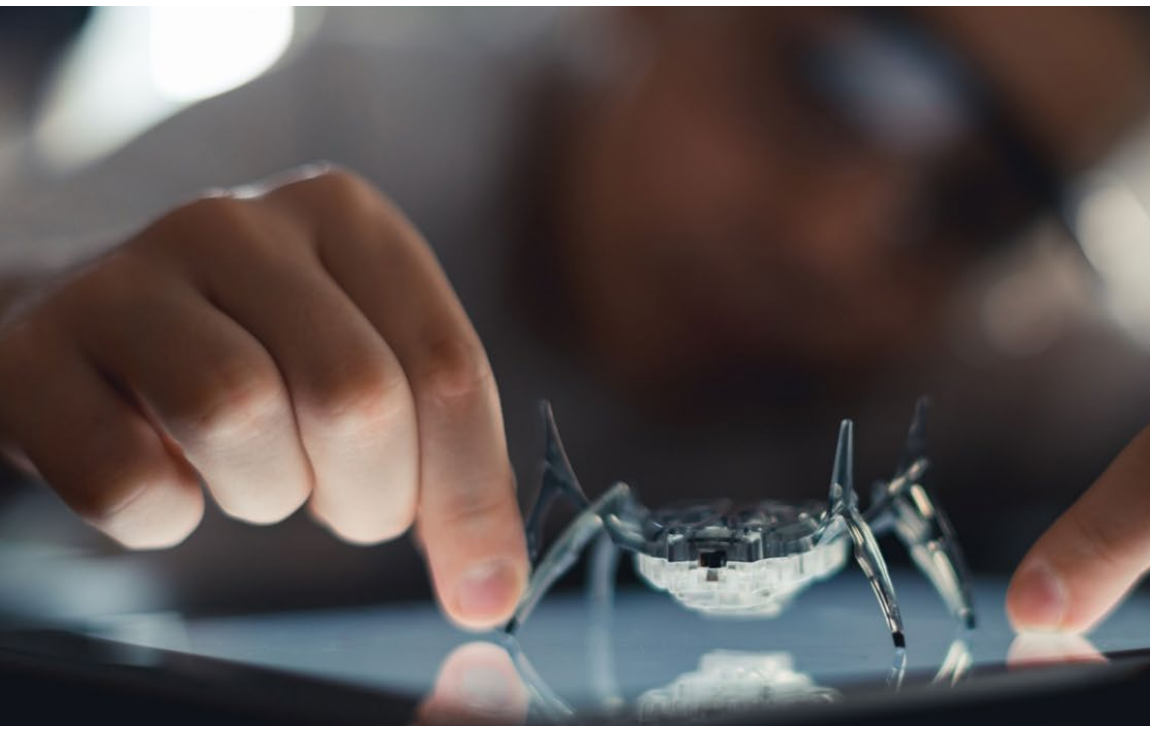
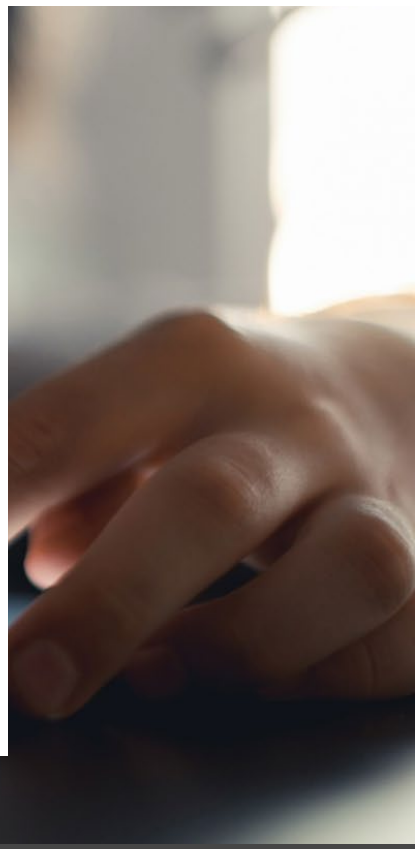
Process mining adds real value to S/4HANA transformations

