

Process Mining:

A DATABASE OF APPLICATIONS

2020 Edition



HSPI Management Consulting

BOLOGNA | ROME | MILAN

Process Mining: A Database of Applications 2020

Acknowledgements

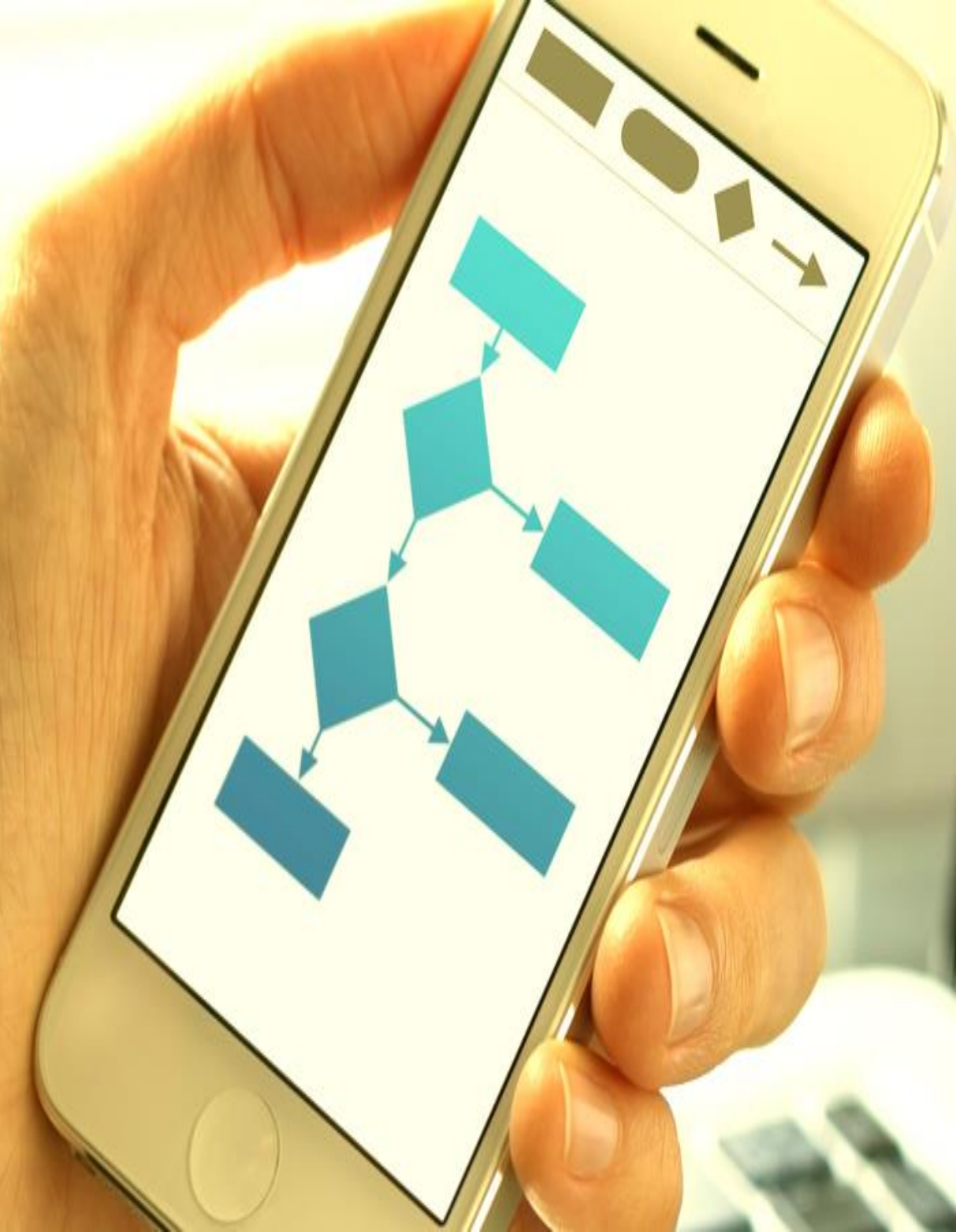
The idea of creating the present database of applications came up within HSPI in 2016, during an informal meeting about process mining technology and its spread over several business – and not only – situations.

The *need to collect, to put into an ordered system* all the historical information about process mining techniques implementations has led the creation of the very first version of "Process Mining: A Database of Applications".

Thanks to all the Firms, the Universities and Institutions, managers, consultants and the researchers involved.

Index

Acknowledgements	I
Index	II
Introduction	1
Our Purpose	2
Scope of the Study	3
Definition and Parameters	5
Process Application	7
Infographics	103
Remarks	109



Introduction

The basic idea of process mining is to **extract knowledge from event logs** recorded by an information system. Until recently, the information stored into these event logs were rarely used to analyse the underlying processes. Process mining aims at improving the control over business processes by providing techniques and tools for discovering performance, organizational and social, information from event logs.

There are three classes of **process mining techniques**. This classification is based on whether there is a prior model and, if so, how the prior model is used during process mining.

- **Discovery:** Previous models do not exist. Based on an event log, a new model is constructed or discovered based on low-level events.
- **Conformance checking:** Used when there is an a priori model. The existing model is compared with the process event logs and discrepancies between the log and the model are analysed.
- **Enhancement:** Used when there is an a priori model. The model is extended with a new aspect or perspective, so that the goal is not to check conformance, but rather to improve the existing model.

Our Purpose

The reason for carrying out this research is to create the most complete **list of all the adoptions of process mining techniques** and to collect, directly from who has been involved, basic information about the utilization of this methodology.

The purpose of the study is to create a database of practical cases, no matter the specific industries and the final results, with the only aim of *completeness* and *validity*.

The intended audience includes all those **researchers, data scientists, managers and firms that are willing to implement process mining solutions** or simply **explore business potentials of process mining** in improving business processes or in developing new performance management practices based on real data, extracted from IT systems.

Therefore, the final goal of this knowledge endeavour remains the same of the first edition, which is to contribute to **build awareness and confidence about process mining methods**.

Please note that HSPI Management Consulting is a **vendor-independent** public company.

Scope of the Study

The cases collected and listed come from companies which operate **in very different industries and markets**. Specifically, the present industry categories have been identified:

- Basic Materials
- Consumer Goods
- Consumer Services
- E-learning
- Financials
- Healthcare
- Industrials
- Public
- Services
- Technology
- Telecommunications
- Utilities

The Industries are then divided among several *sectors* that allow to obtain a further level of categorization of the process mining case studies considered. More in depth, the industries are composed by the following sectors:

- Banking
- Insurance
- Chemicals
- Forestry & Paper
- Food & Beverage
- Manufacturing
- Public Administration & Government Bodies
- Education
- Utilities
- Professional Services
- Industry Services
- Retail & E-Commerce
- Wholesale

The firms analysed do their businesses in many countries, each characterized by **significant differences and unique aspects in terms of competitive scenarios, political, legal and tax environments**. So far, the most frequent countries are:

- Australia
- Belgium
- Canada
- Denmark
- Finland
- Germany
- Italy
- Netherlands
- South Korea
- USA

Definition and Parameters

The database consists of some mandatory features (Industry, Organization, Internal Process, Description, Date, Partner) which characterize each of the projects collected.

- 1) "**Industry**" refers to the specific industry in which the company operates;
- 2) "**Sector**" is a sub classification of industry. In particular, it is a category defined by the kind of product or service produced;
- 3) "**Company**" indicates the name of the firm where process mining techniques were adopted in a project;
- 4) "**Process**" is the specific process - or group of activities - in which process mining was used;
- 5) "**Description**" contains a brief overview of the project: the context, objectives and results (if present);
- 6) "**Year**" / "**Hypotetical Year**" indicates the year in which the project was conducted or the hypothetical year. If not present, the date was assumed to be the same of the working paper or the conference in which the cases were described the first time;
- 7) "**Partner**" refers to the institution (university, firm) or the resource (researcher, scientist) that has supported the organization during the project.

The evaluation of sources of information is an important step in any research activity. All the elements collected have been validated by **HSPI Process Mining Laboratory** taking into account all the working papers, conference acts and relevant evidences and/or via mail and conference calls with the contacts directly involved into the process mining applications listed.

If you are a Company, a University, or a researcher and you want to report a new application of process mining techniques, please contact us to: *process-mining@hspi.it*

From the following page it is possible to examine the complete database

Process Application

INDUSTRY	SECTOR	COMPANY	PROCESS	DESCRIPTION (Goals, Results)	YEAR	HP YEAR	PARTNER
Consumer Services	IT Software and Services	Utilities' specialized software vendor (NDA, Brazil)	Utilities operation and maintenance	This company provides specialized software and services for Utilities companies. Once their software allows customers to manage maintenance and operation activities, EverFlow was applied to help those customer to identify service optimization and automation opportunities.	2019	---	EverFlow Consulting Services
Consumer Services	IT Software and Services	IT software vendor and service provider (NDA, Australia)	BPM	This IT solution provider develops and sells a BPM software that helps organizations to improve their Project Management efforts by automating and tracking main activities. The PoC goal was to discover their customer's project journeys and performance and conformance issues that could drive optimization initiatives.	2019	---	EverFlow Consulting Services
Healthcare	Home Care Services	Care Services company (NDA, Brazil)	IT Incident / Change / Request Management (ITSM)	EverFlow enabled process transparency and allowed this Home Care Services company to identify ITSM flows' slow steps, reworks and bottlenecks that were causing customer complaints.	2019	---	EverFlow Consulting Services
Financials	Real Estate	Real Estate Tech (NDA, Brazil)	Property prospection	This company disrupted the Real Estate market in Brazil. Although they had an innovative business model their success relied on having a high number of premium properties. EverFlow was applied to their property prospection process and allowed the company to identify those situations where property owners did not become customers and what were the root causes.	2019	---	EverFlow Consulting Services
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Corrective Maintenance	As Brazil has continental dimensions, every CSP spends a lot of money with field Services. When there's an outage this Telco tries to automatically solve it and when automation fails, a technician is dispatched to the field. Applying EverFlow allowed this Telco to identify both performance and	2019	---	Icaro Tech (Sao Paulo, Brazil)

				conformance issues and to map the best automation opportunities.			
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	IT Incident Management (ITSM)	The goal was to improve the IT incident management for those cases where a third party companies were engaged for troubleshooting. As the main results it was possible to pinpoint faulty prioritization rules, service quality issues and how to change the way suppliers were paid in order to assure time to market and avoid regulatory penalties.	2019	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Customer Activation / Provisioning	Everytime a new subscriber gets onboard, many activation activities are performed in several IT systems. PM allowed to identify fail situations, integration problems and automation opportunities.	2019	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	Call Center (NDA, Brazil)	Customer Journey	This Call Center provides customer services for several different companies. In this use case EverFlow was applied in order to improve how a Home Appliance Brand' end customer assistance for product issues, warranty, doubts and purchasing problems.	2019	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	Regional Coverage Telco - Mobile and Fixed services (NDA, USA)	ITSM	In this PoC all trouble tickets related to network outages were analyzed and allowed the company to understand how efficient different support teams were, the common issues and automation opportunities.	2019	---	Icaro Tech (Sao Paulo, Brazil)
Consumer Services	Retail & E-Commerce	National coverage retailer (NDA, Brazil)	Supply Chain	The goal was to help the Supply Chain department to improve their purchasing and logistics planning in order to assure on time deliveries and the ideal stock level for every store. Product returns (rever logistic) was also analyzed - reworks, delays and their causes.	2019	---	ICTS Protiviti (São Paulo, Brazil)
Consumer Services	Retail & E-Commerce	National coverage retailer (NDA, Brazil)	Supply Chain	During a logistic consulting project and end-to-end view of distribution centers was needed. The goal was to map how DCs were transferring products between each other and what were the operational issues that could be tackled for cost reduction and time-to-market improvement.	2019	---	ICTS Protiviti (São Paulo, Brazil)

Consumer Services	Retail & E-Commerce	National coverage retailer (NDA, Brazil)	Value Chain	EverFlow discovered the whole Value Chain - from the product purchase to the end customer sale - in order to highlight the most common issues (such as warranties, returns, complaints) and allow this customer to prioritize the next business transformation efforts.	2019	---	ICTS Protiviti (São Paulo, Brazil)
Healthcare	Healthcare Facilities, Services & Equipment	Cancer Specialized Hospital (NDA, Brazil)	Purchase to Pay	With more than 120K purchase requisitions every year, many process faults were driving this company to lose money. EverFlow was applied in order to highlight efficiency opportunities (such joining different departments needs in a single purchase requisition for better prices), the best suppliers and situations where patients were impacted by the lack of medications and other supplies.	2019	---	ICTS Protiviti (São Paulo, Brazil)
Healthcare	Healthcare Facilities, Services & Equipment	Cancer Specialized Hospital (NDA, Brazil)	Internal logistic - medication and supplies	Considering there were several different departments (specialities) and each department had a dedicated pharmacy at the hospital building, EverFlow was applied in order to identify how medications and supplies were transferred between pharmacies, how restricted medication were handled and what were the purchasing optimization opportunities that could drive cost reduction and patient care improvement.	2019	---	ICTS Protiviti (São Paulo, Brazil)
Industrials	Transportation	Airbus (France)	NA	Airbus is using the Celonis ERP Solution Center to gain a better understanding of its processes, and maximize improvement.	2019		Celonis (München, Germany)
Healthcare	Pharmaceuticals & Biotechnology	AstraZeneca (UK)	NA	AstraZeneca describes Celonis Process Mining as the main “catalyst” to their Digital Transformation and operational excellence journey.	2019		Celonis (München, Germany)
Basic Materials	Chemicals	AkzoNobel (Netherlands)	NA	Celonis enables AkzoNobel’s Global Business Services to drive efficient, effective, and compliant transactions.	2019		Celonis (München, Germany)
Industrials	Automotive & Parts	BMW (Germany)	NA	BMW is supercharging their production process to accelerate finance operations, and improve customer experience	2019		Celonis (München, Germany)

Industrials	Manufacturing	Chart Industries (USA)	NA	Chart is realizing enormous working capital opportunities by improving Accounts Payable and Accounts Receivable processes with Celonis	2019	Celonis (München, Germany)
Basic Materials	Chemicals	Chemours (USA)	NA	Chemours gained a better understanding of their Order-to-Cash (O2C) process to remove friction, accelerate working capital, and achieve Frictionless Finance	2019	Celonis (München, Germany)
Healthcare	Medical Technology	Medtronic (USA)	NA	Medtronic implemented process mining for transformation with a value-driven and scalable approach, based collaboration between Finance & Supply Management, Enterprise Excellence, BI and IT.	2019	Celonis (München, Germany)
Industrials	Manufacturing	ASML (Netherlands)	Process improvement	ASML is the leading developer of photolithography systems for the semiconductor industry. The machines are developed and assembled in Veldhoven and shipped to customers all over the world. Availability of the machines is crucial and, therefore, Freerk started a project to reduce the recovery time. A recovery is a procedure of tests and calibrations to get the machine back up and running after repairs or maintenance. The ideal recovery is described by a procedure containing a sequence of 140 steps. After they identified the recoveries from the machine logging, they used process mining to compare the recoveries with the procedure to identify the key deviations. In this way they were able to find steps that are not part of the expected recovery procedure and improve the process.	2019	Fluxicon (Netherlands)
Financials	Banking	Raiffeisen Bank International (Austria)	Process improvement	RBI started process mining 12 months ago as a part of their smart automation portfolio to derive insights from process-related data at the bank. Since then, they were able to apply process mining on various processes such as: corporate lending, credit card and mortgage applications, incident management and service desk, procure to pay, and many	2019	Fluxicon (Netherlands)

				<p>more.</p> <p>Based on their experience they have developed a standard approach for black-box process discoveries. Using process mining, they first explore and review the processes on their own (prior to the in-depth analysis with the subject matter experts). They illustrated their approach and the deliverables they create for the business units based on the customer lending process.</p>		
Technology	Technology	MuyVentive (United States)	User Interaction Design	<p>MuyVentive, LLC is an advanced analytics R&D company focusing on AI/ML and Conversational Analytics work.</p> <p>The case study shows how to leverage process mining techniques to improve natural language interfaces. Based on an example using the Microsoft Cognitive Services LUIS API, the case shows how conversational data from chatbot interactions with customers can be transformed into structured data, which in turn can then be analyzed further with process mining techniques.</p>	2019	Fluxicon (Netherlands)
Financials	Insurance	PGGM (The Netherlands)	Process improvement and audit	<p>PGGM is a non-profit cooperative pension administration organization. They are founded by the social partners in the care and welfare sector and serve four million participants.</p> <p>The case study shows how process mining goes further than unveiling the bottlenecks in their processes. Discovering and analyzing the process is often the starting point to develop a solution. They show how the goal and approach of the analysis are slightly different when you decide to start a Lean Six Sigma or compliance initiative compared to, for example, the goal of automating tasks, developing a data science or robotics process automation solution.</p>	2019	Fluxicon (Netherlands)

Financials	Insurance	AIG, United States	Process improvement	<p>With roots that trace back to 1919, AIG is a global insurance company with operations in more than 80 countries and jurisdictions. AIG provides a range of insurance products to support clients in business and in life, including: general property/casualty, life insurance, and retirement and financial services through General Insurance, Life and Retirement and Investments business units.</p> <p>The cases study discusses their 'Process Wind Tunnel' framework that utilizes data analytics, visualization, process mining and discrete-event simulation optimization for improving insurance business processes within AIG.</p>	2019	Fluxicon (Netherlands)
Industrials	Manufacturing	Vanderlande, The Netherlands	Process design verification, design analysis	<p>Vanderlande is the global market leader for value-added logistic process automation at airports, and in the parcel market. The company is also a leading supplier of process automation solutions for warehouses. Vanderlande's baggage handling systems move 3.7 billion pieces of luggage around the world per year, in other words 10.1 million per day. Its systems are active in 600 airports including 13 of the world's top 20.</p> <p>The case study shows how they use process mining to gain insight on how to validate and optimize test scenarios during some of the most critical phases of a project — acceptance testing and operational trials.</p>	2019	Fluxicon (Netherlands)
Financials	Insurance	PGGM (Netherlands)	Audit / Assurance	<p>PGGM provides Assurance Standard 3402 and Assurance Standard 3000 reports that are specific for each customer. Within PGGM, process mining is used to show that a number of processes can also be tested for multiple clients at once because these processes are generic for multiple pension funds.</p> <p>The case study describes the experiences of PGGM with regard to process mining based</p>	2019	Fluxicon (Netherlands)

				on a practical example. Specifically, the impact on the work of the auditor for the Assurance Standard 3402 and Standard 3000 report and the conditions are described. We also outline how process mining can be deployed to perform the audit more efficiently and with a higher quality in the future.		
Industrials	Manufacturing	Philips Healthcare, The Netherlands	Quality improved (testing based on actual user profiles)	ESI is an independent research organisation for high-tech embedded systems design and engineering. Philips Healthcare is a global maker of many healthcare products, among which are imaging systems such as X-Ray, CT, Fluoroscopy and Magnetic Resonance Imaging (MRI) machines. The case study shows how process mining can be used to analyze the system usage of an MRI machine. It helps to understand how the customer (the physician) uses the MRI system, and how its behavior deviates from the expected (and designed) behavior. But to get to the actual process mining analysis, the low-level technical system log data of the MRI machine first needs to be prepared in several ways.	2019	Fluxicon (Netherlands); ESI
Public	Education	NDA		This case study applies process mining to the data from the 2018 World Cup, he realized that the key to finding patterns is to make the right assumptions when preparing the data. Hadi shows that there is not just one perspective, but that the same data can be molded to explore many different angles.	2019	Fluxicon (Netherlands); JADS
Financials	Financial Services	NDA	Full Acquiring - New Customer acquisition	The full workflow between the request for a new POS by a customer and the final delivery was analyzed. The process was reconstructed with process discovery tools and validated with the Company. The performances of the as-is process were analyzed against the Company SLAs and the percentage of non-compliant cases was measured. Two different improvement	2019	HESPLORA srl

				scenarios were defined and simulated after an accurate statistical modeling of the process as-is. The simulation phase was used to conduct what-if analysis on two improvement scenarios each one of them with different threshold of application. The scenarios expected benefits were measured and analyzed both individually and combined for every threshold.		
Public	Public Administration and Government Bodies	Federal Government (Australia)	ICT procurement	The scope of the project was to discover and analyse the ICT procurement process, across different types of requests and territorial units (regions). Additionally, a historical analysis of 2018 vs 2019 process was performed. Some significant behavioral and performance differences were identified across process variants. A predictive model was also trained to predict the completion time of requests.	2019	Holocentric (Australia)
Public	Public Administration and Government Bodies	Federal Government (Australia)	Portable Electronic Device fulfilment	The scope for the project was to understand the variations of process for the fulfilment of various portal electronic devices including Mobile Phones, iPads, Tablet PCs and Notebooks and then to identify the causes for fulfilment delays and design process improvements. Significant variations in process were identified and compared, enabling a hybrid common process to be designed that drew on the best elements of each process variation.	2019	Holocentric (Australia)
Industrials	Logistic	NDA	Service Desk	The Company has a multiple country organization and in each one of them, different contractors may be used as support team for incidents. The objective was to compare different countries behaviour and performance and to define KPI for evaluating process health, with a specific focus on the handover between different assignment groups.	2019	HSPI Management Consulting (Italy)
Financials	Banking	NDA	Service Desk	The scope of the project was to analyze the incident process.	2019	HSPI Management Consulting (Italy)

