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RESEARCH

Mine Your Journey to Digital Excellence

Role of Process Mining in Accelerating Digital Transformation

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Introduction

The adage “The only constant in life is change” is apt for business, and was never more true than in this pandemic-stricken world. Businesses are under constant pressure to change with evolving customer expectations, intensifying competition, varying regulations, and increasing administrative expenses. The pressure to constantly evolve has been further aggravated by the COVID-19 pandemic.

While traditional/legacy operations and business models are threatened by rapidly changing market dynamics and disruptive business models, it has been demonstrated that organizations that are leaders in digital transformation are better positioned to respond to such disruptions. Consequently, the race is on to adopt digital and automation initiatives and to accelerate the pace of transformation to become lean, resilient, and agile.

A major challenge many organizations face when adopting and accelerating digital transformation initiatives is lack of process visibility and documentation. Manual process discovery and analysis take a long time and significantly delay time-to-value realization. These processes also tend to be inefficient and error prone due to reliance on opinions, human subjectivity, and potential bias rather than data-backed facts.

Process mining technology helps address these challenges by providing an objective and fact-based approach to both discover as-is processes and continuously monitor and optimize them. This whitepaper empowers organizations with key insights and guidance on the role of process mining in ensuring operational excellence and accelerating digital transformation.

In this paper, we discuss:

- The need to change to a digital-first business
- Barriers to scaling digital initiatives and value realization
- The role of process mining in accelerating digital transformation
- The business case for process mining
- Enterprise use cases
- Adoption challenges and key factors for successful execution

The need to change to a digital-first business

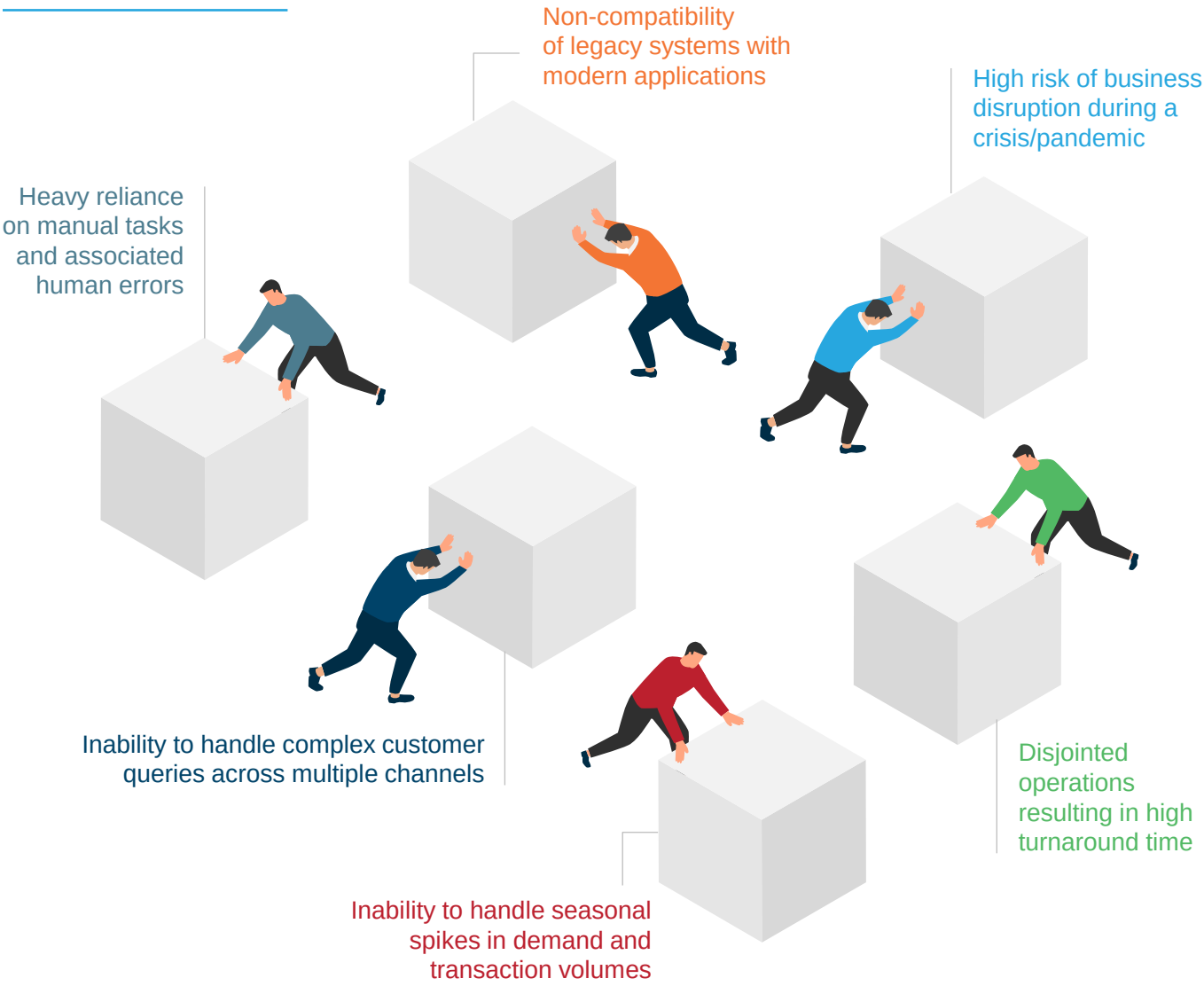
Traditional operations and underlying business problems