Getting the most out of the transition to the new ERP platform





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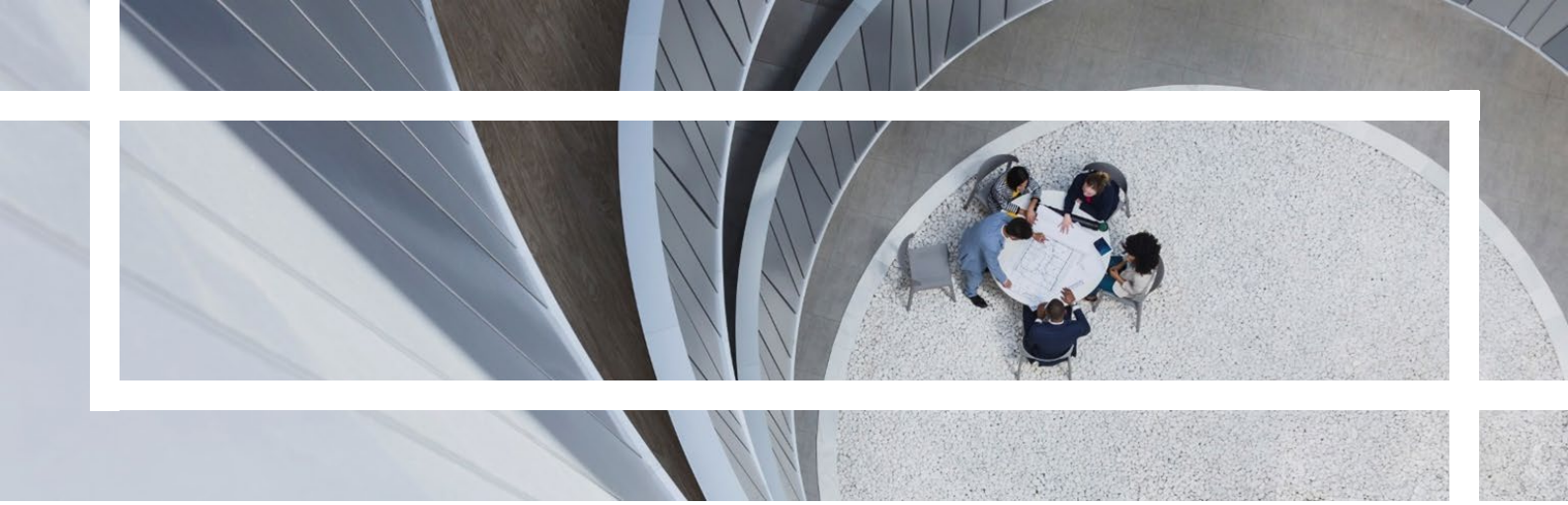


SAP S/4HANA transformation projects are becoming increasingly complex

According to SAP, S/4HANA provides a new backbone for clients to adopt new business models, manage business change at speed, and orchestrate internal and external resources – supported by native integration between processes, industry best practices, and a consistent in-memory data model. It therefore comes as no surprise that making the change from a legacy ERP system landscape to S/4HANA is a top priority for many clients, and the end of support for legacy R/3 systems in 2030 is a powerful driver to upgrade existing systems.

SAP S/4HANA transformation projects are becoming increasingly complex because changes in the IT system landscape affect client processes and organisations during program runtime. Different groups of users and stakeholders need to be involved in designing and implementing systems and processes.

Old processes need to be redesigned or optimised and new processes require to be implemented to meet the needs of IT and the business. Finding the sweet spot between a greenfield and a brownfield approach for each process poses challenges for the transition programme. Resistance to changing existing processes and responsibilities is common, so early buy-in from stakeholders is necessary to establish change.

Uncontrolled growth of project scope and complexity, also known as scope creep, is a threat to successful completion of a transformation project. Scope creep can lead to requirements not being identified or met, unnecessary features being implemented, and budget and time constraints being exceeded. Focusing and prioritising topics helps to set the project scope and prevent cost overruns.

There are various catalysts to help streamline and de-risk S/4HANA transformation programmes and alleviate common pitfalls. One of these is process mining, also known as business process intelligence.

Process mining is widely recognised as a powerful tool, but many companies are still unclear about how exactly it can be used to create value during S/4HANA transformation programmes.

