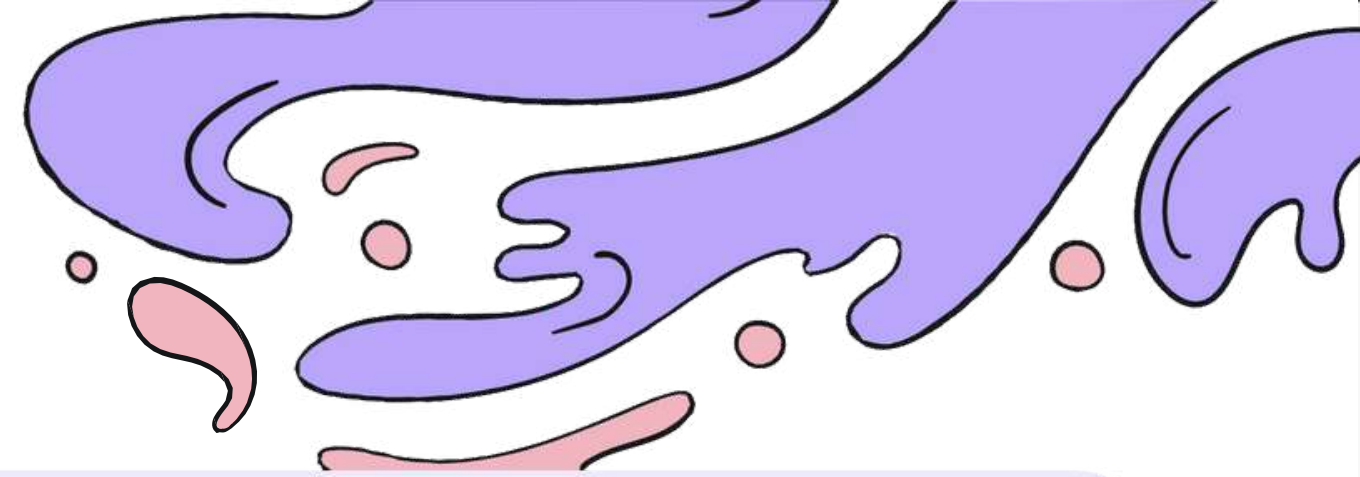
Finding process bottlenecks

Process bottlenecks are difficult to uncover through BPM and process mapping workshops. People have a gut feeling about what might be wrong or inefficient, but they lack fact-based evidence. They need data to back up their assumptions, and that's where process mining comes to the rescue.

Opinions are replaced by facts

One of the main goals of process mining is to see the big picture of business operations and still be able to track down the root causes of deviations, bottlenecks or process variations.

PROCESS MINING SOFTWARE PROVIDER

In the following chapter you will learn more about the most popular process mining software providers. This way you can find the right provider for your project.

First, however, we will give you an overview of how to choose the right process mining software.

How do you choose the best process mining software?

Good process mining software solutions are characterized by three functions:

Process detection	Conformity testing	Performance analysis and improvement

A process mining solution should have strong detection capabilities. It should be able to search event logs to track what employees are actually doing and then create an appropriate process model by generating process maps of the entire business flow.

In addition, the solution should have robust conformance checking that analyzes event logs to ensure that actions match process models.

Third, a process mining solution needs performance analysis and improvement capabilities that analyze potential inefficiencies within an event log to determine if and how they can be improved, and then make improvements based on real process data.

Ultimately, though, which software is right for the job depends on the size of the company, its business needs, and its goals.

Check box: Software key functions

✓ Identify bottlenecks & process optimization opportunities

✓ Provide insights into failed process steps

✓ Ensure end-to-end view of the entire process

✓ Monitor performance indicators in real time

✓ Provide continuous business process monitoring in realtime

✓ Perform data cleansing

✓ Compliance analysis & gap analysis

✓ Improve process model

If your selected process mining software fulfills these key functions, then you have already made a good choice.

However, you should always keep in mind that your company's ability to measure, monitor and optimize business processes has a direct impact on revenue and customer satisfaction.

Therefore, it is important to choose the right process mining solution wisely to ensure that all business goals are optimally met. If necessary, an expert can also be consulted.

Process Mining - Software providers at a glance

Abby Timeline

Apromore

ARIS Process Mining

BusinessOptix

Celonis

Disco

EverFlow

LANA Process Mining

MEHRWERK Process Mining
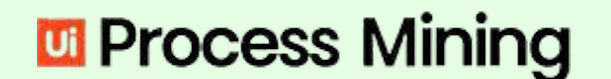
Minit

myInvenio

PAFnow

ProDiscovery

QPR Process Analyzer

Signavio Process Intelligence

UiPath Process Mining

Abby Timeline

ABBYY Timeline was founded in 2015 by Scott Opitz and Alex Elkin, based on their many years of work with business intelligence and BPM tools. The tool focuses on the key areas of process discovery, diverse analytics, real-time robotic monitoring, and neural network prediction and alerting capabilities. ABBYY Timeline not only looks at current processes digitally, but also predicts the future performance of those processes, giving organizations the ability to improve their BPM. This intelligent solution includes features such as a transparent pricing process, analytics, data integration, and the ability to scale quickly. Compared to the usual process graph visualization of other tools, ABBYY Timeline distinguishes itself with its timeline visualization approach. Another notable component is its cloud-integrated ETL feature for advanced and Big Data uploads with various transformation operations. TimelinePI was acquired by ABBYY in 2019.

Apromore

With over a decade of research experience in process mining, Apromore's developers have incorporated extensive academic expertise into their solution. The open-source software is available as a free Community Edition and a subscription-based Enterprise Edition that includes commercial add-ons, connectors and services. Apromore provides robust process discovery capabilities, process comparisons, conformance checks and an authoring environment for editing BPMN process models - all easily accessed and illustrated digitally.

Predictive process monitoring is also available and can be fine-tuned with sophisticated settings by experienced users. Apromore has applications in the public sector, banking, insurance, telecommunications and more. The vendor raised nearly $5 million in a Series A funding round in mid-2020 and plans to further expand and enhance the functionality of its platform.

Aris Process Mining ARIS

BusinessOptix

ARIS is a comprehensive tool that enables fully managed large-scale business process transformation. The product includes traditional process discovery capabilities, conformance checking, highly customizable dashboards and automatic root cause detection, while the light version ARIS Process Mining Elements is available for free. The focus on cross-organizational mining encourages collaboration between all necessary stakeholders with the help of change requests and shareable bookmarks - perfect, in other words, for good BPM. ARIS has strong SAP Solution Manager integration and supports numerous SaaS applications for data extraction via its own webMethods Integration Platform. ARIS Cloud is a process-driven management solution that includes process mining services. ARIS Cloud features include process design, modeling conventions, method filters, content languages, process versioning, release cycle management, content merge, social collaboration, document management and customer journey mapping. There are tiered package services: trial, advanced cloud, and cloud enterprise.

