

SPARK Matrix™

Data, Analytics & AI

SPARK Matrix™: Process Mining, 2021

Market Insights, Competitive Evaluation, and Vendor Rankings

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Executive Overview

This research service includes a detailed analysis of global process Mining market dynamics, major trends, vendor landscape, and competitive positioning analysis. The study provides competition analysis and ranking of the leading process mining vendors in the form of the SPARK Matrix™. This research provides strategic information for technology vendors to better understand the market supporting their growth strategies and for users to evaluate different vendors' capabilities, competitive differentiation, and market position.

Key Research Findings

Followings are the key research findings:

Key Market Drivers and Trends:

Organizations are automating their business processes in order to drive digital transformation, and processes play a critical role in the effective implementation of these digital business initiatives. Process mining is an important solution that uncovers existing processes in an organization and provides solutions to subject matter experts for modelling, documenting, and collaborating to re-engineer an organization's operational processes. Process mining is also helping organizations to go beyond the traditional use cases of process discovery and engaging the process mining solutions with customer journey mapping to further enhance the customer experience.

The process mining market is growing rapidly driven by an increasing number of organizations adopting digital transformation, which allows them to focus on becoming more customer-centric and adopt intelligent automation to thrive in an increasingly digitized world. Additionally, integrating AI with process mining offers real-time analysis of various processes, which enhances businesses' operational capabilities. AI-enabled process mining offers multiple benefits, including larger data sets, enriched event logs, and business intelligence.

Process mining is emerging as an essential technology to incorporate the vision of hyperautomation, which is easily accessible to large, mid, and small sized organizations, and is mainly adopted to automate processes and reduce cost barriers. Process mining vendors are also investing in process packaged solutions to establish third-party partnerships for automation and expand the scope of process mining solutions. These trends are expected to play a key role in improving the penetration rate and overall market growth of process mining globally.

Technology Drivers :

The extended lockdowns by governing bodies globally and the continued uncertainty around the COVID-19 situation have significantly impacted the technology investments in 2020 and 2021 as organizations are more inclined towards efficient digitalized processes. Hence, the technological trends that are driving the process mining market are:

- Continuous process improvement and monitoring through AI-infused process mining adoption across the enterprise
- Increased adoption of classical process mining combined with task mining to support a wider set of use cases
- Predictive and prescriptive process mining will be used to predict the future state of business processes
- AI-powered simulation in business processes learns from the past and automatically adjusts them according to various future scenarios as precisely as possible
- Organizations are rapidly shifting to hyperautomation for architecting and addressing critical business demands and generating automated insights for processes

Competition Dynamics :

Celonis, UiPath, Software AG, Signavio, IBM, Minit, ABBYY, QPR Software, MEHRWERK, and PAFnow are the top performers and technology leaders in the 2021 SPARK Matrix analysis of the global process mining market. These vendors provide a comprehensive technology platform with a strong process mining functionality to help organizations improve the efficiency and effectiveness of their end-to-end business processes. The study includes analysis of other major vendors, including Appian, Kofax, UpFlux, Livejourney, Integris, Logpickr, and Everflow.

Market Definition and Overview

Process mining helps organizations to analyze, identify, automate, and monitor event logs and real-time systems data to enhance end-to-end operational business processes, where-in it includes a dynamic set of tools to capture data across an organization's IT systems and varied data sources. This helps organizations to identify gaps in business processes and solve issues that could impact the performance of these business processes. The collected data is then transformed into event logs to provide dynamic visualization of the organization's "as is" business processes. The process mining software automatically uses these event logs to create a detailed process graph with fact-based insights about the business processes. These insights enable organizations to perform process audits, discover process deviations, identify root causes, optimize operations, and monitor the results against various KPIs. Process mining also identifies issues that need to be improved, thereby enabling organizations to continuously optimize and improve processes.

Process mining provides organization-wide transparency and promotes a detailed business plan to facilitate process automation. It also enhances operation management, business performance, and employee performance when used in sync with other automation technologies such as robotic process automation (RPA) and artificial intelligence (AI). It simplifies the mapping of end-to-end processes, as well as provides an overview for process gaps, bottlenecks, high impact areas, and areas that can potentially increase ROI. Furthermore, process mining also assists in measuring the productivity & efficiency of business processes, which simplifies decision-making regarding the business cycle automation.

An AI-enhanced process mining comprises features such as multi-event logging, cross-platform data mining, time-stamped process logs, and process analytics. This helps eliminate human interference, identify key improvement areas, and provide smart, intuitive, and fully automated business insights. It also identifies and corrects disruptive processes, eliminates low-priority tasks, and suggests alternative processes. In addition, AI-enhanced process mining provides features like enhanced quality control, unified process maps, redundancy evaluation, risk control prediction, and compliance adherence to optimize the processes of modern business organizations.

Process mining can be categorized into two modules—performance mining and conformance checking—based on the type of usage and the preceding model involved. Performance mining evaluates factors such as delays and processing time in order to identify gaps for improving the existing models. Conformance checking focuses on comparing actual events to pre-defined templates to help identify the weak link/s in the business plan and the causes for deviations if any. Process mining is being increasingly used for various applications, including performance evaluation,

identification of improvement areas, data-driven decision making, and real-time process modification. Process mining is hence gaining traction across different industry verticals, such as finance, customer service, procurement, and logistics and distribution.

Some of the major process mining functionalities include:

- ◆ **Data Transformation:** The process mining software is equipped with a data transformation capability that facilitates the ease of extracting, transforming, and loading the process data to create event logs. Process mining solution vendors often provide a wide range of connectors that enables the extraction of the process data directly from the IT system databases and various data sources, including enterprise resource planning (ERP), business process management (BPM), human capital management (HCM), customer relationship management (CRM), and supply chain management (SCM).
- ◆ **Process Discovery:** Process discovery involves collecting event logs to create detailed process maps and business process model and notation (BPMN) models. Organizations can comprehensively visualize, analyze, and map their ongoing business structures and processes using a process discovery tool. The platform offers a unified view of business processes which allows users to comprehend the flow between systems and teams. It detects the vulnerabilities and bottlenecks that impact the process speed, quality, cost, and compliance of the organization's framework. The process map automatically visualizes the as-is process flow in the form of a graph. It also supports multi-level process mining that can map several derived processes within a single comprehensive model. Through the process variant feature, the discovered processes can be compared adjacently to identify repetitive tasks and automate the identified processes.
- ◆ **Conformance Checking:** Conformance checking compares event logs with a reference model. The actual process is visualized using event logs, and the real-time process deviation can be compared and verified with the target process or reference model. This feature facilitates the smooth execution of processes and enables organizations to identify process deviation and eliminate repetitive or redundant processes from the event logs. It also allows organizations to identify root causes of process deviations. These process deviations and repetitions can impact process efficiencies, result in audit problems, and cause a breach of regulatory compliances. Moreover, it is also capable of checking compliance rules such as segregation of duties and conformance with legal & internal company rules.
- ◆ **Process Monitoring and Dashboarding:** The process monitoring and reporting capability enable users to customize dashboards to easily track

various process performance and compliance metrics and monitor the impact of changes in real-time. The process mining solution may also offer various templates and pre-built graphs to provide dynamic visualization of monitoring business processes. Using real-time KPI monitoring, users can improve process performance, gain insights, and drill down to the root cause to achieve the desired outcome. With the simulation module, users can amend the examined process model and its configuration; and represent a parallel process reality, promoting predictive data-driven analytics. Additionally, the improvement ideas produced from process mining analysis can be validated by users prior to its implementation.

Key Technological Trends

The followings are the dominant technological trends and market developments influencing the overall global process mining market growth:

Growing Maturity of AI and Machine Learning within Process Mining Solution:

Organizations are focusing on optimizing complex business processes by infusing AI/ML technology with the existing process mining solutions. The synthesis of AI/ML and process mining is helping organizations to capture data from operational systems and event logs to meticulously comprehend their business processes at various levels. The solutions also help uncover several deficiencies in the process models and suggest redesigns as per the requirements by coupling and comparing event logs data and the prevailing process models. The AI-powered root cause analysis and predictive analytics capabilities are helping to augment the performance of business process operations by rapidly determining congestions and scrutinizing the processes before deployment. The solutions' predictive analysis capability is helping organizations to gain actionable insights related to their process workflow and accordingly build models that will have a positive influence on their businesses. Additionally, AI algorithms are also helping organizations in identifying requirements of resources for various tasks and dispense them in an optimum manner.

Process Mining is Emerging as an Essential Technology in Realizing the Vision of Hyperautomation:

Hyperautomation, also known as intelligent automation, is a polished, comprehensive, end-to-end solution which allows complex, and unstructured processes to be automated. Hyperautomation relies on a collective suite of robotic process automation, process mining, analytical and decision management tools, as well as disruptive technology like artificial intelligence, machine learning, intelligent optical character recognition (iOCR), and natural language processing (NLP) to magnify the scale of process automation. An advanced process mining solution scans through the team's performance, processes, and operations that require automation. It ultimately aims to increase workforce engagement by incorporating the opinions & involvement of business users, technical users, and subject matter experts across the organization.

Growing Partnership and Integration with Leading RPA, Task Mining, and Process Analytic Tools:

Process mining solution is emerging as an essential tool for driving initiatives for operational excellence across industry sectors and geographical regions. Process mining solutions play a critical role in enabling integration with RPA, task mining, and

process analytic tools to offer cumulative integrated support. Process mining vendors are striving to automate various processes and enhance business performance by integrating with these tools.

Process identification and prioritization for automation projects remain the primary challenge for most organizations. Organizations often spend significant time and resources to identify and monitor various manual, repetitive processes and shortlist them for initiating automation projects. In response, numerous RPA vendors have now added in-house capabilities or partnered with process mining providers to overcome challenges related to identifying processes for RPA deployment and facilitating complete process visibility. Process mining technologies help organizations to conduct an objective analysis of their existing business processes, provide visibility and operational insights, and assist in prioritizing processes to drive automation projects. Robotic process automation is helping to expedite digital transformation and is enabling organizations to automate and optimize their current processes.