Financials	Banking	Important Italian bank with over 20,000 employees (Italy)	Incident Management	Goals: Inefficiency analysis of the incident process	2019	HSPI Management Consulting (Italy)
Utilities	Gas, Water & Multiutilities	NDA	Activation and management of emergency actions	investigate the correctness of the process and verify the timing of the intervention broken down by geographical area	2019	HSPI Management Consulting (Italy); SCS Consulting (Italy)
Utilities	Gas, Water & Multiutilities	NDA	Commercial subscription	investigate the correctness of the process and verify the timing of the completion of subscription	2019	HSPI Management Consulting (Italy); SCS Consulting (Italy)
Financials	Nonlife Insurance	NDA	Insurance Claims (Property Branch)	The scope of the project was to analyze the claims submitted in case of water leakage in private or business buildings. The objective was to find measurable areas of improvement and anomalies inside the process. Different behaviours inside the process were isolated and different process dimensions were analyzed (e.g. different kind of settlement, geographic partitioning of claims, performance, etc...). A comparison between different region was also performed. As a result the Company was able to find emerging best practices both process wise and organization wise. The Company was able to define KPI for measuring the process health and to set up improvement initiatives.	2019	HSPI Management Consulting (Italy); SCS Consulting; Melbourne University
Public	Public Administration and Government Bodies	NDA	Billing cycle (Passive); Professional illness complaint; Incident Management; Request Fulfillment; Change Management	1)Billing cycle (Passive): Process that monitors purchases based on the parameters that characterize the cycle itself: material, suppliers, payments. - Analysis on the quality and consistency of information 2)Professional illness complaint: The main objective of the process is to define the responsibilities, criteria and methods that regulate the activities necessary to define the assessment of the occupational disease and the possible provision of an economic / health service. - process re-engineering 3)The Incident Management process has as	2019	HSPI Management Consulting (Italy); University of Melbourne

				its main objective the restoring of normal operations of the service minimizing the impact on the business. - Performance Analysis 4) Request Fulfillment: The main objective of the process is to regulate the management of service requests (Service Request) coming from INAIL employees and authorized external personnel. - Performance Analysis 5) Change Management: Process that controls the life cycle of changes to IT services delivered with the aim of ensuring that all changes are recorded, documented and evaluated in a controlled manner. - Performance Analysis		
Industrials	Automotive & Parts	NDA	End-of-Line Process	Goal: Gain insights into the degree of capacity usage of testing locations to identify irregularities. Optimize testing times of individual test groups and install benchmarking process across subsidiaries. Results: - Identification and removal of bottlenecks that extended the lengths of the production process. - Reduction of process variants. - Increased transparency of testing processes and results	2019	Lana Labs GmbH (Germany)
Telecommunications	Telecommunications	Telefonica	SIM card activation	Goal: Realize cross-system process transparency, to fully understand the customer journey and enable improved efficiency and monitoring.	2019	Lana Labs GmbH (Germany)
Consumer Goods	Food & Beverage	Meat manufacturer (Australia)	Meat Production and Distribution Lifecycle	The scope of the project included: 1. Analyse and visualise carton movements throughout 5 production plants and a central coldstore 2. Analyse the carton movements from in-feeding plants to central coldstore 3. Identify primary and preferred process flows	2019	Leonardo Consulting (Australia); The University of Melbourne (Australia)

				<p>4. Identify and compare variants and associated flows</p> <p>5. Identify re-loops and bottlenecks and quantify effect on target efficiencies</p> <p>6. Identify process inefficiencies and opportunities for change</p> <p>7. Support business requirements gathering and generation of critical business rules required for configuration of automated logistics and loadout software</p> <p>8. Visualise and present real-time/near real-time production and process data to selected management and decision-making personnel</p> <p>9. Develop internal business teams' capability to navigate Apromore, load data, analyse processes and extract insights.</p> <p>10. Develop internal IT capability to install, configure, maintain, and monitor the software.</p> <p>11. Evaluate the datasets required and identify any changes to data structure and extraction capabilities.</p> <p>12. Deliver a "Process Mining Readiness Evaluation" to identify potential requirements to enable successful progression to BAU.</p>		
Public	Public Administration and Government Bodies	Regulator (Australia)	Dispute Resolution; Claims Assessment; Licence Assessment; Compliance Assessment	<p>Analysis of 9 regional branches across the state, and identification of common process Variants, and detailed Time and Cost to Serve.</p> <p>Identification of most suitable and compatible processes to be applied consistently across the state to enable state-wide distribution of workloads.</p> <p>Identification of process optimisation opportunities.</p> <p>Evaluation of Predictive Insight opportunities and Data Suitability</p>	2019	Leonardo Consulting (Australia); The University of Melbourne (Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Siemens Healthineers	IoT Data: CT Workflow (Machine <> Human Interaction)	<p>Field of application: IoT & Digitalization</p> <p>Industry sector: Healthcare</p> <p>Workforce: 1.500</p>	2019	MEHRWERK

Source-systems: IoT data, SQL databases

STORY | Siemens Healthineers Computed Tomography introduces MEHRWERK ProcessMining (MPM) as part of its digitalization strategy

The agile process mining technology based on the Qlik® platform enables Siemens to quickly perform ad-hoc analyses of event logs and context information in order to identify the causes of long lead times, process deviations and bottlenecks. The applications are also used to further advance process standardization and harmonization.

In addition to the user-friendliness of the integrated Self-Service Process Mining functionalities, a key success factor was the simple connection of heterogeneous data sources. Among other data, event logs from IoT data were connected.

The combination of Process Mining with Qlik Sense® made it possible to measure the acceptance of AI algorithms within processes (e.g. by evaluating automation rates) and make them visible for continuous monitoring.

The joint realization of the process mining application took place in just two days within the scope of a coaching workshop. Based on this, a fast rollout could be realized because the users had the ability to perform process analyses independently right from the start due to the native integration into the familiar and intuitive Qlik Sense® interface. A big advantage of the integration in Qlik Sense® is the optimization of the Total Cost of Ownership

				and the reduction of the training effort when introducing Process Mining.		
				<p>QUOTATION</p> <p>"MEHRWERK ProcessMining is a really innovative solution that enables us to analyze complex processes automatically. In this way, we can identify the causes of process weaknesses and generate recommendations for actions to improve processes.</p> <p>Process Mining in Qlik Sense - yes we can!"</p> <p>Jutta Reindler, Project Manager of Siemens Healthineers Computed Tomography</p>		
				<p>BENEFITS</p> <p>Qlik® & MPM ProcessMining for complete process transparency</p>		
				Simple Self-Service Process Mining		
				Easy connection of data sources		
Industrials	Automotive & Parts	Ferdinand Bilstein	Master Data Management	Field of application: Master Data Management	2019	MEHRWERK
				Industry sector: Automotive		
				Workforce: 2.100		
				Source-systems: SAP ERP, PLM-system		
				STORY Ferdinand Bilstein introduces MEHRWERK ProcessMining (MPM) to optimize the Material Master Data Management		
				In particular, Material Master Data Management (MMDM) significantly impacts the core value creation processes of industrial companies and therefore plays an important role at bilsteingroup.		
				Typical challenges in the creation & change process of material master data are		

heterogeneous system landscapes and the coordination of the different departments involved in the company. Delays and errors in the MMDM process often lead to problems and disruptions in related business processes, e.g. in production, sales or purchasing.

The agile process mining tool MPM based on the Qlik® platform enabled Ferdinand Bilstein to identify process inefficiencies and automation potentials in a very short time. In addition, the applications are used to further establish and improve process standardization and harmonization. Current automation rates are visualized at a glance and important process deviations are made visible. Furthermore, lead time delays and their causes are identified. These findings and the measures derived from them have a direct influence on the important key figures order-to-cash and time-to-market.

The joint implementation of the first process mining scenario took place within just one day as part of a coaching workshop. Thanks to the existing Qlik® know-how, Ferdinand Bilstein was directly able to further develop the application and to do the data preparation independently. The users were also able to immediately start self-service process mining in the familiar Qlik Sense® interface.

QUOTATION

"With MEHRWERK ProcessMining we were able to seamlessly establish our existing Qlik Sense® platform as a process mining solution. The simple deployment made it very easy for us to get started so that we could generate added value for our master

				data processes in a very short time.” Ben Mahmoud, Head of Business Intelligence, Ferdinand Bilstein		
				BENEFITS Qlik® & MPM ProcessMining for complete master data process transparency		
				Simple self-service Process Mining		
				Process transparency in days instead of weeks or months		
Healthcare	Medical Technology	CeramTec	Production	Field of application: Production, Quality management Process: Production Industry sector: Medical Technology Workforce: 3.500 Pre-systems: SAP® ERP, CAQ/ MES	2019	MEHRWERK
				STORY In search of an agile analysis solution to achieve process transparency – over various manufacturing steps - in production and quality management the client chose to implement MPM ProcessMining. Besides the associative engine and the high-performance In- Memory data management based on the integrated Qlik® technology, the fulfilment of the following objectives was essential: <ul style="list-style-type: none"> • Flexible creation of relevant process key indicators • Analysis of actual processes for critical process sequences in interaction with reasons for scrap • Ad-hoc lead time analysis between all occurring production events • Simple self-service analyses based on governed data models, key figures for advanced questions and root cause analysis 		

				<ul style="list-style-type: none"> • Simple and intelligent linking between CAQ / MES & SAP®-data <p>RESULT</p> <ul style="list-style-type: none"> • Associative Process Mining makes production processes transparent (from customer order to production to packaging / shipping) • Full process transparency of the manufacturing processes across several manufacturing stages (Raw mixture Machining of blanks Hard machining) • Automatic calculation and evaluation of scrap / good parts and process times • Self-service analyses allow new questions to be answered without IT assistance <p>By combining MPM ProcessMining with the Business Intelligence functionalities of the Qlik® platform, the full power of Process Mining is harnessed.</p> <p>BENEFITS</p> <p>Agile Process Mining for full process transparency</p> <p>Simple, associative self-service analyses</p> <p>In-Memory data management</p>		
Industrials	Manufacturing	Seoul Semiconductor	Employee Task Process Analysis for RPA	Process analysis for the employee behavior based on the PC log file Purpose: Selection of RPA process for Seoul semiconductor's internal RPA deployment Project	2019	Puzzle Data
Industrials	Manufacturing	Yupoong	Headwear production process	Headwear Manufacturing Process Analysis to find out standard process and manufacturing bottleneck Purpose: Headwear Manufacturing Process Analysis	2019	Puzzle Data
Consumer Services	Duty free shop	Jeju Development Center(JDC)	Duty free shop Sales management process	JDC Duty Free Shop Sales Management Process Analysis to find out sales process	2019	Puzzle Data

				and highly used menu and functions Purpose: Sales Management Process Analysis by sales teams		
Services	E-learning	Daekyo	E-learning Process Analysis	On-line Learning Process Analysis by using the log of tablet PCs Purpose: On-line Learning Process Analysis to find out better learning process and on-line learning contents	2019	Puzzle Data
Consumer Services	Retail & E-Commerce	Café24	On-line shopping logistics process	On-line Shopping Delivery Process Analysis Purpose: On-line Shopping Delivery Process Analysis by sellers and shipping companies to find out bottleneck of delivery processes	2019	Puzzle Data
Financials	Financial Services	Shinhan Bank	Employee Task Process Analysis, Bank Customer Behavior Analysis	1) Employee Task Process Analysis to find out over-working tasks and team 2) Customer Behavior Analysis to find out the customer churn Purpose: 1) Employee Task Process Analysis to find out bottlenecks 2) Customer Behavior Analysis to find out the process of customer churn	2019	Puzzle Data
Financials	Financial Services	KOSCOM	Online stock trading process analysis	On-line Trading Process Analysis by find out the customer behavior Purpose: On-line Trading Process Analysis to find out customer usage pattern and processes by using the log of mobile trading system	2019	Puzzle Data
Industrials	Manufacturing	SK hynix	Semiconductor manufacturing process discovery and enhancement	Process Discovery and enhancement for manufacturing fault events Purpose: Detail process discovery and process enhancement for manufacturing fault events	2019	Puzzle Data, Business Insight
Healthcare	Healthcare Facilities, Services & Equipment	KUMC Hospital	Outpatient clinic process	This hospital shows thousands of outpatient attendances in a month for counselling and inspections. To provide better medical service to them, this hospital asked KPC(Korea Productivity Center) and Puzzle Data to analyze their current process and provide enhanced process to them.	2019	Puzzle Data, Korea Productivity Center
Consumer Services	Network marketing	Amway Korea	Online customer journey process analysis	Process Analysis between old home page and new home page to find out the improvement	2019	Puzzle Data, LG CNS

				Process Analysis for Churn customers of Amway Korea and Stochastic modeling development to estimate ratio of churn for potential churn customers Purpose: Customer Churn Process Analysis to reduce customer churn		
Industrials	Manufacturing	LG Household & Health Care	Product Export Logistics process analysis	Export Logistics Process Analysis by Log data of 3PLs Purpose: Export Logistics Process Analysis to find out bottleneck and long activities	2019	Puzzle Data, LG CNS
Telecommunications	Telecommunications	Ericsson (Sweden)	Order to Cash		2019	QPR (Finland)
Basic Materials	Chemicals	Solvay (Belgium)	Order to Cash		2019	QPR (Finland)
Industrials	Transportation	Finland	Aircraft turnaround process		2019	QPR (Finland)
Financials	Financial Services	Finland	Customer service		2019	QPR (Finland)
Telecommunications	Telecommunications	Finland	Customer Service		2019	QPR (Finland)
Telecommunications	Telecommunications	Finland	Order to Cash		2019	QPR (Finland)
Technology	Technology	Finland	Order to Cash		2019	QPR (Finland)
Services	Professional Services	Finland	Order to Cash		2019	QPR (Finland)
Industrials	Manufacturing	Finland	Purchase to Pay		2019	QPR (Finland)
Telecommunications	Telecommunications	Finland	Purchase to Pay		2019	QPR (Finland)
Industrials	Waste Management	NDA (France)	Procure to Pay	This company's main objective is to ensure that suppliers are paid within a reasonable period based on the Sapin regulation in France. If this regulation is not respected, high penalties have to be paid. To avoid this kind of financial risks, it is necessary to identify where P2P loses time (late payments) and low automation They use process mining to discover process violation regarding P2P and accounts payables, discover non complaint process behaviors with the help of conformance check and monitor P2P and payment related issues with a defined set of KPIs.	2019	Signavio (Germany)
Technology	Technology	Partner NDA	Procure to Pay Order to Cash	The partner has leveraged Signavio Process Intelligence to create their own process improvement offering to their ERP customers.	2019	Signavio (Germany)
Industrials	Manufacturing	Finland	Purchase to Pay		2019	QPR (Finland)
Public	Education	The University of Melbourne (Australia)	Research contracts	The scope of this project is to better understand the process of how research	2019	Service Improvement Team

				contract are executed with in the University. It has so far able to raise the awareness within the team of the complexity that currently exists and also the variation in the process. The aim of the project is to establish best practice and be able to monitor on an ongoing basis.		at The University of Melbourne (Australia)
Public	Education	The University of Melbourne (Australia)	Students admission	The scope of the project was to analyse the student admissions process within a particular faculty. The aim of the analysis was to first highlight the improvements that have already been made over the past year and showcase it to the management. Once that was achieved it was to then identify areas of improvements that can lead to shorter turnaround time for students. It also allowed to understand the different behaviour within different courses of assessment and was used as a proof to change it. It has since been expanded to encompass all faculties with similar aim to first understand the process better and then identify areas of improvement.	2019	Service Improvement Team at The University of Melbourne (Australia), Dr Abel Armas-Cervantes, The University of Melbourne (Australia)
Telecommunications	Telecommunications	Network provider (Australia)	Network incident management	The project aimed at identifying possible anomalies (non-compliant cases) in the management of network incidents. Further, variants analysis (between different case variants) as well as conformance checking against a normative process model were carried out.	2019	The University of Melbourne (Australia)
Telecommunications	Telecommunications	Network provider (Australia)	Infrastructure change management	The project aimed at identifying possible anomalies (non-compliant cases) in the management of change requests to the network infrastructure. Further, variants analysis (between different case variants) as well as conformance checking against a normative process model were carried out. The project concluded with a feasibility analysis for predictive process monitoring.	2019	The University of Melbourne (Australia)
Financials	Banking	Payment service provider (Europe)	Customer onboarding	The scope of the project was to analyze the customer onboarding process across four countries. Strong differences in	2019	University of Tartu (Estonia) and

				performance across these countries had been previously observed. The main goal of this project was to determine which steps or pathways of the process were determining these differences in performance. Performance mining of the entire process and variant analysis with filtering, side-by-side comparison, and multi-log animations allowed us to find specific pathways that explained lower performance in some countries.			Breakawai (Denmark)
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Robotic Process Automation (RPA)	This Telco began an RPA initiative to improve service quality and customer journey, and added Process Mining (Accelera Labs EverFlow, previously Icaro Tech EverFlow) to their automation strategy in order to verify operational tasks that could be automated and rank them by ROI. Use cases include ITSM (service desk), customer interactions (tickets from different sources), remote troubleshooting, field services and operators/workforce AI Advisors.	2018	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Change Management	Network and service changes happen all the time and the challenge is to keep services available to all subscribers. Applying PM to Change Management flows allowed this Telco to optimize their process and the Change Advisory Board responsibilities in order to avoid rework and service disruption.	2018	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	National Coverage Telco - Mobile services (NDA, Brazil)	Field Services	Although there was no third party field technicians and trouble ticket prioritization was customer-centric, many corrective actions were not effective. EverFlow helped this company to identify potential root causes.	2018	---	Icaro Tech (Sao Paulo, Brazil)
Telecommunications	Telecommunications	National Coverage Telco - Mobile, Fixed services and Media (NDA, Brazil)	Interactive Voice Response (IVR) Customer Journey	As the main customer service channel, the IVR had more than 500,000 daily calls and most of them could not be solved during the automated steps and had to be forwarded to the Call Center. EverFlow	2018	---	Icaro Tech (Sao Paulo, Brazil)

				mapped this Telco's customer journey and the potential improvement opportunities that could reduce human interaction and increase customer satisfaction.		
Financials	Banking	NDA (Italy)	ICT Service Management	Goals: By the use of Process Mining the bank wanted to reduce their service time and reduce the number of ticketing managed by outsourced services.	2018	Cognitive Technology (Italy)
				Results: NDA		
Financials	Banking	NDA (Italy)	Account Opening	NDA	2018	Cognitive Technology (Italy)
Financials	Banking	NDA (Italy)	Balance and average deposit	Creation of a document with current account balance and average deposit	2018	Cognitive Technology (Italy)
Utilities	Utilities	NDA (Italy)	"Sales Management" Order Management	Under the scope of energy services, NDA wanted to analyze their client acquisition process that specifically include the new clients that switch to NDA from another vendor.	2018	Cognitive Technology (Italy), BIP
				With Process Mining techniques the company wanted to:		
				- Identify and analyze the critical activities.		
				- Reduce the process leadtime.		
				- Identify channel inefficiencies.		
				- In-depth analysis of the process inefficiencies.		
				Results: NDA		
Consumer Services	Retail & E-Commerce	NDA (Italy)	Order to Invoice	Goals: NDA's aim was to monitor the impact of the change and block activities on their order to invoice lead time, analyze the shipment delays (service time), and get an in-depth analysis of rework activities.	2018	Cognitive Technology (Italy), Horsa
				Results: NDA		
Industrials	General Industrials	NDA (Italy)	Procure to Pay	Goals: Monitor the performance, reliability, and costs of the suppliers. Improve the effectiveness and efficiency of the process. Monitor the compliance and violations of the activities with a monitoring tool that	2018	Cognitive Technology (Italy), Mind The Value

				would also provide insight on Maverick Buying activities. Analyze the Spend Under Management.		
				Results: Identified all Maverick Buying activities with the Root Cause Analysis. Discovered the key suppliers. Improved the performance.		
Industrials	Automotive & Parts	NDA (Italy)	Procure to Pay	Goals: By the use of Process Mining techniques the management team wanted to discover and analyze Maverick Buyings within their Procure-to-Pay processes. Results: The Team successfully exposed all Maverick Buyings and initiated the trajectory to eliminate them from their processes.	2018	Cognitive Technology (Italy), OT Consulting
Industrials	Automotive & Parts	NDA (Italy)	Accounts Payable	Goals: By using Process Mining, NDA wanted to: - Account Management dynamics. - Discover and analyze process inefficiencies. - Reduce invoice processing time, by reducing the inefficient activities. - Analyze and Monitor the payment behavior. Results: myInvenio successfully - Exposed the critical suppliers relative to the processing time. - Identified all inefficient activities and bottlenecks. - Implemented the continuous monitoring of the account payable process.	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Current Account Closure	Closure of the services connected to the account and - after the appropriate checks - reservation of the closure on the procedures.	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Compilation of Guarantees	Preparatory checks of the Compilation of the Guarantees and once completed make the prints available to the network	2018	Cognitive Technology (Italy), OT Consulting