BusinessOptix provides a fully cloud-based platform with end-to-end process transformation tools for use cases such as customer experience (CX), operational efficiency and business process visibility. The BusinessOptix Process Transformation Suite includes tools for scenario modeling, documentation, transformation planning, BPM and more. Functionality is integrated into the suite to help users discover and improve processes. In addition to conformance testing, the tool offers sophisticated scenario modeling and simulation capabilities. Cross-organizational mining of processes is realized using various collaboration features for sharing content, documentation and work instructions. The vendor serves customers from various industries, including finance and insurance, engineering and construction, retail and also government.
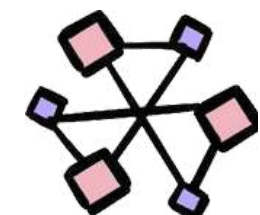
Celonis

Founded in 2011 by three university students, CelonisCelonis helps companies achieve process excellence through its platform by eliminating operational friction with their Intelligent Business Cloud platform. In addition to user-friendly process discovery, analysis and compliance testing capabilities, the platform offers a dedicated Transformation Center for KPI monitoring. A key strength is Celonis' comprehensive approach to process improvement, which includes a Python-based machine learning workbench for predictive insights, an AI-powered action engine for intelligent process recommendations, and process automation to automate workflows. Celonis provides a highly scalable and secure platform, offers multiple deployment options, and supports many databases and systems for data extraction. Celonis recently launched Operational Applications. These are role-based applications that automate tasks, prioritize workflows and provide guidance for achieving business goals by leveraging business context, artificial intelligence and the central process mining engine.

Disco

Fluxicon was founded in 2009 by Dr. Anne Rozinat and Dr. Christian W. Günther after their PhD in the Process Mining group of Prof. Wil van der Aalst at the Eindhoven University of Technology. After working on the academic process mining tool ProM, the software Disco was developed with the goal of making process mining accessible to business users. The Disco framework is based on proven scientific research and is used in various industries with use cases such as customer journey analysis, audit, process improvement and optimization. The tool enables easy and flexible discovery of processes through its visualization and filtering capabilities.
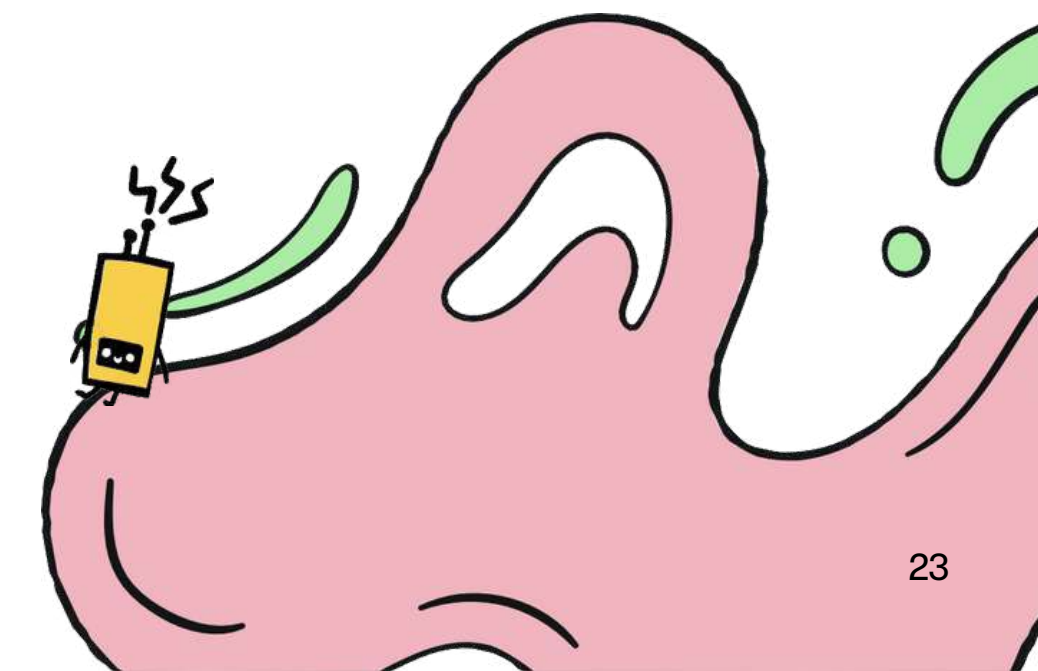
EverFlow

EverFlow is a startup headquartered in Campinas (SP, Brazil) with a co-HQ in San Francisco. One of the solution's strengths is its simple and intuitive design, which allows non-experts to quickly gain insight into processes. In addition to preconfigured dashboards for poor performance, bottlenecks, and rework, EverFlow's case duration prediction and alarm monitoring capabilities lend themselves to operational support.

Social networks can be uncovered and root cause analysis is also available. The tool uses cutting-edge technologies in Big Data and Machine Learning / AI to be able to analyze large volumes of events.

LANA

Lana Labs, based in Berlin, was started by the three founders out of a passion for process optimization and the urge to bring new innovations to the market. Early innovations years ago included automated compliance checks and machine learning-based root-cause analysis.

LANA has developed an algorithm with experts that helps companies understand the parallelism of digital tasks and enables prediction of future process behavior. LANA is used by customers in various sectors including healthcare facilities, industry and utilities.

In addition to providing training videos and webinars, Lana Labs maintains a practical public process mining glossary - perfect foundation for internal skill building of responsible employees.
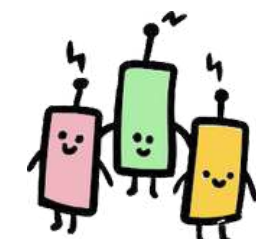
MEHRWERK (MPM)

MEHRWERK GmbH was founded in 2008 with the vision of implementing agile and user-friendly data analytics. The company has developed MEHRWERK ProcessMining (MPM) on the BI platform Qlik Sense to provide enterprise customers with comprehensive process mining capabilities. MPM combines self-service process mining, visual and associative analytics so that even non-experts can achieve rapid results. The platform enables MPM to integrate functionality that extends the standalone process mining capability with advanced analytics, AI tools, process benchmarking, Big Data approaches and real-time scenarios. Data governance capabilities enable users to enrich and create ad hoc analytics and dashboards without programming skills.

Minit

With the first version released in 2015, Minit has developed a powerful process mining tool with advanced process improvement features. Features such as hierarchical visualization, simulation of "what-if" scenarios, and interactive Qlik-based dashboards deserve special attention. The software offers a user-friendly UI. Minit use cases include projects in banking, logistics, e-commerce, and telecommunications with common processes such as purchase to pay (P2P), order to cash (O2C), and IT service management (ITSM). .

myInvenio

myInvenio is a tool that helps to understand and gain deep insight into real-time processes. myInvenio was founded in Italy in 2013 and has continuously expanded its process mining solution since then. The vendor serves customers from various industries and operates mainly in Europe, the U.S. and Japan. In addition to traditional process discovery, analysis and conformance testing, myInvenio's process mining solution offers sophisticated functionalities such as simulation, decision rule mining, task mining and the ability to analyze multi-stage processes. All these capabilities aim to create a digital twin of an organization (DTO) that derives an accurate and dynamic virtual process model to provide organizations with a cost-effective and fail-safe approach to continuous improvement initiatives.

PAFnow

Germany-based Process Analytics Factory (PAF) offers PAFnow, the only process mining solution built on Power BI, Microsoft's business analytics and intelligence software. The powerful symbiosis of process mining and business intelligence capabilities enables users to leverage the full power of both disciplines in one solution.

In addition to traditional process discovery and conformance checking capabilities, the tool offers several preconfigured reports, such as loop/rework analysis, automation reporting and benchmarking. Custom Power BI visualizations include the cycle time calculator, document flow, case viewer and root cause analyzer. PAFnow offers a comprehensive set of deployment options and supports more than 100 Power BI data sources as well as predefined content packs for SAP R/3 purchase-to-pay and order-to-cash processes.