Task mining helps organizations to track, monitor, and analyze the data gathered from user interaction and captures each keystroke to understand actual actions by users in any business process. This helps organizations to enhance person-specific productivity, identify manual processes for appropriate conversion to RPA, and minimize process deviations if any. In addition, various process mining vendors offer integration capabilities with third-party process analysis tools. The integration capability is enabling vendors to increase their product flexibility and enabling users to leverage integrated ecosystems through process mining solutions. There is a conscious and genuine shift toward amalgamating people-driven and data-driven insights for an enhanced predictive analytics experience.

Process Mining Solutions Gaining Popularity for Aiding in creating Digital Twin of an Organization (DTO):

Process mining enables organizations to design visualizations of each process stage by leveraging data from their operational systems. Hence, it acts as a basic attribute for developing the digital twin of an organization (DTO). DTO is a replica of a process that helps organizations to visually compare the desired process with the actual process to make informed business decisions. Organizations are leveraging the technology for testing new systems prior to their deployment, enhancing their business efficiency, productivity and helping to administer assets in real-time. It is also enabling organizations to comprehend the complex data across the business to ultimately provide better service.

Competitive Landscape and Analysis

Quadrant Knowledge Solutions conducted an in-depth analysis of the major process mining vendors by evaluating their products, market presence, and value proposition. The evaluation is based on primary research with expert interviews, analysis of use cases, and Quadrant's internal analysis of the overall process mining market. This study includes analysis of key vendors including ABBYY, Appian, Celonis, Everflow, IBM, Integris, Kofax, Livejourney, Logpickr, MEHRWERK, Minit, PAFnow, QPR Software, Signavio, Software AG, UiPath, and UpFlux.

The process mining market has been gaining traction due to the increasing variety and complexity of operational processes. The process mining technology comprises a dynamic set of tools to capture data across an organization's enterprise IT systems and varied data sources, transform it into event logs, and provide dynamic visualization of the organization's "as is" business processes. The software uses these event logs to automatically create a detailed process graph providing fact-based insights about the processes. These insights enable the organizations to perform process audits, discover process deviations, identify root causes, optimize operations, and monitor the results against various KPIs.

Celonis, UiPath, and Software AG are the top performers in the global process mining market and have been positioned as the top three technology leaders. Celonis is continuing to gain market share, leveraging its robust process mining solution that enables organizations to monitor and eliminate inefficient internal processes. It differentiates with its intuitiveness and ease of use, including a set of pre-built use cases and apps, a rich ecosystem to support users, and quick implementation.

UiPath, on the other hand, has taken a leap forward by offering a unique approach of combined process mining and RPA that helps organizations understand their complex processes and determine automation opportunities. Furthermore, Software AG continues to differentiate itself with its business documentation capabilities, 360-degree view, seamless integration & collaboration feature, and process mapping and reporting. The company offers comprehensive RPA capabilities by partnering with third-party vendors, enabling organizations to improve the automated process from API to UI level automation.

Amongst the other vendors, Signavio enables organizations to operationalize the customer experience by enabling organizations to incorporate the outside-in perspective of customers into the analysis of internal business process activities. It helps users to find inefficiencies and customer pain points across all customer touchpoints and journeys by mining internal business process operations and external customer journeys. IBM helps to simulate future processes, uncovering clear root causes, multi-level process mining, task-mining, and RPA automatic assessment.

IBM's process mining offers a simulation engine that can be used to perform a what-if-analysis to evaluate the improvements in terms of lead time and cost, generated by resource allocation, task robotization, and step elimination.

Furthermore, Minit's process mining platform helps organizations enhance operational efficiencies by underlining process improvement opportunities and determining their root cause. Minit offers a robust technology value proposition with comprehensive capabilities for intuitive interface, hierarchical process mining, business rules monitoring, Minit dashboards, rework analysis, and simulations module. ABBYY, on the other hand, offers a process mining platform named ABBYY Timeline. This platform allows organizations to improve operational efficiency and customer experience by utilizing its task mining capabilities, where it analyzes desktop user interaction data and links this data with the process details mined from system event data.

Similarly, QPR Software offers process mining capability through QPR ProcessAnalyzer. The QPR ProcessAnalyzer helps organizations to find deviations and automate the entire business process or parts of the business process. QPR offers a robust technology proposition with comprehensive process mining capabilities for AI-powered out-of-the-box process mining analyses, cluster analysis and process predictions, advanced and ready-to-use root cause analysis, case attributes, conformance checking dashboard to identify root causes, root causes for long lead times, and root causes for process changes.

MEHRWERK provides customizability, self-service process mining, data governance, security concept, scalability, customer-specific deployment method, seamless integration with existing business intelligence, no-code/low-code IPaaS platform, object-centric process mining, and associative analytics beyond pre-defined cube data structures while enabling intuitive analysis for the end-users. Likewise, PAFnow offers process mining solutions to make data-intensive tasks simpler, more humane, efficient, and up to date. The solution's technological differentiators include integration of Power BI, integration of process mining capabilities inside existing Power BI dashboards & reports, faster ramp-up and rapid deployment of the process mining solution, and interoperability & continuous integration that eliminates the need for sharing data across different platforms.

The global process mining market has a number of strong contenders and is expected to have an even more intense race for maintaining the lead in the near future. With continuously evolving global technology scenarios, faster adoption rates, and compelling developments happening round the clock, the vendors need to keep up with the evolving requirements and customer needs. With the current pandemic situation and its impact on the operational cycles of the organizations across various sectors globally, the opportunities for growth & presenting solutions that truly make a

difference to global process mining are limitless. Hence, it is an open ground for process mining solution providers, who could leverage the current situation for innovating & establishing themselves further.

Competitive Differentiators

While most process mining vendors provide comprehensive functionalities to support various use cases, their technology and customer value proposition may differ based on the customer size, industry vertical, geographical markets, and organization-specific requirements. Some of the key competitive factors and technology differentiators for an integrated process mining solution include:

- ◆ **The Sophistication of Technology:** User organizations are advised to conduct a comprehensive evaluation of different process mining technologies and vendors before making a purchasing decision. Users should employ a weighted analysis of several factors important to their specific organization in terms of vertical and horizontal process optimization requirements. Requirements of key process mining solution features by user organizations may differ based on industry vertical, horizontal processes, compliance requirements, user size, and such others. Users should also look for a process mining solution with a history of successful large-scale deployments and carefully analyze the existing case studies of those deployments. This should form the basis to prepare best-practice for process mining technology deployments. Process mining technology capabilities differ between different vendors' offerings in terms of ease of deployment & use, dynamic visualization, process analytics, security, technology integration, analytics & reporting, support for a broad range of use cases, and such others.
- ◆ **The Breadth of Use Cases:** Users should evaluate process mining vendors' ability to support a wide range of industry-specific and organization-specific use cases. The solution should be proficient in handling general process mining-related use cases, including conformance checking, quality management, process discovery, process optimization, robotic process automation, process-specific KPI monitoring, and more. The solution should support enterprise-wide use cases across functions, such as finance, IT, sales, marketing, operations, human resource, purchase, supply chain, services, and customer support. Depending on the vendor's capability, the solution may support operations or production-related use cases to determine the root cause of process inefficiency, eliminate repetitive tasks, increase production yield, and others. The solution must be able to provide flexibility in addressing the user organization's challenges by supporting new use cases that can be customized based on their specific business requirements and objectives.
- ◆ **Integration and interoperability:** Seamless integration and interoperability with the organization's existing technologies are amongst the most crucial factors impacting technology deployment and ownership experience. Process mining vendors should provide built-in ETL, out-of-the-box connectors, well-

documented API, and a RESTful API to achieve seamless end-user experience and business process design. Users should evaluate vendor capability that offers seamless integration with a wide variety of databases and systems to capture event logs. The process mining vendors may also offer OOTB integration with various business intelligence, analytics, and reporting technologies for ease of reporting, KPI monitoring, and analysis. The vendors should also support integration with organizations' native/ third-party RPA and task mining tools. Also, users should assess the process mining solution for offering breadth and depth of integration capability specific to their existing tools and infrastructure. Some integration and APIs are not comprehensive and may only provide limited functionality.

- ◆ **Process Monitoring, Reporting and Dashboarding:** Process mining vendors' capability in providing end-to-end process visualization, real-time analytics, and KPI monitoring may significantly differ in this space. Users should look for vendors offering pre-built templates for various monitoring use cases and customizable dashboards with drag-and-drop functionality to quickly initiate any simple or complex process deployment. Users should evaluate vendors based on their capability to offer advanced dashboards through a combination of process mining and various other BI tools.

A process mining solution is equipped with an operational live insights feature that enables an organization to track and understand inoperative processes, develop process improvement initiatives, and disclose inefficient processes across the organization. Vendors should allow users to create intuitive and interactive dashboards to enable users to focus on specific processes. Through the drill-down approach, users can comprehensively visualize the root cause of process deviation. The solution also enables users to compare multiple processes to uncover their structural variations.

Users should evaluate vendors based on their ability in comparing metrics, statistics, models, and multi-layered processes through visual means for various views of the process through graphical conformance checking features. Depending on the vendors' capability, they may offer a centralized hub with an organized data repository and provide role-based access for sharing the insights and analysis with associated stakeholders. The visual filtering capability helps organizations interactively filter processes based on various performance parameters, variation filter, attribute filter, timeframe filter, path analysis, and flow analysis.

The solution should offer a comprehensive visualization of every process through charts, statistics, graphs, process maps, or process variants in real-time. The solution should allow stakeholders to visualize and analyze process

performance and monitor KPIs at every hierarchy for making informed decisions. Depending on the vendor's capability, the solution may offer a process animation feature through a dashboard to help users visualize the process flow through animation. Moreover, users can also monitor the process flow on a daily occurrence.

