The Total Economic Impact™ Of IBM Process Mining

Cost Savings And Business Benefits
Enabled By IBM Process Mining

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ABOUT FORRESTER CONSULTING

Forrester provides independent and objective research-based consulting to help leaders deliver key transformation outcomes. Fueled by our customer-obsessed research, Forrester's seasoned consultants partner with leaders to execute on their priorities using a unique engagement model that tailors to diverse needs and ensures lasting impact. For more information, visit forrester.com/consulting.

Executive Summary

Recent advances in process mining, automation, and AI have made data-driven execution a new driver of company growth and differentiation. While the value of automation is clear, the challenge to understand, reengineer, and automate processes at scale can be formidable. IBM Process Mining provides an automated approach to discovery that enables organizations to achieve the scale and objectivity they need and links insight directly to automation execution while supporting continuous improvement.

Once driven primarily by cost reduction imperatives, process optimization and automation initiatives are now critical to strategic business objectives. Today, it's become a prerequisite for businesses to use process mining to identify critical insights on process breakdowns that can span multiple systems and organizations.

IBM's acquisition of MyInvenio, since rebranded as IBM Process Mining, provides organizations with a comprehensive suite of AI-powered automation capabilities for business automation, enabling them to discover and analyze current processes and simulate future processes so they can gain confidence in the changes and understand their impact. IBM Process Mining combines task mining with multilevel/multi-object process mining and decision rules mining capabilities to create a more precise and complete analysis or digital twin of an organization (DTO). Moreover, IBM has developed several process applications that expedite process improvements for specific use cases, including mortgage lending, lead-to-cash management, IT

KEY STATISTICS

Return on investment (ROI)
176%

Net present value (NPV)
$968K

service management, software development lifecycle management, and sustainable procurement practices. IBM Process Mining is tightly integrated with IBM Cloud Paks for Automation and powered by Red Hat OpenShift to run anywhere — in containers, on-premises, or in the cloud — to help customers automate their entire enterprise.

IBM commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying IBM Process Mining.[1] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of IBM Process Mining on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six representatives in four organizations with experience using IBM Process Mining. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results

Benefits PV

$1.52M

into a single composite organization that is a global organization with 6,250 employees and $1.5 billion in annual revenue. The organization provides goods and services to customers around the world and has operations in 20 countries. The organization has a small team responsible for business process evaluation and engineering.

Prior to adopting IBM Process Mining, the interviewees' organizations relied on a mix of traditional BI tools, homegrown methods, and manual process to map out process flows. One interviewee noted their organization borrowed a process mining tool from a supplier but abandoned it when the relationship with the supplier was discontinued.

The interviewees recognized the need to make process improvements but noted how traditional business intelligence (BI) tools did not go deep enough into the complexity of the processes inside their organizations. Traditional survey-driven business process analysis methods were considered inefficient and lacked objectivity. The interviewees described how process flows were often drawn from anecdotes with no actual use of data to support conclusions. Other vendors' process mining tools were found to be more expensive and complicated to use and failed to yield meaningful insights. All the while, these interviewees were aware that process mining was increasingly adopted by their industry peers, and they felt pressure to catch up.

After adopting IBM Process Mining, the interviewees' organizations established competency centers for process mining and undertook increasingly challenging projects to prove the value of task and business process mining. Using IBM Process Mining to detect and diagnose inefficiencies within processes, business process analysts responsible for interpreting results were more efficient with their time. IBM's precise visualizations and digital twin capabilities provided compelling evidence to management, which used this strategic guidance to improve operations, make a case for automation

> **"What we do in our business process engineering area is to try to make improvements in the processes of the bank [and] identify weak points and opportunities for improvement, not only in terms of time efficiencies but also in terms of costs. We also try to help the rest of the bank in different stages of the transformations."**
>
> *Head of business process engineering, financial services*

using robotic process automation (RPA), and create new KPIs. As a result, the interviewees' organizations were able to streamline processes to save money and reduce lead times, reduce their exposure to errors, and improve compliance with service-level agreements (SLAs), therefore improving customer experience in the process.

KEY FINDINGS

Quantified benefits. Three-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **Over $1.1 million saved from streamlined processes.** The composite organization models three processes in the first year and uses the insights to streamline and automate them, achieving a 3% average reduction in time spent by employees engaged in those processes. Process efficiencies grow in subsequent years as additional processes are modeled and improved.

- **Reduced exposure to errors and improved compliance with SLAs.** The improvements stemming from process mining pave the way to a more secure and compliant operating

environment. By automating manual processes, the composite organization reduces the likelihood of human error, saving remediation time, avoiding regulatory fees and fines, and improving the customer experience with faster service.

- **Improved business process analyst productivity.** The composite organization's business analysts are more productive after adopting IBM Process Mining for their day-to-day work analyzing and reporting on business processes. Those using the tool save 30% of their time, 50% of which they can put to more value-added activities.

Unquantified benefits. Benefits that provide value for the composite organization but are not quantified in this study include:

- **Catalyst for strategic transformation.** The composite organization uses the insights gained from process mining to create new KPIs and justify important business initiatives and investments.

- **Diagnostic capabilities.** Process mining improves the composite organization's ability to diagnose the true nature of inefficiencies in complex business processes and evaluate the success of changes over time.

"IBM professionals are very good with a lot of knowledge, not only of the tools but also of the business. They know the market very well."

Operations manager, financial services

- **Validation of observations and intuitions.** Process mining also enables the composite organization to confirm hunches that are based on limited observations and interject fact-based reasoning into business case justifications.

- **Visualization of complex, end-to-end processes through process mapping.** Process owners in the composite organization appreciate IBM Process Mining's precise, end-to-end visualizations of their business processes. The visualizations help these owners understand their processes at a deeper level and more quickly grasp possible alternative solutions.

- **Measurement and demonstration of ROI or value of improved processes.** The composite organization employs simulation and gap analysis features in IBM Process Mining's digital twin capability to compare performance between operational units and to measure the ROI of potential changes.

- **Ease of integration.** The composite organization finds that IBM Process Mining's integration capabilities make it easy tie into their existing technology stack.

- **Improved employee experience.** The composite organization restructures and automates formerly manual work processes, freeing up employees to work on more rewarding tasks and value-added activities.

- **Improved customer experience.** Process mining also enables the composite organization to track and improve customer service levels.

- **Expertise and experience delivered through IBM's service and support organization.** The composite organization maintains a close working relationship with IBM's customer success and account management teams, benefiting from IBM's broad expertise in business process automation in general.

Costs. Three-year, risk-adjusted PV costs for the composite organization include:

- **IBM Process Mining SaaS licensing costs and professional services fees.** IBM offers a modular pricing approach for IBM Process Mining, so the composite organization only pays for what it needs. It pays $39,000 for a software-as-a-service (SaaS) license in Year 1 and extends the license to cover additional processes in subsequent years. The composite organization also contracts for professional services with one of IBM's partners for advice and assistance setting up projects. The costs of the license and professional services add up to $289,500 over three years.

- **Establishment of a process mining center of excellence (COE).** To make the most of process mining's specialized methods and techniques, the composite organization dedicates a small team of data analysts to process mining. The team receives training on the tool and spends additional time on best practices while educating the business on the value of process mining. The cost of these activities comes to $62,500 over three years.

- **Planning and development costs for new projects.** Each process mining project involves collaborations between the process mining team, process owners from the business, and data architects from IT. These costs total $163,000 for the composite organization.

- **Monitoring and maintenance costs for established projects.** Once projects are set up for process mining, they are much simpler to maintain and refresh moving forward. These costs total $36,100 for the composite organization,

The representative interviews and financial analysis found that a composite organization experiences benefits of $1.52 million over three years versus costs of $551,100, adding up to a net present value (NPV) of $968,300 and an ROI of 176%.