Traditional operations and legacy business models revolve around manual and labor-intensive processes and heavy human touchpoints across most business areas, including high volume and transactional/repetitive processes. Such a heavy reliance on manual processing often results in unwanted variances/inconsistencies, especially in large organizations with operations spanning multiple geographies and/or sectors. Legacy businesses typically leverage tools such as labor arbitrage, Lean Six Sigma, and shared services to reduce costs, improve process efficiency, and comply with SLAs. Consequently, given rapidly evolving global business environments, they face a multitude of challenges as illustrated in Exhibit 1 below. COVID-19 has further exposed hitherto inconspicuous gaps in business continuity and resilience in these legacy business models.

EXHIBIT 1

Major challenges faced by legacy businesses

Source: Everest Group (2021)



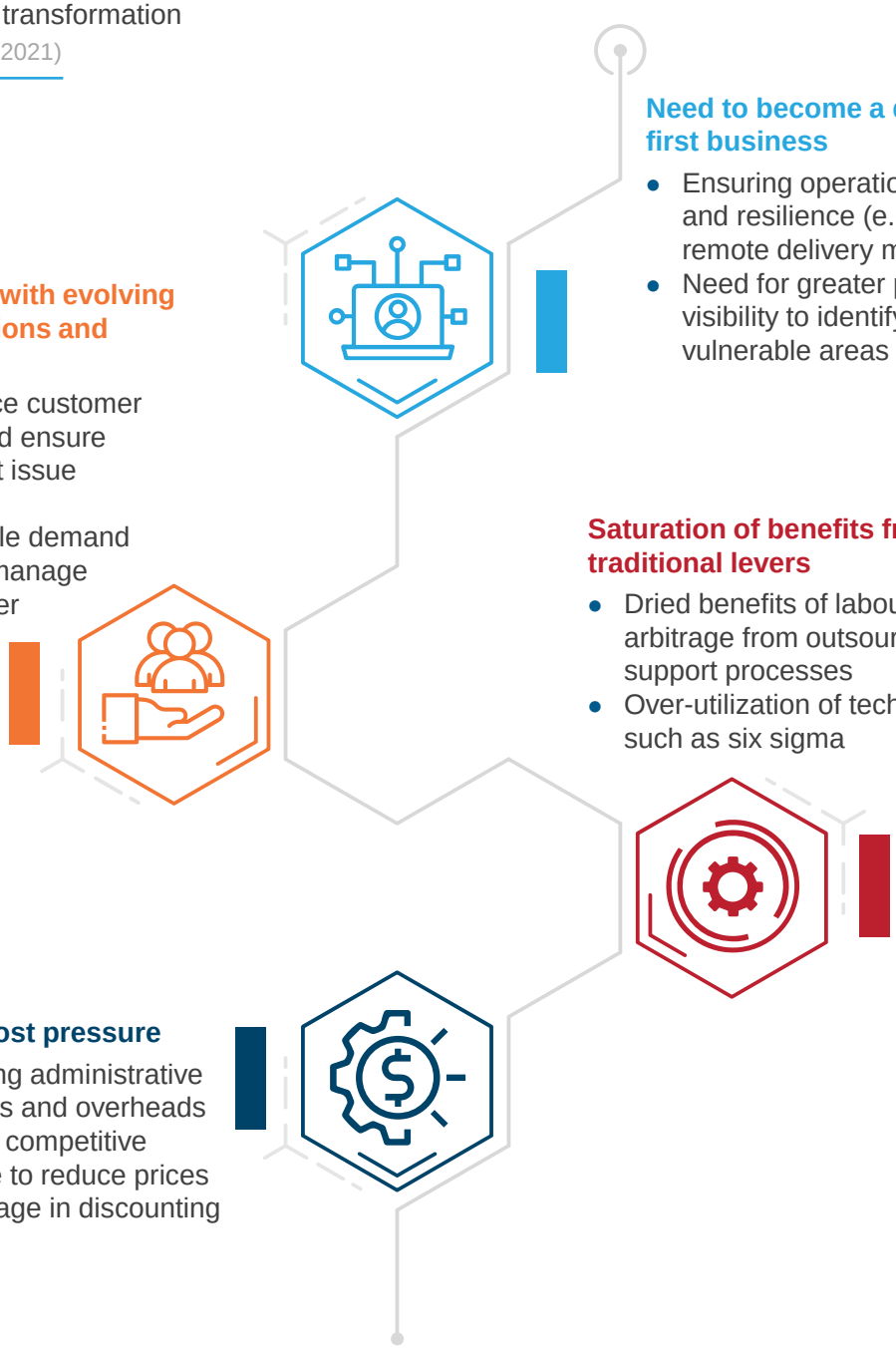
Drivers of transition to a digital-first business