- ◆ **The Sophistication of Process Simulation and Monitoring:** A robust functionality for process simulation, monitoring, and optimization is essential to improve the effectiveness of process mining deployment. The solution should allow users to analyze and compare real-world process models with simulated business process models. A robust process simulation and analysis help users to perform what-if analysis and advanced scenario planning to gain advanced insights into cost estimation, resource planning and utilization, and opportunities for process optimization. It should offer insights into the impact of process automation on overall process improvements. While a majority of the process mining solutions offer process simulation features, the user should look for vendors that are demonstrating the sophistication of simulation and analysis capabilities for their industry-specific use cases.
- ◆ **Multi-level Process Mining:** Organizations may face problems while measuring process performance and identifying root-cause at multiple levels of business processes using the traditional mining approach. Vendors should offer multi-level process mining features to map several complex processes under a single business process model. Users should evaluate vendors whose solutions enable them to assess the performance of every business process level. They should be able to assess and compare these process levels against a number of performance parameters. Moreover, the solution should offer functionalities to enable users to gain holistic visibility with zoom-in and zoom-out within process models. It should also provide comprehensive insights related to each hierarchical level to further streamline the processes. The solution should enable users to dynamically track process activities that are implemented at various levels of business structure such as purchase to pay (P2P) and order to cash (O2C).
- ◆ **Vision and Roadmap:** Process mining technologies are constantly evolving to accommodate emerging and ongoing technology disruption and market trends. Users should carefully select the right technology partner as per their digital transformation roadmap, specific use case, and emerging industry trends. Process mining vendors are continuously improving their technology value proposition in terms of offering robust data integration from various IT systems and event logs, dynamic process visualization, application of advanced analytics and machine learning, robust process discovery, process simulation and optimization, and such others. Users should evaluate vendors'

product strategy and long-term technology vision to inculcate long-term partnerships with solution providers.

- ◆ **Maturity of AI, ML, and Advanced Analytics:** The application of AI and machine learning has emerged as the most important trend across all enterprise and business systems to transform operations and provide intelligent insights. As AI and machine learning technologies are still in the emerging stage, users should evaluate vendors' existing maturity as well as the roadmap around these technologies thoroughly before zeroing in on the vendor.

Future Roadmap for Process Mining

With the rise of emerging technologies, including artificial intelligence (AI), machine learning (ML), and robotic process automation (RPA) there is an increased demand for process mining solutions. These technologies streamline organization operations by identifying and disseminating various processes. Process mining solution also allows organizations to uncover hidden workflows between organizational nodes and make them visible. It analyzes different event logs to automate the monitoring of ongoing processes while creating innovative and enhanced process maps. Organizations are strengthening process mining capabilities to allow organizations to visualize the actual process based on different event logs.

Organizations are expected to increase the adoption of AI, ML, and RPA to enable them to automatically discover and optimize critical business processes. With the emergence of automated process improvement (self-driving organization), process mining will efficiently identify bottlenecks and discover areas of improvement, enabling faster delivery for customers and improving their business experiences. Furthermore, AI-driven process mining will provide organizations with predictive, descriptive, diagnostic, and prescriptive analytics. It will help increase the efficiency and transparency of complex organizational operations with actionable business alerts.

Moreover, AI-driven process mining will simulate and optimize processes to help the organization understand dynamic visualization (digital twin) where costs can be saved, and the complexity of the processes can be reduced. While RPA and task mining have benefited many organizations, insufficient analyses are hampering its efficiency to fully automate a process or capture typical user tasks. The integration of task mining, RPA, and process mining enables businesses to bridge these gaps and remain future-ready and adaptable for the highly competitive environment.

The process mining market is poised to grow at a significant rate; wherein the organizations would tend to rely more on these vendors for support and to lessen their burden of the cumbersome processes to stay ahead in the curve in the future times to come. The process mining solutions are gaining a strong market position with increased penetration amongst small to mid-market organizations.

SPARK Matrix™: Strategic Performance Assessment and Ranking

Quadrant Knowledge Solutions' SPARK Matrix provides a snapshot of the market positioning of the key market participants. SPARK Matrix provides a visual representation of market participants and provides strategic insights on how each supplier ranks related to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact. Quadrant's Competitive Landscape Analysis is a useful planning guide for strategic decision makings, such as finding M&A prospects, partnerships, geographical expansion, portfolio expansion, and similar others.

Each market participants are analyzed against several parameters of Technology Excellence and Customer Impact. In each of the parameters (see charts), an index is assigned to each supplier from 1 (lowest) to 10 (highest). These ratings are designated to each market participant based on the research findings. Based on the individual participant ratings, X and Y coordinate values are calculated. These coordinates are finally used to make SPARK Matrix.

Technology Excellence	Weightage	Customer Impact	Weightage
Sophistication of Technology	20%	Product Strategy & Performance	20%
Competitive Differentiation Strategy	20%	Market Presence	20%
Application Diversity	15%	Proven Record	15%
Scalability	15%	Ease of Deployment & Use	15%
Integration & Interoperability	15%	Customer Service Excellence	15%
Vision & Roadmap	15%	Unique Value Proposition	15%

Evaluation Criteria: Technology Excellence

- ◆ **The Sophistication of Technology:** The ability to provide comprehensive functional capabilities and product features, technology innovations, product/platform architecture, and such others
- ◆ **Competitive Differentiation Strategy:** The ability to differentiate from competitors through functional capabilities and/or innovations and/or GTM strategy, customer value proposition, and such others.
- ◆ **Application Diversity:** The ability to demonstrate product deployment for a range of industry verticals and/or multiple use cases.

- ◆ **Scalability:** The ability to demonstrate that the solution supports enterprise-grade scalability along with customer case examples.
- ◆ **Integration & Interoperability:** The ability to offer product and technology platform that supports integration with multiple best-of-breed technologies, provides prebuilt out-of-the-box integrations, and open API support and services.
- ◆ **Vision & Roadmap:** Evaluation of the vendor's product strategy and roadmap with the analysis of key planned enhancements to offer superior products/technology and improve the customer ownership experience.

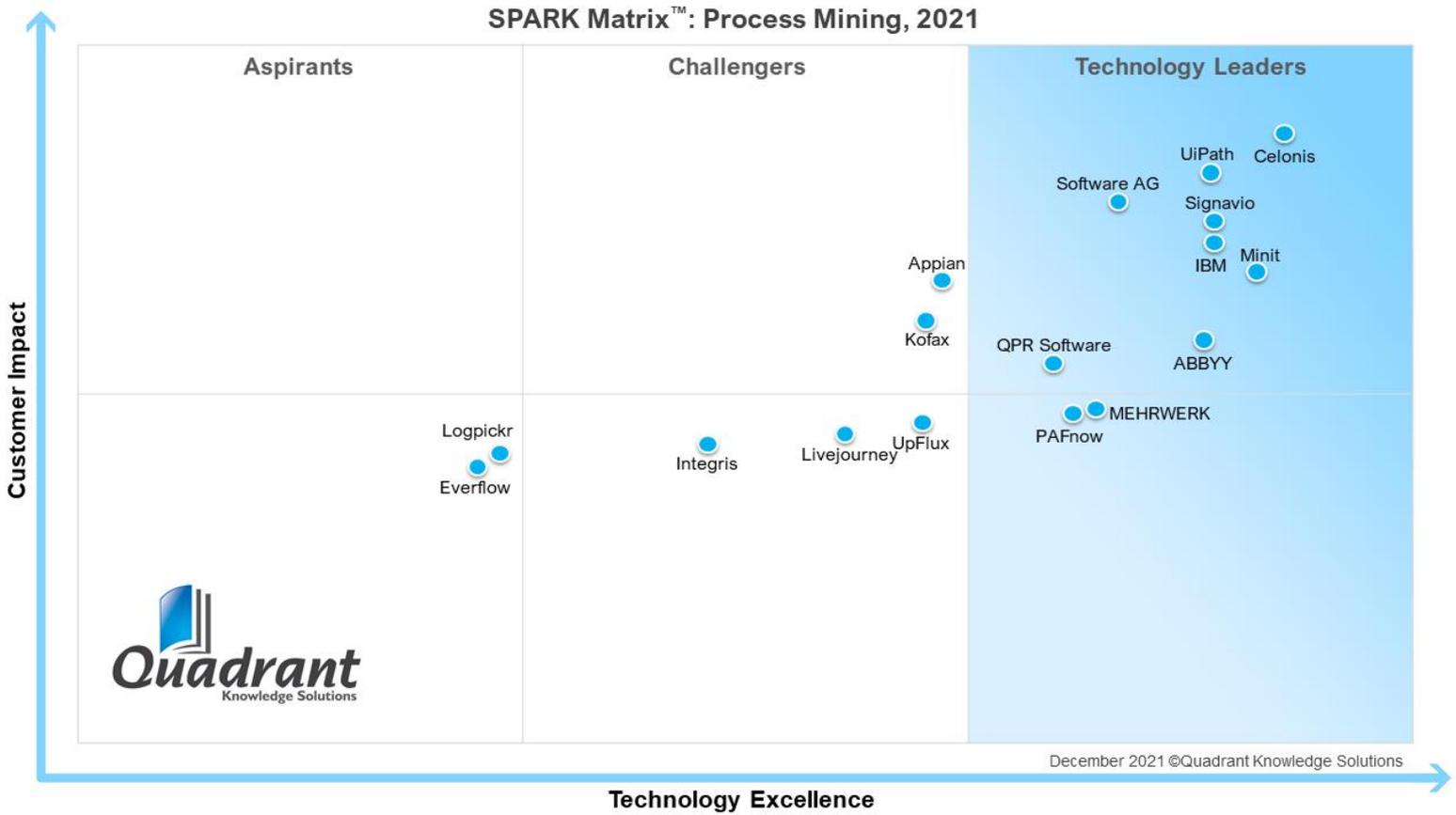
Evaluation Criteria: Customer Impact

- ◆ **Product Strategy & Performance:** Evaluation of multiple aspects of product strategy and performance in terms of product availability, price to performance ratio, excellence in GTM strategy, and other product-specific parameters.
- ◆ **Market Presence:** The ability to demonstrate revenue, client base, and market growth along with a presence in various geographical regions and industry verticals.
- ◆ **Proven Record:** Evaluation of the existing client base from SMB, mid-market and large enterprise segment, growth rate, and analysis of the customer case studies.
- ◆ **Ease of Deployment & Use:** The ability to provide superior deployment experience to clients supporting flexible deployment or demonstrate superior purchase, implementation, and usage experience. Additionally, vendors' products are analyzed to offer a user-friendly UI and ownership experience.
- ◆ **Customer Service Excellence:** The ability to demonstrate vendors capability to provide a range of professional services from consulting, training, and support. Additionally, the company's service partner strategy or system integration capability across geographical regions is also considered.
- ◆ **Unique Value Proposition:** The ability to demonstrate unique differentiators driven by ongoing industry trends, industry convergence, technology innovation, and such others.