ROI
176%

BENEFITS PV
$1.52M

NPV
$968.3K
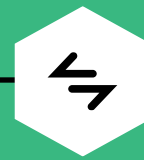
PAYBACK
7 months

Benefits (Three-Year)

Cost savings from streamlined processes — $1.1M

Cost savings associated with reduced exposure to errors and improved compliance with SLAs — $206.7K

Cost savings from streamlined analysis of business processes — $165.3K
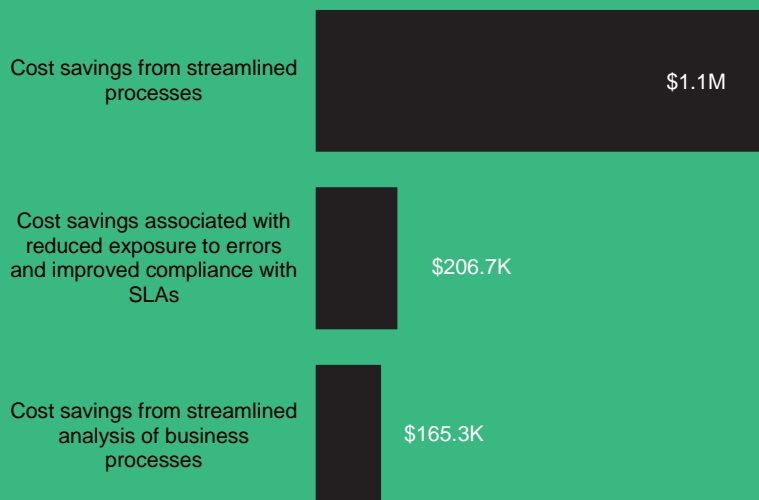
"Using IBM Process Mining and DTO [digital twin of an organization], we were able to identify the areas to be improved and to understand the benefits that could be achieved."

— Process manager, financial services

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in IBM Process Mining.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that IBM Process Mining can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by IBM and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in IBM Process Mining.

IBM reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

IBM provided the customer names for the interviews but did not participate in the interviews.

DUE DILIGENCE
Interviewed IBM stakeholders and Forrester analysts to gather data relative to IBM Process Mining.

INTERVIEWS
Interviewed six representatives at four organizations using IBM Process Mining to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewees' organizations.

FINANCIAL MODEL FRAMEWORK
Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewees.

CASE STUDY
Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The IBM Process Mining Customer Journey

■ Drivers leading to the IBM Process Mining investment

Interviews

Role	Industry	Revenue	Region	Size Of Process Modeling Team
Process manager	Financial services	<$1B	Domestic (Italy)	20
Process manager	Food production	$1B to $5B	Europe (Germany)	4 to 5
Head of digital operations	Apparel	$1B to $5B	Global (Italy)	5
• Operations manager • Manager of business process engineering • Head of business process engineering	Financial services	>$10B	Global (Spain)	3

KEY CHALLENGES AND INVESTMENT OBJECTIVES

Once driven primarily by cost reduction imperatives, interviewees' organizations turned to process mining to solve any number of real-world challenges, including meeting compliance requirements and sustainability goals, increasing employee engagement and customer satisfaction, improving execution of strategic initiatives, and accelerating digital transformation.

Prior to adopting IBM Process Mining, the interviewees' organizations relied on a mix of traditional BI tools and process engineering techniques, homegrown methods, and manual processes to map out process flows. One interviewee's organization borrowed a process mining tool from a supplier but abandoned it when the relationship with the supplier was discontinued.

The interviewees recognized the need to make process improvements but struggled with common challenges, including:

- **Lack of process visibility and data-based objectivity.** One interviewee expressed concerns about relying on anecdotal information for business decisions. The process manager for a financial services firm told Forrester: "We used

> **"The new tools are now in the cloud. One can try most of them without having to install them. This allowed us to think more seriously about a tool that we could install and take advantage of."**
>
> *Operations manager, financial services*

another software [tool] for shaping process flows, but it was all done by the process owners. The process owners would go to a [location] and ask the person, 'Can you tell me how you do this thing?' [And from that,] we would draw the process flow with no actual use of data, no objective view like what IBM Process Mining could provide. … It was more based on the impressions of the process owners."

- **Traditional BI tools that didn't go deep enough.** While the interviewees' organizations' BI tools complemented process mining by providing overviews of a process, they didn't look into specific behaviors underlying business

performance. Process mining tools analyze historical process execution data and desktop behavior to reveal inefficiencies, bottlenecks, and tasks that can be streamlined and/or automated. According to the head of digital operations for a company in the apparel industry: "We needed something to do a deeper analysis in a complex environment because of the way our company is structured. … We have different merchants, different business models, different brands. It was quite a complex design and we needed something that could dig deeper into our systems and processes."

- **Inefficient traditional business process analysis methods.** Interviewees noted that IBM Process Mining analyzed processes and created simulations much more efficiently than traditional survey-based methods used to analyze business processes. The operations manager for a financial services firm explained, "If we didn't have the process mining tool, we would have to [analyze a process] with the usual process engineering technique, which is to do a process survey workshop and then compare what people said to information from the systems."

> **"Process mining was developed several years ago as a technique, so we had it on our radar, but the tools were only mature enough in the last two or three years. … We saw that the tools market was mature enough to have a go and install one."**
>
> *Operations manager, financial services*

> **"Process mining can give you the same results that you can get with crosstabs, but to arrive at the crosstab, you have to do it with a spreadsheet or a database management system or with other tools. With [IBM Process Mining], I can give it to you with a click. The analysis process gains a lot of time, and it offers the relevant conclusions."**
>
> *Operations manager, financial services*

- **Competitive pressure to utilize process mining.** Interviewees were aware of the growing maturity and market acceptance of process mining tools. The process manager for a food production company said: "Most companies in our industry work with such programs. Process mining is a very important software. It's a must-have. We had to find a way in our company to work with it, so we began with IBM."

- **Expensive and inflexible solutions that had less functionality and delivered limited value.** The interviewees' organizations often evaluated several solutions before selecting IBM. One of the interviewees' companies had been watching the process mining space for some time before adopting IBM's solution. They did a demo with a competitor's product years earlier but didn't get the go-ahead on the project at the time. According to the operations manager for a financial services firm: "We tried to install [a competitor's] tool, but it was too expensive. It was not worth buying [at the time] because of its cost and the complexity of [deployment]. … It required a lot of knowledge and what the tool returned was not so revealing."

When they revisited the initiative, they evaluated several more solutions, performing the same analysis on different tools and comparing the results. This organization made the decision to go with IBM because it had more functionality than most of the other tools and was less expensive than a comparable tool. IBM's analytical capabilities to measure process performance and identify key performance indicators (KPIs) were especially valued, as were IBM's simulation and what-if analysis capabilities.

The operations manager at a financial services firm told Forrester: "The truth is that we really liked both [a competitor's product] and the IBM product. Those were the ones that had more functionality. [At the time, the competitor's product] had a little more functionality … but [was] ten times more expensive than IBM's. We didn't see the benefit … and decided to stay with IBM. It really is a good product. It works very well for us."

Interviewees also liked that IBM Process Mining more easily integrated with their existing systems. According to the head of digital operations for an apparel company: "We evaluated IBM Process Mining and found it was more flexible. We were working with custom tools and legacy software and needed flexibility with integration." This interviewee added that their organization conducted an economic evaluation which found IBM Process Mining less expensive than another tool under consideration. The head of digital operations stated, "But the main KPI that we evaluated was the integration capability because the other tool was more rigid, had more constraints, and was not adapting to our customized situation."

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected.

The composite organization is representative of the four organizations, and it is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a global organization with 6,250 employees and $1.5 billion in annual revenue. The organization has operations in 20 countries providing goods and services to customers around the world.

Deployment characteristics. In the first year, the composite organization establishes a process mining center of excellence consisting of three data analysts/data scientists responsible for creating dashboards and one process mining analyst responsible for creating reports and analyses, reporting to a manager overseeing business operations for the organization. Two data engineers in IT are also involved in planning and development for new projects and supporting ongoing projects.

The data mining team works with the business to select three processes to model in Year 1. In Year 2, the team continues to monitor the three established processes while creating models for three additional processes. In Year 3, the team creates models for three more processes while continuing to monitor the six established processes.

Key Assumptions

- **$1.5B in annual revenue**
- **6,250 employees**
  Four process mining team members
- **Three processes modeled in Year 1 with three additional processes modeled in each subsequent year**

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits						
Ref.	**Benefit**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Atr	Cost savings from streamlined processes	$140,400	$468,000	$842,400	$1,450,800	$1,147,321
Btr	Cost savings associated with reduced exposure to errors and improved compliance with SLAs	$26,544	$84,528	$149,968	$261,040	$206,662
Ctr	Cost savings from streamlined analysis of business processes	$18,954	$75,816	$113,724	$208,494	$165,331
	Total benefits (risk-adjusted)	$185,898	$628,344	$1,106,092	$1,920,334	$1,519,314

COST SAVINGS FROM STREAMLINED PROCESSES

Evidence and data. Process mining is a technology that can be applied to any number of business processes in any industry. Because of this broad applicability, there is a wide variance in results.