Motivated by the desire to overcome these challenges, many organizations launched digital transformation initiatives. Furthermore, the COVID-19 pandemic exposed the need to accelerate digital adoption and the pace of change to lean, resilient, and agile operations. The crisis not only amplified the importance of typical change drivers, such as cost pressures, saturation of benefits from traditional levers such as Six Sigma, and evolving customer expectations, but also brought to light some new drivers, including remote working, business continuity during pandemics, and operational resilience, as illustrated in Exhibit 2 below.

EXHIBIT 2

Key drivers of digital transformation

Source: Everest Group (2021)



Barriers to scaling digital initiatives and value realization

Businesses face multiple challenges as they adopt and accelerate digital transformation.

Lack of as-is process visibility and documentation

Most organizations start with defined Standard Operating Procedures (SOPs) for their internal processes. However, over time those processes mutate to meet day-to-day operational pressures, ultimately becoming different from those that were initially laid out. These variances, along with related impacts such as time and cost, are seldom captured and documented to reflect reality. To add to the challenge, traditional process discovery techniques are manual in nature and very time-intensive, often affected by bias, and exposed to opinions instead of verifiable facts, resulting in significantly longer and expensive digital transformation timelines.

Inability to identify the right level of optimization opportunities

Redundant steps, unwanted variances, and other inadequacies are often introduced in the processes over time. Failure to identify the right level of standardization and optimization opportunities could significantly reduce value realization and derail digital transformation initiatives. Additionally, applying automation to broken processes could amplify inefficiencies. Finally, manual optimization techniques are very difficult to scale and are time- and cost-intensive.

Lack of a healthy automation pipeline

Another major challenge organizations face is the inability to maintain a healthy pipeline of processes to automate when scaling up. Organizations target obvious automation opportunities that are not always optimal; then, after the initial wave of benefits from easy opportunities dry up, they find it difficult to maintain a healthy automation pipeline using manual techniques.

Ineffective change and expectation management

Most strategic digital initiatives require time to achieve meaningful results. Without senior management intervention and persistent involvement, these initiatives face a premature end. The absence of buy-in from relevant teams, especially compliance and IT security, and change champions – who are needed to ensure collaboration among business and IT teams and to drive toward a common/shared organizational outcome – leads to failed projects. Unrealistic expectations and lack of defined KPIs to measure performance over time could also derail transformation initiatives.

Skills gap

Increasing demand for digital and automation talent is outstripping supply. While enterprises find value in vendors' training programs, a shortage of the experienced talent needed in the initial stages to jump-start the program remains a key challenge.

Enterprises say that the use of manual techniques to discover processes and identify the right optimization and automation opportunities are the top challenges to scaling digital transformation. These techniques are extremely inefficient, time and cost intensive, and difficult to scale. Thus, enterprises need a more efficient and fact-based approach to overcome these challenges.