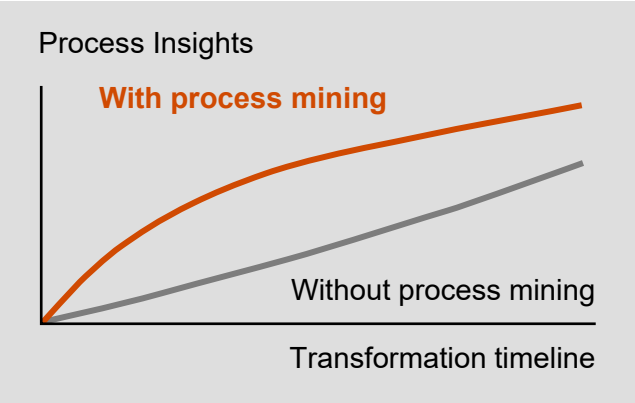
This paper aims to address this lack of knowledge, providing an approach using process mining to add value in S/4HANA transformation projects and describing how potentials for continuous improvement can be explored beyond a transformation project. This includes an explanation of how process mining differs from other techniques, an exploration of its possibilities, and a client case study showing how our expertise in process mining and transformation projects has helped clients to accelerate their S/4HANA journeys.

Process mining visualises end-to-end processes and helps you gain process insights fast

Process mining is a technique for visualising and analysing existing end-to-end processes based on digital footprints (i.e. log files) from IT systems. These are used to automatically create process flow charts, including process variants and key performance indicators (KPIs).

Using this technique significantly increases the speed with which insights can be gained into existing processes, including any peculiarities or deviations from industry standards. It also increases transparency, since processes are depicted as they are executed in a given system. Analyses of these processes can also be enriched with master data and custom settings to drill even deeper. Results can then be used to identify potential for optimisation, reduce risk by analysing inefficiencies and other issues, guide design work for new or updated processes, and automatically document processes using graphs and insights.

The journey towards S/4HANA is typically preceded by considerations of these inefficiencies in the operating model. While it is widely understood that transitioning to the new SAP platform provides the opportunity to make fundamental changes and gain or regain a competitive edge by optimising critical processes and functions, prioritising the various topics can be difficult. Limitations or constraints due to budgets, organisational readiness or the overall approach to the project make it necessary to focus on the areas which are expected to generate the most value for the business. The question is how to get there.



Increase standardization by reducing unwanted process variants

Ensure compliance by comparing as-is with target processes

Boost efficiency, e.g. by eliminating bottlenecks & increasing automation

Conducting workshops and simply talking to the relevant business units about their pain points usually provides a good starting point. However, these answers are often based on gut instinct and the results can end up skewed. This is where process mining comes into the picture. It provides a data-driven approach to identify low-hanging fruits and enable a transformation initiative to focus on the most important and most critical processes first. This is not to say that process mining is a substitute for more traditional means of qualitative analysis. The two approaches can complement each other, providing a holistic target vision of the solution and insights into processes.

Process mining can also help identify a suitable transition methodology, i.e. deciding between a greenfield and a brownfield approach. By providing data-driven insights into existing processes, it enables informed decision-making. This is particularly helpful when a transformation programme follows a hybrid approach (often referred to as selective greenfield or bluefield) and it becomes necessary to focus on processes which are particularly inefficient or are believed to hold the greatest potential for optimisation in the course of the transformation.

The question might arise as to how process mining differs from ‘traditional’ data analytics which is also commonly used as an accelerator in S/4HANA transformations. While both fall under the umbrella of business intelligence, process mining is typically concerned with how certain information is generated and integrated into a series of activities (i.e. a process), whereas data analytics aims to identify meaningful patterns in data.This is not to say that one is better than the other: both tools can provide meaningful insights for a holistic approach to decision-making.

Our value-adding approach to process mining focuses on end-to-end business processes across IT systems

Identifying and setting the right scope for an S/4HANA transformation is a key factor for a successful project.

As processes tend to be complex, process mining focuses on and analyses the most important end-to-end processes.

The scope of process mining is typically aligned with an existing process management organisation, i.e. end-to-end processes such as record-to-report, order-to-cash, purchase-to-pay and others. The results of the analysis are typically impact-led, meaning that the goal is to focus on business processes rather than targeting a dedicated solution or system, so it is important to note that a platform-agnostic approach may go beyond an ERP system (such as S/4HANA) and also involve other entities found in an end-to-end scenario (e.g. MES systems like SAP DMC).