ProDiscovery

South Korea-based Puzzle Data is a relatively new entrant in the process mining software market. Its customer base includes companies in manufacturing, transportation, retail, mobile gaming, and public institutions such as hospitals and the Supreme Prosecutor's Office of Korea. Puzzle Data's ProDiscovery solution consists of approximately 30 widgets ("puzzles") that can be individually configured and added to any dashboard. While a conformance checking functionality is still under development, ProDiscovery already offers sophisticated widgets for process discovery, statistical analysis, social networks and organizational charts. Dashboards can be shared with users in the same organization. The architecture is designed for Big Data processing and is built on the open source Apache Hadoop, Spark and Elasticsearch engine environments.

QPR

QPR Software Plc was founded in 1991 and deals with process mining, BPA, enterprise architecture and performance management. Its QPR ProcessAnalyzer solution provides advanced analytics for identifying case clusters and root causes. Other highlights include process prediction, customizable dashboards and advanced BPMN modeling. Customers can access multiple deployment options and extensive ETL capabilities. QPR offers a highly detailed knowledge base that provides valuable guidance for customizing the configuration using script commands.

Signavio PI SIGNAVIO

Signavio was founded in 2009 and has since become one of the leading providers of business transformation solutions with various offices around the world. The tool enables seamless integration between mining, modeling and automation and helps companies to continuously improve their business processes. With its cloud-based Business Transformation Suite, the vendor equips its customers with powerful modeling and management tools for their business transformation journey. As part of the suite, Signavio Process Intelligence is an intuitive process mining solution with process discovery and conformance checking capabilities and a focus on collaboration and integration. BPMN and value chain diagrams can be enriched with process mining results via the "Live Insights" system to improve end-to-end results. The suite is designed to foster collaboration within an organization so that crowdsourced feedback from users and decision makers can be shared in one place. The company was purchased by SAP AG in 2021.

UI Path Ui Process Mining

UiPath Process Mining started in 2005 as a spin-off from Eindhoven University of Technology (TU/e). The company has grown into one of the leading providers and was acquired by UiPath in 2019, combining expertise in BPM and RPA into one solution. UiPath offers a highly customizable platform with its proprietary, patent-pending TRACY algorithm for rapid process graph visualization. TRACY algorithm is designed to simplify process graphs and the associated visual experience. This includes subtle but powerful features such as maintaining continuity of the graph design when adding or removing new data or changing the selection of filtered data. TRACY says it is significantly faster than the traditional DOT layout algorithm, which is particularly suited to large data sets. UiPath Process Mining offers multiple configuration options. Dashboards and worksheets can be fully customized, including native Python and R integration, to drive machine learning applications and proactive process insights. In addition, an integrated ETL framework enables overall data transformation, including key enterprise features such as role-level filtering and anonymization of sensitive data.

Fazit

Which vendor and solution is the best cannot be answered so simply, as the specific circumstances and requirements of the company is the definitive basis for the decision. In addition to the usual best practices for technical procurement, functions and integrations are the two areas where special attention is required when selecting the right process mining software.

Selected software should provide the necessary functionality to realize the organization's key use cases. The organization must first determine the specific use cases for which they will use software. In addition, selected process mining software should be able to handle logs from software that is commonly used in the organization. Without this, more manual intervention is required while insights are extracted from software logs.

FURTHER TRAINING OPPORTUNITIES

As companies increasingly adopt process mining technology, the demand for expertise in this area also increases.

Employees face the challenge of meeting the developmental requirements of the technologies and the time-to-skill requirements. Especially to be able to handle the process mining tools and softwares, skills are needed.

In the following chapter, we will present you with training opportunities that you can use to acquire sufficient knowledge about process mining for yourself or your company.

Process mining: The options at a glance

Process mining training courses

ABBYY® Timeline

celonis

Disco by Fluxicon

paf now

SIGNAVIO

LANA

businessoptix

Webinars and explanatory videos on process mining

MPM MEHRWERK PROCESSMINING

minit

Ui Process Mining

my invenio

Tool providers only & no educational offerings

ARIS

apromore

QPR

EVERFLOW

ProDiscovery

Know-How with the Celonis Academy

With its Intelligent Business Cloud (IBC), Celonis offers a mature and highly scalable solution for process discovery, analysis, compliance checking and AI-driven process improvement with a focus on KPI monitoring. Data can be extracted from various databases and IT systems.

An online training platform is available to customers around the clock in the Celonis Academy. The training tracks are geared towards different user roles such as executives, business users, analysts, data engineers, business value architects and app creators and conclude with a corresponding online certification exam. However, certification must be renewed each year.

The courses last between 12 and 15 hours. To complement the online training, customers can also book the Analyst Classroom - a 2-day on-site training course - or the Data Engineer Classroom - a 4-day on-site training course.

Interactive web training with Flexicon

Fluxicon's process mining tool Disco is more of an analysis tool than a monitoring or dashboard solution. Disco has perfected its fuzzy-based miner and filtering capabilities for easy process discovery. The standalone tool analyzes data locally, ensuring data privacy.

In intensive, two-day interactive web training sessions, participants learn all the necessary basics and the most important methodological concepts of process mining and work on real problems on their own computers to test their theoretical knowledge on practical applications. Alternatively, two-day on-site training sessions are also offered.
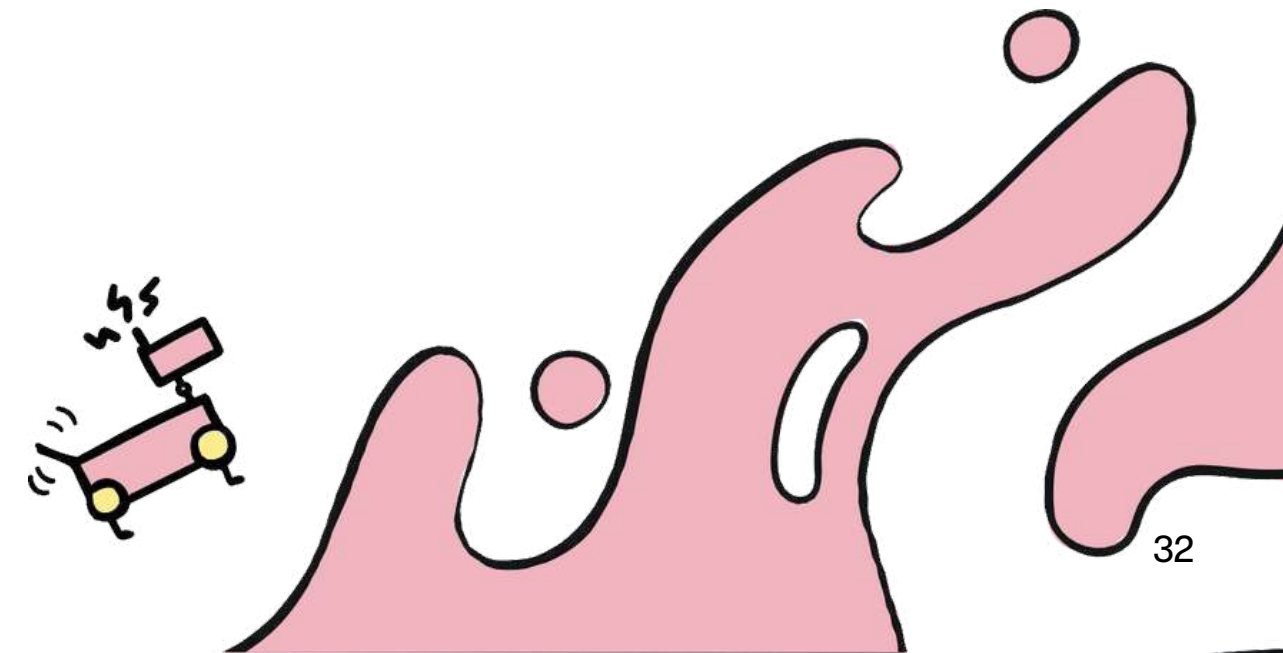
Present and online learning with LANA

LANA Process Mining is a tool with customizable dashboards and automatic root cause analysis that also has connectors for ERP and Manufacturing Execution Systems (MES).