Financials	Banking	NDA (Italy)	Credit Card Remote Selling	Credit checks on the customer's credit card upon request, selling or rejection of the card.	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Large-Scale Retailers Withdrawal	Credits and charges related to the large-scale retail distribution channel.	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Future Verification	Verification of the positions and executions among FUTURE, the bank and the Broker.	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Mortgage Settlements	Process Mining was used to identify the ideal activities for automation of the bank's Tax Office, and to constantly monitor the automation levels and continuously optimize its process. - The 'updating of the database' activity was identified. The activity is relative to the mortgage settlements due to the closure of the related financing. - Expected Saving 1 FTE	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Updating Financial Tools	With automated process discovery, get an objective overview of the business process to identify from the data-derived model the ideal activities for automation. Automating the data updates on the procedure of external data sources. - Estimated saving 0,4 FTE - saving reached 0,4 FTE	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Central Credit Registers - first information	Conduct a data-derived performance analysis through Process Mining, to identify the costly and repetitive tasks that are ideal for Robotic Process Automation. Thereafter, monitor if the optimal outcome is reached. Automation of the 'acquisition' activity of the Central Credit Registers (Banca d'Italia-database on protested or non-performing loans) of the customer ID and their balance sheet. - Expected saving 0,5 FTE - saving reached 0,5 FTE	2018	Cognitive Technology (Italy), OT Consulting

Financials	Banking	NDA (Italy)	Mortgage Check	<p>Optimizing the consistency of the data quality through the discovery of non-conformant behavior of the Mortgage Check process.</p> <ul style="list-style-type: none"> - Automation of the 'consistency check' of the available data on the IT procedures and relative documentation (integration with an OCR system) to avoid unexpected behavior. - Expected saving 5 FTE, Saving reached 7,5 FTE. - Improving the consistency of the data quality. 	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Data Quality	<p>Use Process Mining to detect anomalies and monitor the corrective actions that will be taken to optimize the process.</p> <ul style="list-style-type: none"> - Automation of the 'correct anomalies' activity within the production environment relative to incorrect/incomplete censuses of the users. - Expected Saving 0,6 FTE - Reached Saving 0,6 FTE - Consistent improvements of the data quality 	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Corporate Events - events reconciliation	<p>Automation of the internal purchase/sale of stocks accounting activity.</p> <ul style="list-style-type: none"> - Expected Saving 0,5 FTE - Saving Reached 0,5 FTE 	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Corporate Events - attestation creation	<p>With the use of Process Mining acquire complete transparency of the attestation creation process and discover process weaknesses and automation opportunities.</p> <ul style="list-style-type: none"> - Automation of the attestation creation for customers relating to the holding/handling of stocks in the portfolio. - saving expected 0,2 FTE - saving reached 0,2 FTE 	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Foreclosures	<p>Process Discovery, Analysis, and monitoring of the information extraction process, to identify any irregular activities and inefficient behavior to drive continuous process improvements.</p> <ul style="list-style-type: none"> - Automation of information extraction 	2018	Cognitive Technology (Italy), OT Consulting

				from PDF files (foreclosure documents). - expected saving 3 FTE - saving reached 3 FTE		
Financials	Banking	NDA (Italy)	Liquidity Management Euro and Divided	Obtain complete transparency of bank transfers with performance indicators through Process Mining in order to monitor and improve the end-to-end process. - Automation of transfers between bank accounts: Transfers must be performed several times a day (monitoring 3 times per day) in order to always maintain a proper stock. - estimated saving 0,15 FTE - saving reached 0,15 FTE	2018	Cognitive Technology (Italy), OT Consulting
Financials	Banking	NDA (Italy)	Funds - phone records and e-mail management	Monitor and analyze the process variants of the financial office with Process Mining and Intelligence to reduce the costs and repetitive tasks. - Automation of the recovery and the balancing of phone-records and e-mails relative to the operability of the financial office (purchase/sale of stocks). - expecting saving 0,9 FTE - saving reached 0,9 FTE	2018	Cognitive Technology (Italy), OT Consulting
Consumer Goods	Media	LOEN Entertainment (South Korea)	Customer Journeys	LOEN Entertainment runs Melon, which is the largest online music streaming service in South Korea. They adopted process mining with Disco to analyze their mobile app's log data. LOEN analyzed new users' journeys during the day when they signed up with a KakaoTalk account. KakaoTalk is a free mobile instant messaging application for smartphones with free text and free call features. KakaoTalk is used by 93% of smartphone owners in South Korea. They categorized new users into five segments based on their behavioral pattern and clearly identified the reason why each segment signed up. Furthermore, building on the	2018	Fluxicon (Netherlands)

				analysis results, it is planning to conduct a targeted marketing campaign for increasing each segment's CVR (Conversion Rate). The company is judging that their process mining analysis using Disco plays a key role in understanding new customers and is likely to contribute to maximizing earnings.		
Healthcare	Healthcare Facilities, Services & Equipment	UW Health (United States)	Process improvement, decision support	UW Health is a large academic medical center associated with the University of Wisconsin-Madison located in Midwestern United States. More than 600,000 patients are served annually at 7 hospitals and 87 outpatient clinics. The case study shows the challenges and successes of introducing process mining to UW Health. She also demonstrates how process mining was used to analyze the flow of urgent and emergent surgical cases added to the schedule and how this technology provided a new way of using the data.	2018	Fluxicon (Netherlands)
Financials	Banking	Deutsche Bank, United Kingdom	Process improvement	Deutsche Bank is Germany's leading bank with a strong presence in Europe and significant presence in Americas & Asia Pacific. The case study discusses how the bank has fared in its process mining journey and which lessons they have learnt along the way. One of the things he will show is how they balanced the exploratory and the targeted parts of their process mining analyses.	2018	Fluxicon (Netherlands)
Industrials	Transportation	KLM, The Netherlands	Development support	Founded in 1919, KLM Royal Dutch Airlines is the oldest scheduled airline in the world still operating under its original name. In 2016, the KLM Group operated worldwide flights with over 200 aircraft, generating €10 billion in revenue and employing 32.000 staff from its Amsterdam basis. The case study shows how process mining was used to help the development teams	2018	Fluxicon (Netherlands)

Technology	Technology	Microsoft, United States	Process improvement and operational support	to learn how to get the most out of each sprint.	2018	Fluxicon (Netherlands)
				Microsoft is the worldwide leader in software, services, devices and solutions that help people and businesses realize their full potential.		
				The case study shows the converge of digital technologies with machine learning and cognitive solutions gives him the opportunity to reimagine everything every day. He believes that process mining can be a silver bullet to accelerate the digital transformation and is passionate to share his experience.		
Financials	Technology	Euroclear, Belgium	Audit	Euroclear is one of the largest Financial Market Infrastructure providers in the world. Many of Euroclear's business processes rely on sophisticated IT services developing a large variety of reliable, scalable, and secured solutions. The case study shows how, with the goal to make internal controls more efficient, process mining has been applied to the code testing process of the Component and Data Management IT division. Olga will share the main steps of dealing with complex data and tips for finding the most useful angles from which the process should be looked at.	2018	Fluxicon (Netherlands)
Public	Public Administration and Government Bodies	City of Amsterdam, The Netherlands	Process improvement	Amsterdam is well-known as the capital of the Netherlands. The city itself has a population of more than 850,000, with about 1.5 million people living in the entire Amsterdam city region. The municipality is responsible for defining and enforcing local policies regarding areas like poverty, taxes, sports, parking, and many more. The case study shows which change traits were critical for them to get most out of their process mining projects, so that they could actually improve the financial	2018	Fluxicon (Netherlands)

				function and get the city of Amsterdam on the move.		
Consumer Goods	Media	LOEN Entertainment (South Korea)	Customer Journeys	<p>LOEN Entertainment runs Melon, which is the largest online music streaming service in South Korea. They adopted process mining with Disco to analyze their mobile app's log data. LOEN analyzed new users' journeys during the day when they signed up with a KakaoTalk account. KakaoTalk is a free mobile instant messaging application for smartphones with free text and free call features. KakaoTalk is used by 93% of smartphone owners in South Korea. They categorized new users into five segments based on their behavioral pattern and clearly identified the reason why each segment signed up. Furthermore, building on the analysis results, it is planning to conduct a targeted marketing campaign for increasing each segment's CVR (Conversion Rate). The company is judging that their process mining analysis using Disco plays a key role in understanding new customers and is likely to contribute to maximizing earnings.</p>	2018	Fluxicon (Netherlands)
Financials	Insurance	PGGM (Netherlands)	Process Improvement	<p>PGGM, one of the largest pension providers in the Netherlands, wants to make her processes more efficient and reduce the costs of the accountant. To do this, the company has researched the added value of process mining. And with success: the organization expects time savings of 66% for the first, second and third line checks of the processes which were studied in the experiment.</p>	2018	Fluxicon (Netherlands) KPMG
Financials	Insurance	PGGM (Netherlands)	Process Improvement	<p>PGGM, one of the largest pension providers in the Netherlands, wants to make her processes more efficient and reduce the costs of the accountant. To do this, the company has researched the added value of process mining. And with success: the</p>	2018	Fluxicon (Netherlands) KPMG

				organization expects time savings of 66% for the first, second and third line checks of the processes which were studied in the experiment.		
Public	Education	NDA	account payable (Ciclo passivo)	analysis of process variants to verify the correctness of the various departments and verify workloads and organizational sizing	2018	HSPI Management Consulting (Italy); Cineca
Financials	Nonlife Insurance	NDA	Insurance Claims (motor vehicle branch)	The scope of the project was to analyze the claims submitted with a double signed accident report (an accident report signed by both the Company customer and the counterpart). The objective was to find measurable areas of improvement and anomalies inside the process. Different behaviours inside the process were isolated and different process dimensions were analyzed (e.g. different kind of settlement, geographic partitioning of claims, compliance with regulatory deadlines, etc...). A comparison between different region was also performed. As a result the Company was able to find emerging best practices both process wise and organization wise. Hot spots inside of the process were identified and addressed with specific initiatives, change requests for the it systems that supported the process were also scheduled.	2018	HSPI Management Consulting (Italy); SCS Consulting, Queensland University of Technology (Brisbane, Australia)
Financials	Nonlife Insurance	NDA	Insurance claims (motor vehicle branch)	The scope of the project was to analyze the claims submitted with a single signed accident report (an accident report signed only by one between the Company customer and the counterpart). The objective was to find measurable areas of improvement and anomalies inside the process. Different behaviours inside the process were isolated and different process dimensions were analyzed (e.g. different kind of settlement, geographic partitioning of claims, compliance in reconstructing the accident, performance, etc...). A comparison between different region was	2018	HSPI Management Consulting (Italy); SCS Consulting; Queensland University of Technology (Brisbane, Australia)

				also performed. As a result the Company was able to find emerging best practices both process wise and organization wise. Hot spots inside of the process were identified and addressed with specific initiatives, change requests for the it systems that supported the process were also scheduled.		
Financials	Nonlife Insurance	NDA	Insurance Claims (motor vehicle branch)	The scope of the project was to analyze the claims submitted with a single signed accident report. The objective was to find measurable areas of improvement and anomalies inside the process. Different behaviours inside the process were isolated and analyzed (e.g. for different kind of settlement). A comparison between different region was also performed. As a result the Company was able to find emerging best practices both process wise and organization wise. Hot spots inside of the process were identified and addressed with specific initiatives, change requests for the it systems that supported the process were also scheduled.	2018	HSPI Management Consulting (Italy); SCS Consulting; Queensland University of Technology (Brisbane, Australia)
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Robotic Process Automation (RPA)	This Telco began an RPA initiative to improve service quality and customer journey, and added Process Mining (Accelera Labs EverFlow, previously Icaro Tech EverFlow) to their automation strategy in order to verify operational tasks that could be automated and rank them by ROI. Use cases include ITSM (service desk), customer interactions (tickets from different sources), remote troubleshooting, field services and operators/workforce AI Advisors.	2018	Icaro Tech (Accelera Labs partner) (Brazil)
Healthcare	Healthcare Facilities, Services & Equipment	Alexianer GmbH	Emergency hospitalization	Goal: Gain insights of current process flows and further improve the quality of patient-centered care and the communication among different functions within the institution.	2018	Lana Labs GmbH (Germany)

				Results: - Optimization of the quality of patient care processes - Reduced waiting times for patients by up to 80% - Improved communication across different departments		
Telecommunications	Service Provider	Telefónica	SIM Card Process	Goal: Gain 100% transparency into all customer centric processes and develop a solution that allows an in-depth monitoring of all actions that include customer contacts. Identify bottlenecks and deviations and improve and speed up customer service.	2018	Lana Labs GmbH (Germany)
				Results: - Full control and transparency of the customer centered processes - Customer Journey is completely mapped and can be optimized precisely - Solution established to monitor the performance of the process - Improved service quality		
Industrials	Production	Hoerbiger / Altronic	Production of control units for compressor motors	Goal: discover process steps for better process transparency across departments; Identification of inefficiencies and related savings potentials Results: Detection of unnecessary extensions of the process duration; Cause for non-compliance with production planning determined; Data-based basis created for sustainable business optimization	2018	Lana Labs GmbH (Germany)
Utilities	Water system	Berliner Wasserbetriebe	Cross-media network construction (MÜN)	Goal (and result): Development of an innovative, demand-oriented controlling system Further results: Realization of cross-system process transparency Identification of important process characteristics and key figures Results: • Increased data consistency across the	2018	Lana Labs GmbH (Germany)

				<p>various systems (Camunda, SAP, ASS, Gimba)</p> <ul style="list-style-type: none"> • Enablement of an end-to-end perspective and insights into the real actual processes • Cross-departmental transparency with fast drill down to process key figures • Unification and standardization of controlling, the realization of cross-system and cross-departmental monitoring 		
Utilities	Electric utility	E.ON	Purchase to Pay (P2P)	<p>Field of application: Audit, Governance & ICS</p> <p>Process: Purchase to Pay (P2P)</p> <p>Industry sector: Electric utility</p> <p>Workforce: 42.000</p> <p>Pre-systems: SAP ERP, Excel</p> <p>STORY In search of a powerful solution for the analysis of actual processes in the area of purchasing and accounts payable, the MEHRWERK customer has chosen MPM ProcessMining. Besides the certified connectivity to SAP® and powerful In-Memory data management based on the integrated Qlik® technology, the fulfilment of the following objectives was crucial:</p> <ul style="list-style-type: none"> • Flexible creation of relevant process key figures and required risk indicators • Automated analysis of actual processes for critical process sequences (e.g., changes to bank accounts before and after payments, goods receipt posting after invoice posting, functional separation conflicts, etc.) • Marking of critical processes and events for quick analysis by auditors • Simple self-service analyses based on governed data models and key figures for advanced questions and cause analyses • Reduction of false positives through associative analysis 	2018	MEHRWERK

				<p>MPM ProcessMining was implemented aer a joint pilot phase in which important requirements could be mapped within a few days.</p> <p>RESULT</p> <ul style="list-style-type: none"> • Ensuring and complying with corporate governance, rapid identification of possible compliance violations • Full actual process transparency of purchasing processes (from purchase requisition to payment), across multiple company codes and purchasing organizations if required • Automatic calculation and evaluation of risk indicators <p>By combining MPM ProcessMining with the Business Intelligence functionalities of the Qlik® platform, the full power of Process Mining is harnessed</p> <p>BENEFITS</p> <p>Qlik® & MPM ProcessMining for complete process transparency</p> <p>Simple self-service analyses</p> <p>Easy connection of data sources</p>		
Telecommunications	Telecommunications	NDA (Slovakia)	Customer journey	Analysis of the customer journey in one of the new flagship product going through a number of systems such as web portal, CRM, ERP, and proprietary systems.	2018	Minit j. s. a (Slovakia)
Telecommunications	Telecommunications	NDA (Germany)	SIM Card activation	Understanding the activation process and investigating potential fraud cases with regards to internal stores and partner vendors looking for patterns that could indicate fraudulent behavior.	2018	Minit j. s. a (Slovakia)
Consumer Services	Retail & E-Commerce	NDA (Czech Republic)	Customer support and return logistics	Analysis of the return shipping process with regards to customer returns together with the customer support process.	2018	Minit j. s. a (Slovakia)
Industrials	General Industrials	NDA (Switzerland)	Order-to-ship	Investigating the compliance and variation of the process across multiple plants globally, identifying driving factors for	2018	Minit j. s. a (Slovakia)

				delays for individual products as well as rework happening in the process.		
Telecommunications	Telecommunications	NDA (Slovakia)	Debt Collection	General investigation of the debt collection process, identifying customer payment habits, factors driving successful collection of debt.	2018	Minit j. s. a (Slovakia), Accenture SK
Industrials	General Industrials	NDA (Denmark)	Order-to-cash	Analysing the order-to-cash process to identify optimization points and find the differences between the same process being executed in different countries/regions. Identify the level of resource allocation/overallocation.	2018	Minit j. s. a (Slovakia), Bizcon ApS. DK
Industrials	General Industrials	NDA (Denmark)	Sales Quotes Process	Quoting process to identify steps and bottlenecks, improvement potential / automation opportunities, a "live" overview of how the processes are actually running, where the outliers and where people are not following the process. Overview of throughput time per process / process steps.	2018	Minit j. s. a (Slovakia), Bizcon ApS. DK
Healthcare	Pharmaceuticals & Biotechnology	NDA (Denmark)	Procure-to-pay	G: Visualize the real process, locate automation candidates (RPA) highlight the deviations from standard process, how much rework is being done because of vendors and / or NN employees, how much time is spent on updating information already in the system (change the quantity, delivery date, etc.), what is the lead time between different steps in the process. R: process revealed, rework revealed, automation candidates identified, vendors & NN employees qualified. Improvement effort outside of scope.	2018	Minit j. s. a (Slovakia), Bizcon ApS. DK
Industrials	General Industrials	NDA (Denmark)	Procure-to-pay	Visualize end-to-end process (re-scoped for approving steps), find average handling times between approvers, loops between authorizers, which are most ineffective resources, who is bouncing responsibility more often	2018	Minit j. s. a (Slovakia), Bizcon ApS. DK
Financials	Insurance	NDA (USA)	Car policy renewal customer journey	Analysis of the full process after a car insurance policy has run out and what actions lead to highest probability rates for	2018	Minit j. s. a (Slovakia), Cognitio Analytics LLC, US

				renewal from customers, identifying factors such as individual customer groups characteristics on probability and increase in scope or size of the policy.		
Industrials	General Industrials	NDA (USA)	Order-to-cash	Analysing order-to-cash process to understand how customers' changes in orders are impacting production schedule and bottom line revenue while. Identifying main factors that prolong the duration of the process with regards to delivery and clearing payments.	2018	Minit j. s. a (Slovakia), Cognitio Analytics US
Industrials	General Industrials	NDA (Germany)	Order-to-cash	Analysis of the compliance level and violations in the rrder-to-cash process esp. with regards to internal audit and financial analysis.	2018	Minit j. s. a (Slovakia), dab:Daten - Analysen & Beratung GmbH
Financials	Insurance	NDA (Greece)	Insurance issuance	Analysis of the life insurance policy issuance process with regards to target key performance indicators set up at division level as well as identification of factors leading to their violation.	2018	Minit j. s. a (Slovakia), Gnosis Management Ltd. GR
Financials	Banking	NDA (Greece)	Product bundling	Process analysis of banking product bundling with the goal of achieving a higher rate of repayment of these products.	2018	Minit j. s. a (Slovakia), Gnosis Management Ltd. GR
Financials	Financial Services	NDA (Russia)	IT support process	Reduction of support case resolution time, discovery of process dynamics, identification and elimination of reworks in the process.	2018	Minit j. s. a (Slovakia), I-Teco RU
Telecommunications	Telecommunications	NDA (India)	Procure-to-pay	Analysis of the procure-to-pay process to get an understanding of how bad a shape it is in currently. Main objective though is to use Minit as a near-real-time monitoring tool for their process.	2018	Minit j. s. a (Slovakia), KPMG IN
Industrials	General Industrials	NDA (Russia)	Procure-to-pay, Order-to-cash	Monitoring of the compliance with the defined as-is process and identification of process inefficiencies like bottlenecks and rework.	2018	Minit j. s. a (Slovakia), KPMG RU
Industrials	Logistic	NDA (Russia)	Procure-to-pay	Monitor the load/unload process across the transport network to increase the rolling stock utilization levels and limit the downtimes	2018	Minit j. s. a (Slovakia), Rondem, RU