The role of process mining in accelerating digital transformation

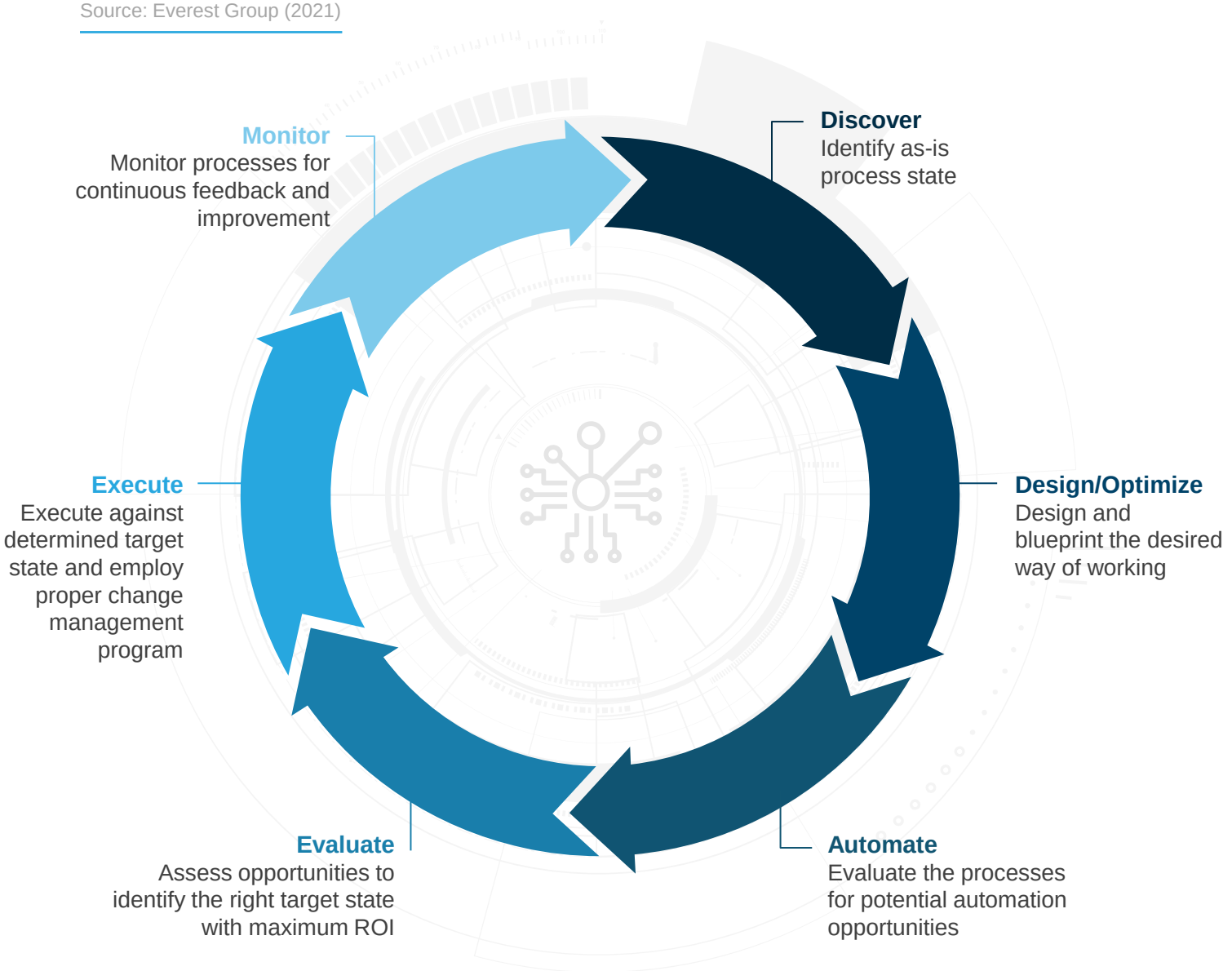
Process mining blends the power of data-based analysis techniques, such as data mining, sequence mining, clustering, association rules mining, and machine learning, to help organizations discover, monitor, and optimize as-is processes. Process mining solutions add significant value to traditional process analysis techniques, which rely solely on the process owners' knowledge and experience to discover and understand processes.

Process mining plays a critical role across various stages of an enterprise's digital transformation lifecycle, accelerating time-to-value realization, ROI, and scale. Exhibit 3 illustrates various stages of a digital transformation lifecycle.

EXHIBIT 3

Digital transformation lifecycle

Source: Everest Group (2021)



Discover

Digital transformation – and other business improvement initiatives – starts with the collection of data from various stakeholders/sources for the discovery of as-is processes. It involves capturing various details about the processes such as hierarchy, ownership structure, business rules, process steps/variances, and process metrics (including turnaround time, cost, and frequency). It is traditionally done through interviews, workshops, and focus group discussions.

The role of process mining in process discovery

Process mining technology utilizes a fact-based approach that leverages system event logs and/or desktop recordings of actual activities performed by users as inputs to recreate process maps. Along with the process maps, essential step information such as time, cost, volume, and frequency are also discovered. The recreated maps help in visualizing the current process flow, along with possible variances that exist across sectors/geographies. They can also be used to create up-to-date process documentation that can be leveraged for uses such as training new employees and handing over processes when outsourcing.

Design/Optimize

After discovery, the next stage of digital transformation is to design the future state of the processes, which primarily involves removing redundant/unnecessary steps and standardizing existing workflows to make the processes more efficient. The level of process optimization can vary widely and is dependent on enterprise requirements.

Enterprises have started to apply design thinking concepts to completely reimagine processes. Design thinking involves an iterative process to understand the customer, redefine problems, and challenge assumptions to identify alternate solutions and strategies. Use of design thinking could help enterprises keep pace with the fast-changing business environment and make them future ready.