SPARK Matrix™: Process Mining Market

Strategic Performance Assessment and Ranking

Figure: 2021 SPARK Matrix™
(Strategic Performance Assessment and Ranking)
Process Mining Market



Vendor Profiles

Following are the profiles of the leading process mining vendors with a global impact. The following vendor profiles are written based on the information provided by the vendor's executives as part of the research process. Quadrant research team has also referred to the company's website, whitepapers, blogs, and other sources for writing the profile. A detailed vendor profile and analysis of all the vendors, along with various competitive scenarios, are available as a custom research deliverable to our clients. Users are advised to directly speak to respective vendors for a more comprehensive understanding of their technology capabilities. Users are advised to consult Quadrant Knowledge Solutions before making any purchase decisions, regarding process mining platforms and solution and vendor selection based on research findings included in this research service.

Celonis

URL: <https://www.celonis.com/>

Founded in 2011 and headquartered in Munich, Germany, Celonis is one of the leading providers of process mining solutions. It offers an execution management system (EMS) that helps organizations measure their process execution capacity. The Celonis EMS comprises Celonis Execution Instruments, Celonis Execution Applications, and Celonis Studio. The company also offers a process mining technology known as Celonis Intelligent Business Cloud, which integrates with the Celonis EMS. The Celonis Intelligent Business cloud helps organizations to optimize their business process and drive operational excellence. It offers comprehensive capabilities like data collection (connect), process discovery and analytics (discover), process insights (enhance), process monitoring, and reporting (monitor).

The platform's connect capability securely collects time-stamped event logs from operational systems, IT systems, and databases within organizations using prebuilt connectors which get easily connected with various ERPs, CRM's, accounting software. The software offers real-time data connections that help users to identify the process gaps in real-time. It also provides capabilities like automated data extraction and transformation with customizable scheduling. Additionally, it offers an AI-powered simplified data transformation feature which can transform noisy data systems into process models along with prebuilt system and process-specific transformation tool.

The platform's discovery capability offers real-time process discovery, process analytics, and process visualization. It provides a unified overview of execution gaps and process variations. It also helps users to gain intuitive visibility into processes and allows them to examine processes through AI-powered root cause analysis. The process discovery capabilities offer various features such as "Happy Path" discoveries, variant and gap discovery, upstream root cause analysis, and process compliance along with vulnerability detection.

The "Happy Path" discoveries feature provides a comprehensive visualization of each variant that discovers the exact point of deviations and gaps. Additionally, it offers an AI-powered root cause analysis feature that can intelligently drill down into a specific process to identify and resolve the root cause and eliminate future process interruptions. Additionally, it provides a process compliance and vulnerability detection feature which help users to identify all the variables that contribute for executing the gaps, affecting speed, quality and cost and compliance.

The process analytics capability offers rich analytic visualizations, automation scout, best-practice benchmarking, and drag-and-drop customization. The rich analytic visualizations feature provides an intuitive and interactive process exploration tool that

helps an organization to discover and analyze the cause via the quick process and variant visualization on the dashboard.

The platform's monitor capability allows users to track and monitor the impact of the business process. It also ensures process conformance, real-time benchmarking and keep aligning team members against process KPIs. The monitor offers a transformation center functionality, that provides a one-stop-shop for process monitoring. The action center includes various features such as KPI & outcome tracking, transformation visualization, and KPI accountability & task allocation. The KPI & outcome tracking feature offers organizations the framework for best practice transformation with objectives, KPIs, targets, and deadlines.

The system also automatically tracks process performance regarding set KPIs and automatically generates alerts for process deviations. It provides real-time visualization of KPI trends and allows identify the problems. Additionally, the platform offers functionality for KPI accountability and task allocation functionality. The functionality helps the organization keep KPI responsibility on track and schedule progress reports according to the tasks allocated to an individual team member.

Analyst Perspectives

Following is the analysis of Celonis' capabilities in the global process mining market:

- ◆ Celonis offers a robust process mining solution that enables organizations monitor and terminate inefficient internal processes. The platform's key differentiations include intuitiveness and ease of use, including a set of pre-built use cases and apps, a rich ecosystem to support users, and quick implementation. The company has a strong partnership ecosystem, that helps organizations initiate their digital transformation journey and build sophisticated products and services.
- ◆ Celonis has a significant geographical presence in North America and the European Union region. The company holds a strong customer base, including the leading brands across industry verticals such as healthcare and pharmaceutical, high-tech and telecom, public sector, CPG and retail, manufacturing, banking, financial services, and insurance.
- ◆ □ Celonis' primary challenges include the growing competition from emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to all the enterprise needs and supporting more use cases to accelerate their growth beyond the European Union and North American region. With its sophisticated technology platform and comprehensive functional capabilities, Celonis is well-positioned to expand its market share in the global process mining market.

UiPath

URL: <https://www.uipath.com/>

Founded in 2010, Headquarter in New York, US, UiPath is one of the leading providers of process mining solution. In 2019, UiPath acquired ProcessGold and StepShot for offering RPA and process mining capabilities. UiPath process mining solution helps businesses to visualize and understand their processes, identify process improvement opportunities, increase efficiency, and reduce operating costs. UiPath offers comprehensive process mining capabilities like process discovery, conformance checking, custom dashboarding, process monitoring, role-based access, and hyperautomation.

UiPath offers built-in extract, transform and load (ETL) capability, which extracts data directly from any IT system database and data sources like enterprise resource planning (ERP), business process management (BPM), or customer relationship management (CRM) systems. The native ETL integration can be facilitated by connecting to any database without the support of any third-party systems. It makes the implementation process quick and secure as no third-party tool is required in it. The platform allows to quickly discover the process map and BPMN process models from the event logs. It also enables an organization to compare two or more processes to find out bottlenecks and deviations. UiPath Process Mining offers a conformance checking capability that provides process comparison to evaluate business processes aligned with set KPIs.

UiPath offers a unique process mining app named AppOne, which provides an adaptable process mining experience for any process. It can load different dashboards on the basis of the available data. It allows for process mining to be made applicable to any process with a pre-built template. The users can customize the dashboard as per their business requirements. The platform ensures a single source of truth by centralizing data and dashboard management. The solution also has built-in business intelligence (BI) technology, which offer an intuitive UI with drag and drop functionality that allows organizations to enhance the end-to-end user experience. The solution provides governed self-services feature for the business users, enabling them to easily modify the dimension and matrices of each chart, save them as favorites and share them among team members.

UiPath Process Mining offers complete transparency and deep analytics to discover opportunities to streamline, automate and eliminate non-value activities. The solution can tag each process so that users can automatically track and monitor business process improvements. Users can directly manage specific KPIs, data records, fields, and dashboards based on authorized access through its roles-based user

management. Additionally, it supports exporting of data, dashboard, and process graphics into multiple file formats.

UiPath's action center automates complex processes that require exceptions and validations from humans. The action center is embedded with built-in access management and dynamic task assignment. The UiPath solution offers collaborative development and controlled deployment capabilities. It enables multiple developers to collaboratively work on one process mining data pipeline and app simultaneously using a Git-based versioning environment. The developers can track the changes and the final version, which can be released into different environments, with automatic roll-back functionality in case of failure. Being a part of the leading hyper-automation platform, the solution also allows users to transform process insights into intelligent automation, monitor impact, and trigger bots by using the end-to-end UiPath platform.

Analyst Perspectives

Following is the analysis of UiPath's capabilities in the global process mining market:

- ◆ UiPath offers a unique approach of combined process mining and RPA that facilitates organizations to understand their complex processes and determine the automation opportunities. It provides a robust technology value proposition with its native capabilities for the end-to-end hyper-automation platform, AppOne, built-in ETL, tagging, and TRACY.
- ◆ The UiPath technological differentiators include the TRACY layout engine that utilizes event logs for identifying the effective way to visualize graphs. UiPath's AppOne process mining is an out-of-the-box app used for adaptable and flexible process mining experience, as it provides centralized data and dashboard management support.
- ◆ UiPath has a significant geographical presence in Europe, North America and the Asia Pacific and Latin America region. The company holds a strong customer base, including the leading brands across industry verticals such as banking & financial services, IT & telecom, automotive, manufacturing, energy & utility, logistics, government & public sector, and healthcare & life science.
- ◆ UiPath's primary challenges include the growing competition from well-established and emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to enterprise needs and supporting more use cases. With its sophisticated technology platform and comprehensive functional capabilities, UiPath is well-positioned to expand its market share in the global process mining market.

- ◆ The future roadmap involves enhancing its process mining platform from a technological standpoint. The company plans to augment the by adding hyperautomation, time-to-insight, bundling, dynamic process mining, next-gen process mining and process mining platform capabilities. The company plans to enhance its hyper-automation feature to leverage process mining insights across UiPath's existing offerings, including Automation Hub, Robots, Action Centre, Robot Assistant, StudioX. Lastly, the company plans to offer next-gen process mining by reconciling features such as Edge Tables, Edge Bundling, Dynamic Process Mining with its TRACY technology.