It is important to note that it usually does not make sense and is not feasible to target a complete process landscape but focus on those processes that typically yield the highest value, as depicted below.

Process	Value add
Purchase-to-Pay	High
Order-to-Cash	High
Accounts Payable/ Accounts Receivable	Medium
Production	Medium
Warehouse Management	Low

Process mining tools are multi-tenant and can process data from different IT systems, or a number of similar ones. For example, opportunities and quotations from a CRM system can be combined with the order-to-cash process from an ERP system to gain transparency over the complete lead-to-cash process. The same process can be compared and benchmarked across multiple ERP systems to find differences and similarities and identify best-of-breed target processes.

KPIs support process analysis and enable benchmarking of process performance between entities. Process mining solutions provide a set of process-driven KPIs for data such as throughput times, rework activities, process variances, and automation rate.

It is also possible to add customer-specific KPIs, and use process mining to track KPIs and trigger alerts when certain thresholds are reached. However, it is important to get the right approach for creating and adding valuable KPIs to gain more process insights: there is a risk that users will simply replicate existing reporting solutions and come to see process mining as just another business intelligence tool. The focus of process mining should be on analysing the process in question to get the most benefit out of these tools.

An example of how we used process mining to accelerate an S/4HANA transformation for one of our clients can be found on the following pages.

Case study: the benefits of process mining on an S/4HANA journey (1/2)

During the preparation phase of our clients' S/4HANA transformation program, discussions with the respective stakeholders (i.e. business and IT) revealed that the quote/order-to-cash process (including after-sales activities) was the area with the most severe pain points – and, therefore, the greatest potential for optimisation, so we selected this process as the target of analysis for process mining. We then narrowed down the analysis using a few other factors, such as countries and distribution channels, and we excluded some specific cases (e.g. cancelled orders) to reduce the overall "noise" in the dataset we were looking at.

Once we had received the dataset for our analysis, we proceeded to set a series of objectives:

1	Achieve process conformance
2	Eliminate redundant activities
3	Increase automation
4	Determine relationship between customer structure and net order value generated
5	Identify benchmarks
6	Optimise cycle times

Armed with the relevant data and a set of objectives, we prepared the analysis results in our process mining tool (Celonis) and used these findings to conduct a series of iterative workshops with our client to validate and discuss the outcomes, involving stakeholders from the business and IT. We then matched these findings with the pain points and requirements which were identified during the qualitative workshops, which had been run in parallel.

This enabled us to identify relevant touchpoints within the order-to-cash process at the sub-process level and continue with redesigning or new designs, while also aligning these activities with appropriate S/4HANA best practices, processes and functions.

To give a specific example, our client introduced a new process standard for a certain type of after-sales activity which allowed for more granular control of follow-up activities compared to the legacy process. This more granular control, in turn, offered greater flexibility for the employees and users concerned. The client suspected that acceptance of the new standard process had been fairly low, but they had found it hard to estimate the actual level of process conformance and develop suitable measures to address the issue. Process mining allowed us to segment the relevant sub-process by territory and by unit within our client's organisation. We were then able to make contact with the relevant stakeholders to identify the root cause of the low level of process conformance and develop suitable process adjustments to combat the problem.

While we utilised Celonis in this case, the exact choice of tool is usually a secondary consideration in achieving meaningful results from this kind of process mining initiative. Interpreting relevant metrics and putting them in the right context is far more important. There are also a few best practices that help ensure a successful outcome. Examples of these are summarised on the next page.