The role of process mining in designing or optimizing processes

Process mining helps in conformance checking or benchmarking against established/best practices. It helps in gap analysis to identify deviations in two ways:

- **Perceived process behavior:** The model derived from process mining is compared with the perceived process model based on SOPs defined within an organization. To perform the comparison, a Business Process Model and Notation (BPNM) is created based on the specific SOP and fed into the process mining software to identify deviations in factors such as path, time, and cost. For example, external auditing companies can use process mining to validate whether actual operations conform to the defined operations or whether the same processes are followed across different business units, subsidiaries, or even countries.
- **Identified baseline:** Variances identified as part of the process discovery stage can lead to the selection of a variant, instead of the SOP, as a baseline due to practical feasibility and applicability. Consequently, other existing variants can be compared with the selected baseline to identify deviations.

After deviations have been identified, process mining can help in root-cause analysis by leveraging machine learning algorithms to provide insights into causes of detected process anomalies. The analyses can be used to reengineer processes after identification of exceptions, such as process loops, blind spots, and process vulnerabilities. Thus, enterprises can streamline processes by eliminating redundant and non-value-add tasks. For example, organizations can ascertain and rectify the root causes of late deliveries, enabling on-time delivery and improving customer satisfaction. Process mining also helps identify insights into employee collaboration that could improve resource allocation and work delegation.

Automate

The inability to populate their automation pipelines is one of the biggest challenges organizations face when scaling automation initiatives. A best practice to address this challenge is to break down complex enterprise processes into their basic/constituent parts, then assess the parts for their suitability for automation based on a set of assessment dimensions such as transactional nature, repetitiveness, cost, and volume.

The role of process mining in filling the automation pipeline

Process mining significantly reduces the time and effort required to create a healthy pipeline of automation opportunities. The wealth of process information such as volume, cost, time, and frequency captured by process mining tools enables enterprises to analyze automation potential and associated ROI to help identify and prioritize automation use cases.

Evaluate

The previous stages in the digital transformation lifecycle could result in multiple target state options for processes with varying levels of optimization and automation opportunities. Enterprises now need to evaluate/test various combinations against the likelihood of diminishing returns to determine the optimal scenario with the maximum ROI. For example, the level of additional investment required to optimize and automate a process beyond a certain point may surpass the additional benefits delivered. Finding the optimal target state could be an iterative process where enterprises temper the various aspirational target states with a business case. Process simulations empower enterprises to test new scenarios that have the potential to become the new SOP.

The role of process mining in identifying the right target state

Process mining helps enterprises carry out virtual simulations, using data-backed assumptions, to test changes to the as-is state without impacting day-to-day operations. Enterprises can simulate various improvement scenarios to predict ROI and help create/validate a business case. The most common simulation analysis approach involves configuring what-if scenarios by defining certain attributes/ variables, using process filters to compare steps, and examining the impact on the relevant KPIs such as throughput time and rework. This process mining capability creates business value for enterprises as it minimizes/eradicates the risk of implementing improvement projects without understanding how they will impact real-time operations.

Execute

Enterprises can now execute those projects that showed maximum ROI after the evaluation stage. However, to ensure successful execution, they need to consider two crucial aspects – change management and process orchestration. An effective change management strategy ensures frictionless adoption of rolled-out changes related to new technology or processes and acts as a key factor to get the most out of the investments made. As part of this process, enterprises need to:

- Secure buy-in from leadership and enabling teams like IT and security
- Bring interdepartmental stakeholders together to avoid departmental silos and determine process ownership and accountability
- Communicate changes to employees, especially the frontline managers who can, in turn, educate their subordinates
- Structure thorough training to make sure employees understand the changes and follow them
- Perform periodic governance to evaluate adoption progress and ensure a smooth transition to steady state

As enterprises scale up, it becomes important for them to be able to effectively manage human+machine dynamics and orchestrate the flow of work across the digital and human workforces to realize greater business value from digital investments.

The role of process mining in executing improvement projects

Process mining provides a transparent view into the operations that represent the interplay of all existing and optimized business processes, including their interrelationships, which helps enable a smooth rollout of new SOPs and serves as a guide for employees.

It also helps in conformance checks during the transition stage to evaluate whether employees are following process changes. As stakeholders across departments often need to work together to achieve a shared goal, process mining outputs can also shed light on any blind spots and help enterprises trigger actions to break down departmental silos, promote collaboration, and enable course correction.

Monitor

Even after executing improvement projects, enterprises need to continually review and analyze process performance to identify successes and bottlenecks. This stage helps enterprises monitor process performance against expected/desired outcomes to identify further improvement opportunities and refine/update the transformation roadmap.

The role of process mining in monitoring processes

Once implemented, process mining shifts enterprises from a reactive to a proactive state. As enterprise systems and desktops keep feeding inputs into the process mining software, operations managers / business users can keep an eye on the process maps it generates and plan for ongoing efficiency maintenance and improvement, helping to create a feedback loop to the discover stage for continuous monitoring/improvements and agile transformation.