Industrials	General Industrials	NDA (Spain)	Order-to-ship	Overall on-going process discovery across the whole organization with the help of kaizen and lean six sigma process improvement techniques with process mining as a baseline tool for process discovery and improvement esp. in the manufacturing of goods and supply chain areas.	2018	Minit j. s. a (Slovakia), Xolyd PT
Consumer Services	Retail & E-Commerce	NDA (Portugal)	Customer journey and customer support	Continuous analysis and monitoring of sales performance in correlation with customer support quality based on customer satisfaction. Analysis of return customer sales and up-selling.	2018	Minit j. s. a (Slovakia), Xolyd PT
Technology	Technology	Information Technology provider (Israel)	Purchase-to-pay process	The scope of the project was to do an initial process discovery and apply predictive monitoring to predict the occurrence of "Late supply" instances, and severity of delays (if any). As a result, several predictive models were trained, and custom operational dashboard was created to visualize real-time predictions for ongoing (incomplete) process instance	2018	Nools (Israel); The University of Melbourne (Australia)
Financials	Banking	Banca Intesa Sanpaolo	Forex exchange	The scope of the project was to discover and analyse the paths of different forex exchange deals at the client. Data was extracted from different systems and aggregated into a single event log (each deal can embrace several systems). Next, different variants of a deal where segregated based on logical drivers (e.g. type of deal, broker/no broker) and performance driver (e.g. average number of activities, or average cycle time). The variants were then used as input for variant analysis in order to identify root causes for deviations.	2018	P4I (Italy); The University of Melbourne (Australia)
Financials	Insurance	Menzis (Netherlands)	Customer declaration process	Menzis wanted to increase their first time right process activities. Therefore they needed insight in all variations of the process. Insight was delivered on how to increase their first time right from 63% to 80% of their declaration process.	2018	ProcessGold (Netherlands) and First Consulting

Utilities	Utilities	Eneco (Netherlands)	Onboarding, delivery process of smart meter, maintenance process.	The goal was to reduce 1% of unnecessary customer phone calls and to increase their First Time Right also with 1%. With the ProcessGold Platform we showed Eneco that it was possible to reduce the number of phone calls with the minimum of 2,8% and maximum of 25,1%. Eneco is now working on improving the process. FTR could be improved with maximal 7,7%.	2018	ProcessGold (Netherlands) and First Consulting
Basic Materials	Chemicals	Extrafarma (Brazil)	Purchase to Pay	Extrafarma want to use process mining capabilities to make their processes more efficient. Therefore they asked Grupo Assa to prove they can connect their SAP data to the ProcessGold Platform. Once that has been realized a new project will start to implement ProcessGold and define new goals.	2018	ProcessGold (Netherlands) and Grupo Assa
Telecommunications	Telecommunications	KPN (Netherlands)	All relevant business processes starting with Source to Pay and Order to Cash	KPN is convinced of the value of process mining for continuous improvement of their whole organization. KPN selected ProcessGold as a platform for continuous monitoring and improvement of their business processes starting at their finance department (S2P and O2C).	2018	ProcessGold (Netherlands) and KPMG
Industrials	Construction & Materials	POSCO E&C (Republic of Korea)	Production outsourcing management process	This company adopted process mining to analyze and improve production outsourcing management process and purchase order process.	2018	Puzzle Data (Republic of Korea)
Technology	Technology	PC Online/Mobile gaming company over \$1.6 B revenue in 2017	Mobile game user analysis process	This company's mobile game hits more than \$900 million revenue in 2017, and it shows 300,000 DAU (Daily Active User) in a day. Game user's response and behavior are key success factors to the game. To analyze game user's activity pattern, this company applied process mining integrated with their big data system. It shows user's activity pattern, cheating signal of bad users, and user's response to weekly event.	2018	Puzzle Data (Republic of Korea)
Financials	Financial Services	Securities company	Non-face-to-face account opening process	Nowadays, securities companies are adopting non-face-to-face account opening through non-face-to-face customer identification by their app. This is very quick	2018	Puzzle Data (Republic of Korea), 2e Consulting

				and easy way to open security account without visiting offline branches. However, large portion of mobile app users seem to quit the account opening process and exit the app. To analyze user's activity and their pattern in the app, Puzzle Data provided process mining consulting with 2e Consulting.		
Technology	Technology	Semiconductor business company over \$27B revenue in 2017	Semiconductor manufacturing process discovery and enhancement	Semiconductor manufacturing process is so complex that lots of approaches have been applied to enhance the process for better yield. However, the state of the art approaches were based on statistics and data analysis.	2018	Puzzle Data (Republic of Korea), EY (Ernst & Young)
Healthcare	Healthcare Facilities, Services & Equipment	Severance hospital (Republic of Korea)	Outpatient clinic process	This hospital shows thousands of outpatient attendances in a month for counselling and inspections. To provide better medical service to them, this hospital asked KPC(Korea Productivity Center) and Puzzle Data to analyze their current process and provide enhanced process to them.	2018	Puzzle Data (Republic of Korea), Korea Productivity Center
Utilities	Utilities	Fennovoima (Finland)	Document Handling	Gain visibility and lead time analysis on documents handling process. Now understands bottlenecks and how to improve upon them. Dashboards for process performance follow-up.	2018	QPR (Finland)
Financials	Banking	Komerční banka (Czech)	Finance	Visualization of processes. Lead time improvement. Process statistics with root cause analysis. Combining data across variety of systems for an end-to-end view.	2018	QPR (Finland)
Consumer Services	Retail & E-Commerce	Stark (Denmark)	Order to Cash	Identify process rework & repetition points. Find which cases deviate from the designed process. Found out major deviations and gained insight on where to begin to improve	2018	QPR (Finland)
Financials	Financial Services	NA	Customer Service		2018	QPR (Finland)
Industrials	Electronics	NA	Document Handling	Understand how processes work and how to get more efficient lead times. Gained transparency and knowledge on how to improve processes	2018	QPR (Finland)

Utilities	Utilities	NA	Document Handling	Gain visibility and lead time analysis on documents handling process. Now understands bottlenecks and how to improve upon them. Dashboards for process performance follow-up.	2018	QPR (Finland)
Financials	Banking	NA	Finance	Visualization of processes. Lead time improvement. Process statistics with root cause analysis. Combining data across variety of systems for an end-to-end view.	2018	QPR (Finland)
Telecommunications	Telecommunications	NA	Incident management		2018	QPR (Finland)
Financials	Banking	NA	ITIL Service Management		2018	QPR (Finland)
Telecommunications	Telecommunications	NA	ITIL Service Management		2018	QPR (Finland)
Financials	Banking	NA	Loan Approval		2018	QPR (Finland)
Financials	Banking	NA	Loan Approval	Measure processing time for loan application. Resulted in creating a Dashboard for monitoring process performance.	2018	QPR (Finland)
Basic Materials	Industrial Metals & Mining	NA	Logistics		2018	QPR (Finland)
Industrials	Logistic	NA	Logistics	Needed transparency to processes. Wanted to know how end-to-end process works, what is the deviation. Gained knowledge on how to improve upon these.	2018	QPR (Finland)
Consumer Goods	Media	NA	Logistics		2018	QPR (Finland)
Industrials	Electronics	NA	Maintenance		2018	QPR (Finland)
Industrials	Manufacturing	NA	Manufacturing		2018	QPR (Finland)
Services	Professional Services	NA	Marketing & sales		2018	QPR (Finland)
Technology	Technology	NA	Order Handling	Improving Order Handling accuracy and efficiency.	2018	QPR (Finland)
Technology	Technology	NA	Order to Cash		2018	QPR (Finland)
Consumer Services	Restaurant	NA	Order to Cash		2018	QPR (Finland)
Technology	Technology	NA	Order to cash		2018	QPR (Finland)
Technology	Technology	NA	Order to Cash		2018	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2018	QPR (Finland)
Consumer Services	Retail & E-Commerce	NA	Order to Cash		2018	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash		2018	QPR (Finland)
Utilities	Utilities	NA	Order to Cash		2018	QPR (Finland)
Technology	Technology	NA	Order to Cash		2018	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash		2018	QPR (Finland)

Consumer Services	Retail & E-Commerce	NA	Order to Cash	Identify process rework & repetition points. Find which cases deviate from the designed process. Found out major deviations and gained insight on where to begin to improve	2018	QPR (Finland)
Telecommunications	Telecommunications	NA	Order to Cash		2018	QPR (Finland)
Healthcare	Medical Technology	NA	Order to Cash	Wanted to know lead times. Have improved process lead times and deviations according to the findings	2018	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2018	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Order to Cash		2018	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2018	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2018	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Plant Maintenance	Customer Care analysis	2018	QPR (Finland)
Services	Industry Services	NA	Plant Maintenance		2018	QPR (Finland)
Services	Professional Services	NA	Production milestones	Understanding process mining capabilities	2018	QPR (Finland)
Technology	Technology	NA	Professional Services		2018	QPR (Finland)
Basic Materials	Chemicals	NA	Purchase to Pay		2018	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Purchase to Pay		2018	QPR (Finland)
Telecommunications	Telecommunications	NA	Purchase to Pay	Process Transparency and finding out the ideal process. Process Development.	2018	QPR (Finland)
Telecommunications	Telecommunications	NA	Purchase to Pay		2018	QPR (Finland)
Services	Professional Services	NA	Purchase to Pay		2018	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Purchase to Pay		2018	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2018	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Purchase to Pay	Process Transparency and finding out the ideal process. Process Development.	2018	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay	Auditing the process using Process Conformance tools	2018	QPR (Finland)
Basic Materials	Chemicals	NA	Purchase to Pay	See visibility on processes. Gained knowledge on how processes work and can be improved upon	2018	QPR (Finland)
Basic Materials	Chemicals	NA	Purchase to Pay		2018	QPR (Finland)
Healthcare	Medical Technology	NA	Purchase To Pay		2018	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2018	QPR (Finland)
Technology	Technology	NA	Supply Chain Management		2018	QPR (Finland)

Financials	Banking	NA	Workflow management	Researched how the process is currently and used that information to create an ideal version of the process.	2018	QPR (Finland)
Services	Professional Services	NA	Consulting		2018	QPR (Finland)
Services	Professional Services	NA	Consulting		2018	QPR (Finland)
Services	Professional Services	NA	Services		2018	QPR (Finland)
Industrials	Construction & Materials	NDA (Germany)	Payable & Invoice processes; Data from SAP ERP (FI, MM) and SAP Workflow	Analyzing and improving the accounts payable processes, incl. the invoice check, functional approval, etc. The results derive process improvements, show compliance deviations and show automation potential using RPA. Invoice processing is split among multiple service centers. Data was extracted from all involved IT systems and loaded into Signavio Process Intelligence. The approach identified cost saving potential of ca. 3 mio. € per year by both automation (esp. RPA and enforcement of rules in SAP Workflow), as well as optimized work distribution and communication between service centers.	2018	Signavio (Germany)
Industrials	Construction & Materials	NDA (US)	Go-Live Monitoring of harmonized processes & new Supply Chain Software; Data from Oracle Cloud SCM system	In parallel to a global process harmonization campaign and introduction of a new software, system adoption and compliance with new processes are monitored, eg monitor the usage of the new procurement system and whether the process (purchase requisition, order with preferred supplier, goods receipt) is followed or whether compliance violations or lack of information/integration are identified. Work in close collaboration with the process management & Quality assurance organization that uses Signavio Process Manager and	2018	Signavio (Germany)

				Collaboration Hub for process definition, agreement and adoption, as well as Signavio Workflow Accelerator for harmonizing manual-IT-processinteractions.		
Financials	Insurance	NDA (Germany)	Optimize taskforce for process “application for care”; Data from highly customized and industry solution of SAP system	The process “application for care” is highly standardized and monitored with existing reporting functionality. The goal was to add additional insights into the process execution to optimize priority setting and avoid penalties for delays as defined by law. The process involves interaction with external parties, such as health providers, that prolong the process. The users are able to analyze their highly regulated process end-to-end, instead of partial views as with existing reporting. Data and views can be created on the fly to drill down into specific process behavior. With existing reporting, this always required an IT change request, that took multiple weeks to be implemented.	2018	Signavio (Germany)
Telecommunications	Telecommunications	NDA (Australia)	Multiple customer facing processes (multiple legacy systems)	The large offering and customer experience transformation initiative required this organisation to assess hundreds of processes with a data-based approach. They have used process mining to address issues with internal structure across business units and reach consensus on processes and process owners. This company uses process mining on top of a larger cx and opex initiative driven by an end-to-end process management approach.	2018	Signavio (Germany)
Telecommunications	Telecommunications	NDA (Australia)	Asset maintenance (Legacy)	This company used process mining on top of a larger opex initiative driven by an end-to-end process management approach	2018	Signavio(Germany)

Financials	Banking	US Bank with over \$30B US Assets, NDA	LOB: Anti Money Laundering <u>Area</u> : Back Office, Transaction Review and Reporting	Use Cases: <ul style="list-style-type: none"> ● Process Discovery and Documentation ● Validation of Anti Money Laundering Procedures ● Identification of Opportunities for Robotic Process Automation (RPA) ● Generation of Specifications for Robotic Process Automation (RPA) Results: ● Increased Process Discovery Capacity by 6X ● Increased the Process Improvement Capacity by 2X ● Non-Post and Branch Validation Processes detected inefficiencies and potential savings – up to 60% ● Funding and Onboarding Processes: detected inefficiencies and potential savings – up to 40% ● Documents Production Process (HELOC Processes) - list of data fields transferred between applications - time wasted on transferring data fields between applications - detected inefficiencies and potential savings – up to 33% 	2018	StereoLOGIC (Canada)
Financials	Banking	One of the Big Five Banks in Canada with over 40,000 employees, NDA	LOB: Shared Services <u>Area</u> : IT Group	Use Cases: <ul style="list-style-type: none"> ● Discovery and Documentation of Legacy Mainframe Processes ● Generation of Process Maps for Systems Transformation Project Results: 5X Acceleration of Business Process Mapping 	2018	StereoLOGIC (Canada)
Financials	Real Estate	Canadian Real Estate Finance Company, NDA	LOB: Mortgage Processing <u>Area</u> : Back Office	Use Cases: <ul style="list-style-type: none"> ● Process Discovery and Documentation ● Identifying Opportunities for Robotic Process Automation (RPA) ● Generation of Specifications for Robotic Process Automation (RPA) Results (In less than 1 month): ● Identified Opportunities for Automation reducing 17 FTE 	2018	StereoLOGIC (Canada)

				Generated Process Specifications for RPA Automation (50 Processes)		
Financials	Insurance	Global Mortgage Insurance Company with offices in the US, Canada and Australia, NDA	LOB: Appraisals, Underwriting <u>Area:</u> Call Center Operations, Back Offices	Use Cases: <ul style="list-style-type: none"> ● Process Discovery ● Productivity Management ● Improvement Recommendations Results: 33.6 % process efficiency gain in less than 3 months	2018	StereoLOGIC (Canada)
Financials	Insurance	Canadian Health Insurance Company (One of Canada's leading life insurance providers), NDA	LOB: Customer Onboarding <u>Area:</u> Back Offices	Use Cases: <ul style="list-style-type: none"> ● Process Discovery and Improvement ● Identifying Opportunities for Robotic Process Automation (RPA) <ul style="list-style-type: none"> ● New Business Application Set-up (5 agents) - 42% FTE Savings ● New Business Issue Process (5 agents) - 66% FTE Savings 	2018	StereoLOGIC (Canada)
Financials	Insurance	US Health Insurance Company with over 20,000 employees, NDA	LOB: Enterprise <u>Area:</u> Back Offices, Claims, Customer Onboarding, Call Centers	Use Cases: StereoLOGIC has replaced staff interviews with automated capture of the employee activities in real-time and producing the End-to-End process visualizations and measurements Results: 88% time savings for process analysis improvement work	2018	StereoLOGIC (Canada)
Healthcare	Home Care Services	Care Services company (NDA, Brazil)	Workforce Management	This company's core business relies on field dispatches of different skilled technicians to meet customer requests. As the customer satisfaction varied according to location and service expertise, this company needed to identify the customer journey's top offenders and positive highlights in order to improve their process.	2017	--- Icaro Tech (Sao Paulo, Brazil)
Public	Education	University of Parma (Italy)	Student's administrative career & General Accounting mgmt.	University of Parma, in a very important phase of reviewing and centralizing many of its administrative processes, decided to start a Process Mining Assessment to further investigate his processes. The aim	2017	HSPI Management Consulting ; University of Melbourne (Australia)

				of the project is to assess the organization and the activities performed by different faculties, to map processes, capture differences, examine performance and implement best practice, with the final target to gain efficiency centralizing and standardizing the best-fit process flow.		
Financials	Banking	Bank 2b under NDA	Process Analysis	Analysis of Mortgage Approval process. Analysis of communication between frontoffice and backoffice. Preparation of inbank methodology that organizes work in both front and back office.	2017	InHouse analysis / support by Minit j. s. a (Slovakia)
Public	Education	The School of Management (VSM) City University of Seattle	Paths discovery	The School of Management (VSM) implemented a modern e-learning platform to facilitate more convenient and personalized form of studying. The application for automated processes analysis Minit was used to compare the utilization of the e-learning platform Moodle by different student groups. Aim of the project: discovering new paths to student success Findings from the project led to the implementation of rules for continuous analysis of processes in the Moodle platform, creation of methodology and best practice guide for usage of the e-learning system, and improved student onboarding. The School of Management succeeded in putting in action an individual approach to students, and improving their journey to outstanding academic results. This progressive approach to students brings greater renown to VSM and increases students' interest in attending.	2017	Minit j. s. a (Slovakia)
Consumer Goods	Personal & Household Goods	NDA (Italy)	E-Commerce BtoC analysis	NDA's aim was to monitor the O2C e-commerce process with the objective to compare the brands, retail chains, and commercial areas to finally increase the	2017	Cognitive Technology (Italy)

				<p>efficiency of the order management, shipment, and any processes related to deliver to final customer.</p> <p>Results: myInvenio exposed differences between logistics centers, and in some cases important process deviations caused by order reassignments. The intra-brand differences were used for a subsequent detailed analysis, always for efficiency purposes.</p>		
Healthcare	Healthcare Facilities, Services & Equipment	NDA (Germany)	Order to Cash	<p>Goals: Apply process mining to provide insights into the Order to Cash process, to ultimately reduce the delivery time and the payment time by identifying the optimal delivery routes and the root causes of bottlenecks.</p> <p>Results: NDA</p>	2017	Cognitive Technology (Italy)
Industrials	General Industrials	NDA (Italy)	Order to Cash	<p>Goals: Apply process mining to provide insights into the Order to Cash process, to ultimately reduce the delivery time and the payment time by identifying the optimal delivery routes and the root causes of bottlenecks.</p> <p>Results: NDA</p>	2017	Cognitive Technology (Italy)
Industrials	General Industrials	NDA (Italy)	Shipment Management	<p>Process Mining was used to deliver the advanced insight on the orders that were necessary to optimize the shipment process.</p> <p>Results: NDA</p>	2017	Cognitive Technology (Italy)
Industrials	General Industrials	NDA (Italy)	Order to Cash	<p>A Warehouse Management System Analysis was conducted in order to discover process inefficiencies.</p> <p>Results: By the use of myInvenio, NDA discovered a critical inefficiency in the process: material that was produced in Italy was send to a warehouse located in Spain, and thereafter send back to a different warehouse in Italy to finally be distributed in Italy.</p>	2017	Cognitive Technology (Italy)