LANA offers compact, 1-day classroom workshops to show attendees how to perform and evaluate their own process mining analyses. Free video tutorials are used to prepare the introduction to process mining already on your own screen. To this end, LANA offers online seminars on various industry-related uses of process mining, each lasting one hour.

LANA webinars use practical examples to demonstrate to participants how analysis methods, conformance checks or automated root cause analysis can be used for process analysis.

Live-Webinar by Signavio

Signavio is a provider of business transformation solutions. As part of the Signavio Business Transformation Suite, Signavio Process Intelligence serves as an intuitive process mining solution with a focus on collaboration and integration.

Signavio offers several webinars (duration 60 min - live on the internet) on the topic of process mining, explaining the possibilities of process mining with examples. The learning content focuses on the added value of the combination of Process Mining and BPM, how this looks concretely in the Signavio tool and which analysis possibilities Signavio Process Intelligence offers here. Furthermore, the participants will learn which factors are important for a successful implementation of Process Mining and which importance Process Mining has within the Leadec organization.

Modular training for PAFnow

PAFnow is a process mining solution that works with pre-configured reports for process discovery, conformance testing, benchmarking, automation and rework, in addition to various deployment options and an extensive list of data connectors.

The training offered, consisting of four modules
MODUL 1: PAFnow Viewer Training
MODUL 2: PAFnow Editor Training
MODUL 3: PAFnow Report Designer Training
MODUL 4: PAFnow Data Engineer Training
and aims to prepare participants to independently examine their own to independently examine their own business processes with the PAFnow solution, to create their own evaluations and to sustainably improve the processes. At the end of the course, participants receive a certificate as a "Certified PAFnow User".

Classroom & eLearning by ABBYY

ABBYY Timeline focuses on process recognition, manifold analysis, real-time robot monitoring, and neural network prediction with over 20 pre-built components for process analysis and monitoring.
One of the highlights of the tool is its unique visualization approach.
"Timeline." The role-based technical product training courses are designed to introduce solution architects and consultants to the company's own product and solution offerings and provide practical insights into implementing digital intelligence in digital transformation projects.
The online courses (eLearning) typically last 20 hours. There are a total of 4 Classroom courses (ranging from $300 to $1,500) and 3 eLearning courses (ranging from $200 to $500). At the end, participants receive a certificate.

BusinessOptix Academy

The cloud-based BusinessOptix Process Transformation Suite provides end-to-end process transformation tools for various use cases. The integrated process mining capability helps organizations discover, model, simulate and improve business processes with a focus on collaboration.

BusinessOptix Academy offers the following power user certification program:

- Power User Level 1: suitable for all participants.
- Power User Level 2: includes reports and dashboards for technically savvy attendees.

A series of webinar recordings is still available. The BusinessOptix Thought Leadership series is designed to help organizations gain knowledge from industry-leading experts to navigate the complex environment. The training material is in video format on Youtube. The dedicated playlist on Youtube includes trainings, webinars and features and overviews.

UiPath - Trainings without Process Mining Focus

With UiPath Process Mining, formerly known as ProcessGold, RPA specialist UiPath offers a highly customizable process mining platform with the proprietary TRACY algorithm for fast rendering of process graphs.

Another highlight is the integrated ETL framework, with a special function for data anonymization. In its

own academy, however, UiPath mainly offers training courses for the use of its own RPA software and related areas, which usually last between 2 and 5 hours. Only four one- to two-hour webinars are offered on the topic of process mining.
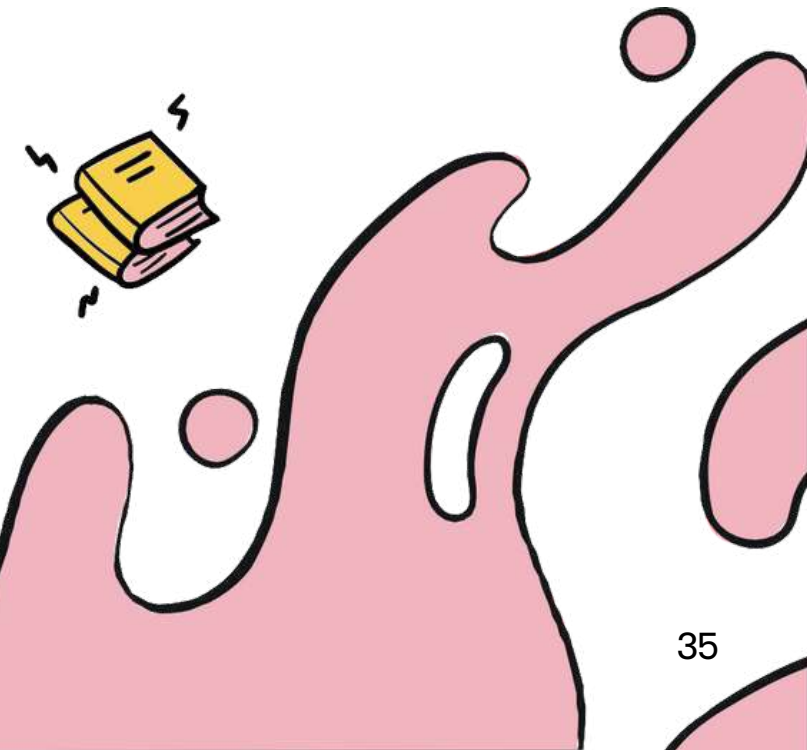
Explainer videos & webinars

MEHRWERK's vision is to integrate Process Mining with Business Intelligence functions. ThereforeMEHRWERK ProcessMining (MPM) is provided on the BI platform Qlik Sense and tries to bring together the advantages from both worlds.

MEHRWERK operates its own specialist portal as a webinar channel with videos on the various topics related to process mining, but no active training.

Minit has developed a process mining tool with advanced features for process improvement with the first version released in 2015. Features such as hierarchical visualization, simulation of "what if" scenarios, and interactive Qlik-based dashboards. Minit offers a variety of guides on process mining and a total of nine videos on process mining, but no dedicated training.

myInvenio provides a process mining solution that includes features such as simulation, decision rule mining, and multi-stage process mining, and offers the ability to easily visualize and analyze multi-stage processes. myInvenio operates its own video library of structured explainer videos or conference presentations, as well as four webinar recordings, with only one webinar explicitly addressing process mining.

Process Mining without support

QPR ProcessAnalyzer provides advanced analytics and predictive capabilities, customizable dashboards, and enhanced BPMN modeling. Customers can access multiple deployment options and extensive ETL capabilities.

EverFlow is a robust and intuitive process mining solution with several preconfigured dashboards, social network analysis capabilities, root cause analysis, and operations support features. The tool is based on an architecture that can handle large event volumes.

ARIS Process Mining is one of the first commercial process mining tools and offers traditional process discovery capabilities, conformance testing, highly customizable dashboards and automated root cause analysis. Data can be sourced from SAP and numerous SaaS applications.

Apromore's process mining solution incorporates the extensive academic expertise and research experience of a decade. The open source software is available as a free Community Edition and as an Enterprise Edition with commercial add-ons, connectors and services

Logpickr is a relatively new player in the process mining software market. It offers user-friendly process discovery analysis. The vendor is in the process of developing a Big Data framework that allows companies to analyze large amounts of data and complex processes.