Process mining can be used to improve the productivity of organizations in many ways, including back-office operations, invoicing and accounting functions, production floor operations, auditing processes related to certifying balances, compliance and sustainability, sales and post-sales activities related to account management, customer service, claims management, and ticketing support. A single successful use case can easily generate savings for an organization, allowing it to more than recoup the cost of the IBM Process Mining investment.

> **"Because of the improvements that were implemented, there is faster work. There is more productivity. … Process mining is the tool that helps to detect many of the things that had to be done."**
>
> *Operations manager, financial services*

The interviewed representatives described several use cases where process mining uncovered opportunities to streamline and automate processes. Improvements in performance ranged widely, including time reductions of 30% to 70% for specific processes and one instance of cost savings up to 85% for a particular step in a process, which added 20% efficiency to the overall business process.

- The interviewees noted that the nature of the benefit differs relative to the process evaluated.

Time reductions experienced for specific processes

30% to 70%

According to the head of business process engineering for a financial services firm: "We get different benefits depending on the process. Some benefits are cost savings, and others are time savings or better speed. In the case of one process that we analyzed, it was time efficiency."

- The process manager for a financial services firm told Forrester: "Thanks to the KPIs and Performance View [functionality], we discovered that the most time-consuming and most critical activity was 'Back Office Service Closure.'" After making changes to ensure better compliance with the process, the interviewee's organization experienced cost savings of 85% for back-office service closure activities, a 30% reduction in process lead time and an overall cost reduction of 20%.

- The process manager described another feature that benefitted their organization: "We used the IBM Process Mining digital twin feature to create a simulation to predict and simulate the future ROI before the actual RPA implementation. The simulation of the inefficient activity confirmed that we could reach a greater ROI by automating this activity. In other words, we could automate 90% of the first activity, which resulted in a considerable saving of money and time. The remaining 10% involved negotiations and relations with our customers, which needed to be dealt with manually."

- The interviewees noted that their process mining efforts often focused on steps within a much larger process, so the overall impact reflects the fractional improvement. The head of digital operations for an apparel company explained: "I'm getting time reduced significantly. Of course, it is not the complete time of the total process. It's just the complete time of the process managed by these systems, but for that, we had a significant reduction."

Modeling and assumptions. Forrester assumes the following about the composite organization:

- The composite organization has 6,250 employees, 1.5% of whom are involved in a given process on average (just under 100 employees in this case).

- The composite organization selects three processes to model in Year 1 and achieves a 3% average reduction in time spent by the affected employees after making improvements to streamline and automate these processes.

- Process efficiencies grow over time as additional processes are modeled and improved, half of which can be attributed to IBM Process Mining.

- The average fully burdened salary for general employees at the composite organization is $40 per hour.

- Half of the time saved by the employees involved in these processes is recaptured and applied to other daily or weekly tasks.

Risks. Operational differences that may impact the cost savings from streamlining and automating processes include:

- The number, scope, and complexity of business processes undertaken for process mining.

- The number of employees involved in each process.

- The organization's prior state of process efficiency and its ability to effectively manage the changes indicated by process mining. The time and cost savings can be even greater depending on the scope of the process and the extent to which it can be reengineered and/or automated.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1.1 million.

Cost Savings From Streamlined Processes

Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Total number of employees	Composite	6,250	6,250	6,250
A2	Number of processes subject to process mining (cumulative)	Composite	3	6	9
A3	Average percentage of employees participating in a given process	Composite	1.5%	1.5%	1.5%
A4	Average reduction in time achieved from streamlined process	Interviews	3%	5%	6%
A5	Reduction in time attributable to IBM Process Mining	Interviews	50%	50%	50%
A6	Subtotal: Hours saved from streamlined processes attributable to IBM Process Mining	A1*A2*A3*A4*A5*2080	8,775	29,250	52,650
A7	Average fully loaded hourly wage for employees at the organization	TEI standard	$40	$40	$40
A8	Percentage of time recaptured	Assumption	50%	50%	50%
At	Cost savings from streamlined processes	A6*A7*A8	$175,500	$585,000	$1,053,000
	Risk adjustment	↓20%			
Atr	Cost savings from streamlined processes (risk-adjusted)		$140,400	$468,000	$842,400
	Three-year total: $1,450,800		**Three-year present value: $1,147,321**		

COST SAVINGS ASSOCIATED WITH REDUCED EXPOSURE TO ERRORS AND IMPROVED COMPLIANCE WITH SLAS

Evidence and data. Process mining paved the interviewees' organizations' way to a more secure and compliant operating environment as the rate of errors and mistakes fell when manual processes were automated. This was particularly the case for repetitive tasks where focus can wane and human errors creep in. Interviewees remarked on the improved SLAs and enhanced customer experience after making process changes diagnosed through process mining.

- According to the operations manager for a financial services firm: "A good challenge we had was to get back to meeting the service-level agreement. To return to 90% of the operations in 24 hours was the most important thing. … With process mining, we ended up confirming our suspicions and not only took care of them but at the same time, we were able to detect exactly where the rework was."

- This was echoed by the process manager for another financial services firm: "The real benefit is to see where time to serve the customer is very long. We established SLAs that we want to keep on target, so the benefits are those areas where we can improve lead times. There can be variations in the process that cause long lead times. For loans, for mortgages, it's really complicated. Every loan takes its own path. You have 1,000 mortgages and you have 1,000

> **"In the case of the foreign trade process, we went from meeting the service level agreement in 50% of cases to meeting it in about 90%."**
>
> *Operations manager, financial services*

variations of the process. We are focusing on standardizing as much as we can."

This interviewee continued: "[IBM Process Mining] helped us focus on lead time variation in the processes, recycles in the process, and percentage of complete processes, the process that went to the end with 100% actions done in time, while also caring for the satisfaction of the customers."

- The head of digital operations for an apparel firm described how process mining was beneficial in quickly catching potential problems during peak operations: "We use IBM Process Mining throughout the year, but especially during peak sales periods. During these sales periods, we set up a special team to take care of the systems, to take care of customer service, to monitor other activities, etc. It's a time where it's not only one person doing the monitoring, but usually two people looking at [the tool] and monitoring the dashboards in order to check time, check performance on the floor … Having a tool that monitors these activities allows us to react better in case something goes wrong. It's an indirect benefit because it is not due to the mining, but it is due to the monitoring that we implemented. Without having this tool for the monitoring, we wouldn't have this benefit."

Errors avoided over three years

4,535

Modeling and assumptions. Forrester assumes the following about the composite organization:

- The number of errors and compliance events avoided corresponds to hours saved from streamlined processes.

- For every 20 hours saved, one error is avoided, and for every 1,000 hours saved, one compliance issue is avoided.

- The average error takes 1 hour to correct while the average noncompliance event requires 10 days of effort to resolve.

- Ten percent of the avoided noncompliance events would have resulted in incurring a regulatory fee of $10,000.

Risks. Operational differences that may impact the cost savings associated with reduced exposure to errors and improved compliance with SLAs include:

- The hours saved from streamlined processes as a result of process mining, which is a function of the number, scope, and complexity of business processes undertaken for process mining, the number of employees involved in each process, and the organization's prior state of process efficiency and its ability to effectively manage the changes indicated by process mining. The time and cost savings can be even greater depending on the scope of the process and the extent to which it can be reengineered and/or automated.

- Cost savings will also vary based on the number of errors made and frequency of compliance events before adoption of IBM Process Mining, the time to correct errors and resolve compliance events, and the size of fees associated with compliance events.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of $206,700.