Industrials	General Industrials	NDA (USA)	Order to Delivery	<p>Goals: Apply process mining to provide insights into the Order to Cash process, in particular:</p> <ul style="list-style-type: none"> - Analyze Process Behaviour and Identify any Improvement opportunities! - Identify the Critical Activities in terms of costs and time. - Monitor the Customers Lead Time Variability - Discover the Key Users of the process and check the Segregation of Duties <p>Results:</p> <ul style="list-style-type: none"> - Redesigning of the process in order to drastically reduce “Logistics Block”. Cost Saving of at least 100k\$ and 2 days of average leadtime. - Reducing the number of “Change of Delivery Date” with an expected cost and time saving of about 50k\$ and 3 days. - Increase of the Orders within KPI boundaries of 25% 	2017	Cognitive Technology (Italy), Mind The Value
Industrials	Automotive & Parts	NDA (Italy)	MRP	NDA	2017	Cognitive Technology (Italy), OT Consulting
Consumer Goods	Food & Beverage	NDA (Italy)	Order to Cash	<p>Goals: Apply process mining to provide insights into the Order to Cash process, to ultimately reduce the delivery time and the payment time by identifying the optimal delivery routes and the root causes of bottlenecks.</p> <p>Results: NDA</p>	2017	Cognitive Technology (Italy), OT Consulting
Consumer Services	Retail & E-Commerce	NDA (Italy)	Order to Cash	<p>Goals: By analyzing data from the different corporate IT systems, NDA wanted to discover the segregation of duties; find what activities were performed by the specific resources and roles of the organization's Order to Cash process.</p> <p>Results: NDA</p>	2017	Cognitive Technology (Italy), OT Consulting
Industrials	Transportation	NS Dutch Railways (Netherlands)	Dataset Analysis	Analysis of all the datasets with Process Mining demonstrated that by waiting a few more days before emptying abandoned	2017	Fluxicon (Netherlands)

				station lockers would bring to the company a lot of time and effort saved. In addition, Process Mining let NS noticed that some of the OV bikes that where reported as stolen were actually not stolen at all.		
Financials	Insurance	Nationale Nederlanden (Netherlands)	Transactions analysis	The company got pushback because results were not always aligned with the viewpoints of all stakeholders. For instance, for one process the operational teams experienced a lot of variation - while IT was managing a Straight Through Process. With process mining, it was ultimately possible to get a deeper understanding of how the process was actually working and to take both perspectives into account. Results: <ul style="list-style-type: none"> - 225.000 process ID obtained, from 600.000 records - Straight Through Processing (STP) Rate= 87% - Non STP processes (#44) could ranked based on % of variants an lead time 	2017	Fluxicon (Netherlands)
Financials	Insurance	CZ (Netherlands)	IT Audit	By using process mining techniques, CZ Health Insurance was able to obtain different results from the traditional approach in the preparation, fieldwork, reporting, and follow-up steps in its audits. Results: <ul style="list-style-type: none"> - Changes 'out of the blue' - Quality of work measured - Automated compliancy 	2017	Fluxicon (Netherlands)
Utilities	Utilities	Essent NC (Netherlands)	Credit Management	Discovering why the firm was losing so much money in the payment collection process: the termination of contracts took too long time to be performed. By visualizing the problem, the company was able to understand the actual root causes. Therefore, process mining proved to be so much more meaningful than just a snake plot and a ping-pong factor.	2017	Fluxicon (Netherlands)
Financials	Insurance	VGZ (Netherlands)	Dental care process analysis	Solving of many operational problems much quicker by combining Lean tools with process mining. Using process mining, VGZ	2017	Fluxicon (Netherlands)

				was able to visualize the flow of the dental care process within weeks. This directly pointed out bottlenecks and it demonstrated that there were long waiting times when the work was handed over from medical advisors to experts and vice-versa. By applying the traditional Lean tools, such as 5x Why, CZ was able to pinpoint the actual root causes. Results:		
Industrials	Industrial Engineering	Veco (Netherlands)	Customer journey analysis	Obtaining a clear visualization of the journey of the customer. Looking into the visualization, a new product development process was discovered. Instead of only producing a sample, in the new product development process pieces needed to be designed, produced and delivered quickly. By shifting priorities, Veco was able to produce customer samples quicker without impacting the regular production lead times. This allows Veco to grow their business, while keeping up the delivery performance for their existing customers.	2017	Fluxicon (Netherlands)
Telecommunications	Telecommunications	Telefónica (Spain)	IT Service Management	With logs analysis carried out by process mining techniques Telefonica discovered that the incidents were not registered properly in the trouble ticketing tool, as well as that the internal information/reports could be misleading. Results of the project: - A correct incident recording in the trouble ticketing tool used - Improvement in the relationships with the interested parties - Updating and improving of operational reports	2017	Fluxicon (Netherlands)
Telecommunications	Telecommunications	National Coverage Telco - Mobile and Fixed services (NDA, Brazil)	Operational Efficiency	Considering Fault Management is critical to network based services, Accelera Labs EverFlow (previously Icaro Tech EverFlow) helped this Telco to understand any network/APM fault alarm lifecycle, from	2017	Icaro Tech (Accelera Labs partner) (Brazil)

				the moment it was generated to the final resolution. This allowed operation managers to easily identify how alarms were impacted by operators (re)classification, (re)categorization and other actions, improving the decision making process for fast troubleshooting and MTTR reduction.		
Healthcare	Healthcare Facilities, Services & Equipment	Care Services company (NDA, Brazil)	Workforce Management	As a care service provider with a wide variety of expertises, this company's core business relies on field dispatches of different skilled technicians to meet customer requests. As the customer satisfaction varied according to location and service expertise, this company needed to identify the customer journey's top offenders and positive highlights in order to improve their process. Accelerera Labs EverFlow (previously Icaro Tech EverFlow) provided the expected answers by analyzing logs from this company's Workforce Management system.	2017	Icaro Tech (Accelerera Labs partner) (Brazil)
Financials	Insurance	Interroll Group (Switzerland)	Production Process	Goal: Gain comprehensive insights into the production process that were not accessible through the regular Manufacturing Execution System. Results: - Identified unexpectedly high process variance with over 3,000 distinct variants - Determined cause for the extension of process duration by over 700% - Created data-based foundation for the internal continuous improvement process	2017	Lana Labs GmbH (Germany)
Healthcare	Healthcare Facilities, Services & Equipment	NDA	Invoice Verification	Goal: Gain a deeper understanding of process challenges and deviations and identify opportunities for process automation. Results: - Saved 900 man hours per year through process automation	2017	Lana Labs GmbH (Germany)

Industrials	Logistic	NDA	Credit & Collections Management	<ul style="list-style-type: none"> - Identified the cause for 97% of process deviations - Revealed over 1,000 internal violations of the Service-Level Agreement - Achieved higher degree of standardization 	2017	Lana Labs GmbH (Germany)
				<p>Goal: Gain a competitive advantage by automating and optimizing the process beyond the capabilities of the established process management systems.</p> <p>Results:</p> <ul style="list-style-type: none"> - Saved more than 100,000 Euros and 1,600 man hours per year on extra manual work - Reduced execution times and idle periods in the process by up to 80% - Identified compliance risks in over 70% of all cases 		
Public	Public Administration and Government Bodies	NDA (Netherlands)	Logistic flow of ships	Organization wanted to improve the quality of controlling ships on hazardous substances. Based on the visualization of the routes it is now possible to perform the controls based on places and ships with the highest risks.	2017	ProcessGold (Netherlands)
Public	Public Administration and Government Bodies	General Prosecution Service (Netherlands)	All internal processes (Criminal Cases)	Customer wants to improve their internal processes by shortening throughput times, minimizing risks and fully comply to internal and external laws and regulations. Customer is implementing the so called DMAIC improvement cycle with the help of the ProcessGold platform.	2017	ProcessGold (Netherlands)
Consumer Services	Retail & E-Commerce	Heineken (Netherlands)	Segregation of Duties and Manual Journey Entries	Organization wanted to be audit ready. Controls were defined and put in the ProcessGold Platform. 100% insight on violations of these controls was delivered. Roll-out was globally.	2017	ProcessGold (Netherlands) and Agilos
Utilities	Utilities	Shell (UK)	Purchase to Pay and Order to Cash	SAP HANA data was connected direct into the ProcessGold platform. Focus was on efficiency. Non-compliant processes, early and late payments and fraud were discovered.	2017	ProcessGold (Netherlands) and CGI
Services	Support Services	Barona (Finland)	Invoicing	Identify organizational difference to drive process and operations harmonization.	2017	QPR (Finland)

Consumer Goods	Personal & Household Goods	Nokia (Germany)	Order to Cash	Discover the invoicing procedures. Communicate process related knowledge.	2017	QPR (Finland)
				Visualization of processes. Lead time improvements. Process harmonization. Measuring & communicating process performance. Reduced rework. Continuous data driven development.		
Industrials	Aerospace & Defense	Patria (Finland)	Order to Cash	Visual process intelligence. Visibility to operations. Ensuring ontime delivery with first time right execution. Minimizing rework.	2017	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Department Transfers		2017	QPR (Finland)
Technology	Technology	NA	Game development		2017	QPR (Finland)
Services	Industry Services	NA	Invoicing	Identify organizational difference to drive process and operations harmonization. Discover the invoicing procedures. Communicate process related knowledge.	2017	QPR (Finland)
Public	Public Administration and Government Bodies	NA	ITIL Service Management	Find out how the ticketing system is performing. Set up a continuous Process Mining environment	2017	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Manufacturing	Gain an understanding over each process and their performance. Identify bottlenecks. Created documentation based on the as-is proces that can be used for development support.	2017	QPR (Finland)
Utilities	Utilities	NA	Marketing & Sales		2017	QPR (Finland)
Utilities	Utilities	NA	Marketing & Sales		2017	QPR (Finland)
Utilities	Utilities	NA	Meter to Cash	Researched how the process is currently and used that information to create an ideal version of the process.	2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Order Handling	Improving Order Handling accuracy and efficiency.	2017	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash		2017	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash	Measure how process is performing, create a basis for process monitoring	2017	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Order to Cash		2017	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2017	QPR (Finland)
Consumer Services	Retail & E-Commerce	NA	Order to Cash		2017	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2017	QPR (Finland)

Basic Materials	Forestry & Paper	NA	Order to Cash		2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Order to Cash		2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Order to Cash	Visualization of processes. Lead time improvements. Process harmonization. Measuring & communicating process performance. Reduced rework. Continuous data driven development.	2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Order to Cash		2017	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	Visual process intelligence. Visibility to operations. Ensuring ontime delivery with first time right execution. Minimizing rework.	2017	QPR (Finland)
Utilities	Utilities	NA	Order to Cash		2017	QPR (Finland)
Healthcare	Medical Technology	NA	Order to Cash		2017	QPR (Finland)
Consumer Services	Wholesale	NA	Order to Cash	Identify SLA conformance and deviations, possible causes for breaches. Gained an insight on where to focus on improving the levels of SLA.	2017	QPR (Finland)
Services	Professional Services	NA	Professional Services		2017	QPR (Finland)
Industrials	Manufacturing	NA	Project Management	Visual process intelligence. Visibility to operations. Ensuring ontime delivery with first time right execution. Minimizing rework.	2017	QPR (Finland)
Financials	Banking	NA	Purchase to Pay		2017	QPR (Finland)
Basic Materials	Chemicals	NA	Purchase to Pay		2017	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2017	QPR (Finland)
Basic Materials	Industrial Metals & Mining	NA	Purchase to Pay	Understand process mining capabilities	2017	QPR (Finland)
Basic Materials	Industrial Metals & Mining	NA	Purchase to Pay	Transparency into processes and find out Maverick Buying incidents. Found out a significant amount of Maverick Buying. Saw how maverick buying occurred on a organizational group basis	2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Purchase to Pay		2017	QPR (Finland)
Healthcare	Medical Technology	NA	Purchase To Pay		2017	QPR (Finland)
Industrials	Manufacturing	NA	Sales	Visual process intelligence. Visibility to operations. Ensuring ontime delivery with first time right execution. Minimizing rework.	2017	QPR (Finland)
Consumer Services	Retail & E-Commerce	NA	Service tickets		2017	QPR (Finland)
Telecommunications	Telecommunications	NA	Software Development		2017	QPR (Finland)

Financials	Banking	NA	Banking & Finance		2017	QPR (Finland)
Technology	Technology	NA	Information Technology		2017	QPR (Finland)
Technology	Technology	NA	Information Technology		2017	QPR (Finland)
Services	Support Services	SIAV S.p.A. (Italy)	Order to Cash, Help Desk	The company aimed to map Order to Cash process (supported by SAP, Microsoft Dynamics and Siav Archiflow document management system) and Help Desk process (supported by Microsoft Dynamics CRM). The OTC process was particularly challenging, because it involves many different information systems; despite this, a consistent mapping between different identifiers has been found during ETL phase, and consistent end-to-end process instances have been extracted. An internal Process Discovery tool has been used to analyze the processes. The result of the study was a detailed report on the real processes, underlining unexpected behaviour and performance issues, valuable information to develop an improvement plan.	2017	SIAV S.p.A. (Italy)
Industrials	Logistic	NDA (Germany)	Order-to-cash & procure-to-pay processes of multiple sub-organizations; Prepare Implementation & Go-Live of a global ERP system	Assess current Order-to-cash and procure-to-pay processes of multiple sub-organizations. Per organization, analyze deviation of process from the global template by using Signavio Process Intelligence. The global process definition and communication is done using Signavio Process Manager and Collaboration Hub. After the go-live of the global ERP system, a continuous monitoring of the processes in the new ERP system are established. Outcomes: Faster project, better requirements definition, improvement of ongoing operations after Go-Live.	2017	Signavio (Germany)
Telecommunications	Telecommunications	NDA (Europe)	product delivery for a new internet service	The demand for a new corporate internet product is high, but delivery projects are taking much longer	2017	Signavio (Germany)

				than expected, even resulting in many cancelations of orders. Among other things, the analysis unveiled additional revenue potential of several million EUR by delivering earlier and therefore starting the subscription earlier.		
Financials	Banking	The largest Bank in Canada, NDA	LOB 1: Credit Cards <u>Area</u> : Back Office and Business Process Outsourcing Groups LOB 2: Payments <u>Area</u> : Back Offices (Toronto, Montreal) LOB 3: Personal Banking Operations <u>Area</u> : Back Office and Business Process Outsourcing Groups	LOB 1 Use Cases: <ul style="list-style-type: none"> ● Monitoring of Offshore BPO Processes for conformance to Best Practices; ● Analysis of Inefficiencies and Process Improvement LOB 1 Results: <ul style="list-style-type: none"> ● Detected and corrected non-conformance to best practices in Offshore BPO Centers (60%); ● 22% Performance Improvement LOB 2 Use Cases: <ul style="list-style-type: none"> ● Process Discovery & Documentation ● Process Improvement ● Generation of Standard Operating Procedures LOB 2 Results: 5X Acceleration of Business Process Documentation and SOP Development LOB 3 Use Cases: <ul style="list-style-type: none"> ● Process Discovery ● Productivity Management ● Process Improvement ● Detection and Prioritization of RPA Opportunities LOB 3 Results: <ul style="list-style-type: none"> ● Up to 90 % process efficiency gain for the Outsourced Processes in scope ● Detected automation opportunities for over 50% of processes 	2017	StereoLOGIC (Canada)
Financials	Banking	One of the Big Five Banks in Canada with over 1000 branches, NDA	LOB 1: Documentation and Training Group <u>Area</u> : Back Office LOB 2: Retail Banking <u>Area</u> : Customer Services,	LOB 1 Use Cases: <ul style="list-style-type: none"> ● Process Discovery & Documentation ● Generation of Standard Operating Procedures LOB 1 Results: 5X Acceleration of Business	2017	StereoLOGIC (Canada)

Branches, Nationwide	Process Documentation and SOP Development
LOB 3: Credit Adjudication	LOB 2 Use Cases:
<u>Area</u> : Back Offices, Mortgage Processing	<ul style="list-style-type: none"> ● Process Discovery and Time Measurement ● Detection of Errors and Inefficiencies ● Process Improvement and Standardization ● Customer Experience Measurement
LOB 4: Process Management Group	LOB 2 Results:
<u>Area</u> : Call Center Operations	<ul style="list-style-type: none"> ● Accelerated Customer Services by 22.5% and Reduced Errors and Delays by 95% in less than 6 months ● \$15MM operational savings across all branches in less than 1 year
LOB 5: Finance	LOB 3 Use Cases:
<u>Area</u> : Finance, Back Office	<ul style="list-style-type: none"> ● Process Discovery and Time Measurement ● Detection of Employee Errors and Inefficiencies ● Customer Experience Measurement
	LOB 3 Results:
	<ul style="list-style-type: none"> ● Measured: 1) Total No of Cases reviewed by each Adjudicator; 2) Number of times each Case was re-opened by the Adjudicator; 3) Review Start / End Time; 4) Number of Approved Cases ● 30% Customer Service Acceleration
	LOB 4 Use Cases:
	<ul style="list-style-type: none"> ● Process Discovery and Analysis ● Detection of Employee Errors and Inefficiencies ● Customer Experience Measurement
	LOB 4 Results: 5X Acceleration of Process Analysis and Documetation
	LOB 5 Use Cases:
	<ul style="list-style-type: none"> ● Process Discovery and Documentation ● Generation of Standard Operating Procedures (SOP)
	LOB 5 Results: 6X Acceleration of Process Analysis and Documetation

Financials	Banking	US Federal Bank with over \$70B US Assets, NDA	LOB: Finance <u>Area:</u> Finance, Back Office	Use Cases: <ul style="list-style-type: none"> ● Discovery and Documentation of As-Is Business Processes ● Generation of Process Maps for Systems Transformation Project Results: 6X Acceleration of Process Analysis and Documentatation	2017	StereoLOGIC (Canada)
Financials	Banking	Large European Bank with over 90,000 employees, NDA	LOB: Back Office Operations <u>Area:</u> BPO Processing in Eastern Europe	Use Cases: <ul style="list-style-type: none"> ● Remote capture of As-Is business processes from local branch offices ● Variation analysis and process optimization Results: <ul style="list-style-type: none"> ● Compressing the time to gather business process by 60% ● Process optimization by an average of 16%. ● Some processes optimized by as much as 70%. ● 4 month ROI 	2017	StereoLOGIC (Canada)
Telecommunications	Telecommunications	Vodafone (UK)	Process Improvement	Vodafone deals with copious amounts of data, and needs a robust process mining solution to keep up to speed and scale. Vodafone deeply looks into its process variations, non-compliances, workarounds, and more to compare their results to goals. -Process Mining facilitates Vodafone's existing SAP infrastructure – enabling continual real-time analytics and seamless transition to new process mining functions. -Vodafone mentions their new process mining also enables faster GTM; they can resolve things faster and more proactively because they have more visibility into their processes and operations.	2016	Celonis (München, Germany)
Financials	Banking	NDA (Italy)	Loan Management	Goals: Making the right and corrective actions to decrease the lead time. Results: NDA	2016	Cognitive Technology (Italy)
Healthcare	Healthcare Facilities, Services & Equipment	NDA (USA)	Sales & Order to Delivery	NDA	2016	Cognitive Technology (Italy)
Consumer Services	Retail & E-Commerce	NDA (Italy)	New Product Rollout	Goals: The project aimed to define, analyze, monitor, and improve the ideal path, also known as happy path, of the	2016	Cognitive Technology (Italy)

				<p>company's New Product Rollout process, to ultimately increase the rollout quantity. Every 6 months NDA has a new product rollout.</p> <p>Results: The company found the Happy Path of its New Product Rollout process by the use of Process Mining and found the insight that drove the increase in their new product rollout.</p>		
Industrials	Automotive & Parts	NDA (Italy)	After Sales Car Maintenance	<p>Goals:</p> <ul style="list-style-type: none"> - Discover and analyze process inefficiencies and critical activities. - Get a holistic overview of all activities from different legacy IT systems, and unstructured and structured data. <p>Results:</p> <ul style="list-style-type: none"> - myInvenio discovered the process involved in the system in its entirety, inclusive of the smallest variance. - myInvenio immediately displayed the visual comparison between the data-derived and the reference model. - The "As is" Process Analysis was completed at a fraction of the estimated budget, slashing 70% of the predicted man-hours and leading to important savings on the overall project's phases. 	2016	Cognitive Technology (Italy), OT Consulting
Industrials	General Industrials	NDA (Italy)	Order to Delivery	<p>Goals: The project aimed to apply process mining to provide insights into the Order to Delivery process, to ultimately reduce the delivery time by identifying the optimal delivery routes.</p> <p>Results: NDA</p>	2016	Cognitive Technology (Italy), OT Consulting
Consumer Services	Retail & E-Commerce	NDA (Italy)	Claim Management	<p>Goals: Process mining techniques were used to obtain meaningful information about the Claim Management process provided by multiple corporate IT systems to expose any inefficiencies of the handling to reduce the response time to the claims of their customers.</p> <p>Results: NDA</p>	2016	Cognitive Technology (Italy), OT Consulting

Industrials	Logistic	Smart Coat Inc. (Belgium)	Logistic	<ul style="list-style-type: none"> -Real business processes discovery -Removing unnecessary and divergent process activities -Benchmark various departments, plants, products or sales channels within your company -Identification of the bottlenecks -Visualizing the interactions amongst your employees -Reporting the exact cost prices of activities -Predicting and preventing process errors 	2016	Horsum - Accelerating technology companies (Belgium)
Public	Public Administration and Government Bodies	Copyright mediator company (Italy)	Event Licence Approval	<p>This case study applied process mining techniques to event licence approval process to expose deviations and performance issues. Specifically, the study involved process discovery of the "as is" model and the conformance checking of the "as is" process to the expected process. Aim of the project: finding out the root of the problem that was affecting company's core processes.</p> <p>Process mining was used to conduct a conformance and performance analysis, which enable the firm to achieve the following objectives:</p> <ul style="list-style-type: none"> - Anomalies and bottlenecks were clearly detected - Was found that core processes didn't perform well because of the lack of quality data and transparent communications. <p>As a result, improvements could be made with measurable effects on the internal quality of the service.</p>	2016	HSPI Management Consulting (Italy) Queensland University of Technology (Brisbane, Australia);
Public	Public Administration and Government Bodies	IT Service Provider company (Italy)	Help Desk for Universities	<p>This case study applied process mining techniques to help desk data collected to expose performance issues. Specifically, the study involved process discovery and comparison of execution traces associated with various cohorts of customers including (i) requiring assistance, (ii) presenting malfunctioning with their system, and (iii) requiring changes.</p>	2016	HSPI Management Consulting (Italy); Queensland University of Technology (Brisbane, Australia)