Vendors such as QPR ProcessAnalyzer, EverFlow, ARIS Process Mining, Apromore and Logpickr do not offer any training or education seminars at all.

Summary

Just half of the providers surveyed here organize training courses that offer added value in terms of process mining.

In fact, only three providers award a corresponding certificate that certifies the participant's ability to handle process mining.

In all efforts to impart expert knowledge, one technological trend is completely ignored across all providers: The boundaries between pure process mining and other disciplines such as process modeling (BPMN), process automation (RPA/Cloud Automation), business intelligence and machine learning. The boundaries are becoming increasingly blurred here.

A hybrid use of different automation technologies requires a completely new understanding of roles with completely new skills that cannot be taught with a monolithic, one-dimensional understanding of training with a very strong product focus - as is the case with most of the providers described above.

The necessary re-skilling and upskilling requires new training concepts, such as those offered by the Automation Academies along the lines of Bots and People.

Thanks to Daniel Viner and www.processmining-software.com for the roundup of the best tools for process mining!
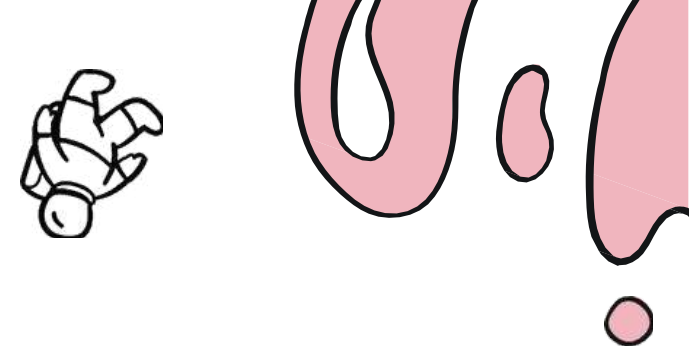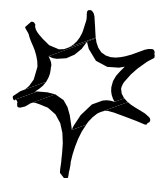
PROCESS MINING USE-CASE

The following chapter presents a use case of an airline.
The airline is pursuing a process mining-based lean approach to improve its processes. What exactly is behind it and how the whole thing works, you will learn on the following pages!

Process Mining with Lean Approach

The airline is pursuing a lean approach. Unlike a classic lean approach, where, for example, employees are directly surveyed to identify errors and potential for improvement, the airline has decided to pursue a process mining-based lean approach.

Especially the massive amount of data and processes this large airline has support this decision. The digital lean approach in this case is called: Process Mining for Operational Excellence.
Through the process mining supported lean approach, it is possible to find out how good or bad processes are and where work can be done more efficiently.

Bots and People Knowledge-Box

Lean management sees mistakes as an opportunity for improvement. Hidden potential" can be found everywhere in the processes of employees, teams, managers and companies. Instead of bashing each other on the knuckles, the idea is to learn from problems. The lean management approach consists of principles, methods and, above all, a change in thinking within the company that can be used to "clean up" processes.

Reasons for the use of process mining
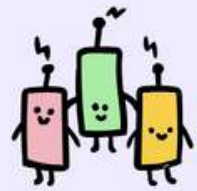
Customer Satisfaction

Customer satisfaction is a very important factor. This includes, for example, that no flights are canceled and everything runs on time.
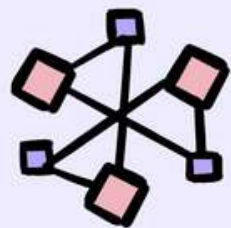
Complex, worldwide processes

There are many complex processes at the airline, because various processes take place 24/7 all over the world. This means that different processes take place at 280 different airports.

Utilized capacity

Apart from the Corona crisis, the airline has reached its capacity limits enormously. This results in take-off bottlenecks and waiting times. This means: A delayed flight trial in London can have an impact on a trial in Munich.

In summary, processes at the present company can no longer be improved and audited using the classic lean approach because it is not possible to go to the airports with personnel to examine processes there. Because of this, the digital process mining approach PROMOTE was created.

PROMOTE

The PROMOTE approach consists of three important factors:

✓ **Integrated continuous improvement process (digitized Lean)**

✓ **Agile way of working through process mining**

✓ **Automated comparison between reference and real processes (digital reporting)**

Process mining can be used to examine up to 500,000 flights per year, far more than by using staff and documentation via "clipboard". In addition, PROMOTE allowed the airline to see for the first time, for each flight, how each process performed.

In addition, a new operating model for the application of process mining was developed so that the software, in this case Celonis, could be used to its fullest extent and the best results could be achieved.

In addition to the points listed previously (Left side), the efficiency and transparency of the processes are particularly important on the road to operational excellence.

PROMOTE

Especially the point of the integrated continuous improvement processes of the PROMOTE approach is important to improve sustainably and to reach the goal of operational excellence.

The integrated continuous improvement processes have an impact on the following:

- Improvement potentials can be identified
- Potentials are quantified
- Countermeasures are identified
- Simple prioritization
- Measures can be implemented
- Processes can be controlled

Thus, process mining has a great impact on the improvement of processes and thus also on the performance of the airline.

Teamwork is also an important approach of PROMOTE.

Teamwork:
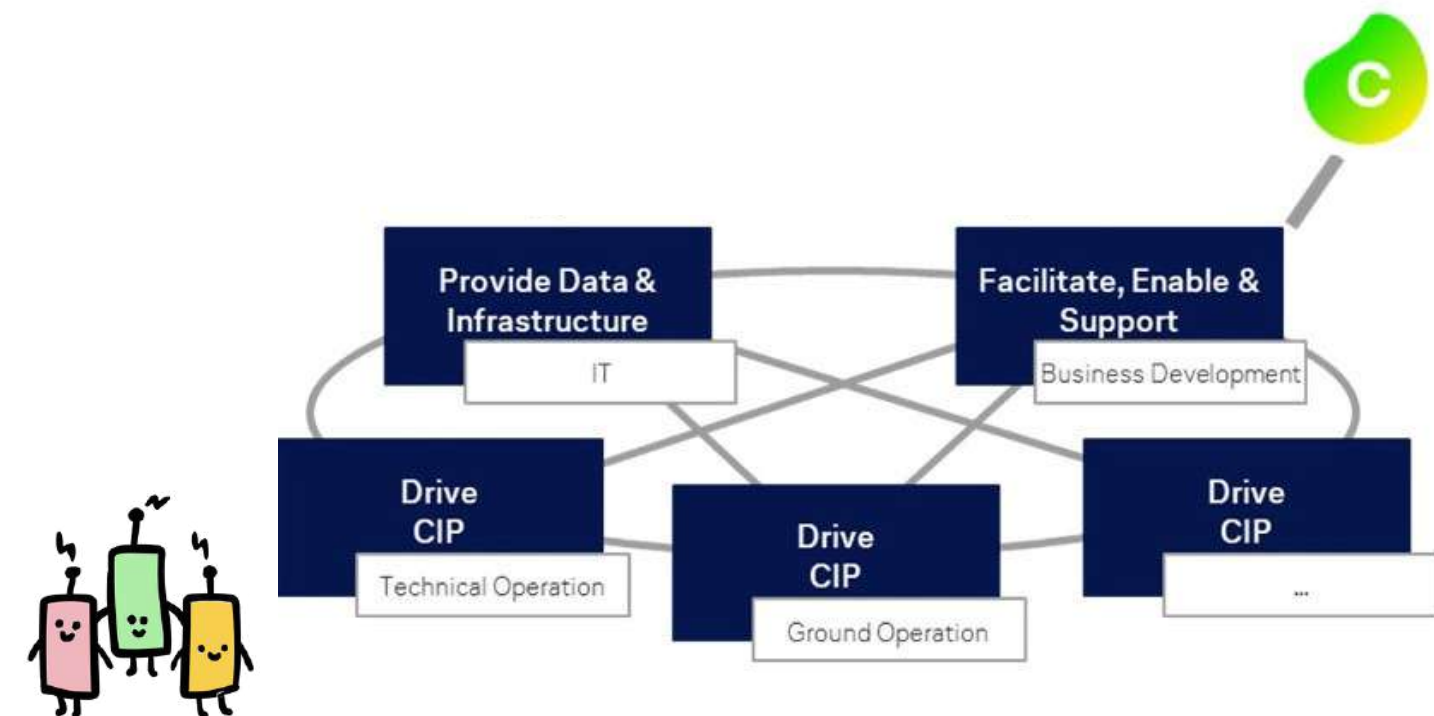
PROMOTE is characterized by a heterogeneous group of people from different departments. These include IT, Business Development, Technical Operation and Ground Operation. Process mining is particularly successful due to the cooperation of all departments and employees.