Case study: the benefits of process mining on an S/4HANA journey (2/2)

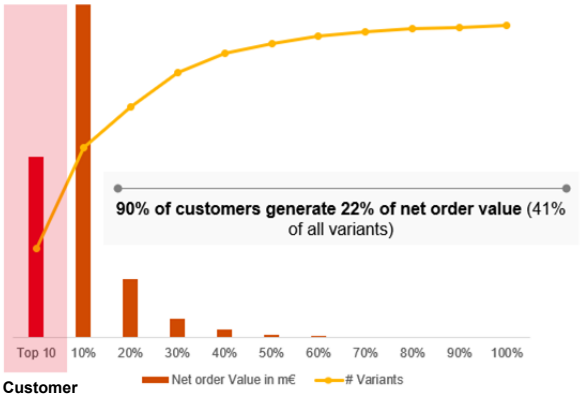
Example analysis results

	Business scenario A	Business scenario B
Process variants	1,200	590
Complexity[1]	84	294
Ratio[2]	7%	50%
Happy path rate[3]	35%	6%
Automation	17%	7%

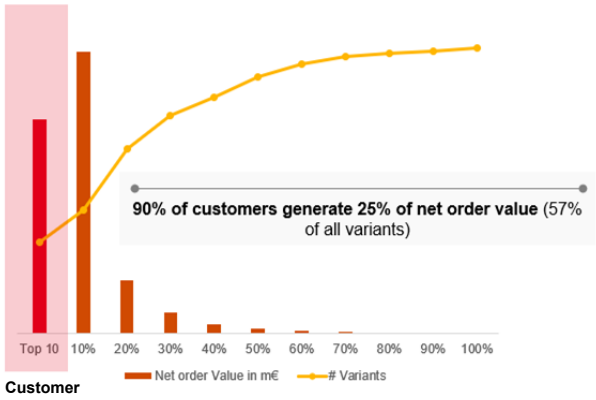
Most process mining tools offer a standardised set of KPIs and parameters. An example set of these metrics is depicted on the left, divided into two business scenarios. Depending on the operating model, this might be a distinction between elements such as business units, product segments or distribution channels. To provide an effective explanation, these results are then interpreted in the corresponding (business) context. An example for this is shown below, where the focus of the analysis was on the distribution of net order value depending on customers and process variants.

1) Number of variants covering 90% of sales order items. 2) Percentage of variants covering 90% of sales order items.
3) Percentage of sales order items adhering to defined happy path/best practice process.

Business scenario A



Business scenario B



Best practices

Scope

Even though the quote/order-to-cash process was selected as the process to focus on, there was some variation in understanding of the scope at first (e.g. whether after-sales activities or follow-up functions in finance were included, such as accounts receivable management). As well as standard tables (e.g. VBAK, LIKP), relevant appends and Z-tables should be identified and evaluated at an early stage.

Setting KPIs

Building up a common understanding in the initial phase of the project of what terms such as “process variance” or “rework rate” actually mean makes subsequent discussions a lot more efficient and ensures results are correctly interpreted. For instance, using different Incoterms does not necessarily constitute a deviation from a defined order-to-cash standard.

Stakeholder involvement

Identifying redundant objects (e.g. legacy order types, org structures) makes subsequent analysis a lot easier. To do this, it is a good idea to get the operational level (IT and business) involved early in the process, as they usually have the most comprehensive overview of the relevant objects.

Data extraction time

Depending on the client, approval from the data protection officer and the works council may be necessary before extracting data.

Interpreting results

KPIs must be interpreted in the context of the process in question. One example of this is trying to work out the potential for automation from a low automation rate without evaluating feasibility first. Invoicing, for instance, is often considered to be an activity with potential for automation, but it may require manual tasks in some client organisations – for example, if the two-person rule is implemented.

Benefits with process mining in S/4HANA transformations and beyond

Objectives of transformation projects change during each phase of the digital transformation lifecycle. These changes are driven by both internal and external factors. S/4HANA transformation projects benefit from using process mining, both during the project and beyond it.

During transformation, the main objective is to find the most suitable approach for the transformation project in question. Process mining helps companies to identify the right scope more quickly by rapidly gaining an in-depth understanding of processes based on actual data from IT systems. Identification of critical or frequent processes helps to prioritise areas for improvement. Analysing process variances reveals potential for harmonisation and standardisation, further helping to guide the process of designing the target vision. Process visualisations, analytics and KPI measurements create a common understanding of this potential for stakeholders, business and IT. Quantifying potential helps ensure stakeholder buy-in from an early stage and makes the need to change visible, reducing the resistance to change.

During subsequent project phases, process mining can also be utilized to drive the fit/gap analysis between implementation template and current processes, support and validate test execution, and prioritize improvement measures within the system tests. Furthermore, it supports the documentation of process flows while monitoring the conformance to the respective process templates.