				<p>Aim of the project: improving Service Desk and ticket management and understanding how the real processes are performed inside the company.</p> <p>Thanks to process mining, the following results were achieved:</p> <ul style="list-style-type: none"> - Real process map was identified - Origins of bottleneck and reloop were detected - More transparency about the ticket processes was obtained in order to improve customer orientation of its Service Desk 		
Industrials	Industrial Engineering	Production Company in a B2B environment	Production Process	<p>Goal: to reduce throughput time from 3 months to 1 months (later further reduction was anticipated). Process mining was used for:</p> <ul style="list-style-type: none"> -Analysing bottlenecks, which revealed also unexpected ones. -Measuring “as-is” situation (throughput/waiting time per resource). <p>Improvements to be performed based on event data were identified.</p>	2016	Novo Consilium B.V (Netherlands)
Financials	Insurance	Aegon (Netherlands)	Call center and retirement insurance process	<p>Need to work more efficient in order to save costs. Serve their customers better. RPA bottlenecks were detected. Dramatic reduction in response times were achieved.</p> <p>Substantial savings in first 3 months after implementing the ProcessGold platform.</p>	2016	ProcessGold (Netherlands)
Public	Public Administration and Government Bodies	Supreme prosecutors' office (Republic of Korea)	Prosecutors' work process and workload	This government organization adopted process mining to analyze and enhance prosecutor's working process and workload.	2016	Puzzle Data (Republic of Korea)
Consumer Goods	Personal & Household Goods	Samsung Heavy Industries (Republic of Korea)	Pipe production process	This company adopted process mining to analyze and enhance pipe production process.	2016	Puzzle Data (Republic of Korea)
Industrials	Transportation	DSME (Republic of Korea)	Shipbuilding block assembly location process	This company adopted process mining to analyze and enhance shipbuilding block assembly location process.	2016	Puzzle Data (Republic of Korea), Xinnos
Services	Support Services	Lassila & Tikanoja (Finland)	Order to Cash	<p>Better visibility to the new ERP system. Reduced ERP Implementation costs.</p>	2016	QPR (Finland)

				Increased data quality. Reducing risks in ERP deployment.	
Healthcare	Healthcare Facilities, Services & Equipment	NA	Hip Surgery	2016	QPR (Finland)
Technology	Technology	NA	Invoicing	2016	QPR (Finland)
Industrials	Manufacturing	NA	ITIL Service Management	2016	QPR (Finland)
Industrials	Construction & Materials	NA	ITIL Service Management	2016	QPR (Finland)
Basic Materials	Forestry & Paper	NA	ITIL Service Management	2016	QPR (Finland)
Public	Defense	NA	ITIL Service Management	2016	QPR (Finland)
Industrials	Manufacturing	NA	ITIL Service Management	2016	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Joint Replacement	2016	QPR (Finland)
Industrials	Manufacturing	NA	Marketing & Sales	2016	QPR (Finland)
Technology	Technology	NA	Marketing & Sales	2016	QPR (Finland)
Basic Materials	Chemicals	NA	Material management	2016	QPR (Finland)
Telecommunications	Telecommunications	NA	Order Handling	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Consumer Services	Retail & E-Commerce	NA	Order to Cash	2016	QPR (Finland)
Technology	Technology	NA	Order to Cash	2016	QPR (Finland)
Services	Industry Services	NA	Order to Cash	2016	QPR (Finland)
				Better visibility to the new ERP system. Reduced ERP Implementation costs. Increased data quality. Reducing risks in ERP deployment.	
Technology	Technology	NA	Order to Cash	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2016	QPR (Finland)
Basic Materials	Chemicals	NA	Plant Maintenance	2016	QPR (Finland)
Industrials	Construction & Materials	NA	Purchase to Pay	2016	QPR (Finland)

Services	Industry Services	NA	Purchase to Pay	Better visibility to the new ERP system. Reduced ERP Implementation costs. Increased data quality. Reducing risks in ERP deployment.	2016	QPR (Finland)
Telecommunications	Telecommunications	NA	Purchase to Pay		2016	QPR (Finland)
Technology	Technology	NA	Purchase to Pay		2016	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2016	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase To Pay		2016	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2016	QPR (Finland)
Telecommunications	Telecommunications	NA	Quote to Cash		2016	QPR (Finland)
Services	Industry Services	NA	Service Delivery	Better visibility to the new ERP system. Reduced ERP Implementation costs. Increased data quality. Reducing risks in ERP deployment.	2016	QPR (Finland)
Telecommunications	Telecommunications	NA	Service Repair		2016	QPR (Finland)
Consumer Services	Wholesale	NA	Supply Chain Management		2016	QPR (Finland)
Financials	Banking	NA	Workflow management		2016	QPR (Finland)
Consumer Services	Wholesale	NA	Wholesale		2016	QPR (Finland)
Industrials	Electronics	NA	Electronics		2016	QPR (Finland)
Services	Professional Services	NA	Services		2016	QPR (Finland)
Telecommunications	Telecommunications	NA	Telecommunications		2016	QPR (Finland)
Consumer Goods	Personal & Household Goods	Xerox (India)	Process Optimization	Xerox is currently is starting to use process mining in order to develop new technology projects. The focus of these projects will be on characterizing and analyzing complex business processes, designing cost and performance optimized policies for execution, monitoring, and identifying scope for process improvements	2016	Xerox Algorithms & Optimization group
Financials	Insurance	UWV (Employee Insurance Agency) (Netherlands)	Correlation analysis	Authors presented such a framework and its implementation in ProM by defining an analysis use case composed of three elements (one dependent characteristic, multiple independent characteristics and a filter), and they can create a classification or regression problem. -The results of performing an analysis use case is a decision or a regression tree that describes the dependent characteristic in terms of the independent characteristics. -The evaluation has demonstrated the	2016	Eindhoven University of Technology (Eindhoven, Netherlands)

				usefulness of performing correlation analyses to gain insight into processes as well as of clustering event logs according to the results of performing analysis use cases.		
Telecommunications	Telecommunications	Telefónica (Spain)	Digital Operations	-Identification the sources of delays, inefficient communication patterns, and bad practices such as work orders performed out of the scheduled window. As a result, improvements could be made with measurable effects on both the operation costs and the quality of the services.	2016	Fluxicon (Netherlands)
Industrials	Logistic	Deutsche Post DHL Group (Germany)	Audit	Integration of process mining into DHL's audit process to improve both the time spent for the analysis and the depth of the information audited. -They found that process mining helps to reduce the audit time by 25% in comparison to classical data analytics. In addition, they are now able to identify unknown risks in processes, which helps to add more value to the audits.	2016	Fluxicon (Netherlands)
Technology	Technology	Zig Websoftware (Netherlands)	Housing allocation process	-Improving the housing allocation process. Every day that a rental property is vacant costs the housing association money. After process mining analysis, these vacancy costs could be reduced by 4,000 days within just the first six months.	2016	Fluxicon (Netherlands)
Utilities	Utilities	SPARQ Solutions (Australia)	Root case analysis	-Improving of the operations. -Discovering the actual problems and involve the relevant people in the root cause analysis. -Analyzing the overall dispatching process as well as the maintenance process for a single machine.	2016	Fluxicon (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Zimmer Biomet (Switzerland)	Value Stream Mapping	- Creating the value stream mapping with a process mining-based analysis of the manufacturing flow in a easier and effective way	2016	Fluxicon (Netherlands)
Services	Support Services	Dimension Data (South Africa)	Compliance	Each region was responsible for running their own operations with very little	2016	Fluxicon (Netherlands)

				enforced standards from a group perspective. The changing business landscape made it necessary for Dimension Data to standardize all their processes across all continents and process mining permitted it.		
Financials	Insurance	ALFAM	Process improvement	ALFAM is a subsidiary of ABN AMRO specializing in consumer credits. In the sales process, customer applications need to be assessed effectively and efficiently. For example, it is not worth to put a lot of time into an application when it is clear early on that the application cannot be granted. The case study shows how process mining was used to analyze ALFAM's processes from many different angles. She has analyzed variation, re-processing, waiting times, and service levels. By visualizing the processes and the process problems, improvement opportunities could be crystallized in a powerful way.	2016	Fluxicon (Netherlands)
Industrials	Logistic	GEFCO	Order and Invoice Process management	The aim of the project was to analyze the existing automated processes in play and based on this analysis, identify bottlenecks overburdened human resources, process variants due to their attributes and in latter cases, propose areas in which could benefit from additional optimizations. Gefco utilized Minit to reveal optimization opportunities in its automated business processes, resulting in 60% productivity increase.	2016	Minit j. s. a (Slovakia)
Financials	Banking	Bank 1 under NDA	Process Analysis	Analysis of Payment Order Processing process. Analysis of correction/verification team performance. Identification of infrastructural problems in the involved bank infrastructure.	2016	Minit j. s. a (Slovakia)
Financials	Banking	Bank 2 under NDA	Process Analysis	Analysis of Payment Order Processing process. Analysis of correction/verification team	2016	Minit j. s. a (Slovakia)

				performance. Identification of infrastructural problems in the involved bank infrastructure.		
Technology	Technology	One of the biggest online games providers under NDA	Online game clickstream processing	Analysis aimed at monetization in online gaming, trying to answer questions: - what is the behaviour of people leaving the game at a certain moment - which people and why buy certain extension packs in the game	2016	Minit j. s. a (Slovakia)
Public	Public Administration and Government Bodies	Vysoka skola manazmentu / City University of Seattle programs	Compare the utilization of the e-learning platform by different student groups.	Monitor behavior of Moodle users by visualizing the process map Display platform usage in a dynamic animation of the process Analyze statistics and metrics of the process and its variants Analyze the success of individual online activities, evaluate their attractiveness and replace those with low attendance. ^[1] The project also led to the creation of ideal study roadmaps for each subject. Minit identified an optimal course of study and time requirements for online activities for prospective students.	2016	Minit j. s. a (Slovakia)
Financials	Banking	Financial Insitution 1 under NDA	Mortgage Approval Process	Analysis of Mortgage Approval process. Data preprocessing from 10 internal systems.	2016	Minit j. s. a (Slovakia), KPMG CZ
Financials	Insurance	Financial Insitution 2 under NDA	Claim Processing	Analysis of the work load of teams of claim processing team and claim preparation team in order to answer the question: why do the teams need to perform working Saturdays once in a while.	2016	Minit j. s. a (Slovakia), Trask
Financials	Banking	ALFAM Consumer Credit (Netherlands)	Sales Process	They analyzed variation, re-processing, waiting times, and service levels. -By visualizing the processes and the process problems, improvement opportunities could be crystallized in a powerful way	2016	
Services	Professional Services	NA	Invoicing		2015	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Invoicing		2015	QPR (Finland)
Technology	Technology	NA	Invoicing		2015	QPR (Finland)

Technology	Technology	NA	ITIL Service Management	2015	QPR (Finland)
Technology	Technology	NA	ITIL Service Management	2015	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Laboratory	2015	QPR (Finland)
Industrials	Logistic	NA	Mailman working day	2015	QPR (Finland)
Industrials	Manufacturing	NA	Manufacturing	2015	QPR (Finland)
Industrials	Manufacturing	NA	Manufacturing	2015	QPR (Finland)
Consumer Services	Retail & E-Commerce	NA	Marketing & Sales	2015	QPR (Finland)
Services	Professional Services	NA	Marketing & Sales	2015	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2015	QPR (Finland)
Technology	Technology	NA	Order to Cash	2015	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash	2015	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2015	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2015	QPR (Finland)
Basic Materials	Chemicals	NA	Order to Cash	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Order to Cash	2015	QPR (Finland)
Telecommunications	Telecommunications	NA	Order to Cash	2015	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2015	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Order to Cash	2015	QPR (Finland)
Utilities	Utilities	NA	Order to Cash	2015	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	2015	QPR (Finland)
Services	Professional Services	NA	Production	2015	QPR (Finland)
Industrials	Manufacturing	NA	Project Management	2015	QPR (Finland)
Technology	Technology	NA	Purchase to Pay	The analysis was conducted for the invoicing process and for a number of selected customers, all using Basware's invoicing system. They managed to analyse the number of open invoices in order to make comparisons between different invoice types or vendors	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		QPR (Finland)
Industrials	Manufacturing	NA	Purchase to pay	2015	QPR (Finland)
Basic Materials	Chemicals	NA	Purchase to Pay	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase to Pay	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase to Pay	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase to Pay	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase to Pay	2015	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Purchase to Pay	2015	QPR (Finland)

Public	Public Administration and Government Bodies	NA	Purchase to Pay		2015	QPR (Finland)
Technology	Technology	NA	Information Technology		2015	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Food		2015	QPR (Finland)
Technology	Technology	NA	Information Technology		2015	QPR (Finland)
Public	Education	Latin American University (Colombia)	Risk evaluation	Quantifying the level of financial risk associated with each IT service supporting the business process, taking into account different scenarios (optimistic, stable, pessimistic) -Measuring the expected incomes of business processes, the probability for IT threats, and the changes on the performance of its quality attributes. -Analyzing historic events to quantify the impact of IT failures depending on different time horizons (i.e. daily, n-day) and confidence levels (occurrence probability).	2015	Systems and Computing Engineering Department, School of Engineering, Universidad de los Andes, Bogota (Colombia)
Public	Community, Social and Personal Services	Opéra de Lausanne (Switzerland)	Users accesses analysis	Analysis of the users accesses of the Opera's Storage Area Network (SAN) in order to refine the organisation of the SAN.	2015	Ville de Lausanne (Switzerland)
Industrials	Transportation	Dockwise (Netherlands)	Procure-to-Pay processes	By using Process Mining was Dockwise able to: - Discover that 15% of the orders go through a different process. - Determine that are not always adhered to certain rules and procedural arrangements. - Optimize the quality and usefulness of the KPIs. - Business cases for improvement to establish the process based on facts . - To prepare the BI environment for the use of Process Mining.	2015	Zuiver ICT (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Atrium Hospital (Germany)	Conformance analysis	Process Mining was used in many ways, to obtaining many results: -Visualizing the pathway "Malignant Lymphoma " . -The duration of the different patients can easily be fixed and then analyzed . -Finding the difference in fixed times for	2015	Zuiver ICT (Netherlands)

Industrials	Industrial Engineering	Veco (Netherlands)	Quality Management (Six Sigma Analysis)	patients in whom a case manager is involved .	2015	Fluxicon (Netherlands)
				Veco is a precision metal manufacturer. With more than 15 years of experience in supply chain management, Joris is the operations manager and Six Sigma expert at Veco. He has used Minitab to statistically analyze the processes and drive improvements. According to him, Process mining can leverage the human process knowledge in a powerful way that classical Six Sigma analyses can't.		
Healthcare	Healthcare Facilities, Services & Equipment	Radboudumc (Netherlands)	Process improvement	Radboud university medical center is an academic hospital that is quite advanced in their adoption of electronic patient record systems, among other things, but process analysis and improvement remains as big a challenge as in all other hospitals as well. Process mining gave advantages to the improvement of healthcare processes based on the example of the Intensive care unit and the Head and Neck Care chain at Radboudumc.	2015	Fluxicon (Netherlands)
Public	Public Administration and Government Bodies	DUO (Netherlands)	Process improvement of finance request	Unlike typical workflow or BPM systems, event-driven architectures are set up as loosely-coupled process steps (which can be either human or automated tasks) that are combined in a flexible way. The new system was introduced with the goal to improve the speed of DUO's student finance request handling processes and to save 25% of the costs. Process mining can be used to very quickly uncover technical errors in the pilot phase of a new system, as well as gain transparency in the business KPIs for the new process.	2015	Fluxicon (Netherlands)
Public	Public Administration and Government Bodies	City of Lausanne (Switzerland)	Process improvement	Administrative processes are typically based on public laws and regulations. As such, you might think that they must be quite simple and well-structured, especially when compared to customer journey or	2015	Fluxicon (Netherlands)

Healthcare	Healthcare Facilities, Services & Equipment	Hospital in Mainkofen (Germany)	Care station for elderly people	<p>hospital processes. The truth, though, is that administrative processes can become very complicated as well.</p> <p>Léonard and his colleague Ines analyzed the construction permit process at the City of Lausanne, which is regulated by 27 different laws from Swiss federal law, cantonal law, and communal regulation. It takes an average of six months to obtain a construction permit in Lausanne, from when the demand is filed. The administrative and technical employees already handle a heavy workload, while external clients like architects and construction businesses have put pressure on the public works department to speed up the process.</p> <p>The objective of the study was to identify bottlenecks and inefficiencies in the process, of course without changing or removing any of the legally required steps. Léonard will take us on a journey through the project, with all its challenges, highlights, and findings. One of the problems was that there was no proper activity name and Léonard will show hands-on how he used text mining to pre-process the data.</p>	2015	Institut für Parallele und Verteilte Systeme (IPVS) der Universität Stuttgart (Germany)
				<p>The ward is an intensive care station for elderly people suffering from dementia and similar old-age diseases. Each of the patients needs care around-the-clock</p> <p>-Studied what real-world processes are executed</p> <p>-The process exhibit a relatively high repetition rate</p> <p>The process can be documented directly and time-saving in comparison to the current way</p>		

Telecommunications	Telecommunications	Telecommunication Company (Indonesia)	Customer fulfilment analysis	<p>The aim of process mining implementation is firstly to discover the typical customer fulfilment business process. It is also aimed at assessing the current rate of completed customer fulfilment, the typical component required for the process and the lead time for different types of customer requests.</p> <p>-The company can use the findings as a foundation to improve their business process. First the fact that the completion rate of the customer requests are found to be very low deserves further investigation. Findings regarding typical processes can be used to set standard sets of services which will be useful for prediction and planning of capacity</p>	2015	Institut Teknologi Sepuluh Nopember, Sukolilo, Surabaya, (Indonesia)
Healthcare	Healthcare Facilities, Services & Equipment	General Hospital of Valencia (Spain)	Health Process Tracking	<p>Performing a detailed review of how the surgery protocol is happening at the hospital is out of the scope of this paper. The main objective of this paper is to demonstrate the potential of the combination of indoor location systems with process mining techniques. Process mining techniques provides an easy to use way to achieve a view of the deployed process. The algorithm perfectly captures the features of the processes, showing them in an easy and understandable view that is accepted by the medical staff in a real environment.</p> <p>-With this information, the health professionals and managers can achieve a real view of the problems that are currently happening. This enables them the improvement of protocols with a better knowledge of the problems, increasing their efficiency and the probability of success for their further deployment in the real context.</p>	2015	Instituto Universitario de Investigación de Aplicaciones de las Tecnologías de la Información y de las Comunicaciones Avanzadas (ITACA), Universitat Politecnica de Valencia (Spain); Instituto de Investigación Sanitaria del Hospital Universitario y Politecnico La Fe (Spain)
Healthcare	Healthcare Facilities, Services & Equipment	Integrating the Healthcare Enterprise (IHE)	Audit and node authentication	Integrating the Healthcare Enterprise (IHE) defines in its Audit Trail and Node Authentication (ATNA) profile how real-	2015	Integrating the Healthcare Enterprise (IHE)

				world events must be recorded. Since IHE is used by many healthcare providers throughout the world, an extensive amount of log data is produced. In the research they investigate if audit trails, generated from an IHE test system, carry enough content to successfully apply process mining techniques. Furthermore they assess the quality of the recorded events in accordance with the maturity level scoring system.		
Healthcare	Healthcare Facilities, Services & Equipment	4 South Australian Hospitals (Australia)	Emergency Department Patient Treatment	This case study applied process mining techniques to patient flow data collected from patients presenting with chest pain at four South Australian hospitals. In particular, the study was a cross-organisational, comparative analysis that aimed to utilise routinely collected patient and treatment data to describe differences in the care processes associated with management of Acute Coronary Syndrome (ACS) practiced in the four hospitals.	2015	Queensland University of Technology (Brisbane, Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Toulouse Hospital (France)	Outpatient clinic redesign	Toulouse Hospital has decided to redesign an outpatient clinic in order to mutualize the 11 consulting services of 6 medical specialties. -Process Mining clearly appears as a good solution to support continuous improvement of complex and continuous (24/24) hospital processes. Furthermore, it could be a relevant tool in diagnosis phase and also to monitor activities.	2015	Quelques réflexions autour des métiers de l'Excellence Industrielle, du Supply-Demand Chain Management et de la Gestion du Changement (France); 2015 IEEE International Conference on Automation Science and Engineering (Sweden)
Public	Education	NA	ITIL Service Management		2014	QPR (Finland)
Financials	Banking	NA	Loan Approval	-Making right corrective actions and making the loan application process 40% faster. - Gaining a better understanding of	2014	QPR (Finland)

				why actual processes may differ, and measuring the performance of the system processes. -Monthly reports for comparing and analysing process performances. - Proactive process management via quick discovery of problem areas.		
Consumer Goods	Food & Beverage	NA	Logistics		2014	QPR (Finland)
Industrials	Construction & Materials	NA	Marketing & Sales		2014	QPR (Finland)
Industrials	Construction & Materials	NA	Order to Cash	-Measuring process performance based on ready defined indicators to ensure proactive actions to any discrepancies. - Quicker invoicing and improved cash flow from discovering and removing process bottlenecks. - Ability to continuously compare and value process performances and variations per country.	2014	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Order to Cash		2014	QPR (Finland)
Technology	Technology	NA	Order to cash		2014	QPR (Finland)
Consumer Services	Wholesale	NA	Order to Cash		2014	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2014	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Order to Cash		2014	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash	Process Transparency and finding out the ideal process. Process Development.	2014	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2014	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Order to Cash		2014	QPR (Finland)
Industrials	Manufacturing	NA	Purchase to Pay		2014	QPR (Finland)
Public	Public	NA	Purchase To Pay		2014	QPR (Finland)
	Administration and Government Bodies					
Industrials	Manufacturing	NA	Supply Chain Management		2014	QPR (Finland)
Basic Materials	Forestry & Paper	NA	Supply Chain Management		2014	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Warehouse Management		2014	QPR (Finland)
Technology	Technology	NA	Information Technology		2014	QPR (Finland)
Basic Materials	Industrial Metals & Mining	A steel manufacturer (UK) Strip Products (UK) NDA	Process improvement	Objective: -To investigate the flows of material through the route. -To get insights and practicable knowledge on the approach by using our own data.	2014	Tata Steel UK (UK)