PROMOTE

The point of agile working is also particularly important for the PROMOTE approach, so that the process potentials are exploited.

During two-week sprints, people look into the processes to find out where sources of error lie and where everything is already running according to plan. Only in this way can continuous improvement succeed and the top of the mountain be climbed.
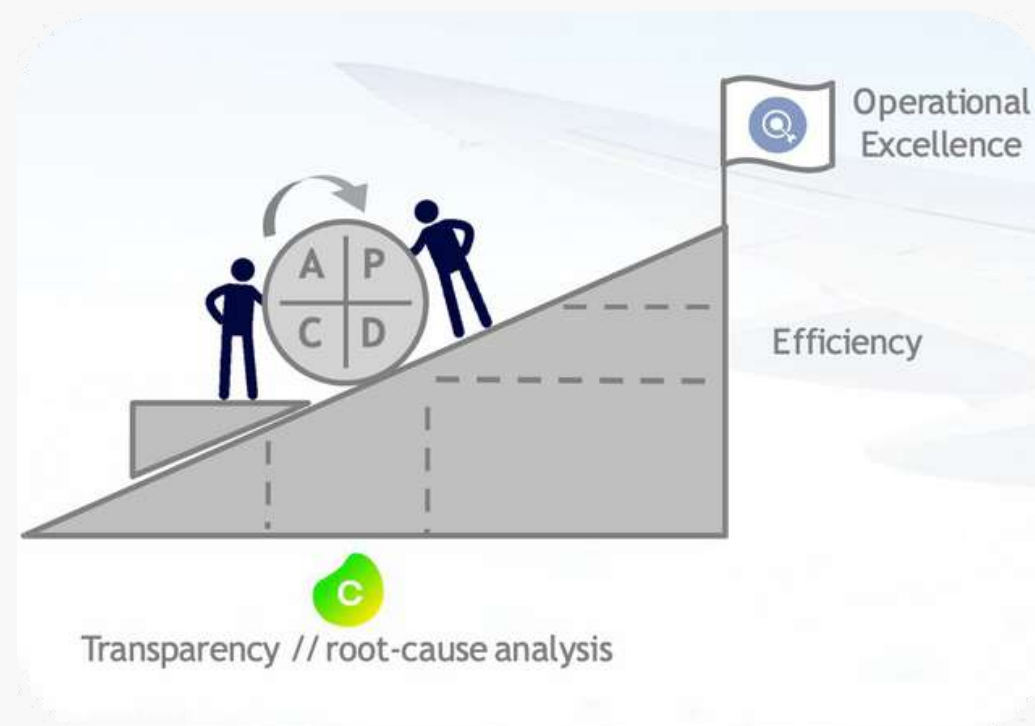

Here's an illustration of how Agile works at the airline:

Agile way of work:

- Check-In to align and prioritize potentials
- Sprints with a duration of 2 weeks

| Backlog	To Do	In Progress	Done
Potential J — Planning	Potential G — Material	Potential C — Engineering	Potential A — Material
Potential K — Planning	Potential H — Line Maintenance	Potential D — Engineering	Potential B — Line Maintenance
Potential L — Commercial	Potential I — Commercial	Potential E — Planning	
Potential M — Line Maintenance		Potential F — Material	
Potenzial N — Engineering			
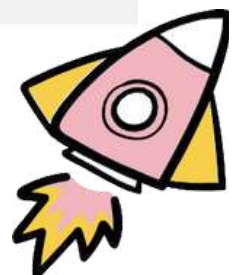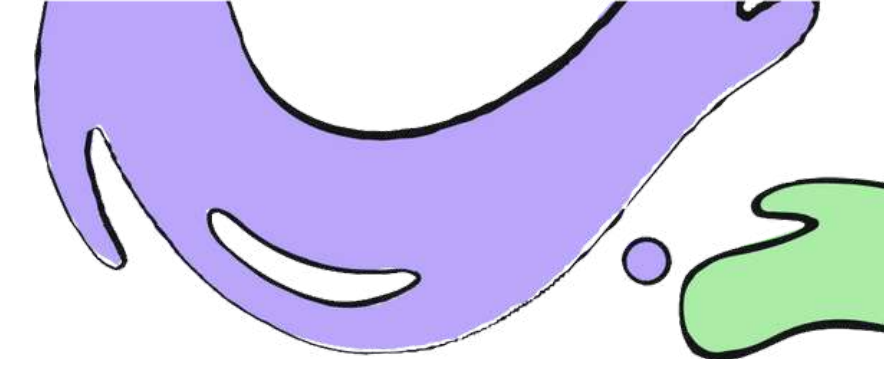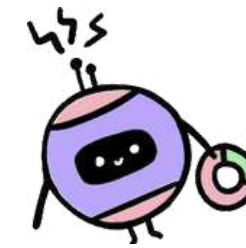
Use - Ground Operation

By using PROMOTE, the airline has optimized the "Ground Operation" process, among other things. Ground Operation is the handling of the aircraft at the airport.

The extensive ground operation process includes many smaller processes, such as transport, refueling, catering, cleaning, loading and unloading, boarding and pushback of the aircraft. This means that even before the flight takes off, a large number of complex parallel processes are involved.

The processes are interdependent and have to work together to ensure an on-time departure.

Through the process mining supported lean approach, the airline was able to create an overview of all processes and display this graphically.