Process mining technology helps in long-term maintenance and also in day-to-day operations. Process mining's ability to monitor processes in near real-time helps enterprises immediately notice failures in meeting critical SLAs or potential KPI breaches. It has the potential to automatically notify business users in advance and recommend ways to improve process performance such as resource allocation and step elimination. Consequently, predictive monitoring enabled by process mining can help enterprises take proactive steps to ensure business resilience.

Process mining shifts enterprises from a reactive to a proactive state and enables a virtuous cycle of process optimization

The business case for process mining

Developing a quantitative business case for process mining

Manual process discovery techniques require significant time, effort, and cost to bear meaningful results. This business case demonstrates the cost savings potential when process mining technology is used for process discovery.

Scope

- Discovering the as-is state of the Accounts Payable (AP) process within the Procure-to-Pay (P2P) sub-function in the Finance & Accounting (F&A) department, along with associated process variances and step information such as time, cost, and frequency
- Subsequent process optimization and monitoring exercises, such as conformance check, root cause analysis, and simulation analysis, are excluded from the scope for this business case analysis

Assumptions

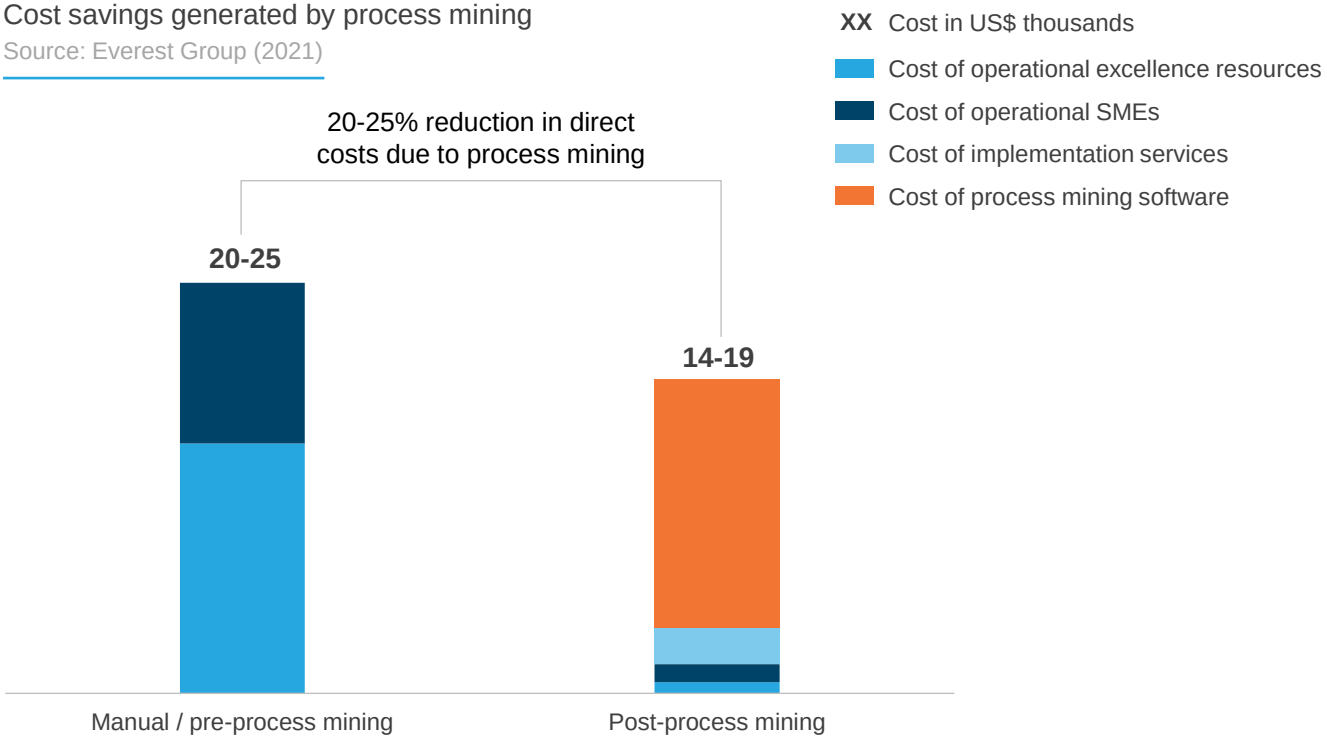
- A US-based global enterprise with operations around the world
- 140-160 FTEs are employed in the accounts payable process
- An in-house team of operational excellence resources / green/black belts is assigned to the process discovery exercise
- Operational SMEs are employees who are responsible for executing/overseeing the accounts payable process

Exhibit 4 illustrates the cost savings generated by the adoption of process mining for business process discovery.