				Results: -Shows issues with the flows -Shows the large number of processes actually undertaken -Shows issues with interpretation of the process.		
Healthcare	Healthcare Facilities, Services & Equipment	Isala Hospital (Netherlands)	Patients' records management	- Compliance analysis of the whole patients' records management. In average, 30 medical steps have been saved. -Reduction of the emergency management total duration	2014	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)
Public	Public Administration and Government Bodies	Ville de Lausanne (Switzerland)	Construction permit process	Analysis of construction permit process in order to find bottlenecks.	2014	Ville de Lausanne (Switzerland)
Telecommunications	Telecommunications	Norddeutscher Rundfunk (NDR) (Germany)	IT Service Management	-Analyzing Service Desk processes and building the foundation for an optimized Services Management	2014	Celonis (München, Germany)
Telecommunications	Telecommunications	Fiducia (Germany)	IT Service Management	Thousands of requests, service tickets and service calls need to be handled on a daily basis and must be responded to and kept track of immediately. Fiducia wished to implement automatic reporting. Results: -Reconstructed the entire dataset based on HP Service Manager (and SAP Solution Manager in the future). Now possible to perform long-time evaluations and process reconstructions based on the data saved in archives of the last 2-10 years. -Using live process reconstruction, the identification and elimination of bottlenecks, long-running tickets and process inefficiencies is now possible. To keep track of current trends, live monitoring dashboards have been established	2014	Celonis (München, Germany)
Telecommunications	Telecommunications	Hessischer Rundfunk (Germany)	IT Service Management	-Analyzing Service Desk processes and building the foundation for an optimized Services Management	2014	Celonis (München, Germany)

Consumer Goods	Personal & Household Goods	Siemens AG (Germany)	Service Process Management	With the continuously monitoring and analysis of new data from a multitude of SAP systems around the world, they obtained: - Evidence of weak points - Enabling constant improvement, harmonization and standardization of processes.	2014	Celonis (München, Germany)
Healthcare	Healthcare Facilities, Services & Equipment	Berufsgenossenschaftliche Unfallkrankenhaus Hamburg stands (Germany)	Service Process Management	Clearly assigned tasks, optimized flows of information as well as communication and collaboration across departments and occupation groups result in smooth work flows, short decision making processes and individual solutions. This enables the best possible treatment and rehabilitation of patients across all medical fields. A lean and highly focused organizational structure is an important factor in guaranteeing the best possible treatment.	2014	Celonis (München, Germany)
Healthcare	Pharmaceuticals & Biotechnology	Bayer (Germany)	Process compliance	Bayer AG possesses a highly complex system landscape with hundreds of millions of process instances within more than thirty SAP and Non-SAP systems. The goal of the project BayPat was to bring global transparency to the core processes (procurement, sales and logistics) in order to identify efficiency potentials and ensure process compliance. The solution: process mining is used to reconstruct and monitor global processes in relation to efficiency and risk beyond country, system and company borders. Processes as well as performance and risk indicators can be dynamically analyzed by users creating a completely unseen level of transparency.	2014	Celonis (München, Germany)
Healthcare	Healthcare Facilities, Services & Equipment	Kliniken Südostbayern (Germany)	Performance management for medicinal treatment	The hospitals work efficiently and are conscious of costs as well as revenues in order to stay successful and capable to act. Any profit is solely reinvested into the development of the clinics. Medicinal	2014	Celonis (München, Germany)

				<p>treatment is not performed based on profit but based on patient need.</p> <p>In order to maintain their good performance and efficiency the Kliniken Südostbayern constantly analyze their structure, organization, systems and processes and adjust their service offer and provision according to demands and changes. Such a consistent development can only be pursued based on solid data.</p> <p>The Kliniken Südostbayern have decided to use the Process Mining solution for hospital management as a tool to obtain all needed information. With Process Mining extracts all necessary data from the hospital information system (HIS) and provides a detailed view of treatment and management processes.</p>		
Financials	Banking	DZ-Bank (Germany)	Process data analysis	<p>Research, according to DZ Bank, has to be independent, customer-oriented, transparent and objective. This is why DZ Bank uses quantitative methods that have been scientifically approved when undertaking analyses and making recommendations.</p> <p>Of course business processes also require the highest possible level of transparency. Especially in the banking sector, the analysis of process data from source systems plays a very important role. Employees of the banking sector work with IT-systems every day, for example in relation to electronic files, creating process data continuously. Process mining permits the improvement of the analysis required.</p>	2014	Celonis (München, Germany)
Services	Support Services	IG Metall (Germany)	IT Service Management	<p>IG Metall places high expectations on its customer service and internal IT Service Management. That's why the IG Metall has opted for the use of Process Mining. Process Mining makes it possible to significantly improve efficiency and quality in the handling of customer requests by</p>	2014	Celonis (München, Germany)

				visualizing how inquiries are being processed in reality and thus uncovering process weaknesses.		
Telecommunications	Telecommunications	SWR (Germany)	IT Service Management	<p>The SWR makes the people in the Southwest of Germany the focus of its program: their stories, their way of life and their topics.</p> <p>The decision of multiple public German broadcasting companies to use Process Mining in the early phase of the company underlines the practical orientation our product concept is based on. The SWR uses the software assyst as its service desk solution and has now integrated the Process Mining for IT service management in order to analyze its service processes. This enabled the company to substantially improve its Service Management.</p>	2014	Celonis (München, Germany)
Industrials	Logistic	Schukat Electronic (Germany)	Order Process management	<p>As a catalog distributor of electronic components, the company puts high emphasis on the ability to deliver and on speed in processing orders. This requires an efficient warehouse, delivery and order management, which can only be accomplished through constant and high-quality IT support.</p> <p>Since complete transparency of business processes is also an important component of constant optimization, Process Mining is part of the IT landscape of the company. In conjunction with SAP HANA, Process Mining every day creates real-time transparency over the actual processes of Schukat Electronic.</p>	2014	Celonis (München, Germany)
Industrials	Automotive & Parts	Essmann Automotive (Germany)	Production process system	<p>By using and process mining the Eissmann production system, Eissmann creates efficient production processes. Integrated into lean corporate processes and into the management system, these represent a key pillar of its long-term success. By involving suppliers at an early stage in the product creation process and promoting team-</p>	2014	Celonis (München, Germany)

				oriented partnerships, Eissmann achieves products which are both excellent and competitive.		
Healthcare	Healthcare Facilities, Services & Equipment	Chicago Outpatient Clinic (US)	Analysis of Workflows in Clinical Care	<p>Process Mining was used for workflows analysis for outpatient clinic center, admitting high-risk patients and low-risk patients.</p> <p>Based on the results from process mining, a discrete event simulation model is proposed to quantitatively analyze the clinical center. Sensitivity analyses have also been carried out to investigate the care activities with limited resources such as doctors and nurses. The results suggest that this methodology is a useful and flexible tool for healthcare process performance improvement.</p>	2014	Department of Mechanical and Industrial Engineering, University of Illinois at Chicago (US)
Public	Public Administration and Government Bodies	Centraal Bureau voor de Statistiek (Netherlands)	Statistic analysis	<p>Statistics Netherlands is responsible for collecting and processing data in order to publish statistics to be used in practice, by policymakers and for scientific research.</p> <p>With process mining they have improved their performances</p>	2014	Fluxicon (Netherlands)
Financials	Banking	ING (Netherlands)	Website and call center improvements	<p>Making sure a customer has the best possible experience when interacting with your company is one the most important goals many companies strive for. In light of this ING DIRECT Australia asked for an in-depth analysis of the behavior of their customers on their website before they called the call center. Using process mining they were able to get valuable business insight to make better decisions on how to further develop both their website and call center.</p>	2014	Fluxicon (Netherlands)
Financials	Banking	Rabobank (Netherlands)	Process improvement	<p>The Rabobank has performed dozens of process mining projects over the past years. Today, it is one of the most successful companies in using process mining for driving change and continuous improvement.</p>	2014	Fluxicon (Netherlands)

Financials	Insurance	MLP Finanzdienstleistungen AG, Germany	Process improvement	The IT at MLP is facing the same challenges as other IT departments everywhere: Delivering excellent IT support for the business, while keeping an eye on costs and demonstrating the value they deliver. Process mining can help to achieve just that by making the actual processes transparent, highlighting waste, and measuring compliance. The case study discusses the benefits such as objectifying the discussion and challenges like getting the data.	2014	Fluxicon (Netherlands)
Financials	Compliance	KPMG (Netherlands)	Audit	Process mining can not only be used for process improvement, but also for compliance purposes. Are the controls that are in place to reduce risk and fraud actually working? Processes are often documented on paper but running differently in reality. The case study shows the results of multiple client projects, where process mining was applied as an additional auditing tool.	2014	Fluxicon (Netherlands)
Industrials	Automotive & Parts	Volvo (Germany)	Paths discovery	A first dataset provides data about factory orders for the construction of trucks. The second dataset contains customer orders of trucks. It was discovered that the attribute 'ORDERNUMBER' of any event in a trace of the first event log was also displayed in the attribute 'Omnumber' of the event 'Accepted' in the second event log.	2014	Ghent University, Department of Business Informatics and Operations Management, (Belgium)
Healthcare	Healthcare Facilities, Services & Equipment	EU project's MOSAIC	Datasets of Type 2 Diabetes analysis	Process mining methods in order to derive healthcare pathways. The approach starts by processing raw data, derived from heterogeneous data sources, and create event logs, which contain meaningful healthcare activities. Once event logs have been obtained and tasks and transitions defined, it is possible to explore how state-of-art process mining techniques can be used to gain insights into patients care.	2014	International Conference on Biomedical and Health Informatics (Spain)

Healthcare	Healthcare Facilities, Services & Equipment	Scottish Rite Emergency Department of Children's Healthcare of Atlanta (US)	Pediatric asthma emergency department (ED) processes	Process mining's visual analytics can play an important role in healthcare process analysis. The interactive visual approach enables users to gain insight into the complexity of pediatric asthma care processes. It could help with care quality improvement programs, provider comparison and benchmarking, and analysis of conformance to existing care protocols. An extension that "matches" patients based on a selected care process could potentially make cohort identification far more efficient and possibly even more accurate. Similarly, if certain activities are deemed to be "markers" for a specific clinical condition analysis of the care patterns of all patients with those markers might be used to identify clinical care process variations and their relative impacts on outcomes and costs.	2014	School of Interactive Computing & Tennenbaum Institute, Georgia Institute of Technology (US)
Technology	Technology	NA	Software Development		2013	QPR (Finland)
Technology	Technology	NA	Web Visitor Analysis		2013	QPR (Finland)
Technology	Technology	NA	Information Technology		2013	QPR (Finland)
Consumer Services	Wholesale	NA	Wholesale		2013	QPR (Finland)
Financials	Insurance	Suncorp (Australia)	Home Insurance Claim	This project aimed to apply process-oriented data mining (process mining) to Home Insurance Claims processing records provided by Suncorp with a view to find insight into the reasons behind lengthy processing times. - Evidence of two major loops, which represented bottlenecks for the entire process. - Processing time reduction from 30-60 days to 5 days (within the SLA conditions)	2013	Queensland University of Technology (Brisbane, Australia)
Telecommunications	Telecommunications	Pitney Bowes Inc. USA	LOB: Customer Service <u>Area</u> : Call Center	Use Cases: ● Customer Satisfaction Improvement and Cost Reduction in a very short period of time ● In just 2 weeks after deploying StereoLOGIC, the team has revealed the Average Wasted Time of 43.5% and	2013	StereoLOGIC (Canada)

				<p>Average Error Rate of 20%</p> <p>Results:</p> <ul style="list-style-type: none"> ● Cut customer service response time by 56% ● Reduced operational costs by 30% ● Reduced the error rates (errors in servicing customers) from 20% to ~0% ● Achieved 8 consecutive months above 65% NSAT (Global Corporate Target for Customer Satisfaction – first team to achieve globally) 		
Consumer Goods	Personal & Household Goods	Samsung Electro-Mechanics (South Korea)	Conformance analysis and machine performance analysis	<p>Process modeling and conformance analysis and the machine performance analysis. Results:</p> <ul style="list-style-type: none"> -The derived process model shows real process flows in the factory and is used to understand the manufacturing process. -The conformance checking shows how traces fit with the derived model. -The machine performance analysis shows the utilization of their resources. -The analysis results were presented to the managers of SEM, who were impressed by the obtained results. -The results will be used to improve their processes. In particular, the performance parameters will be used for a factory simulation in the e-FEED system that is the integrated design and analysis system for optimized manufacturing line development. 	2013	Ulsan National Institute of Science and Technology (South Korea)
Healthcare	Healthcare Facilities, Services & Equipment	Children's National Medical Center (Columbia)	Adherence to ATLS protocol analysis	<p>The traces can be compared with an ideal process model (conformance process mining) or with each other to determine the inherent process model (discovery process mining).</p> <ul style="list-style-type: none"> -Through process mining they determine compliance with the ATLS protocol sequence, review the most commonly occurring sequence and individual deviations, detect differences in clinical 	2013	American College of Surgeon's 99th Clinical Congress, Surgical Forum (US)

				behavior after the introduction of the checklist. Although the frequency of activations without notification was not reduced, the addition of the checklist to the trauma resuscitation routine helped standardize the care provided specifically for these events.		
Healthcare	Healthcare Facilities, Services & Equipment	37 hospitals located in the Lombardia Region (Italy)	Patient treatment	The work showed that process mining and case retrieval techniques can be applied successfully to clinical data to gain a better understanding of different medical processes adopted by different hospitals (and for different groups of patients). It is interesting to analyze the differences, to establish whether they concern only the scheduling of the various tasks or also the tasks themselves. In this way, not only different practices may be discovered that are used to treat similar patients, but also unexpected behavior may be highlighted.	2013	Computer Science Institute, Università del Piemonte Orientale, Alessandria (Italy); Dipartimento di Informatica e Sistemistica, Università di Pavia (Italy); IRCCS Fondazione "C. Mondino", Pavia, (Italy)
Industrials	General Industrials	Boxes manufacturing unit, (India)	Process modelling and improving	The raw data includes information about events referring to an activity and a case. The information from corrugated boxes manufacturing unit is analyzed using alpha mining algorithm and heuristic mining algorithm. The alpha mining algorithm is used to construct a model which elucidates the activities observed in the event log, noise and exceptions are effectively handled by heuristic mining algorithm -The generated process model reflects the actual process as observed through real process executions. -The heuristic mining algorithm gives the clear information how the process is executed and analysis of the process can be evaluated to improve the performance of manufacturing	2013	Department of Computer Science and Applications, Dayananda Sagar College of Arts (India); Science and Commerce, (India)
Healthcare	Healthcare Facilities, Services & Equipment	Gynecologic Oncology Department (Belgium)	Patient treatment deviation analysis	Using process mining techniques research has demonstrated that the patients' diagnosis-treatment cycles often significantly deviate from the standardized	2013	Department of Decision Sciences and Information Management,

				<p>clinical pathways.</p> <ul style="list-style-type: none"> -Analyzing these deviations might result in the further enhancement of the quality of care, the promotion of patient safety, an increase in patient satisfaction and an optimization of the use of resources. -Understanding pathway behavior and deviations becomes possible because of an increased availability of reliable data, which originates from the hospitals information systems. 		Faculty of Economics and Business, Leuven (Belgium)
Healthcare	Healthcare Facilities, Services & Equipment	Many European academic hospital	Diagnosis treatment cycle	<p>Research has demonstrated that the patients' diagnosis-treatment cycles often significantly deviate from the standardized clinical pathways. Analyzing these deviations might result in the further enhancement of the quality of care, the promotion of patient safety, an increase in patient satisfaction and an optimization of the use of resources. Understanding pathway behavior and deviations becomes possible because of an increased availability of reliable data, which originates from the hospitals information systems.</p>	2013	Department of Decision Sciences and Information Management, Faculty of Economics and Business, Leuven (Belgium)
Healthcare	Healthcare Facilities, Services & Equipment	Chania Hospital (Greece)	Clustering healthcare processes	<p>The aim is to support decision making by providing comprehensible process models in the case of such flexible environments. Following a process mining approach, they propose a methodology to cluster customers' flows and produce effective summarizations. Then they propose a novel method to create a similarity metric that is efficient in downgrading the effect of noise and outliers. It was used a spectral technique that emphasizes the robustness of the estimated groups, therefore it provides process analysts with clearer process maps.</p>	2013	Eastern Macedonia and Thrace Institute of Technology (Greece); Technical University of Crete, University Campus (Greece)
Public	Public Administration and Government Bodies	Auditdienst Rijk (Netherlands)	Assurance on the financial statements	<p>The Dutch National Auditing Service monitors the annual reports of all Dutch ministries and provides assurance on the financial statements that are included. In</p>	2013	Fluxicon (Netherlands)

				2013 they have used process mining to perform their audits in a more efficient way.		
Financials	Insurance	Suncorp (Australia)	Process improvement	Suncorp, Australia's largest insurance provider, have an established BPM team and process management methodology, and a single claims-processing IT platform. Suncorp is integrating process mining into their existing process management methodology at a range of points across the process lifecycle. They have also explored connecting process mining results to service process outcome measures, like customer satisfaction.	2013	Fluxicon (Netherlands)
Industrials	Automotive & Parts	Volkswagen (Germany)	Process improvement	Process mining is particularly interesting when you can apply it to high-volume processes in different entities around the world. This case study talks about the experiences in an analysis project of the ordering process of Volkswagen AG, one of the biggest purchasing processes of the world. At the end of the project, the results were reviewed by different types of stakeholders in a joint workshop.	2013	Fluxicon (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	IBM T. J. Watson Research Center, NY, (US)	Paths discovery	Identifying care pathways correlated with outcomes from patient event data is of vital importance for gaining the insights of which specific care pathway will lead to a good/bad outcome. Once identified, such care pathways could be used by medical boards for refining care plan descriptions for treating particular diseases such as congestive heart failure etc.	2013	IBM
Healthcare	Healthcare Facilities, Services & Equipment	St Andrew's War Memorial Hospital (Australia)	Emergency Department Patient Treatment	This project aimed to apply process-oriented data mining (process mining) to provide insights into St Andrew's War Memorial Hospital's (SAWMH) process for treating patients presenting at the Emergency Department (ED) with chest pain. The project conducted performance analyses and comparisons to uncover	2013	Queensland University of Technology (Brisbane, Australia)

				efficiencies and delays. Specifically the study involved process discovery and comparison of patient flows associated with patients whose stay in ED was less than 4 hours with those whose stay was longer than 4 hours. The study also aimed to investigate potential delays introduced to the patient flows as a result of conducting routine clinical activities (such as blood tests and X-ray imaging) and the determination of factors that influence patients' length of stay in ED.		
Healthcare	Healthcare Facilities, Services & Equipment	Dutch clinic (Netherlands)	Ambulant surgery process	It was used the log of a Dutch clinic for the ambulant surgery process. It is a sequential process that deals with both ambulant patients and ordered stationary patients.	2013	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Maastricht University Medical Centre (Netherlands)	Patient routes in a medical Treatment process	The study has used both the heuristic and the fuzzy miner for the process analysis. It is concluded that the heuristics miner is not able to show all low frequent behavior which makes it difficult to use for extension/improvement research in the medical domain. The fuzzy miner is able to show this behavior but must be accompanied by the Conformance Checker to make sure that all discrepancies are found between the original process and the acquired event log	2013	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands); Maastricht University Medical Centre (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Seoul National University Bundang Hospital (South Korea)	Performance Analysis per patient type	Performance analysis to make a simulation model and analyzed the process patterns according to patient types. The results and applications are following: -According to the result of comparing the event log and their standard process model, the matching rate was as 89.01%. That is, they relatively well understood workflows of outpatients and the process was well-managed by the hospital. -Using the performance analysis result, we	2013	Ulsan National Institute of Science and Technology (South Korea)