Software AG

URL: <https://www.softwareag.com>

Founded in 1969 and headquartered in Darmstadt, Germany, Software AG offers business process management, enterprise integration and IoT, enterprise transaction systems, data management products, and consulting services. The company provides a process mining solution named ARIS. It enables users to gain holistic visibility into business processes to uncover possible process improvement opportunities and make informed decisions. The company offers ARIS Process Mining in three editions: ARIS Process Mining Elements, ARIS Process Mining Advanced, and ARIS Process Mining Enterprise. The platform provides comprehensive process mining capabilities like process discovery, process analysis, process improvement, process monitoring, build process mining apps, and process snapshots.

The ARIS platform offers process discovery capability that leverages the process data and automatically reconstructs the ' 'organization's real processes. It offers fact-based visibility and insights, enabling users to analyze the entire process. It also provides clarity into any deviations that occurred at each process level.

The ARIS platform's process analysis capability enables users to analyze and assess organizational processes from all aspects. It provides compelling visual components and selection options to examine process KPIs. The platform's in-built artificial intelligence capabilities discover vulnerabilities and patterns impacting the process KPIs. The built-in analysis and dashboarding capability provide deep insights that help organizations to make decisions and act accordingly. It provides a query feature to assess the organization's repository and shares KPI-related analysis through the dashboard.

The platform's improvement capability enables organizations to spot bottlenecks. It helps organizations sync the process data and deep dive into specific cases to understand the deficiencies and possible improvement process opportunities. The platform helps organizations discover optimal ways to improve processes. Users can leverage the platform to accommodate the current process design and use it as a blueprint for process implementation. Additionally, the platform enables users to focus on a specific process component through its comprehensive features such as activity selection, attribute selection, and process-flow selection

The platform offers a drill-down approach to execute root cause analysis, enabling users to improve process performance. The platform allows users to monitor the process and business KPIs. It allows users to understand both the overall and level-wise performance of each process. It also enables users to spot fluctuations in the process performance. Both help the users meet and maintain operational excellence across their organizations. The ARIS process mining elements enable organizations

to develop process mining applications with built-in components. These applications can be analyzed through an intuitive visual editor without any need for programming skills. The apps can be customized depending on 'users' requirements and desired outcomes. The Software AG platform also provides a swift process snapshot capability through the ARIS Process Mining Elements. The capability platform is embedded with the compelling visualization that enables organizations to upload the exported log files for further data assessment.

Analyst Perspectives

Following is the analysis of Software AG's capabilities in the global process mining market:

- ◆ Software AG's robust process mining solution enables organizations to identify the frequently occurring process deviations and comprehensively understand the implications on the business critical KPIs. The Software AG's 'platform's key technological differentiators include business documentation capabilities, 360-degree view, seamless integration & collaboration feature, and process mapping and reporting. Software AG has a strong global partner ecosystem to drive product and service innovation. The company offers comprehensive RPA capabilities by partnering with third-party vendors, enabling organizations to improve the automated process from API to UI level automation.
- ◆ Software AG offers out-of-the-box connectors for integrating with various enterprise-level applications. The AI-enabled process mining platform automatically helps organizations determine the root cause of process deviation through its root-cause miner. The platform enables organizations to efficiently perform multi-level process mining.
- ◆ Software AG has a significant geographical presence in North America, followed by Europe, the Middle East and Africa, Asia Pacific, and Latin America. The company holds a strong customer base, including some leading brands across industry verticals such as healthcare and pharmaceutical, manufacturing, high-tech and telecom, travel, and logistics, govt and public sector, CPG and retail, manufacturing, and banking, financial services, and insurance.
- ◆ Software 'AG's primary challenges include the growing competition from emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to enterprise needs and supporting more use cases. With its sophisticated technology platform and comprehensive functional capabilities, Software AG is well-positioned to expand its market share in the global process mining market.

Signavio

URL: <https://www.signavio.com/>

Founded in 2009 and headquartered in Berlin, Germany, Signavio was acquired by SAP in March 2021. Signavio offers SaaS-based all-in-one SAP Signavio Process Transformation Suite which helps organizations optimize their business processes and drive intelligent business transformations. Signavio offers SAP Signavio Process Intelligence, SAP Signavio Collaboration Hub, SAP Signavio Process Manager, SAP Journey Modeler and SAP Signavio Process Governance solutions as part of its process transformation suite.

SAP Signavio Process Intelligence is an intuitive process mining solution that helps organizations to comprehensively analyze their business processes. The solution provides a clear understanding of the real process execution, highlighting inefficiencies and problems hitting top and bottom line and providing a fast way to discover root causes and triggering process improvements for the whole company.

It offers native connectivity capabilities including API, standard connectors and ETL capabilities, as well as process and variant discovery, graphical process conformance, a metrics library, collaborative analysis consumption, journey to process analytics, process simulation and task mining (via integration with FortressIQ). As part of the whole SAP Signavio Process Transformation Suite customers also profit from process modeling, journey modeling, process comparison, operational live insights, and actionable insights capabilities with customizable workflows.

SAP Signavio Process Intelligence supports data onboarding through several data sources and IT systems. The platform allows business users to execute file uploading and column mapping through flat-file upload and REST API. The platform provides a wide range of built-in connectors to directly connect with various data sources seamlessly. To reduce time to insight it makes use of out-of-the-box functionalities such as standard ETL connectors, templated transformations, and metrics for the most common business processes.

The metrics library contains templated metrics and KPIs for common processes and creates a knowledge hub for customers where they can select process-specific and process-agnostic metrics, and by utilizing these, users can start a process mining initiative. The solution's automated process discovery capability provides users with visibility and understanding of actual business operations and processes. It applies advanced process mining algorithms to offer a clear understanding of process variants in end-to-end business processes and also provides graphical process representation from the happy path to the full spaghetti view to better understand existing process variants.

SAP Signavio Process Intelligence, as part of the whole SAP Signavio Process Transformation Suite, is integrated to the SAP Signavio Collaboration Hub, which allows teams and decision-makers to collaborate and share process related information, insights, and actions in one single collaborative environment for the whole organization, providing complete transparency.

The integration with SAP Signavio Process Manager provides process modeling capabilities with multiple notations. It supports modeling conventions check, previews, revisions management, and risk & controls. The solution is equipped with operational live insights that enable users to access full process analyses and selected widgets, as well as journey models which merge process and experience data.

Journey modeling capabilities are available with SAP Signavio Journey Modeler, enabling the connection of operations, experiences, and customer journeys. Journey to process analytics, supported by SAP Signavio Process Intelligence, connects the experience and operations data to understand, improve and transform the customer, employee or supplier experience and eliminates the risk of implementing siloed experience and process excellence initiatives.

SAP Signavio Process Intelligence offers intuitive and customizable dashboards to track down relevant information about the overall business process and workflows and process investigations with integrated analytics. The solution also translates insights into actionable plans by creating customizable governance workflows with SAP Signavio Process Governance. Process comparison helps users to compare different process models and allows them to highlight variations and changes in the process. Additionally, the solution provides Signavio Analytics Language (SiGNAL), a querying framework to build tailored process-centric views using built-in formulas, which allows customers to perform faster calculations, and accelerate business outcomes.

The process simulation capabilities allow users to simulate their process models by leveraging pre-defined scenarios and understanding implications on cost, resources, and time. SAP Signavio Process Intelligence also offers task mining capabilities with the integration of FortressIQ. This integration enables the combination of process-level analysis with task-level information recorded directly from user screens.

Analyst Perspectives

Following is the analysis of Signavio's capabilities in the global process mining market:

- ◆ Signavio enables organizations to curate customized processes as per their specifications for automating their workflow processes. Its single-vendor solution approach with integrated discovery, modeling, analysis, and monitoring capabilities helps users seamlessly manage their complex processes across the organization.

- ◆ The platform's technological differentiators include operationalizing customer experience by enabling organizations to incorporate the outside-in perspective of customers to the analysis of internal business process activities. It helps users to find inefficiencies and customer pain points across all customer touchpoints and journeys by mining internal business process operations and external customer journeys. By employing the experience-driven process mining capabilities, users may transform, optimize, and construct an integrated customer experience with actionable insights and recommendations.
- ◆ Operational Live Insights enables users to better understand and correlate activities and event sequences by merging system data with modeling aspects of processes. This allows users to quickly uncover the truth about how processes are functioning. With the help of Live Insights, users can add dynamic elements to their models that inform, guide, and warn about problems in real-time.
- ◆ This real-time business intelligence establishes end-to-end process orientation, allowing organizations to immediately identify processes and improvement opportunities while also increasing transparency. The simulation capability uses RPA to enable users to conduct "what-if" scenarios. SAP Signavio Process Intelligence allows users to approach process analysis and gain important insights without requiring deep analytical knowledge.
- ◆ In terms of geographical presence, Signavio has a significant presence in Europe, followed by the USA, Asia Pacific, Canada, the Middle East & Africa, and Latin America. The company holds a strong customer base including some of the leading brands across industry verticals such as banking & financial services, IT & telecom, retail & e-commerce, manufacturing, government & public sectors, energy & utilities, travel & hospitality, healthcare & life sciences, media & entertainment, and education.
- ◆ Signavio's process mining solution caters to a variety of use cases, including S/4HANA transformation, customer excellence, operational excellence, automation-driven transformation (via RPA, low code, and workflow), audit & compliance, and process improvement for single processes.
- ◆ The primary challenges for Signavio include competition from relatively well-established vendors as well as emerging process mining vendors. The company may also face challenges in executing its market growth strategies to expand in the rapidly growing markets of North America and the Asia Pacific region. However, with its sophisticated technology platform, advanced analytics, strong customer value proposition, and comprehensive roadmap and vision, Signavio is well-positioned to expand its share in the global process mining market. Signavio's strategic roadmap for the next few years includes

investments to improve the process mining capabilities of its Process Intelligence platform.

IBM

URL: <https://www.ibm.com/cloud/cloud-pak-for-business-automation/process-mining>

Founded in 1911 and headquartered in Armonk, New York, IBM is a leading provider of hardware, software, infrastructure, and hosting services. IBM offers a range of products and solutions in the fields/domains of artificial intelligence (AI), blockchain, business operations, cloud computing, data & analytics, hybrid cloud, IT infrastructure, security, and supply chain. The key features and functionalities offered by the IBM process mining platform include process discovery, advanced analytics, business process analysis (BPA), conformance checking, activity map and social network analysis (SNA), business processes, process animation, automation insights, predictive analytics, simulation engine, task mining, rules miner and root cause analysis, continuous process monitoring and RPA integration.