EXHIBIT 4

Cost savings generated by process mining

Source: Everest Group (2021)



Analysis of cost components

- Blended hourly rates of transformation center resources and operational SMEs are US$90-95 and US$50-60 per hour, respectively
- About 20-25 process mining analyst software licenses are needed
- Process mining software has two major cost components: a base cost of US$1,000-1,500 per month and analyst license cost per user per month of US$180-220; software cost and commercial models vary across vendors
- Software implementation requires a one-time fee that can be amortized across functions or sub-functions whose processes are being discovered
- The expense heads, such as cost of operational excellence resources and operational SMEs, and the percentage of cost reduction will vary for process optimization/improvement and monitoring exercises that are not part of the scope of this quantitative business case

Outcomes for a 140-160 FTE AP process within P2P

- Process mining can result in a 20-25% direct cost reduction over manual process discovery techniques
- It could bring down the discovery time from 5 months (using manual techniques) to about 2 months

Benefits of process mining

Adoption of process mining technologies could yield several benefits including cost savings, operational improvements, better customer experience, and top-line growth.

Cost impact

- Cost-efficient process discovery and analysis (as illustrated in Exhibit 4)
- Increased capacity/time available to resources involved in the manual process discovery exercise to focus on their core work

Operational impact

- Quality: significant improvement in quality of process discovery and analysis due to a fact-based approach as compared with manual techniques that rely on opinions, bias, and abstract information
- Time-to-value: substantial reduction in time needed for process discovery/analysis and greater scalability given the technology-driven approach

Business impact

- Creation of a healthy pipeline of digital transformation initiatives resulting in improved ROI and scalability
- Enhanced customer experience due to the improved ability to identify and offer actionable insights to address customer pain points
- Extraction of hidden process insights that can uncover new cross-sell/upsell opportunities or better ways of conducting business

Additional benefits offered by a cloud-based process mining solution

Cloud is an important digital transformation lever, and a SaaS-based process mining solution yields additional benefits such as:

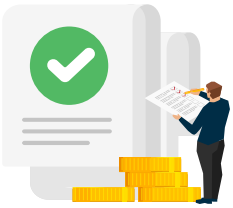
- The ability to start using the product immediately without the need to consider internal infrastructure requirements, associated costs, and other constraints
- Easier access in remote working scenarios
- Dynamic scalability and more flexibility

- Ease of maintenance, upgrade, and use
- Lower Total Cost of Ownership (TCO), primarily due to movement from capital expenditure (CapEx) to operating expenditure (OpEx) for various IT infrastructure costs and overheads

Organizations can achieve cloud deployments either by lifting and shifting a traditional/monolithic architecture-based on-premise application to cloud infrastructure or by adopting a cloud-native solution. Cloud-native solutions are created with a containerized and microservices-based architecture that offers future-readiness and enables enterprises to take full benefit of cloud infrastructure.

Process mining use cases

Process mining has a wide variety of applications across functions, business lines, and vertical



Days Sales Outstanding (DSO) reduction

Challenge

- DSO represents the average number of days it takes an enterprise to collect its Account Receivables (AR)
- A high DSO indicates that a company takes longer to collect on credit sales and potentially indicates working capital management challenges, current or impending cash flow problems, and other operational issues
- Enterprises target quick conversion of their account receivables to cash to sustain their operations and not rely on external financing

Solution

- Process mining can address this challenge by analyzing the Order-to-Cash (O2C) process, thereby:
  - Identifying the accounts/clients with the highest overdue payments, which the enterprises can target
  - Monitoring the O2C process in near real-time and notifying relevant stakeholders from the AR team about potential cases of high DSO so that they can address them

Raw material inventory optimization

Challenge

- Manufacturing companies typically increase stock of inventory when they do not receive raw materials on time
- Increasing stock of inventory is an inefficiency that can negatively impact production planning. It also forces enterprises to make changes to planning during the frozen period, an important period in the Supply Chain Management (SCM) cycle, which should ideally be free of any planning/activity
- Enterprises target an optimal raw material inventory and stable production planning with no activity during the frozen period

Solution

- Process mining can address this challenge by analyzing the processes and identifying:
  - Root causes, such as an inaccurate configuration set in the ERP system
  - Blind spots or bottlenecks, which otherwise remain unknown to operational resources

Identifying best practices and improving compliance in P2P processes

Challenge

- Even after standardizing processes such as P2P using ERP systems, regional offices in global enterprises typically develop their own ways of working to reflect local best practices, resulting in multiple variations of the same process across different locations, leading to a lack of standardization and difficulty in process auditing
- Enterprises aim to limit deviations from approved processes, while at the same time trying to adopt some local best practices at the corporate level

Solution

- Process mining can help achieve desired outcomes by:
  - Generating and comparing process flow visualizations across regions against the norm
  - Understanding root causes of the deviations and identifying a single best practice
  - Identifying the need to implement additional process compliance controls