Cost Savings Associated With Reduced Exposure To Errors And Improved Compliance With SLAs

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Hours saved from streamlined processes attributable to IBM Process Mining	A6	8,775	29,250	52,650
B2	Number of errors avoided from streamlined processes (1 error avoided per 20 hours saved)	B1/20	439	1,463	2,633
B3	Hours saved correcting errors (1 hour per error)	Composite	439	1,463	2,633
B4	Average fully loaded hourly cost of an employee	TEI standard	$40	$40	$40
B5	Percentage of time recaptured	Assumption	50%	50%	50%
B6	Subtotal: Error avoidance cost savings	B3*B4*B5	$8,780	$29,260	$52,660
B7	Number of noncompliance events avoided from streamlined processes (1 event avoided per 1,000 hours saved)	Composite	9	29	53
B8	Hours saved resolving noncompliance events (10 days per event)	B7*80	720	2,320	4,240
B9	Average fully loaded hourly cost of an employee	TEI standard	$40	$40	$40
B10	Percentage of time recaptured	Assumption	50%	50%	50%
B11	Subtotal: Noncompliance event avoidance cost savings	B8*B9*B10	$14,400	$46,400	$84,800
B12	Number of noncompliance events resulting in a regulatory fine (10%)	Composite	1	3	5
B13	Average regulatory fine	Assumption	$10,000	$10,000	$10,000
B14	Subtotal: Regulatory fine avoidance cost savings	B12*B13	$10,000	$30,000	$50,000
Bt	Cost savings associated with reduced exposure to errors and improved compliance with SLAs	B6+B11+B14	$33,180	$105,660	$187,460
	Risk adjustment	↓20%			
Btr	Cost savings associated with reduced exposure to errors and improved compliance with SLAs (risk-adjusted)		$26,544	$84,528	$149,968
	Three-year total: $261,040		**Three-year present value: $206,662**		

COST SAVINGS FROM STREAMLINED ANALYSIS OF BUSINESS PROCESSES

Evidence and data. Several interviewees praised IBM Process Mining for its simplicity and ease of use and noted that while its more powerful functionalities were more complicated to use, IBM was always available to provide support.

- According to the head of business process engineering for a financial services firm: "The simplicity of what we are talking about, how to load the data, how to generate a diagram, how to see the statistics, from my point of view, is an advantage. The power of certain functionalities that may be a little more complicated but that can also be solved. … The analysis has improved, as far as I know. Clearly, we are trying to expand this to as many engineers as possible."

  This sentiment was confirmed by the firm's operations manager, who added IBM's support came in where things got more complex: "The issue of simplicity, on one hand, and support for what is not so simple are key things. What differentiates it for me is that you have the product and that it has IBM behind it. What is simple is really simple, and when it's not so simple, you have support from IBM people, which is fantastic."

- The operations manager explained further: "By implementing process mining and having information from the system, we have had a much more detailed and much faster effort than we would have had if we had to wait for the whole usual process. The usual procedure took a

> **"In itself, the analysis process is faster. Before, to reach conclusions, it took us much more time around more difficult work. Now, one can reach conclusions from real data and the analysis process is also shortened by at least three weeks."**
>
> *Operations manager, financial services*

few weeks. With process mining, results are coming in a few days."

- Likewise, the process manager at another financial services firm found the tool easy to use: "In general, it's very easy, actually very hands on. It's very easy to get KPIs from IBM Process Mining's views, and it's easy to recreate data sets. Then, with all the dashboards that you can create, the customizable views, it's all very handy. This is a very good instrument."

- The process manager for the food production company described struggling with the data inputs required initially for the process mining but said once the data was in the tool, it was easy enough to use. "You have to do really hard work in the step before you have process mining. When the data is in the process mining tool and you have your dashboards, it's a good tool. You can click here and there and it's all working together, and you can easily change things, but before that, it's really hard work."

- One interviewee noted that because IBM Process Mining is a powerful tool, it's able to take a complex process and make it easier for laymen to understand, essentially upskilling them. According to the head of digital operations for an

Analysis hours saved over three years

10,296 ↗

apparel firm: "It's able to analyze a complex process so [business analysts] are more aware of what they are looking at, so you have more skilled people."

Modeling and assumptions. Forrester assumes the following about the composite organization:

- The number of business analysts accessing IBM Process Mining's reports and analyses grows over time as adoption spreads and more processes are modeled.

- These business analysts typically devote half of their time to projects involving process mining.

- The use of IBM Process Mining is found to save 30% of these analysts' time, half of which is recaptured for work on other activities.

- The average fully burdened cost of business analysts at the composite organization is $45 per hour.

Risks. Operational differences that may impact the cost savings from streamlined analysis of business processes include:

> **"Once we understood the system, I found it easy to create new ways of looking at the process and create new analyses ourselves. The software gives us the possibility to do it."**
>
> *Process manager, food production*

- The number and compensation of business analysts involved in process mining projects and their prior state of business process analysis efficiency. These time savings can be even greater for users who leverage IBM Process Mining more proficiently.

- The number of employees involved in each process.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $165,300.

Cost Savings From Streamlined Analysis Of Business Processes					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of business analysts accessing IBM Process Mining reports and analyses	Composite	3	12	18
C2	Percentage of time spent analyzing business processes	Interviews	50%	50%	50%
C3	Reduction in analysis time attributable to IBM Process Mining	Interviews	30%	30%	30%
C4	Subtotal: Business analysis hours saved attributable to IBM Process Mining	C1*C2*C3*2,080 hours	936	3,744	5,616
C5	Average fully loaded hourly wage for business analysts	TEI standard	$45	$45	$45
C6	Percentage of time recaptured	TEI standard	50%	50%	50%
Ct	Cost savings from streamlined analysis of business processes	C4*C5*C6	$21,060	$84,240	$126,360
	Risk adjustment	↓10%			
Ctr	Cost savings from streamlined analysis of business processes (risk-adjusted)		$18,954	$75,816	$113,724
	Three-year total: $208,494		**Three-year present value: $165,331**		

UNQUANTIFIED BENEFITS

Interviewees mentioned the following additional benefits that their organizations experienced but were not able to quantify:

- **Catalyst for strategic transformation.** While process mining is frequently associated with automation, its scope transcends that purpose, serving as a catalyst for strategic transformation. Several of the interviewees described how IBM Process Mining guided their organizations' strategic decisions. According to the process manager for a financial services firm: "We use [IBM Process Mining] as a strategic instrument to show results to management. We present all this evidence, all the analysis that we do with [a homegrown process monitoring tool] combined with numbers from IBM Process Mining to management, and it provides strategic direction on where to focus for the next year or next quarter."

  Underscoring the strategic importance of process mining, the head of digital operations for the apparel company explained that the analysis they conducted using IBM Process Mining led to the implementation of a new technology stack for processing orders: "We chose the new architecture according to the insight that we had from IBM Process Mining. … That has been the biggest benefit."

> **"We must make decisions for the future. It's the basis of our decisions for the future."**
>
> *Process manager, food production*

> **"We use [IBM Process Mining] as a strategic instrument to make decisions and to focus our operations."**
>
> *Process manager, financial services*

Similarly, the process manager for the food production company told Forrester that process mining led to the creation of new performance measures for the company to follow: "For a long time, headquarters only looked at the number of pallets for performance, but this doesn't factor in picking time. While we suspected this before, we can see it better with process mining. As a result, we created new KPIs that factored in picking time along with the number of pallets."

- **Diagnostic capabilities.** Interviewees also valued process mining for its diagnostic capabilities. According to the process manager for the food production company: "We now have the insights to engage with the working groups. We are able to get them to implement process improvements, and later, since we are rerecording the data, we have the opportunity to see whether we are successful with the changes. This becomes measurable and there is no other way to measure it. Any other approaches to measuring this are too limited."

While interviewees made clear that process mining was but one step in a larger change management process, they stressed that its diagnostic capabilities were extremely valuable. The operations manager for a financial services firm explained: "It is not just what process mining

says did not work. Tomorrow, I will change it and the next day I will have benefits, but many things, in the end, require changes in our software, in our systems, in our relationships with clients, in the way we organize ourselves. In the end, there are a lot of changes to be implemented and all of that makes us more productive. But it's an important factor for the conclusions to be solid, and to know where to apply the improvements."

The head of business process engineering at the same firm seconded this, adding, "We use is as a diagnostic tool more than anything else, to diagnose how the process is at a certain stage."

- **Validation of observations and intuitions.** The interviewees also valued being able to confirm hunches based on limited observations and tell more compelling stories based on objective data. According to the process manager at one of the financial services firms: "[IBM Process Mining] gives objective views of the level of our processes like the level of efficiency and service that we provide to customers, and that's crucial for us. It must be crucial for any company to know where the process stands at and being able to do this objectively is very important."

The operations manager at the other financial services firm described a foreign currency exchange process they analyzed: "Every two weeks, there is a regulatory change and sometimes they are so urgent to apply, we can't always stop time to analyze the best way to implement them. We implemented a solution to make these changes as best we could, but we had many doubts about it and suspected there was rework and reassigning of tasks. With process mining, we finally ended up confirming suspicions and not only took care of them, but at the same time were able to detect exactly where the rework was."