With the process discovery feature, users get a holistic view of the processes. It presents frequency, fit, reworks, automation level, performances, costs, KPI alignment, main variants, roles, and resources. It also offers a point-and-click interface that allows the user to interact with the model. Advanced analytics feature enables users to create advanced dashboards and monitor process mining-specific actions, contextual data correlations, and dependencies using no-code or low-code SQL-like queries.

BPA allows users to define company landscapes and use them as reference models for process mining analysis with simulation and conformance checks. It is the process repository that stores the process change history. It serves as a link between the model and the digital twin's process information (business rules, activities, and expenses) and business process reengineering directives. The process mining platform offers a conformance checking feature, allows organizations to integrate manual activities, run simulations and what-if analysis, and compare the generated process with the reference model to detect non-conformances, deviations, and root cause analysis.

The feature activity map and SNA are the vital tools used for analyzing the strengths, weaknesses, risks, and compliance of an organization. With the help of these features, the users can recognize key resources, check segregation of duties and behavioral risks. The activity map enables users to view the suitable resource, examines the role involved in the activities, and performs in-depth analysis on the specific resources. The SNA tools are used to identify and analyze the relationships formed within a process.

Process animation allows users to replay the process behavior. It visually represents the path followed by each instance, highlighting bottlenecks and KPI alignments. The automation insights capability helps users identify the automation opportunities in the

processes. The platform offers predictive analytics on running processes and extends its predictive capabilities by implementing ML platform through embedding several predictive models. Further, the simulation engine feature allows users to examine the impact and ROI of a model.

IBM process mining platform provides useful information on the business processes that are most likely to give the best results when automated. It allows users to map several derived processes into a single comprehensive model. Additionally, it delivers end-to-end visibility into complicated multi-level processes. The business rules miner and root cause analysis feature help users to derive decision rules from the data and adds them directly to the business process model and notation (BPMN) model and decision model and notation (DMN) tables.

The interconnected task mining feature records the interaction of the user by installing agents on the user machine. These agents record all the screen activity of the user and simultaneously collect the screen information. This allows organizations to view business processes from both, business level and the task level. The continuous process monitoring feature allows to monitor KPIs and user-specified behaviors. The RPA integration feature allows users to analyze and identify activities used for enhancing the end-to-end processes.

Analyst Perspectives

Following is the analysis of IBM's capabilities in the global process mining market:

- ◆ IBM provides a cloud platform for its variety of products. IBM process mining provides a set of integrated software that helps organizations to automate operational processes. Some of the differentiators for IBM's process mining capability include simulation of future processes, uncovering clear root causes, multi-level process mining, task-mining, and RPA automatic assessment. IBM process mining offers a simulation engine which can be used to perform a what-if-analysis to evaluate the improvements in terms of lead time and cost, generated by resource allocation, task robotization, and step elimination. This stimulation engine helps the organization to examine the data that can be imported into the IBM process mining platform through utilizing the simulated data and by comparing it directly with the observed data. The simulation engine is used to verify the impact of automation on the overall process.
- ◆ The multi-level process mining provides the modeling for both flat-and multi-level processes. The task mining capability allows the organization to record the user interactions by installing an agent on the desktop/machine of the user. This agent records the actions (click, keystrokes, applications) and collect application screenshots and data. This collected data is then combined

with process mining to provide insights on business and task-level views of the business processes. The RPA candidates feature combines process mining, task mining, business rules, and simulation to automatically assess the activities, task candidates, and expected ROI.

- ◆ IBM has a significant geographical presence in European Union, the USA, and APAC. The company holds a strong customer base including, the leading brands across industry verticals such as banking & financial services, energy & utilities, retail & e-commerce, healthcare & lifesciences, automotive, manufacturing, and IT & telecom.
- ◆ The use cases for IBM's process mining include procure-to-pay, order-to-cash, back-office operations, IT system ticketing, customer care, and after-sales operations. These use cases help organizations to standardize the banking-related back-office processes and automatically analyzes P2P & O2C for SAP and Oracle EBS.
- ◆ IBM's primary challenges include the growing competition from well-established and emerging vendors. The company may focus on catering to mid-market to small enterprise needs and supporting more use cases. With its sophisticated technology platform and comprehensive functional capabilities, IBM is well-positioned to expand its market share in the global process mining market, in the near future.
- ◆ IBM's strategic roadmap for the next few years includes continuous investment in technology, namely AI, ML, and RPA, for enhancing its existing process mining capability. The company is also looking at delivering third-party accelerators. The company is also enhancing its insights into action capability, which will automatically identify and execute the actions needed for ensuring process compliance and KPI alignment. IBM also plans to deliver AI-powered automation to identify the automation skills that can be used.
- ◆ IBM is also focusing on improving its drag & drop query-by-example (QBE) for AI-driven data ingestion, migration tools for intelligent automation, automated process improvement, and virtual process advisor/assistant. Lastly, IBM plans to deliver an extended digital twin of an organization (DTO) that moves from process analysis to a organizational holistic analysis. This will not only help the organization to automate and improve at a single process level as well as at the organization level to drive the strategic transformations.

Minit

URL: <https://www.minit.io/>

Founded in 2013 and headquartered in Amsterdam, Netherlands, Minit is one of the leading providers of process mining solutions. The company offers Minit Analyst and Minit Business products for process mining. Minit offers robust functionality combined with the best-in-class user experience democratizing process mining for every business user eager to understand their processes, automate and continuously improve them. The features and functionalities offered by Minit for process mining include variant analysis, compliance checking and gap analysis, AI-powered root cause analysis, custom metrics, business rules monitoring, hierarchical process mining, simulations, rework analysis, filtering capabilities, collaboration, dashboards, and social chart.

The platform offers variant analysis to highlight variants in the process map and variant DNA for process standardization analysis. The compliance checking and gap analysis help users visualize multi-layered process comparison on different process map views and detailed comparison on activity and edge level. Additionally, the root cause analysis capability of the platform helps in identifying what causes problems in the processes and why are they happening.

Business rules monitoring (BR) enables users to define and evaluate different process compliance issues as well as get notifications. BR helps users to continuously monitor processes in the enterprise. In simple terms, BR can be defined as KPIs or a combination of different attribute criteria, process behavior, and KPI values more complex.

Hierarchical Process Mining of Minit is a patent-pending technology. This capability helps analyze complex processes at various hierarchical levels, including value chain-process-subprocess mining, organizational structure mining, user interface interaction recording, bot execution monitoring for end-to-end process overview, and bottleneck shift identification. Users can focus on all essential portions of processes using the drill-down capability in combination with aggregated analytics.

The simulation module of the platform enables users to modify the analyze process model, its configuration and depict a parallel process reality. By this, they will be able to examine all the what-if questions and scenarios. Users can validate improvement ideas generated by process mining analysis before they are implemented. It enables them to save expenses while also lowering the chance of failure.

The platform is equipped with a real-time intuitive dashboard that provides process mining insights to the users under a single window. The dashboard is powered by Minit process mining capabilities complemented with BI analytics by Qlik's Sense, it

offers built-in drill-down capabilities that compare two or more processes and gain insights into complex datasets. Its simple dashboard design allows users to depict information through charts, graphs, process variants, and map. It will enable users to selectively focus on a specific issue to identify the root cause. Users can easily customize the dashboard through the drag and drop method.

The rework analysis helps organizations to understand the amount of rework needed within the same or multiple activities. It quickly identifies starting and ending activities flow, it allows the user figure out the repeated activities initiation point. In addition, rework analysis provides complete process transparency by providing a single source of truth and effectively improving the process performance.

Analyst Perspectives

Following is the analysis of Minit's capabilities in the global process mining market:

- ◆ Minit process mining platform helps organizations enhance their operational efficiencies by underlining process improvement opportunities and determining their root cause. Minit offers a robust technology value proposition with comprehensive capabilities for intuitive interface, hierarchical process mining, business rules monitoring, Minit dashboards, rework analysis, and simulations module. The company also offers an advanced dashboard to leverage process mining visualization and analytics capabilities for context-aware recommendations.
- ◆ The platform's technological differentiators include AI-based Root Cause Analysis, advanced dashboards, Hierarchical Process Mining as a patent-pending technology, and Business Rules Monitoring . The AI-based Root Cause Analysis helps organizations with an automatic evaluation of possible bottleneck root causes based on available data using machine learning algorithms with the possibility to drill down to detailed metrics and statistics and the ability to analyze further by automatic filter application.
- ◆ Minit Dashboards combine powerful interactive dashboarding with process mining visualization and analytics capabilities. Powered by the top Minit process mining engine with the top BI computational engine created by Qlik, Minit Dashboards allow users to create interactive dashboards with built-in drill-down capabilities, providing them with flexibility up to the level of self-service process intelligence. Additionally, users can combine inter-connected visualization both from process mining and business intelligence.
- ◆ Minit analyzes complex processes based on different hierarchical levels, such as value chain-process-subprocess mining, organizational structure mining, UI interaction recording, bot execution monitoring for end-to-end process

overview, and bottleneck shift identification. The drill-down feature combined with aggregated metrics helps users focus on all the relevant parts of processes. Additionally, business rules monitoring (BR) allow organizations to define, evaluate, and get notified about different process compliance issues. BR can be defined as simple KPIs but also on a more complex level – as a combination of varying attribute criteria, process behavior, and KPI values.