Challenges and best practices for process mining adoption

Challenges		Best practices
• Availability of event logs data can be scarce, especially in market segments with relatively lower penetration of information systems • Even if information systems are available, sometimes enterprises do not have saved historical data	**Data availability**	• Educating key stakeholders around the benefits of logging data through information systems and saving them for future use • Integrating with desktop process mining capabilities to mine parts of the processes that involve use of productivity tools
• Extracting event logs and data in the right format especially from non-standard IT systems can be time consuming • Data that is not available in the right format is a key adoption hurdle	**Data quality**	• Evaluating the availability of pre-built connectors for leading enterprise applications in the process mining tools under consideration • Leveraging Extract, Transform, Load (ETL) tools and developing data lakes
• Apprehensions around a new solution's credibility/effectiveness • Lack of stakeholder buy-in due to limited understanding of process mining technology and its benefits • Absence of a framework to prioritize processes for adoption	**Getting started**	• Educating and aligning stakeholders and senior leaders around the benefits of process mining to secure their buy-in • Prioritizing processes that are structured, frequent, and require less data preparation • Securing first results quickly to establish credibility and accelerate enterprise-wide adoption

Challenges		Best practices
Adoption of process mining in organizational silos could lead to lower ROI and redundant efforts	**Implementation**	• Combining efforts across process excellence, automation, and digital transformation initiatives • Involving process SMEs and IT infrastructure teams from the beginning of a project to help with data/analysis and overcome system roadblocks, respectively
• Apprehensions around data security and privacy • Getting approvals from enterprise IT to access data can be time consuming	**IT security and compliance**	• Implementing proactive efforts to obtain buy-in from the IT security and compliance functions • Exploring on-premises or hybrid deployment models to keep sensitive data on the premises
Resistance to process mining adoption due to increased transparency and visibility into employees' way of working	**Operational transparency**	• Spreading awareness and proactively addressing employee concerns • Educating employees about expected organizational benefits from process mining

Conclusion

Traditional/legacy businesses find it difficult to adapt to changing market dynamics, evolving customer expectations, and unexpected disruptions. Digital transformation is a key lever to overcome these challenges. Its importance has increased exponentially as the pandemic highlighted the need for business continuity and sustenance, not to mention growth.

As enterprises navigate their digital transformations and scale up, they face a multitude of challenges including the inability to maintain a healthy transformation pipeline. Process mining offers a great potential to address many of these challenges. It supplements the traditional/manual techniques employed across various stages of digital transformation with a technology-driven and fact-based approach to accelerate the transition to a digital-first business. As process mining technologies mature, they play an essential part in uncovering a company's process DNA and helping to drive continuous improvement.

With increasing enterprise focus on driving operational excellence and accelerating digital transformation initiatives, process mining is poised for increased adoption. Cloud-based solutions, pre-built connectors for various enterprise systems, the addition of task mining / desktop process mining capabilities, and greater integration within the broader digital ecosystem are accelerating its adoption.

Everest Group is a consulting and research firm focused on strategic IT, business services, engineering services, and sourcing. Our clients include leading global enterprises, service providers, and investors. Through our research-informed insights and deep experience, we guide clients in their journeys to achieve heightened operational and financial performance, accelerated value delivery, and high-impact business outcomes. Details and in-depth content are available at www.everestgrp.com.

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Why Software AG for Digital Transformation?

To answer that, we must first ask this: what is digital transformation? Why is it crucial to business? At its core, a business transforms to digital within its own internal business processes, achieving transparency and control while mitigating risk and compliance. Many businesses see it as a major challenge given the complex structure of their operations, but if any business absolutely needs to transform their business from the inside out, becoming more digital in this day and age, a new player in the game has to arrive.

Enter: ARIS, the original pioneer of what is now known as process mining, and for more than two decades, the brand had brought with its era of pinpointing processes and analytics a true software solution fitting perfectly with Software AG. That solution had revolved around holding the number one position in business process analysis (BPA), digging deeper than the granular to discover what it takes to change, grow and evolve in today's volatile market. Now today ARIS remains as the single source of truth for many businesses seeking to reinvent, revitalize and reinvigorate business through transparency, risk mitigation, process conformance and compliance toward complete process excellence.

Visit us at www.softwareag.com

Why ARIS and Process Mining Are Crucial

"Process mining and process analytics for us is key."

Head of Group Organization & Process Excellence for a Leading Sustainable Energy Corporation

What ARIS and Process Mining Have Contributed

"We have taken that product [ARIS] to evaluate how efficient we were and to give us the solution that was able to provide a good view of how we can improve, and where was the problem, and where we could adjust the processes to make them more efficient."

Quality Manager of a Major Automotive Finance Company

What Results ARIS and Process Mining Have Provided

"Results (expected): Reduce time taken to identify process and quickly identify most efficient path to resolution… Since partnering with Software AG… Estimated savings, $2.4 million through process optimization."

Head of Operational Excellence for an IT Services Corporation