45
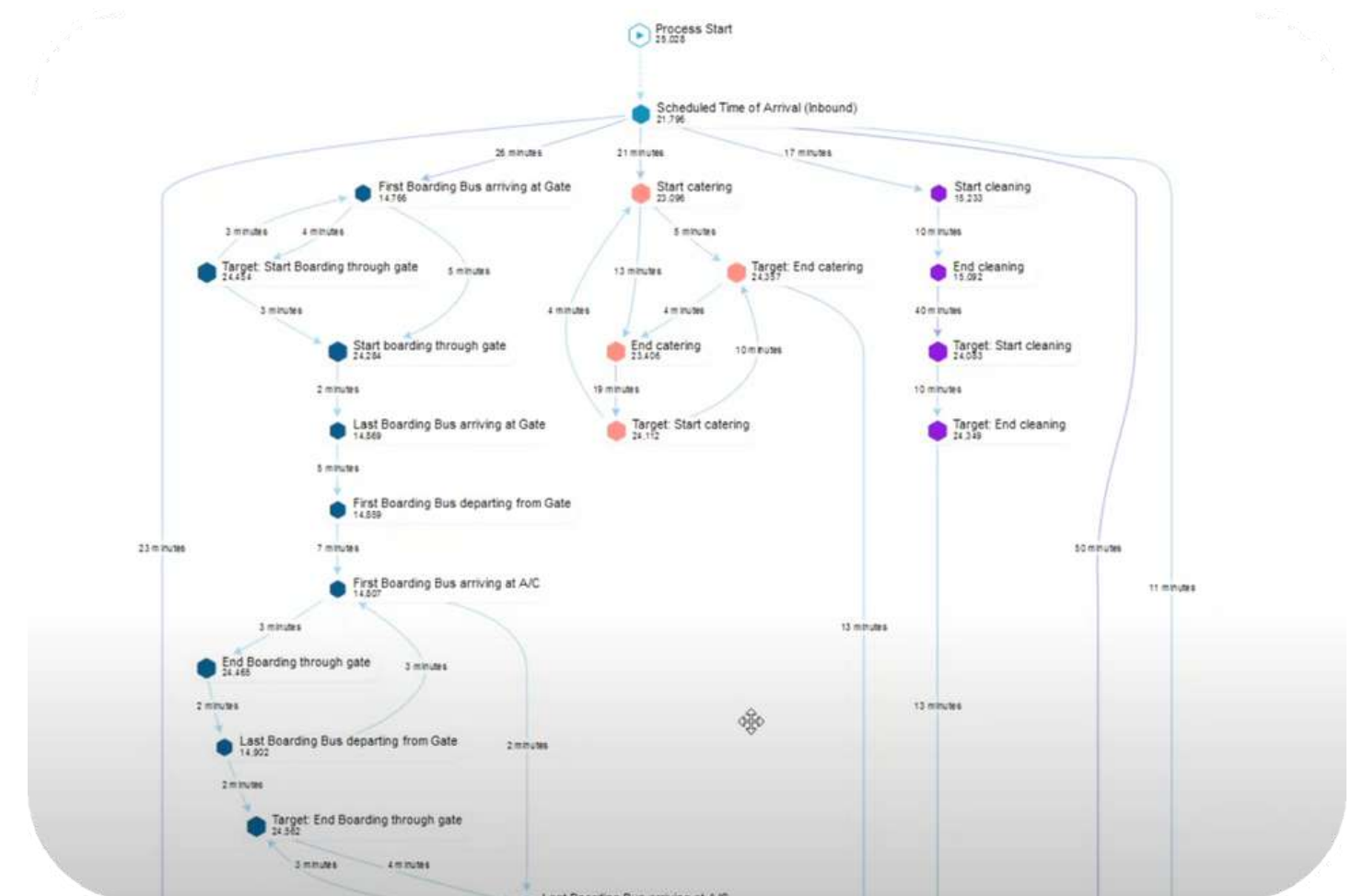
Use - Ground Operation

Furthermore, the airline built a ground operation dashboard to get a better view of processes and operations.

During the sprints of the PROMOTE approach, it was discovered that there was a problem with departure punctuality at Munich Airport.
By using the process mining software, it was possible to view all processes in the dashboard, including the boarding process, where the airline suspected the reason for the tardiness.

It turned out that bus boarding and boarding at the aircraft were reasons for the unpunctual start.

Walkboarding was introduced as a solution to the process problem, i.e. walking to the aircraft when shorter distances are involved. Thus, the long wait in front of the aircraft can be minimized.

This solution was developed using the agile way of working, i.e. stand-up meetings and sprints. This allowed the process to be improved quickly.
By using the Celonis software, the measures could be checked in retrospect, as all processes should be subject to constant monitoring.
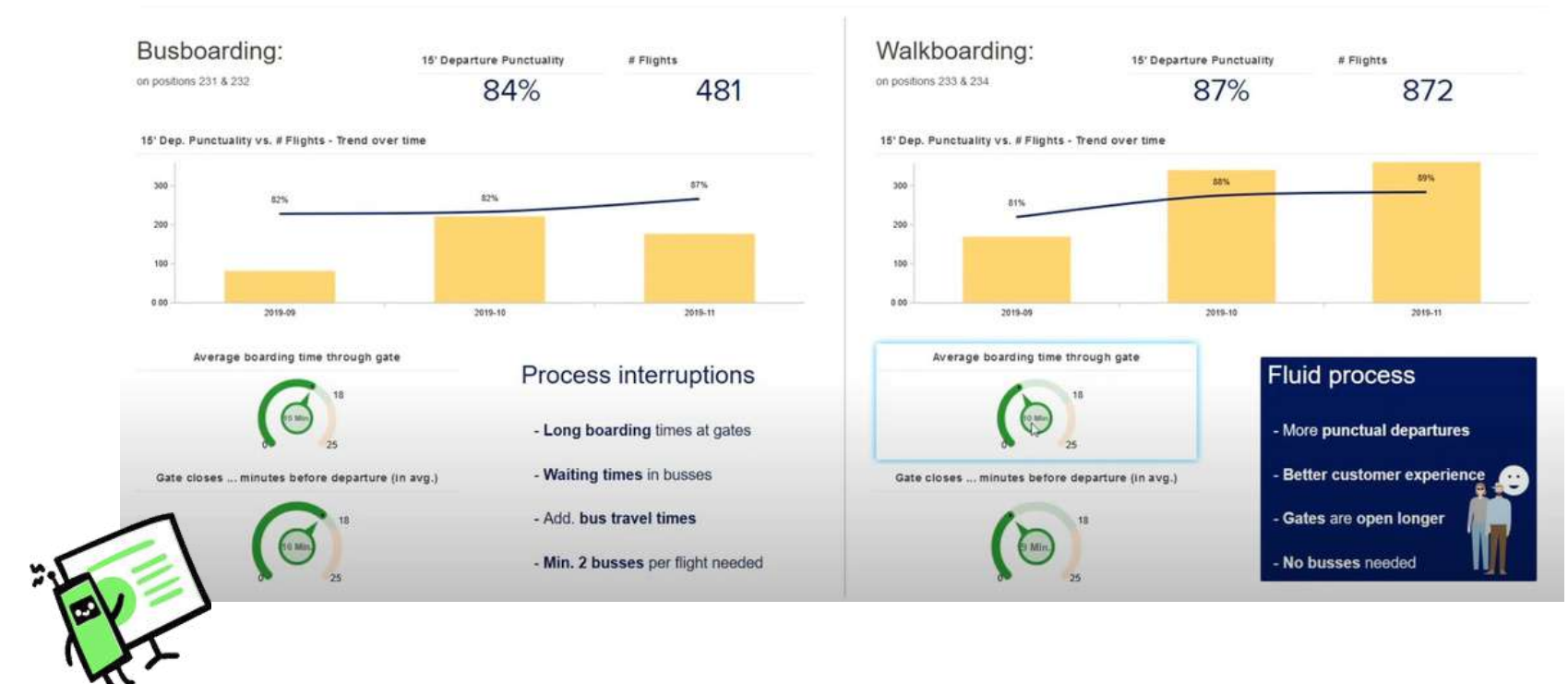
Use - Ground Operation

The evaluation of the results shows that walkboarding made flights 3% more punctual, which is definitely a good result given the volume of flights the airline operates.

In addition, the boarding time at the gate was reduced by 5 minutes due to the process improvement. The gate can also stay open 7 minutes longer as a result of the new process, giving people with connecting flights, for example, more time to board, minimizing stress factors.