- ◆ Minit has a significant geographical presence in Europe, the Americas, Middle East & Africa, and the Asia Pacific. The company holds a strong customer base including the leading brands across industry verticals such as manufacturing, IT & telecom, retail & e-commerce, energy & utilities, banking & financial services, govt & public sectors, healthcare & life sciences, travel & hospitality, education, and media & entertainment.
- ◆ Minit's process mining platform caters to various use cases, including Procure2Pay, Order2Cash, Order2Activation, Process Audit, Service management, and RPA. Primary challenges include the growing competition from well-established and emerging vendors. With its sophisticated technology platform and comprehensive functional capabilities and offerings, Minit is poised to expand its market share in the global process mining market.
- ◆ The future roadmap involves actionable business alerts, AI-powered simulations, releasing in December 2021 and AI-powered predictive analytics releasing in 2022. The actionable business alerts will automatically inform organizations on what is happening in the business process and react to deviations by triggering corrective actions. The AI-powered simulations will learn from the past and automatically adjust how they simulate the alternative future as precisely as possible. Additionally, AI-powered predictive analytics will predict outcomes and KPIs and proactively minimize negative impact.

ABBYY

URL: <https://www.abbyy.com/>

Founded in 1989 and headquartered in Milpitas, California, US. ABBYY is a digital intelligence company. It aims to drive digital transformation within organizations by enabling users to understand and control business processes and the data that drives them. The company offers digital intelligence solutions to the users for visualizing and getting a complete understanding of business processes that help them to rapidly grow. automating the customer experience and increasing operational productivity. ABBYY offers a process mining platform named ABBYY Timeline.

ABBYY Timeline is a process intelligence platform with advanced task and process mining technology. It uses artificial intelligence (AI) that enables organizations to create an interactive digital twin for their processes, evaluate them in real-time to find bottlenecks, and help them to predict future results. The platform integrates deep-rooted analysis, predictive classification, and search capabilities with granular monitoring and alerts.

ABBYY Timeline offers task mining, desktop recording, and desktop analysis capability where users can analyze desktop user interaction. These user interactions can be linked with process data for connecting the dots between people, processes, and content. It offers a single location to users to visualize and evaluate all the end-to-end business processes.

Analyst Perspectives

Following is the analysis of ABBYY's capabilities in the global process mining market:

- ◆ ABBYY Timeline allows organizations to improve operational efficiency, customer experience by utilizing its task mining capabilities, where it analyzes desktop user interaction data and links this data with the process details mined from system event data.
- ◆ ABBYY has a significant geographical presence in Europe, North America, Asia Pacific, Latin America, the Middle East, and Africa. The company holds a strong customer base, including the leading brands across industry verticals such as banking & financial services, govt & public sectors, transportation and logistics, life sciences & healthcare, manufacturing, and IT & telecom.
- ◆ Top use cases for ABBYY in process mining include robotic process automation (RPA) to identify, design, implement and monitor RPA initiatives, banking, and financial services healthcare for improving patient experience, and optimizing multiple connected steps in the claims cycle in insurance.

- ◆ ABBYY's primary challenges include the growing competition from well-established and emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to enterprise needs and supporting more use cases. With its sophisticated technology platform and comprehensive functional capabilities, ABBYY is well-positioned to expand its market share in the global process mining market in the near future. ABBYY's strategic roadmap for the next few years includes continuous investment in emerging technologies and enhancing its existing process mining capabilities.

QPR Software

URL: <https://www.qpr.com/>

Founded in 1991 and headquartered in Finland, QPR Software Plc offers robust solutions for strategy execution, performance and process management, process mining, and enterprise architecture. QPR's product portfolio includes QPR ProcessAnalyzer, QPR EnterpriseArchitect, QPR Metrics, QPR ProcessDesigner, QPR Connectors, and QPR Cloud. QPR ProcessAnalyzer, a process mining solution that enables users to easily connect to all data sources using a broad range of connectors and combine sourced data to build valuable process, and mining models. The solution offers comprehensive capabilities including discovering, investigating, measuring, and orchestrating.

QPR ProcessAnalyzer offers automated process discovery capability that helps organizations to gather data from various data sources and discover the current state of processes. The platform's investigation feature runs automated root cause analysis that enables process benchmarking to identify root causes regarding process flow. This feature enables users to develop custom analysis with a no-code analysis wizard. Additionally, the platform offers a drill-down approach that allows users to focus on specific issues and identify the root cause.

The platform's measure capability evaluates business performance by utilizing intuitive dynamic dashboards for process analysis. This helps users to clearly understand process issues through various custom charts and filtering options to make better decisions for improving process performance. The platform provides a wide variety of customizable chart pre-sets which are applicable for various use cases. It also offers flowchart and duration analysis that help organizations to analyze processes. The analysis provides a dynamic visualization of repetitive steps, process loops, path deviations, path flows, durations, and cost of each step in the process. This helps the organization to drill down to the issue and identify long-lead time, reworks, delays, and bottlenecks in specific processes.

Analyst Perspectives

Following is the analysis of QPR Software's capabilities in the global process mining market:

- ◆ The QPR ProcessAnalyzer helps organizations to find deviations and automate the entire business process or parts of the business process. QPR offers a robust technology proposition with comprehensive process mining capabilities for AI-powered out-of-the-box process mining analyses, clustering analysis and process predictions, advanced and ready-to-use root cause analysis, case

attributes, conformance checking dashboard to identify root causes, root causes for long lead times, and root causes for process changes.

- ◆ QPR ProcessAnalyzer offers access to a wide range of pre-built packaged connectors for a variety of industry-specific source systems. The solutions are equipped with a robust user administration and user interface that helps individuals with varying skill levels to seamlessly execute specific business activities.
- ◆ Some of the key differentiators of QPR's process mining solution include its no-code wizard that allows users to analyze and modify wizard expressions on code-level, next-gen process mining via predict & act capability, ability to operate on top of any data lakes and databases including AWS Redshift and Snowflake, and comprehensive set of out-of-the-box analysis including unique 'one click' root cause analysis.
- ◆ In terms of geographical presence, QPR Software has a significant presence in the European region. The company holds a strong customer base including some of the leading brands across industry verticals such as manufacturing, IT & telecom, healthcare & life sciences, banking & financial services, energy & utilities, media & entertainment, retail & e-commerce, govt & public sectors, education, and travel & hospitality.
- ◆ QPR's platform supports various use cases such as process improvement, process automation, process monitoring, digital transformation, IT support, and auditing & compliance. QPR Software's strategic roadmap for the next few years includes continuous investment in emerging technologies and enhancing its existing capabilities. During 2022, the vendor is planning to extend QPR ProcessAnalyzer's capabilities by task mining functionality.
- ◆ QPR Software's primary challenges include the growing competition from emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to mid-market to small enterprise needs and supporting more use cases to accelerate its growth beyond the European Union region. With its sophisticated technology platform and comprehensive functional capabilities, QPR Software is well-positioned to expand its share in the global process mining market.

MEHRWERK GmbH

URL: <https://mpm-processmining.com/en/enterprise-performance-intelligence/>

Founded in 2008 and headquartered in Karlsruhe, Germany, MEHRWERK offers a process mining solution called MEHRWERK Process Mining (MPM). MPM is based on the Qlik Sense platform, equipped with comprehensive analytics and data governance for data-driven process optimization. The robust MPM platform is defined as the association of intuitive self-service BI with lean process mining algorithms.

MEHRWERK offers low code/no-code app configuration and deployment that enables users, even non-technical users, to deploy their process mining analysis application. As well MEHRWERK offers in standard a seamlessly integrated low code/no code Automation Platform called Application Automation. Within their MPM eXecution framework MEHRWERK offers off the shelf automations for Alerting/Notification and external triggering of actions into 3rd party tools. Such as for example SAP, Jira, Salesforce, Microsoft Stack, etc. The unique template approach of the process mining platform allows users to receive valuable insights for every type of process. The platform offers a combination of process mining with data governance that helps users to create visualizations through validated master elements (dimensions, fields, KPIs, and PPIs) in a governed environment to ensure correct dashboards.

The object-centric process mining feature enables users to untangle processes into single process objects which allows more detailed and realistic insights into the process as it solves the m x n connection problem. Simple example: One order holds several line items and is shipped within more than one package. Only with OCPM this can be visualized correctly. Within the “normal” approach you will have to deal with duplications. The platform also offers seamless integration of Task Mining Log information into the EventLog information. For executing the root cause analysis and process predictions, the platform is well integrated with machine learning platforms such as Python, R, DataRobot, Big Squid, and Hugging Face. Additionally, it offers integration with business process model and notation (BPMN) tools. It supports more than 250+ connectors.

Analyst Perspectives

Following is the analysis of MEHRWERK GmbH’s capabilities in the global process mining market:

- ◆ MEHRWERK’s process mining solution leverages the self-service business intelligence capabilities of the Qlik platform for comprehensive process visualization. It is embedded with native in-memory technology that provides visibility of all business-related data and processes. Some of the key

differentiators of MEHRWERK GmbH are customizability, self-service process mining, data governance, security concept, scalability, customer-specific deployment method, seamless integration with existing business intelligence, no-code/low-code IPaaS platform, object centric process mining, and associative analytics beyond pre-defined cube data structures enables intuitive analysis for the end users.

- ◆ MEHRWERK GmbH has a significant geographical presence in Europe, followed by the USA, the Middle East & Africa, and Asia Pacific. The company holds a strong customer base including some of the leading brands across industry verticals such as manufacturing, energy & utilities, automotive, electronics & semiconductor, logistics & transportation, insurance, healthcare & life sciences, IT & telecom, retail & eCommerce, banking & financial services, media & entertainment, and travel & hospitality.
- ◆ The top use cases of MEHRWERK GmbH in process mining include value stream mapping analysis in logistics process by utilizing big data to improve shop floor performance, activation of process intelligence to trigger actions automatically to back-end-systems, immediate DSO reduction and detection of late invoices in O2C, analysis of IoT data for human to machine interaction to improve the product engineering process, and auditing & fraud detection in purchase to pay process.
- ◆ MEHRWERK GmbH's key challenges include the growing competition from emerging vendors with innovative technology offerings. These vendors are successful in gaining a strong market position with increased penetration amongst small to mid-market enterprises and are among the primary targets for mergers and acquisitions. However, MEHRWERK GmbH, with its comprehensive functional capabilities, compelling customer references, and robust customer value proposition, is well-positioned to maintain and grow its market share.
- ◆ MEHRWERK GmbH's strategic roadmap for the next few years includes continuous investment in technology, artificial intelligence, machine learning, and robotic process automation to further automate and advance its process mining capability. The company also focuses on seamlessly integrated no code/low code automated machine learning platform, extended no code/low code business content, and object-centric process mining (OCPM) templates.