The manager of business process engineering at the same financial services firm affirmed this:

> **"Thanks to the IBM Process Mining solution, we had the opportunity to create our digital twin to discover bottlenecks and potential areas to improve."**
>
> *Process manager, financial services*

"More than anything else, it provides a little bit of validation with data of what sometimes was intuited or was demonstrated in the observation. We made our data more of a story. This is always what the tool makes evident."

- **Visualization of complex, end-to-end processes through process mapping.** Interviewees praised the robust process mapping and visualization capabilities of IBM Process Mining, which enabled them to create accurate, end-to-end visualizations known as digital twins of an organization (DTO). They utilized these visual representations, especially for complex processes, to better understand process sequences, dependencies, and decision points and gain valuable insights into process bottlenecks. The process manager for a food production company described how their first project focused on warehouse management: "There are many thousands of activities. Process mining helps visualize this in a very good way with its dashboards."

The head of business process engineering for a financial services firm told Forrester: "With the use of data, we can easily draw a flow chart of the process. It seems to me to be very valuable because it says a lot about how the process works. It says a lot about the alternatives that

may exist and the problems that we encounter. We are solving problems in a much faster and more concrete way."

The head of digital operations for the apparel firm noted that the clear visualizations helped junior analysts better understand highly complex processes in their organization: "It's easier to show, even to junior people. We have a very high turnover in our business. And if you don't have a tool like IBM Process Mining, you have to provide a lot of training to new people in order [for them] to understand how it works, how the values system involved works, and you have to train them on the complexity [of our business] that is divided [between] multiple brands, multiple channels, multiple countries. With IBM Process Mining, it's much easier because you have all of these elements in a graphical way. You have something that is already showing what's happening. And even with a lower technical or business understanding or knowledge, you can still evaluate if the process is running well or not. It's easier for untrained people to detect something that is not going [according to process]."

IBM's digital twin capabilities encompass several unique features that enable it to deliver a more precise representation of an organization's

"Using instruments like IBM Process Mining can help us measure the numbers, identifying the worst parts of a process."

Process manager, financial services

processes, including process conformance checking capabilities, options to add contextual information, business impact analysis features, and collaboration and governance features that support cross-functional teams.

- **Measurement and demonstration of ROI or value of improved processes.** For each insight discovered, it is also possible to precisely measure the return on investment (ROI) of potential changes through IBM Process Mining's digital twin capabilities, using simulation and gap analysis features. The interviewees described to Forrester how IBM Process Mining enabled them to compare two or more operational units or compare between existing and proposed new processes to confirm which aspects or improvements yielded the most significant returns.

According to the head of business process engineering at a financial services firm: "We made two analyses, one prior to the implementation of the improvements and then another one after the implementation of the improvements, and IBM Process Mining helped us demonstrate with data, with statistics, that the improvements we implemented were really efficient. We could show how times were reduced in certain stages, which was one of the objectives we were working on."

The head of digital operations for an apparel company confirmed they were using digital twin for these purposes, stating, "We are now using the tool to compare two processes to check if the benefits we projected at the beginning are realized or not."

The process manager for the food production company described how their second use case involved comparing between different operations: "In the first project, we only looked at one factory, but in the second project, we looked at a batch of five factories — the best ones — and we could

compare the work and see that one, two, three factories were doing a very good job. To those factories, you can tell them they are very good. It's helpful. To the others, we can tell them it is possible for you to have better results. People tend to think only in terms of their own area and not look at other factories, and that's a problem. They can't think of new things to introduce that would yield a better result."

- **Ease of integration.** Ease of integration was an important issue for one of the interviewees. According to the head of digital operations for an apparel company: "We evaluated IBM Process Mining and found it was more flexible. We were working with custom tools and with legacy software and needed more flexibility with integration. There was also an economic evaluation that found it was cheaper than the other tool, but the main KPI we evaluated was the integration capability, because the other tool was more rigid, had more constraints, and was not adapting to our customized situation."

  Other interviewees noted that IBM Process Mining's data extraction capabilities made it easy to integrate with other tools, including homegrown solutions. According to the head of process engineering at a financial services firm: "I believe IBM Process Mining can work perfectly [in any environment] because it has an input interface, and it doesn't matter how you generate that input. As long as it arrives in this interface, you can upload it to the tool to do your analysis. The product works perfectly as a satellite of whatever you have."

- **Improved employee experience.** Interviewees described how they were able to restructure and automate formerly manual work processes, freeing up employees to work on more rewarding tasks and value-added activities. According to the process manager for a financial services firm: "Sometimes you identify bottlenecks that can free

> **"When you go to the IBM site to try the tool, you must upload your data for the trial. It wasn't even a week later that they called me … From then on, we were supported all the time."**
>
> *Operations manager, financial services*

up head counts, not physically, but in terms of employee time that can be relocated to other roles. You identify specific areas or actions that can be made automatic, freeing up people to go to other roles that need more hands."

- **Improved customer experience.** Process mining also enabled organizations to track and improve customer service levels. According to the process manager at the financial services firm: "It gives objective views of the levels of our processes, the levels of efficiencies and service that we provide to customers. That's crucial for us. It must be crucial for any company to know where their processes stand. Being able to do this in an objective way is very important."

- **Expertise and experience delivered through IBM's service and support.** Interviewees praised the IBM customer success and account management teams and noted their existing relationships with IBM contributed to the decision to select IBM Process Mining. IBM worked to understand interviewees' organizations' goals and needs from the onset, provided guidance, and shared best practices for implementing and utilizing process mining.

"We have a roadmap to improve the usage between our teams, to develop the culture of data, of data mining, of process mining, and this is really the way that we want to continue. At the moment, we are happy with it, and we are almost ready to schedule the activities for the new year."

Process manager, financial services

The operations manager at a financial services firm told Forrester: "[IBM] helped us a lot with our own resources. The IBM agent was available for us to understand how to take advantage of their tools. … They also invested time for us to understand how to use the tool, something that did not happen with our [other] products."

The head of business process engineering at the same firm added: "In fact, we continue to have workshop meetings with global specialists among IBM. They are people who are always on top of things and know what we need. The truth is that IBM support stands out."

This sentiment was echoed by the process manager at the food production company, who said: "[IBM] was part of the project team, along with another consultant, and they led us through the process that we could use for process mining. It was very, very helpful."

The head of digital operations at the apparel company liked that IBM provided overviews of their roadmap and felt they had IBM's ear on future product enhancements.

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement IBM Process Mining and later realize additional uses and business opportunities, including:

- **Expanding use cases.** Several of the interviewees discussed their plans and processes for selecting future projects. The process manager at a financial services team told Forrester, "We have two main goals that we want to reach with the minimum IT effort possible: reducing costs and being compliant with regulatory terms, including SLAs."

When asked how many projects are added each year, the same interviewee said: "It really depends on the processes that we add. We have a lot of surprises because sometimes, we think that a process will be easy to upload because it's one where it's important to have it tracked, but then we face difficulties in extracting the data, in putting the data set together because maybe the data for the process comes from different procedures and, sometimes, they don't speak to each other." The interviewee explained that while the business leads the process mining team to what they want to work on, the process mining team must then determine what kind of data they need, which procedures and organizations they sit in, and which IT team covers the specific procedures involved, and ask them to find the time to extract the data.

The operations manager at another financial services firm also explained their process for selecting projects: "There is a governance method of how those initiatives, those improvements are put into practice. To drive those initiatives within the organization, it is very important to weigh their benefit. When the benefit is linked to efficiency, it becomes very tangible. Generally, those initiatives are better ranked and

ultimately get referred to us for process mining because we can immediately know where the results will be found, where there will be improvements in the process, and it helps a lot to quantify that process improvement."

The head of digital operations at the apparel company characterized their process mining effort as one large, ever-expanding project: "Basically, this is a big project that started with the pilot and now we are planning different ways to implement … for all the brands in all the countries. It's a big project. It's an ambitious project, and it's very difficult to do it all at once, so we have divided it into phases. We just started with the rollout of the first three brands and now we are following up with the other phases of the project."

- **Continuous improvement.** Continuous improvement was an important goal for the interviewees over the long run. The operations manager for the financial services firm explained to Forrester that process mining was not a one-off endeavor: "The other part is to monitor the evolution of these processes. You must be able to see that the benefit of improvements is maintained over time and that the process continues to be performed as expected and if there are changes or diversions."