In summary, it can be judged that the process has been improved by PROMOTE. Punctuality has increased, the customer experience has improved and costs have been reduced.
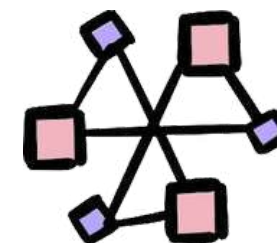
SUMMARY

Here is a summary of the most important facts about process mining in general and in relation to digital transformation.
In addition, we will provide you with useful templates that can accompany you on your way to using process mining.

Process mining - an important building block

Process mining is a holistic, bottom-up approach to process excellence that builds on the principles of continuous improvement such as Six Sigma while advancing the technologies used to achieve it, such as AI, automation, and BI analytics.

In process mining, event data in the company's IT systems (such as ERP, CRM, and BPM) is used to gain insights into the company's business processes. Insights are provided by automatically visualizing data with process flow diagrams and creating analytics that provide information on required improvements and deepen the understanding of what is happening in the business processes. That is why process mining is now an indispensable component of any automation and digitization strategy.

Process Mining & the Digital Transformation

Process mining is regularly used as part of larger digital transformation efforts because it can provide objective, data-driven insights into the core of delays and inefficiencies within business processes. At the same time, it provides companies with the clear insights needed to make process improvements so that systems run faster, smoother and leaner.

As a result, process mining can help prioritize the highest value Digital Transformation opportunities and evaluate whether transformation efforts have actually delivered the desired benefits. Process mining becomes an invaluable tool for maximizing the return on investment in digital transformation initiatives.
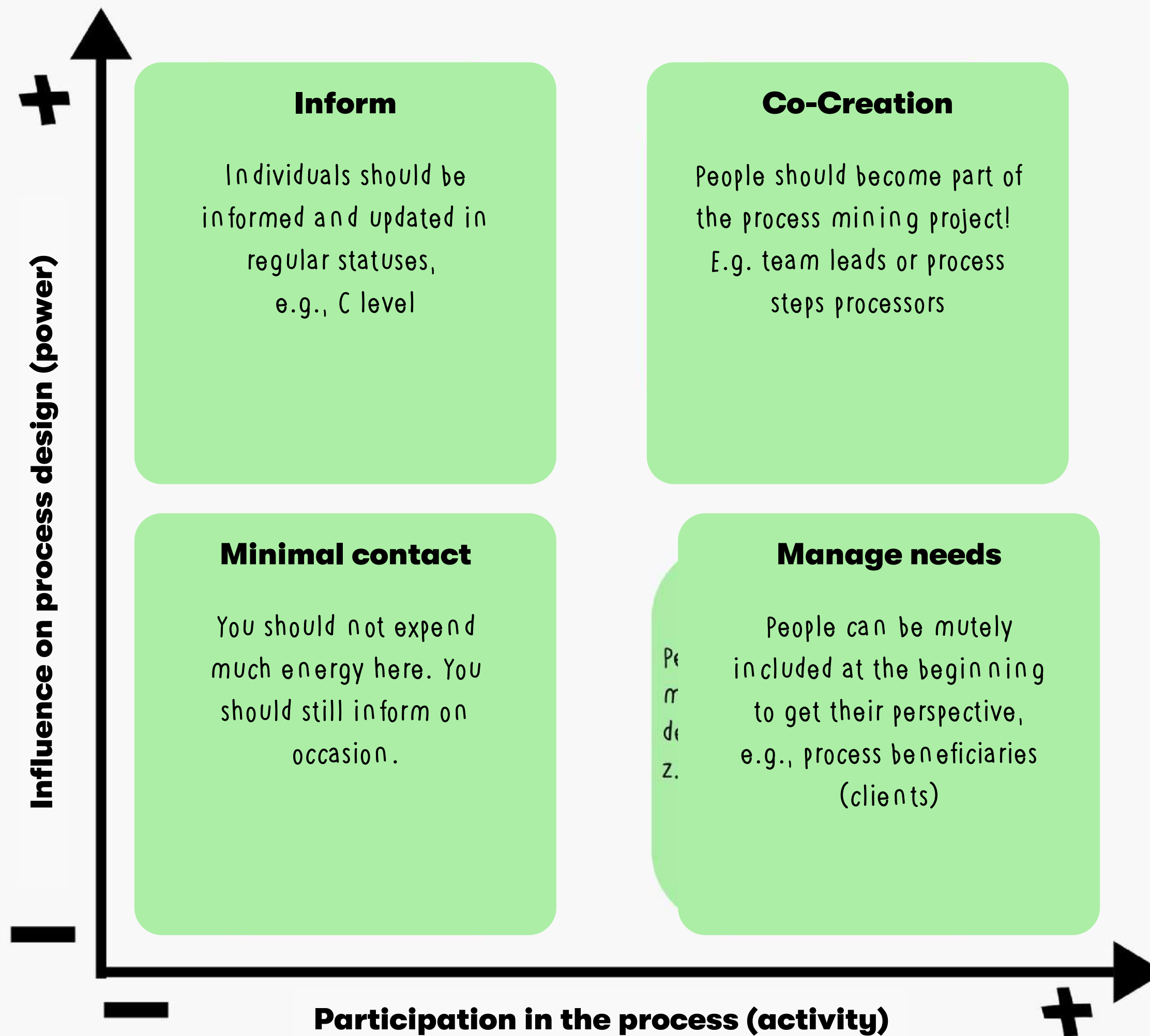
What Process Mining can do !!

✓ Process mining creates transparency, accelerates processes and increases productivity.

✓ Bottlenecks, errors and time wasters in business processes are identified.

✓ Process mining provides better and more accurate insights into the process, resulting in higher quality results.

✓ Process mining creates up-to-date monitoring and problems can be solved immediately at the point of origin, thus minimizing risks.

Process Mining Key-Takeaways

- Process mining improves your business process management and is applicable in almost any industry.
- Process mining provides your company with complete transparency about how processes really work. Thus, processes can be better optimized!
- Through process mining you can save time and manpower, define process bottlenecks and get facts about the process.
- Good process mining software should have these three functions: Process Identification, Conformance Checking & Performance and Improvement Analysis.
- To become proficient with software tools, further training in process mining academies is beneficial.

Inform

Individuals should be informed and updated in regular statuses, e.g., C level

Co-Creation

People should become part of the process mining project! E.g. team leads or process steps processors

Minimal contact

You should not expend much energy here. You should still inform on occasion.

Manage needs

People can be mutely included at the beginning to get their perspective, e.g., process beneficiaries (clients)

Influence on process design (power)

Participation in the process (activity)

Objective

What is the objective (O) to be achieved?

Theme

Which process is affected?

Hypothesis

What are potential vulnerabilities (S)?

How can we improve the process (V)? (Attention: Initially we recommend to identify the weak points first. In the next step, the table can be used to derive improvement hypotheses.

When V is done we lower/increase KPI. Thus we avoid O.

When we avoid/reduce S we lower/increase KPI. Thus we achieve O.

KPI

How can we tell that the hypothesis is right or wrong?

Evaluation

Is the hypothesis right / wrong?

People: Who is involved in your process?

_____

_____

Process Name: What is a "catchy" name for your process?

_____

_____

Process Purpose: What is the job to be done?

_____

_____

Pain Points: Which pain points does the process solve?

_____

_____

Department: Which departments are involved?

_____

_____

Connected Systems: What are the connected systems?

_____

_____

Improvement Protential: What is the improvement potential?

_____

_____

Process Lifecycle: How often needs the process need to happen?

_____

_____

Let's automate your business!

We help your company to scale internally by teaching automation skills and supporting your automation management. From idea generation to measuring your ROI. Tell us, what you need.

Book a Meeting