Process Analytics Factory (PAFnow)

URL: <https://pafnow.com/>

Founded in 2014 and headquartered in Darmstadt, Hessen, Process Analytics Factory is a provider of process mining solutions. The company's PAFnow solution is built on the Microsoft Power BI and has tight integration with Microsoft's Power Platform. This integration allows users to leverage Microsoft Power Automate and the Power Platform for process optimization and automation. The PAFnow process mining solution provides various features and functionalities include advanced process discovery, auto conformance check, artificial intelligence & machine learning (AI & ML), security & compliance, prebuilt intelligence, and corrective action enablement.

PAFnow is equipped with Power BI-specific process mining algorithms as well as 11 process mining-specific custom , including FlowChart, DocumentFlow, Swimlanes, and CaseViewer inside Power BI to provide a process-centric view of data. Users can also utilize the Power BI visualization capabilities such as basic bar or doughnut charts, maps, matrices, ribbon charts, scatter and bubble charts, Q&A visuals or even R script visuals, Python visuals, or box plot visuals for a visual representation of statistical summaries of datasets.

PAFnow auto conformance check eliminates the need of importing and manually adjusting complex Business Process Model and Notation (BPMN) process model as an input. The data-driven conformance check provides users with a ready-to-use target model as well as conformance scores. PAFnow utilizes AI & ML technologies to execute predictive analytics and help users identify and highlight any KPI breaches. Additionally, users can use Azure ML, Sentiment Analysis, AI Visualizations, Python Integration, Explore predictions, Key Phrase extraction, Natural language, and a variety of other ML languages to reduce time to insights.

Analyst Perspectives

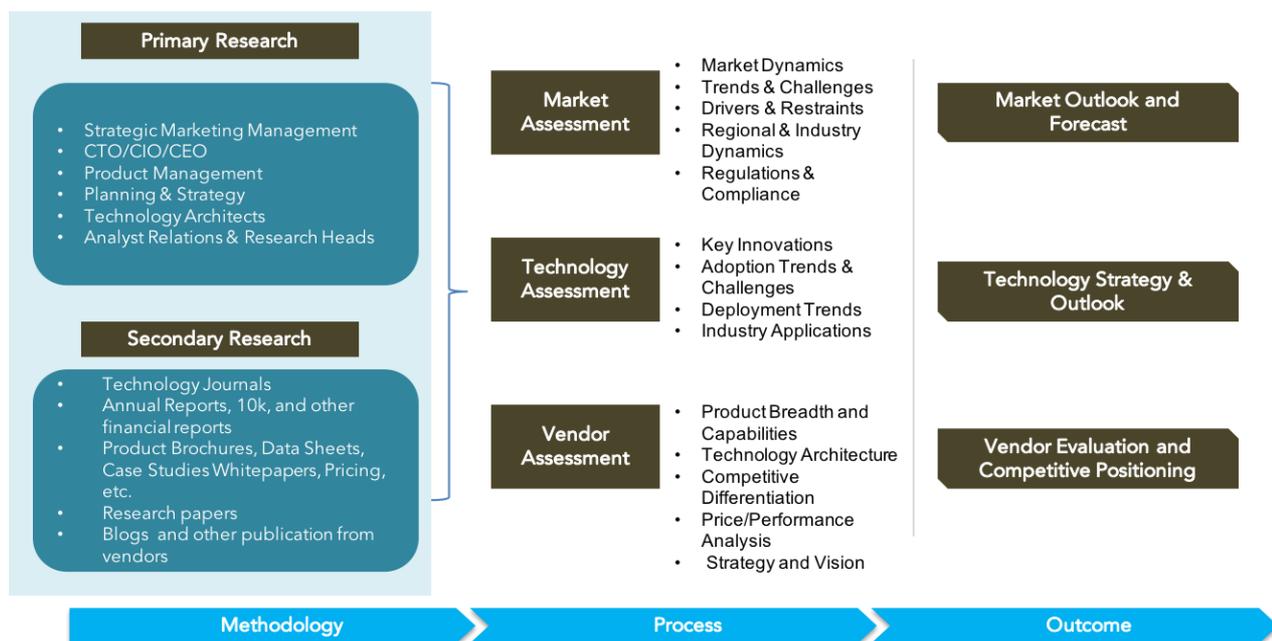
Following is the analysis of PAFnow's capabilities in the global process mining market:

- ◆ Process Analytics Factory is empowering its clients by Process Mining. The company is focusing on making data-intensive tasks simpler, humane, efficient, and up to date. The solution's technological differentiators include integration of Power BI, integration of process mining capabilities inside existing Power BI dashboards & reports, faster ramp-up and rapid deployment of the process mining solution, interoperability & continuous integration that eliminates the need of sharing data across different platforms and lower TCO where PAFnow can be deployed inside Microsoft Power Platform.

- ◆ Process Analytics Factory has a significant geographical presence in Europe, followed by the U.S., Middle East & Africa, Asia Pacific, Canada, and Latin America. The company holds a strong customer base, including some of the leading brands across industry verticals such as manufacturing, education, energy & utilities, banking & financial services, travel & hospitality, retail & eCommerce, and media & entertainment.
- ◆ Process Analytics Factory's process mining solution caters to a variety of use cases, including Purchase-to-Pay content packs for specific process systems combinations such as P2P on SAP, INFOR, Microsoft Dynamics, and Coupa. Order-to-Cash content pack, audit edition that can focus on a specific department, and Operational Excellence (OPEX).
- ◆ Process Analytics Factory's primary challenges include the growing competition from well-established and emerging vendors offering integrated or complementary process mining capabilities. The company may focus on catering to mid-market to small enterprise needs and supporting more use cases to accelerate its growth beyond the European Union region. With its sophisticated technology platform and comprehensive functional capabilities, Process Analytics Factory is well-positioned to expand its market share in the global process mining market. Process Analytics Factory's future roadmap involves focusing on the next generation of process mining by utilizing PAF.ai

Research Methodologies

Quadrant Knowledge Solutions uses a comprehensive approach to conduct global market outlook research for various technologies. Quadrant's research approach provides our analysts with the most effective framework to identify market and technology trends and helps in formulating meaningful growth strategies for our clients. All the sections of our research report are prepared with a considerable amount of time and thought process before moving on to the next step. Following is a brief description of the major sections of our research methodologies.



Secondary Research

Following are the major sources of information for conducting secondary research:

Quadrant's Internal Database

Quadrant Knowledge Solutions maintains a proprietary database in several technology marketplaces. This database provides our analyst with an adequate foundation to kick-start the research project. This database includes information from the following sources:

- Annual reports and other financial reports
- Industry participant lists
- Published secondary data on companies and their products
- Database of market sizes and forecast data for different market segments
- Major market and technology trends

Literature Research

Quadrant Knowledge Solutions leverages on several magazine subscriptions and other publications that cover a wide range of subjects related to technology research. We also use the extensive library of directories and Journals on various technology domains. Our analysts use blog posts, whitepapers, case studies, and other literature published by major technology vendors, online experts, and industry news publications.

Inputs from Industry Participants

Quadrant analysts collect relevant documents such as whitepaper, brochures, case studies, price lists, datasheet, and other reports from all major industry participants.

Primary Research

Quadrant analysts use a two-step process for conducting primary research that helps us in capturing meaningful and most accurate market information. Below is the two-step process of our primary research:

Market Estimation: Based on the top-down and bottom-up approach, our analyst analyses all industry participants to estimate their business in the technology market for various market segments. We also seek information and verification of client business performance as part of our primary research interviews or through a detailed market questionnaire. The Quadrant research team conducts a detailed analysis of the comments and inputs provided by the industry participants.

Client Interview: Quadrant analyst team conducts a detailed telephonic interview of all major industry participants to get their perspectives of the current and future market dynamics. Our analyst also gets their first-hand experience with the vendor's product demo to understand their technology capabilities, user experience, product features, and other aspects. Based on the requirements, Quadrant analysts interview with more than one person from each of the market participants to verify the accuracy of the information provided. We typically engage with client personnel in one of the following functions:

- Strategic Marketing Management
- Product Management
- Product Planning
- Planning & Strategy

Feedback from Channel Partners and End Users

Quadrant research team researches with various sales channel partners, including distributors, system integrators, and consultants to understand the detailed perspective of the market. Our analysts also get feedback from end-users from multiple industries and geographical regions to understand key issues, technology trends, and supplier capabilities in the technology market.

Data Analysis: Market Forecast & Competition Analysis

Quadrant's analysts' team gathers all the necessary information from secondary research and primary research to a computer database. These databases are then analyzed, verified, and cross-tabulated in numerous ways to get the right picture of the overall market and its segments. After analyzing all the market data, industry trends, market trends, technology trends, and key issues, we prepare preliminary market forecasts. This preliminary market forecast is tested against several market scenarios, economic scenario, industry trends, and economic dynamics. Finally, the analyst team arrives at the most accurate forecast scenario for the overall market and its segments.

In addition to market forecasts, our team conducts a detailed review of industry participants to prepare competitive landscape and market positioning analysis for the overall market as well as for various market segments.

SPARK Matrix: Strategic Performance Assessment and Ranking

Quadrant Knowledge Solutions' SPARK Matrix provides a snapshot of the market positioning of the key market participants. SPARK Matrix representation provides a visual representation of market participants and provides strategic insights on how each supplier ranks in comparison to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact.

Final Report Preparation

After finalization of market analysis and forecasts, our analyst prepares necessary graphs, charts, and table to get further insights and preparation of the final research report. Our final research report includes information including market forecast; competitive analysis; major market & technology trends; market drivers; vendor profiles, and such others.