The process manager for the other financial firm told Forrester they developed a system to monitor the progress they are making: "We use these instruments as part of lean management, management for continuous improvement of processes. … We use these to continuously improve our processes and basically save time and money and headcount. We are business driven in this continuous improvement and continuous focus on getting the processes better."

The process manager at the food production company confirmed, "[Process mining] is a long

> **"To be honest, the business benefit will come at the end of the process of implementing improvements on all of the phases, but now we can approach them. One year ago, we were not in the position to do this because we didn't have the technology that allowed us to make these changes."**
>
> *Head of digital operations, apparel*

process and we are not at the end of the process; it's only the beginning."

- **Acceleration of automation.** The interviewees' organizations were at varying maturity levels when it came to using process mining to accelerate automation. The process manager at one of the financial services firms said their organization invested in the suite of IBM automation solutions, including IBM Process Mining, IBM Automation Anywhere, and IBM Blueworks. They set up a specific office dedicated to automation with the goal of radically increasing the number of fully digitized processes, taking advantage of IBM's Business Automation Workflow potential by linking it with other tools like optical character recognition (OCR) and artificial intelligence (AI). According to this interviewee: "We used the IBM Process Mining digital twin feature to create a simulation to predict and simulate the future ROI before the actual RPA implementation. The simulation of this inefficient activity confirmed that we could reach a greater ROI by automating this activity."

The head of digital operations at the apparel firm noted their organization used IBM Process Mining's simulation tool to test automatically

classifying customer service requests using AI and automating the delivery of answers using RPA and was moving ahead with implementation and delivery. The interviewee also described how they recently implemented an automated process for the reporting for digital payments. "It was a time-consuming activity that had no added value. It was just data entry and [the business analyst] had no time left to analyze the information, which is the real value that they bring."

- **Knock-on effects.** Interviewees recognized the benefits of process mining could extend far beyond the immediate process examined. The head of digital operations for the apparel firm explained: "If we talk about a process that right now takes days and you reduce a process from hours to half an hour, it seems like nothing, but that enables us to reduce other parts as well. To give an e-commerce example, if your goal is to do same-day delivery, you need to work on different parts. There is the pick-and-pack activity that belongs to the warehouse, and then the shipping part, and the system process [which processes orders]. If you have a system that takes half a day to process the order, you can forget about same-day delivery. You can work as much as you want in the warehouse and on the shipment, but if your order needs to be digested for half a day, you can't think of doing same-day delivery. So, we are working on a small part of the process because it enables us to work on the other parts of the process, too."

- **Expanded use of functionality.** Interviewees noted they were growing their use of IBM Process Mining functionality, as well as expanding basic process mining training to others in their organization. The head of business process engineering at the financial services firm told Forrester: "There is a simulation part that we are very interested in, which will be a later step, something that we have been learning. We have not yet been able to create simulations of cost

verification, but we do believe that this part is very interesting."

The process manager for a financial services firm spoke of expansion in more general terms: "We want to continue to get better, to improve our skills, to teach all our process owners how to use process mining instruments. We want our process owners to be more proactive in telling us where we should focus."

- **Deeper engagement with the business.** Some of the interviewees acknowledged challenges working with the business on process mining projects because the methods and tools are somewhat esoteric and complex to explain to laymen. According to the operations manager at the financial services firm: "It's a tool aimed at users. We are the ones with process mining and process engineering training. … Our commercial teams see the end results, the final benefits, without any diagnosis of the method by which we arrived at these benefits."

The interviewee continued: "The operations team is a very big team. There are 300 people working in this team with different operative processes of the bank. … One of the things I would like to do is to make sure that people are much more oriented in their decisions based on IBM data and not only by observation or intuition but also by adding data to the decisions they make."

The process manager at the other financial services firm described the work to educate the business on the value of process mining: "All the process owners know [about the tool and] know what they can do with [process mining]. As needs arise, they are ready to at least start a conversation with our experts and start to build the data set and start the analysis."

The head of digital operations at the apparel company explained: "We're a very tech-confident department. It is much more difficult to extend a

process mining concept that is quite technical to other business [functions] that are not as confident with technology and may not have this kind of commitment. Our advantage in this implementation is not immediate. It's not easy for a pure businessperson to understand."

The interviewee added: "We were lucky because our CEO is also CIO, very savvy with digital, and very keen to do the project and to support the activity, so we had the sponsorship. We had everything necessary to do the implementation. To roll [this] out in the other parts of the company, it's more difficult because there are less tech-oriented people, and it is more difficult to convince the C-level that I have to take care of the investment and [provide] the resources to implement the process mining."

- **Sustainability.** While the interviewees' organizations were mainly focused on reducing time and costs inherent in manual processes, there are several ways in which process mining contributes to sustainability. The process manager for the food production company noted their next project would focus on the production planning process, potentially uncovering inefficiencies contributing to excess energy consumption and waste generation after examining how energy and resources are used.

  Process mining helps organizations monitor their compliance with sustainability goals by tracking KPIs such as energy consumption, carbon emissions, or waste generation. Visualization techniques like IBM Process Mining's digital twin feature can be used by organizations to set targets, identify areas needing improvement, and continuously monitor their progress toward greater sustainability.

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Analysis Of Costs

Quantified cost data as applied to the composite

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Dtr	IBM Process Mining SaaS licensing costs and professional services fees	$10,500	$51,450	$109,200	$189,000	$360,150	$289,519
Etr	Costs related to process mining center of excellence	$12,880	$19,964	$19,964	$19,964	$72,772	$62,528
Ftr	Planning and development costs for new projects	$3,600	$64,080	$64,080	$64,080	$195,840	$162,957
Gtr	Monitoring and maintenance costs for established projects	$0	$0	$15,480	$30,960	$46,440	$36,054
	Total costs (risk-adjusted)	$26,980	$135,494	$208,724	$304,004	$675,202	$551,058

IBM PROCESS MINING SAAS LICENSING COSTS AND PROFESSIONAL SERVICES FEES

Evidence and data. IBM offers a modular pricing approach for IBM Process Mining, so interviewed users only paid for what their organizations needed. Both SaaS and on-premises licensing are available, and purchases can be bundled with other IBM Business Automation Cloud Service offerings and charged through Flexpoints on a monthly basis.

The Base Package for a SaaS license starts at $39,000/year, which covers up to three process mining projects or processes with two task mining agents for up to 20 million events for one data analyst and three business users. Customers can purchase add-ons to cover additional processes, events, analyst or business users, and task mining agents.

A no-cost trial version of Process Mining tool is available, which some interviewees' organizations took advantage of for POC purposes. There are also student and faculty packages at reduced rates.

In addition to licensing fees, some interviewees said their organizations partnered with a professional

> **"As far as licensing is concerned, we are part of a corporate agreement that the bank has at the global level, so the licensing deal we have is a good one."**
>
> *Head of business process engineering, financial services*

services provider to get started with process mining, in addition to receiving support from IBM.

- The process manager for the food production company told Forrester: "IBM was part of the project team, and we also had another consultant, someone not from IBM, who knew process mining, and for a few months, they led us through the process that we could use for process mining. It was very, very helpful."

- The process manager for a financial services firm explained: "We mainly use [an external services provider] for cases where we need to re-upload the dataset, or we have problems with the data. They help us with the data set for processes where the process owner hasn't reached the level of being able to do it by themselves. It's not a very time-consuming action, so the invoice for that action is not so heavy."

Modeling and assumptions. Forrester assumes the following about the composite organization:

- After trialing the software, the composite organization signs up for SaaS licensing, starting with three processes in Year 1. The composite organization adds three more processes in Year 2 and another three more processes in Year 3.

- The composite organization also contracts for professional services with one of IBM's partners to advise on installation and setup associated with the first process modeling cases and remains on hand to help with subsequent cases in the following years.

- IBM's annual SaaS license pricing for this scenario comes to $39,000, representing four virtual processor cores (VPCs) in Year 1, $94,000 representing 10 VPCs in Year 2, and $170,000 representing 18 VPCs in Year 3.

Risks. Organization differences that may impact the costs associated with IBM licensing and professional services fees include:

- The size and scale of deployment.

- The license type.

- The use of and prevailing rates for professional services.

- Global licensing agreements and other volume discounts. Contact IBM for additional details.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $289,500.