For usage during the run/operational phase, the main objective is ensuring process compliance. For instance, processes that were designed based on a template during the course of a project often end up deviating from the intended standards once they are running in a productive setup. In this context, process mining can be used to validate conformance and adherence to templates within processes, providing a metric which is otherwise hard to quantify. Alerts are provided if non-compliant processes are found to be running, helping to strengthen process governance and management processes. Process mining thus provides monitoring functions for established business processes, integrated into the organisation's process management/ownership governance model.

While process mining can be used within a programme organisation (i.e. a S/4HANA transformation initiative), it can also provide value beyond the constraints of a project setup. Drivers such as changes in markets and new technologies require companies to create new products and services or even develop new business models.

Continuous improvement cycles and initiatives can be driven by using process mining capabilities to analyse processes and identify potential for optimisation. Based on the insights gained from this analysis, measures can be developed to evaluate outcomes, improvements can be implemented and the results can be continuously monitored. If the results do not match the expected outcome, the improvement cycle can be started again until the desired outcomes are achieved.

Digital transformation life cycle

	Transformation	Run	Continuous improvement
Benefits	Enable and accelerate **design target vision** for the solution	Ensure and measure **process compliance**	Enable **process improvement** Establish and support **new business models**
Drivers	Transformation programme organisation	Process governance/ management	Markets Technology Legal requirements Process management/ ownership

Thought leadership throughout your transformation journey

The disruptive potential of S/4HANA transformation programmes is widely recognised, but there is also a growing awareness that these initiatives transcend mere IT projects. As a result, stakeholders expect a solid approach to addressing the most important pain points in order to create value for the business without relying on guesswork. In this context, process mining can be seen as an important part of an S/4HANA transformation toolbox that makes it possible to gain insights into processes more quickly. Use cases differ depending on the phase of the transformation life cycle, and extend beyond the constraints of a typical project organisation. Process mining can support finding a suitable transition methodology prior to starting an S/4HANA transformation, i.e. choosing between a greenfield and a brownfield approach or qualifying the “green spots” in a hybrid/selective greenfield approach. During the transformation, process mining can be used to enable and optimise the task of defining target processes and provide benchmarking against best practices. Finally, process mining can support a process organisation after the transition to S/4HANA by enabling continuous improvement.

In our experience, process mining has proved to be a useful accelerator for our clients’ S/4HANA transformation programmes. Is it worth it? Yes – if it is used correctly. The scope of a process mining initiative needs to be aligned with the existing process organisation, and the results need to be interpreted correctly.

If these conditions are met, data-driven decision-making enables you to bring order to the chaos of a complex process landscape, and helps get relevant stakeholders involved in the decision-making process. This is not to say that process mining and more traditional types of qualitative analysis (design workshops, interviews etc.) should be viewed as mutually exclusive. Traditional and modern can work in synergy, providing a “best of both worlds” approach for S/4HANA-driven transformation programmes.

At PwC, we combine relevant expertise in process mining, S/4HANA and business processes, enabling us to guide our clients on their transformation journeys and get the most out of their journeys to a new ERP platform. While our case study above used Celonis, we also partner with other players in the market such as Signavio/SAP, using a technology-agnostic approach to help our clients find the process mining tool that best suits their needs. Our service offerings include one-off process mining analyses, rolling out and implementing process mining software in additional processes, and support with introducing and establishing a permanent process mining organisation. We can also provide regular evaluation of data without the need for your company to license process mining software with our process mining as a service (PROMaaS) offer.

We at PwC can lead your S/4HANA transformation journey with our unique blend of business, experience and technical expertise. Adding process mining into the equation allows us to strategically address our clients’ most complex business problems and generate sustainable value.

Accelerating your transformation	In-depth understanding of processes, based on data/as-is and prioritisation of processes
	Approach to target process design (degree of greenfield vs. brownfield) based on data-driven analysis
	Graphs and insights for automated documentation
PwC expertise	Process mining expertise: implementation, process analysis, roll-out, process mining as a service (PROMaaS)
	Transformation expertise: business processes, change management, project management
	S/4HANA expertise: application processes, implementation, template process design

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Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.

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