IBM Process Mining SaaS Licensing Costs And Professional Services Fees						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
D1	Number of processes subject to process mining (cumulative)	Composite	0	3	6	9
D2	IBM Process Mining SaaS licensing costs	IBM	$0	$39,000	$94,000	$170,000
D3	Professional services fees	Interviews	10,000	$10,000	$10,000	$10,000
Dt	IBM Process Mining SaaS licensing costs and professional services fees	D2+D3	$10,000	$49,000	$104,000	$180,000
	Risk adjustment	↑5%				
Dtr	IBM Process Mining SaaS licensing costs and professional services fees (risk-adjusted)		$10,500	$51,450	$109,200	$189,000
	Three-year total: $360,150			**Three-year present value: $289,519**		

COSTS RELATED TO PROCESS MINING CENTER OF EXCELLENCE

Evidence and data. To make the most of process mining's specialized methods and techniques, most interviewees noted their organizations set up small teams of three to five data analysts dedicated to process modeling, forming a center of excellence to collect and share best practices and interface with business leaders on applications for process mining in the organization.

- The process manager for the food production company explained: "Process mining is completely different from data analysis. There is a difference between analyzing data versus looking at a process in totality, the timing of it, and the sequence of activities one after the other."

- The operations manager for a financial services firm likened the skill set required for process mining to industrial engineering combined with business knowledge: "They are the people who know how to analyze and synthesize what is happening in a process and interpret that in a methodical way and translate that into a day-to-day business language."

  The interviewee continued: "The basics of process mining were very easy to learn. You could do a lot without having to do a lot of research. The basics of [loading] data and building a diagram are quite intuitive, just doing it automatically and getting some statistics, but the tool has a lot of details that are really very deep, and you need help to take advantage of them."

- The head of business process engineering for the same firm added: "The truth is that we are still on the learning curve. The tool is very powerful. It has many options, and we are still learning. The reality is that the learning curve of the tool itself must be accompanied by the knowledge of the process, and that is why we are working together, not only with part of the team that is more in

> **"The team that is most educated with the work is three people, more or less. The plan is to try to train the entire process engineering team. Then, there is another managerial function interested in having their team use it, so maybe at some point we'll also expand to that organization."**
>
> *Head of business process engineering, financial services*

contact with the tool but also with each of the engineers that know the processes and analysis."

- One financial services interviewee noted their team with a much larger team of 20 process engineers had, within that group, a core of experts in process mining. According to the process manager: "We have three or four people that are more engaged and skillful using IBM Process Mining. They can really customize their views, customize their dashboards. … They spend most of the time trying to understand the tool and use it. We also spend time with the IBM team. We tell them what we are investigating, try to analyze processes. Everything goes toward seeing what the tool does and the type of conclusions that can be drawn from it. We have weekly meetings so that everything is aligned with the tool."

Part of their role, the interviewee explained, was to train the rest of the team and to educate the business on the value of process mining: "We started spreading knowledge of the specifics of the [IBM Process Mining] instrument throughout the team. Then, with all our process owners, we are trying to spread the knowledge and the

culture of process mining, of data mining. It's more complicated to get people to really get their hands on the rough data and be willing to spend time and play with it. But almost all the process owners know how to relate to the instrument. They have seen it. They know how it works."

- The head of digital operations at the apparel company had a similar setup and explained that their team met weekly to review best practices and engagement with the business: "For us, it's on the order of one day a week. If I put together the weekly meeting, the activity that people put into it, the support that we have from our internal competence center, it's one day a week."

Modeling and assumptions. Forrester assumes the following about the composite organization:

- The four members of the process mining team initially receive 40 hours of training on the IBM Process Mining tool.

- The team spends an average of one hour per month refreshing their training and learning about new best practices in subsequent years.

- The team also spends an average of an hour per week on center of excellence activities outside of project work.

- The average fully burdened cost for these individuals is $70 per hour.

Risks. Organizational differences that may impact costs related to training and establishing a center of excellence for process mining include:

- The size and compensation of the process mining team.

- The amount of time devoted to training and center of excellence activities.

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of $62,500.

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
**Costs Related To Process Mining Center Of Excellence**
E1	Size of process mining team	Composite	4	4	4	4
E2	Number of hours spent on training (initial and refresh)	Interviews	40	12	12	12
E3	Number of hours spent on COE activities outside of project work	Interviews	0	50	50	50
E4	Average fully loaded hourly wage for process mining team	TEI standard	$70	$70	$70	$70
Et	Costs related to process mining center of excellence	E1*(E2+E3)*E4	$11,200	$17,360	$17,360	$17,360
	Risk adjustment	↑15%				
Etr	Costs related to process mining center of excellence (risk-adjusted)		$12,880	$19,964	$19,964	$19,964
\multicolumn{4}{c}{Three-year total: $72,772}	\multicolumn{3}{c}{Three-year present value: $62,528}

PLANNING AND DEVELOPMENT COSTS FOR NEW PROJECTS

Evidence and data. Interviewees noted that the deployment of IBM Process Mining was reasonably straightforward. However, setting up projects for the first time took much more time and involved collaborations between the process mining team, process owners from the business, and data architects from IT. Interviewees noted that new projects could take months to complete the data requirements.

- Planning sometimes took more time than the deployment itself. The operations manager at the financial services firm noted: "We worked with our technology team to determine where hosting the tool was convenient, whether it was more convenient to install in our facilities [on-premises] or upload to the cloud. We finally decided to use a new cloud or space in the cloud to upload the tool. The cloud tool was deployed in a week and, from there, we gave it to the users to begin to use."

  The process manager also noted a long lead time to install the IBM Process Mining solution but attributed this to their organization, "In our company, we outsource everything, so it takes time to arrange for new software to be installed."

- The manager of business process engineering for the financial services firm described the collaboration process involved in setting up new projects: "We did this with internal people. Our process engineers collaborated with data engineers to collect the data. A lot of models came from us, but it was a collaboration. When the operations people saw the results, it became a collaboration, a shared team between the process engineer, data engineers, and operations."

- The process manager for the other financial services firm listed the steps involved: "First, you have the business leading you to what they want

> **"We worked with the [IBM] team to implement the tool because it was a technology we didn't know. We also needed people who knew something about our process, so for the design phase of the implementation, we dedicated a couple of our business experts to the project. We literally put them in a room and took away the key until they could provide results. They crunched the technology to analyze every step of the communication process between the different systems, every step that represented an exchange in the physical process or in the logical process. And they set up all the information required to feed the process mining tool. It was a work effort that took roughly six months."**
>
> *Head of digital operations, apparel*

you to work on. You have to list all the processes they want you to focus on. You have to decide what kind of data you need, which procedure they are in [that is, identify the correct IT team that covers the specific procedure], and ask them to extract the data [which they need to find the time to do]. You then have to check the data they extracted and maybe go back to them and ask them to extract it again because something's not right. If It's good, you give it to the external [service provider]. They upload the data set and then you go through the software and extract all the insights that you need."

This interviewee said new projects can take months to work out the data requirements because only the process owner knows the

process. "Only the process owner knows that activity one is an inquiry from the client and activity two is sending the letters. All this needs a proper review that takes 5 hours, 10 hours. Sometimes we take two to three meetings with the process owners to review the data to determine if it makes sense."

- The process manager for the food production company agreed that setting up projects for the first time takes time: "It takes a lot of time. You have to give employees time to work on this project. It's not done in a few days. You have to analyze exactly what you want to know, and you have to find the questions that would give you good clues for your process. After that, you can collect the data and visualize it."

Modeling and assumptions. Forrester assumes the following about the composite organization:

- Three new projects are modeled each year.

- Two business analysts and two members of the process mining team each spend an average of 40 hours planning each new project.

- The two members of the process mining team each spend an additional 40 hours developing the dashboards and reports for each project.

- Two data engineers each spend 20 hours per project working with the process mining team members to develop the specifications for and extract the data required for process mining.

- The data engineers also spend 20 hours installing and integrating IBM Process Mining in their IT environment.

- The average fully burdened cost for these individuals is $45 per hour for the business analysts, $70 per hour for the members of the process mining team, and $75 per hour for the data engineers.

Risks. Organizational differences that may impact planning and development costs for new projects include:

- The number, scope, and complexity of processes undertaken for process modeling.

- The efficiency and compensation of those involved in planning and development for process mining projects.

Results. To account for these risks, Forrester adjusted this cost upward by 20%, yielding a three-year, risk-adjusted total PV of $163,000.

Planning And Development Costs For New Projects

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Number of new process mining projects in a given year	Composite	0	3	3	3
F2	Number of business analysts involved in planning (per process)	Interviews	0	2	2	2
F3	Number of hours spent by business analysts on planning	Interviews	0	40	40	40
F4	Average fully loaded hourly wage for business analysts	TEI standard	$0	$45	$45	$45
F5	Subtotal: Business analyst planning costs	F1*F2*F3*F4	$0	$10,800	$10,800	$10,800
F6	Number of process mining team members involved in planning and development (per process)	Interviews	0	2	2	2
F7	Number of hours spent by process mining team on planning and development (per process)	Interviews	0	80	80	80
F8	Average fully loaded hourly wage for process mining team	TEI standard	$0	$70	$70	$70
F9	Subtotal: Process mining team planning and development costs	F1*F6*F7*F8	$0	$33,600	$33,600	$33,600
F10	Number of data engineers involved in planning and development (per process)	Composite	2	2	2	2
F11	Number of hours spent by data engineers on planning and development (per process)	Interviews	20	20	20	20
F12	Average fully loaded hourly wage for data engineers supporting process mining	TEI standard	$75	$75	$75	$75
F13	Subtotal: Data engineer planning and development costs	F1*F10*F11*F12	$3,000	$9,000	$9,000	$9,000
Ft	Planning and development costs for new projects	F5+F9+F13	$3,000	$53,400	$53,400	$53,400
	Risk adjustment	↑20%				
Ftr	Planning and development costs for new projects (risk-adjusted)		$3,600	$64,080	$64,080	$64,080
Three-year total: $195,840			**Three-year present value: $162,957**			

MONITORING AND MAINTENANCE COSTS FOR ESTABLISHED PROJECTS

Evidence and data. Interviewees noted that once projects were set up for process mining, they were much simpler to maintain and refresh moving forward. According to the interviewees, some processes required continuous monitoring while others only needed a photograph to be taken every quarter or year or even every two years.

For example, for a procure-to-pay process, an interviewees' organization could analyze the last 12 months, determine what to improve, and take action on the process, which may include automation and training to correct unwanted behaviors. After a year or two, they could revisit the process to ensure that it continues to align with their business goals and objectives, make any other necessary changes, or stop monitoring the process.

Processes considered 'core' to interviewees' organizations may need continuous monitoring to identify anomalies that require immediate correction to manage customer satisfaction.

- The process manager for the financial services firm estimated it took 5 to 10 hours to complete a refresh for an existing project: "Hopefully, it's very straightforward because [IT] just needs to understand what data you need. We are supposed to have logs for every procedure, so it's only a matter of doing an inquiry or an extract, but sometimes you need to rerun it because the data doesn't make sense."

> **"It's very useful. It's very easy to maintain. I'm one of two main people who manage the instrument and the licenses, and in these [past] three years, I don't recall any requests for service or needs for maintenance. We haven't needed anything."**
>
> *Process manager, financial services*

The interviewee added: "More and more, we would like to be able to have all our people able to upload new data sets by themselves. After that's done, the instrument automatically refreshes the flow, refreshes the numbers."

- The head of digital operations for the apparel company confirmed the reduced effort involved in refreshing existing projects: "After the implementation, the IT work is reduced to a very small effort for system maintenance. They're just basically making sure the data is feeding the right way. Everything's set up and running, and they're there to troubleshoot in case we encounter a bug. It's just support."

This interviewee explained that after they moved to a new technology stack, they made sure it was architected to support process mining: "It was something that we put in the requirement for. We are moving to new technology, and it is not enough that you have to process the payment. You have to provide the data, the information for the process mining. It is now something that is a leading part of our landscape."

Estimated time to refresh existing project

5 to 10 hours

Modeling and assumptions. Forrester assumes the following about the composite organization:

- The composite organization continues to monitor all existing projects in subsequent years.

- The process mining team spends an average of 40 hours per project on refresh activities, including creating and refining dashboards, over the course of each year.

- Data engineers from IT also spend an average of 20 hours per project supporting refreshes of existing process mining projects.

- The average fully burdened cost of these individuals is $70 per hour for the members of the process mining team and $75 per hour for the data engineers.

Risks. Organizational differences that may impact monitoring and maintenance costs for established projects include:

- The number, scope, complexity, and frequency of process mining projects refreshed in any given year.

- The efficiency and compensation of those involved in refreshes for process mining projects.

Results. To account for these risks, Forrester adjusted this cost upward by 20%, yielding a three-year, risk-adjusted total PV of $36,100.

Monitoring And Maintenance Costs For Established Projects

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Number of established process mining projects being monitored in a given year	Composite	0	0	3	6
G2	Number of hours spent by process mining team creating and refining dashboards (per process)	Interviews	0	40	40	40
G3	Average fully loaded hourly cost of a process mining analyst	TEI standard	$0	$70	$70	$70
G4	Subtotal: Process mining team ongoing project management costs	G1*G2*G3	$0	$0	$8,400	$16,800
G5	Number of hours spent by data engineers supporting process mining projects (per process)	Interviews	0	20	20	20
G6	Average fully loaded hourly cos of a data engineer supporting process mining	TEI standard	$0	$75	$75	$75
G7	Subtotal: Data engineer ongoing project management costs	G1*G5*G6	$0	$0	$4,500	$9,000
Gt	Monitoring and maintenance costs for established projects	G4+G7	$0	$0	$12,900	$25,800
	Risk adjustment	↑20%				
Gtr	Monitoring and maintenance costs for established projects (risk-adjusted)		$0	$0	$15,480	$30,960
	Three-year total: $46,440			**Three-year present value: $36,054**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)
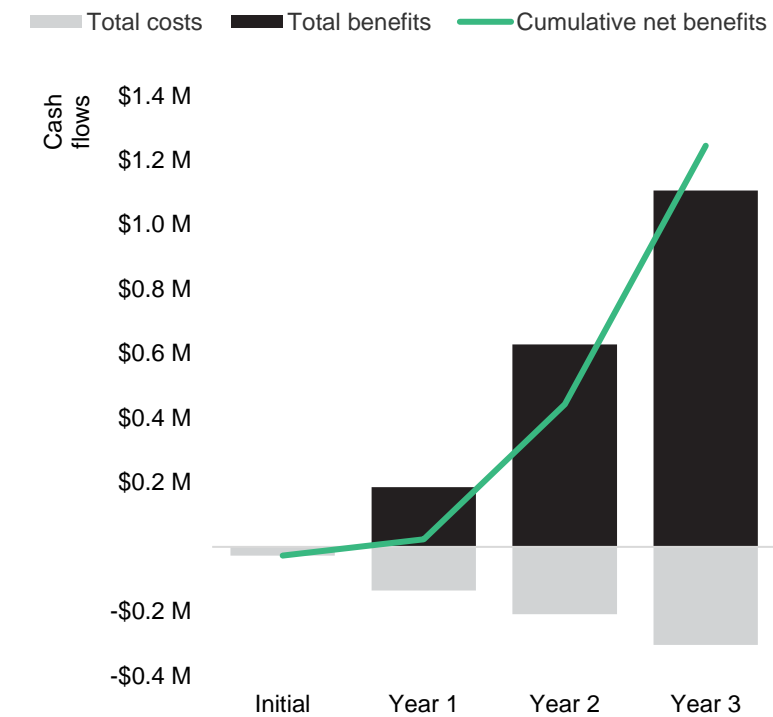
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Analysis (Risk-Adjusted Estimates)						
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Total costs	($26,980)	($135,494)	($208,724)	($304,004)	($675,202)	($551,058)
Total benefits	$0	$185,898	$628,344	$1,106,092	$1,920,334	$1,519,314
Net benefits	($26,980)	$50,404	$419,620	$802,088	$1,245,132	$968,256
ROI						176%
Payback						7 months

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Supplemental Material

Related Forrester Research

Bernhard Schaffrik and Renee Taylor, "Forrester's Process Intelligence Landscape Preview — Three Primary Trends To Watch," Forrester Blogs.

"The Process Intelligence Software Landscape, Q2 2023," Forrester Research, Inc., April 6, 2023.

"Process Mining And Task Mining: Two Sides Of The Same Coin," Forrester Research, Inc., March 9, 2023.

"Experiment: Process Mining," Forrester Research, Inc., January 11, 2023

"Forrester's Q3 2022 Digital Process Automation Survey Results: Organizations Respond To The Automation Imperative," Forrester Research, Inc., October 19, 2022.

Appendix C: Endnotes

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[1] Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

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