				<p>generated the simulation model. The simulation shows that the 10% increase of patients makes the largest change in consultation waiting time. Thus, we recommended less than 10% of increase.</p> <p>-Extracted the process models and analyzed the process patterns according to patient types. The most frequent pattern of each patient type was discovered. The patterns are used to build a smart guidance app in the ubiquitous healthcare system in the hospital.</p>		
Industrials	Logistic	Package Delivery Company (Belgium)	Machine Configuration	<p>-Evaluation of the correctness of the configuration of the state machine.</p> <p>-Investigation of a huge number of abnormal flows that have been identified by business users.</p> <p>-Link the different states and events back to the business process.</p>	2012	AE architects for business & ICT (Belgium)
Basic Materials	Chemicals	AkzoNobel (Netherlands)	Procure-to-Pay processes	<p>The following results were achieved:</p> <p>-Management obtained insights into exceptions where the 'First time right' principle was not realized.</p> <p>-Peer comparisons between countries helped to identify best practices that can be adopted on the corporate level.</p> <p>-The direct insights in process improvements enabled the desired 'value extraction' from the P2P processes.</p> <p>-Compliance control was realized to execute on corporate guidelines that must be followed.</p>	2012	Capgemini
Utilities	Utilities	Alliander (Netherlands)	Purchasing	<p>The Challenges:</p> <p>-Company managers think they know how processes work, but are not sure</p> <p>-Find a process mining solution that can be applied to multiple processes and departments</p> <p>-Discover areas of inefficiency</p> <p>-Staff members have different ways of completing the same process</p>	2012	Perceptive Process Mining, Lexmark (Lexington, Kentucky)

				<p>The Results:</p> <ul style="list-style-type: none"> -Quick insight into how processes really work -Extensive list with potential areas for improvement -Improved process insight delivers efficiency improvements -Complete picture of eight business processes allows for standardisation and staff re-training 		
Industrials	Industrial Engineering	Vaisala (Finland)	Service Repair	-Making effective operations and improved customer satisfaction through clear visual understanding of the real process and the deviations. -Reducing operational costs and time to corrective actions by having the means for effective change management, through fast verification and follow-up of process changes. -Sales process optimization through understanding of the process flows, and the ability to benchmark performances	2012	QPR (Finland)
Utilities	Utilities	NA	Accounts Payable		2012	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Application Management		2012	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Case Management		2012	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Healthcare		2012	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Healthcare		2012	QPR (Finland)
Public	Education	NA	ITIL Service Management		2012	QPR (Finland)
Public	Public Administration and Government Bodies	NA	Loan Approval		2012	QPR (Finland)
Consumer Services	Car Dealership	NA	Marketing & Sales		2012	QPR (Finland)
Services	Industry Services	NA	Marketing & Sales		2012	QPR (Finland)
Financials	Real Estate	NA	Marketing & Sales		2012	QPR (Finland)

Consumer Services	Car Dealership	NA	Marketing & Sales		2012	QPR (Finland)
Consumer Services	Car Dealership	NA	Marketing & Sales		2012	QPR (Finland)
Technology	Technology	NA	Order to Cash		2012	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2012	QPR (Finland)
Consumer Goods	Food & Beverage	NA	Order to Cash		2012	QPR (Finland)
Industrials	Manufacturing	NA	Order to Cash		2012	QPR (Finland)
Industrials	Manufacturing	NA	Project Management		2012	QPR (Finland)
Healthcare	Healthcare Facilities, Services & Equipment	NA	Referral to Surgery to Discharge		2012	QPR (Finland)
Industrials	Manufacturing	NA	Service Repair	-Making effective operations and improved customer satisfaction through clear visual understanding of the real process and the deviations. -Reducing operational costs and time to corrective actions by having the means for effective change management, through fast verification and follow-up of process changes. -Sales process optimization through understanding of the process flows, and the ability to benchmark performances	2012	QPR (Finland)
Telecommunications	Telecommunications	WDR (Germany)	IT Service Management	NA	2012	Celonis (München, Germany)
Healthcare	Healthcare Facilities, Services & Equipment	Dentistry (Netherlands)	Patient treatment	For a complex dental process, it turns out that the introduction of new digital technologies is largely beneficial for patients and dental lab owners, whereas for dentists there is hardly any benefit. -The effects of digital dentistry on the implant value chain is investigated using process mining and discrete event simulation. The implant value chain is concerned with all steps that can be associated with dental implants, covering the stages from patient diagnosis until implant placement.	2012	Eindhoven University of Technology (Eindhoven, Netherlands); Perceptive Software, (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Hospital of Sao Sebastiao, (Portugal)	Emergency Services	The proposed methodology was applied in the emergency service of a hospital that has its own electronic patient record system, developed in-house. Event data collected from this system was analyzed with a special- purpose tool as well as with	2012	Hospital de Sao Sebastiao, Santa Maria da Feira, (Portugal); Technical University of Lisbon (Portugal)

				plug-ins available in the ProM framework. Using the radiology workflow as an example, they showed how the proposed methodology can provide insight into the flow of healthcare processes, their performance, and their adherence to institutional guidelines.		
Financials	Banking	Bank of Queensland, (Australia)	NDA	NDA	2012	Queensland University of Technology (Brisbane, Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Princess Alexandra Hospital (Australia)	Emergency Department Patient Treatment	This project aimed to apply process-oriented data mining (process mining) to provide insights into Princess Alexandra Hospital's (PAH) 'as is' processes for treating patients presenting at the Emergency Department with multiple traumatic injuries. Specifically, the study involved process discovery and comparison of patient flows associated with various cohorts of patients including (i) patients presenting with minor and major trauma, and (ii) patients presenting at different times of the day.	2012	Queensland University of Technology (Brisbane, Australia)
Public	Education	Queensland University of Technology (Australia)	Student Services	This project aimed to apply process-oriented data mining (process mining) to analyse student behaviour (through the use of Blackboard data) in order to increase student retention.	2012	Queensland University of Technology (Brisbane, Australia)
Consumer Services	Retail & E-Commerce	Woolworths (Australia)	Logistic Process	This project aimed to apply process-oriented data mining (process mining) to provide insights into Woolworths' Delivery Process. Specifically, the study involved process discovery of the delivery process, and the identification of optimal delivery routes.	2012	Queensland University of Technology (Brisbane, Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Royal Prince Alfred Hospital Sydney (Australia)	Patient treatment	Gaining Insight from HIV/AIDS Patient Journey Data using a Process-Oriented Analysis Approach with process mining.	2012	School of Information Technologies The University of Sydney, Australia (Australia)

Healthcare	Healthcare Facilities, Services & Equipment	Dutch Academic Hospital (Healthcare)	Analysis of Patient Treatment Procedures	Given the heterogeneous nature of these cases, the research first demonstrates that it is possible to create more homogeneous subsets of cases (e.g., patients having a particular type of cancer that need to be treated urgently). Such preprocessing is crucial given the variation and variability found in the event log. The discovered homogeneous subsets are analyzed using state-of-the-art process mining approaches. More specifically, they report on the findings discovered using enhanced fuzzy mining and trace alignment. A dedicated preprocessing ProM plug-in was developed for this challenge.	2012	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands) Philips Healthcare
Healthcare	Healthcare Facilities, Services & Equipment	Department of Ophthalmology at the University Hospital of Leipzig (Germany)	Workflow Management	Objective: Workflow guidance of surgical activities is a challenging task because of variations in patient properties and applied surgical techniques. The objective was the design and implementation of a surgical workflow management system (SWFMS) that can provide a robust guidance for surgical activities. Results: They demonstrated that a SWFMS with a workflow schema that was generated from a subset of 10 patient individual surgical process models (iSPMs) is sufficient to guide approximately 65% of all surgical processes in the total set, and that a subset of 50 iSPMs is sufficient to guide approx. 80% of all processes.	2012	University of Leipzig, Innovation Center for Computer Assisted Surgery (ICCAS) (Germany); University Hospital of Leipzig Department of Ophthalmology (Germany); University Hospital of Leipzig, Department of Neurosurgery (Germany); University of Leipzig, Innovation Center for Computer Assisted Surgery (ICCAS) (Germany)
Healthcare	Healthcare Facilities, Services & Equipment	Medical University of Vienna (Austria)	Compliance analysis for treatment processes	The goal of the project is to analyze skin cancer treatment processes regarding their compliance with relevant guidelines. Focus was put on the transformation and integration of the available data sources as well as billing data of the Main Association of Austrian Social Security Institutions. The	2012	University of Vienna (Austria); Medical University of Vienna (Austria)

				challenge was to extract and integrate the data in a process-oriented way in order to apply process mining techniques in the sequel.		
Basic Materials	Forestry & Paper	NA	Supply Chain Management		2011	QPR (Finland)
Telecommunications	Telecommunications	NA	Work Order, Delivery		2011	QPR (Finland)
Financials	Insurance	Motor Accident Insurance Commission (Australia)	Compulsory Third Party (CTP) Claim	This project aimed to apply process-oriented data mining (process mining) to historical CTP claims processing records provided by multiple CTP insurance providers with a view to exposing impediments to efficient (time & cost) claims handling and to determine the impact of various “context” factors on the process execution.	2011	Queensland University of Technology (Brisbane, Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Mercy Health System St. Louis, MO (US)	Clinical workflow management	<ul style="list-style-type: none"> - Automating the method of documenting clinical workflows - Identify varying clinical workflows -Optimizing clinical workflows 	2011	The Healthcare Business Process Management Blog
Financials	Insurance	United India Insurance Company LTD. (India)	Paths discovery	<p>Process mining techniques was used to obtain meaningful knowledge about flows, to discover typical paths followed by particular groups of Insurance holders.</p> <ul style="list-style-type: none"> -Obtaining understandable mined process models for large groups of services to identify the same and different insurance holder process -The results are not derived by human thinking, it goes as per the recorded information and hence the automated mined process model helps the insurance agent, well sufficient for the better insurance holder process. 	2011	Bharathiar University, Coimbatore Dept. of IT in VEL TECH, Technical University, Avadi, Tamil Nadu, (India); Department of Computer Science, Rashtriya Sanskrit Vidyapeetha, Tirupati, Andhra Pradesh, (India)
Financials	Insurance	Association of Certified Fraud Examiners (ACFE) (US)	Transactional logs analysis	Process mining offers the ability to objectively extract a model out of transactional logs. In the light of finding flaws in the process under investigation, this open mind setting is a very important characteristic. Also the ability of monitoring internal controls is very promising. Authors presented a case study in which they	2011	Faculty of Business Economics, Hasselt University, Agoralaan, (Belgium); Technische Universiteit

				applied process mining in the context of transaction fraud. Given the procurement process of an organization using SAP as ERP system, they applied the process diagnostics approach to discover the real process and to analyze flaws, i.e., to discover cases that are not compliant. -This enables the explicit possibility of checking internal controls and business rules in more general. This way, process mining enables auditing by not only providing theory and algorithms to check compliance, but also by providing tooling that help the auditor to detect fraud or other flaws in a much earlier stage.		Eindhoven, (Netherlands)
Financials	Insurance	Queensland Nominal Defendant (Australia)	NA	NA	2011	Queensland University of Technology (Brisbane, Australia)
Healthcare	Healthcare Facilities, Services & Equipment	Clinical Application Domain (Hospital for Sick Children, Toronto & Women and Infants Hospital, Providence, Rhode Island) (Canada, US)	Patient treatment modeling	This paper presents a framework for process mining in critical care. The framework uses the CRISP-DM model, extended to incorporate temporal and multidimensional aspects (CRISP-TDMn), combined with the Patient Journey Modeling Architecture (PaJMa), to provide a structured approach to knowledge discovery of new condition onset pathophysiologies in physiological data streams. The approach is based on temporal abstraction and mining of physiological data streams to develop process flow mappings.	2011	University of Ontario Institute of Technology, Oshawa (Canada); The Hospital for Sick Children, Toronto (Canada) Department of Paediatrics, University of Toronto, Toronto (Canada)
Healthcare	Healthcare Facilities, Services & Equipment	Verbeeten Institute (Netherlands)	Achieve standardization in healthcare processes	Goal: to help healthcare organizations achieving a standardized and high quality care process by using historic information gathered by registering the day-to-day operations with a healthcare information system. The research project successfully evaluates the applicability of process and data mining	2010	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)

				techniques in the context of the problem definition. However, it must be stated that the unavailability of exact activity and waiting time metrics significantly restricted simulation capabilities		
Healthcare	Healthcare Facilities, Services & Equipment	EncounterPRO Healthcare Resources, Atlanta, USA	Systematic Optimization of EHR Efficiency	<p>The goal was to improve medical practice throughput and throughput time using process mining to visualize, compare, and improve ambulatory EHR patient encounter task workflows, by:</p> <ul style="list-style-type: none"> -Generating process models of existing practices. -Comparing measures of productivity (throughput and throughput time). -Explaining differences in productivity in terms of differences in processes. -Suggesting process improvements for low productivity practices. <p>They chose nine pediatric practices relying on the same EHR workflow management system and they compared throughput and throughput times across the practices for October (traditionally a busy month for pediatricians).</p> <p>The goal was to systematically improve EHR WfMS efficiency, by using process mining as a negative feedback control model.</p>	2010	EncounterPRO Healthcare Resources, Atlanta, USA
Healthcare	Healthcare Facilities, Services & Equipment	Maastricht University Medical Centre (Netherlands)	Conformance analysis on clinical pathways	The researchers develop and test dynamic programming formulations for adherence measurement in clinical pathways – based on partially ordered data in medical records and pathway definitions. With these new methods at hand, they analyzed clinical pathway adherence at the Cardiovascular Center of Maastricht University Medical Center.	2010	Institute of Health Policy & Management, Erasmus Medical Centre, Rotterdam, (Netherlands); Maastricht University Medical Centre, Maastricht (Netherlands); Maastricht

						Instruments, Maastricht, (Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Dutch Hospitals (Netherlands)	Process improvement for diabetes foot patients	The project was divided in three phases process visualization, process analysis, and evaluation. During these phases, two approaches, process mining and visual analytics were used to visualize and analyze a business case. Based on the outcomes of this, the method was developed. The main finding is these phases was the fact that process mining and visual analytics as such do not provide with sufficient process insight. Rather, a combination of both approaches is required	2009	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	University Hospital Leipzig (Germany)	Analysis of surgical intervention populations	According to differences in patient characteristics, surgical performance, or used surgical technological resources, surgical interventions have high variability. Statistical differences between the gSPMs of ambulatory and inpatient procedures of performance times for surgical activities and activity sequences were identified	2009	Universität Leipzig, Leipzig (Germany); Faculty of Medicine, INSERM, Rennes (France); VisAGeS Unit/Project, INRIA, Rennes, (France);
Technology	Technology	ASML (Netherlands)	Test Processes	ASML is the world's leading manufacturer of chip-making equip- ment and a key supplier to the chip industry. Authors demonstrated that current process mining techniques can already answer many questions, even yield concrete suggestions for process improvement also in as complex environments as the wafer scanner qualification phase of ASML. However, due to the rapid tech- nological advancements, the analysis results presented are likely to be outdated already for the next series of wafer scanners than the ones that we analyzed. To enable a continuous improvement of the test process in ASML, process analysis should be best carried out in an iterative manner.	2009	IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS

Public	Public Administration and Government Bodies	Dutch governmental organization (Netherlands)	Process Diagnostics	<p>The diversity of current research in this area makes it hard to see how to apply process mining within organizations. Authors propose a process diagnostics methodology, that gives a broad overview of the process supported by the information system. The methodology only uses some of the available analysis methods, and can be performed in a short period of time.</p> <p>-In the process diagnostics methodology, several perspectives of the process are highlighted. The outcome covers the control flow perspective, i.e. "how the process model actually looks like", the performance perspective, i.e. "how well does the system perform" and the organizational perspective, i.e. "who is involved in the process and how". The outcome of the methodology can be used for further analysis on specific topics.</p>	2009	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Zhejiang Huzhou Central hospital (China)	Patient workflow	<p>This study adopts process mining to analyze clinical pathways. The key contribution of the paper is to develop a new process mining approach to find a set of clinical pathway patterns given a specific clinical workflow log and minimum support threshold.</p> <p>The experimental results indicate the applicability of the proposed approach, based on which it is possible to discover clinical pathway patterns that can cover most frequent medical behaviors that are most regularly encountered in clinical practice.</p>	2008	College of Biomedical Engineering and Instrument Science, Zhejiang University (China)
Healthcare	Healthcare Facilities, Services & Equipment	4 Italian Hospitals (Italy)	Patient treatment	<p>Process mining was used to discover how stroke patients are treated in different hospitals. First there was a need for intensive preprocessing of clinical events to build the event logs. Then the ProM framework was used along with the Heuristic Miner to gain insights about the</p>	2008	Eindhoven University of Technology (Eindhoven, Netherlands); Dept. Computer and System science,

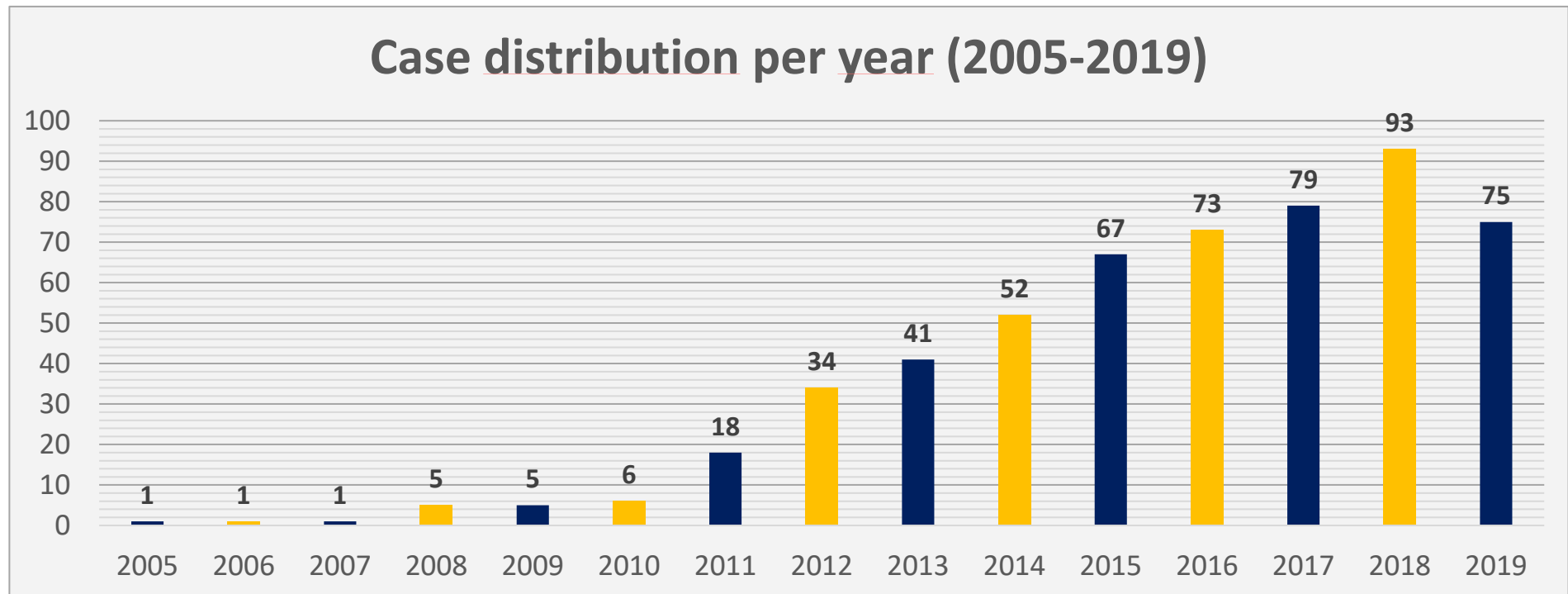
				control-flow perspective of the process. Different practices that are used to treat similar patients were discovered, together with unexpected behavior as well. The performance of the process was then analyzed by projecting performance indicators onto the Petri net. It was concluded that process mining can be successfully applied to understand the different clinical pathways adopted by different hospitals and different groups of patients.		University of Pavia (Italy); IRCCS Casimiro Mondino Foundation, Pavia (Italy)
Healthcare	Healthcare Facilities, Services & Equipment	Erlangen University Clinic (Germany)	Business Process Analysis	In order to support the analysis of the radiology workflows at the clinic, the authors developed a data warehouse for process mining. During the study several control-flow mining techniques were evaluated, and the authors found that none of the techniques alone was able to meet all the major challenges of healthcare processes, such as noise, incompleteness, multiple occurrence of activities, and the richness of process variants. Despite the limitations, the authors concluded that process mining has a great potential to facilitate the understanding of medical processes and their variants.	2008	International Congress of the European Federation for Medical Informatics
Public	Public Administration and Government Bodies	Municipality in the Netherlands (Netherlands)	Modeling of social network and information flows	Authors addressed three issues (1) Organizational model mining, (2) Social network analysis, and (3) Information flows between organizational entities. With a case study, they have shown how each of these issues can be supported. Moreover, they showed how organizational mining can benefit from creatively using approaches developed for the process perspective.	2008	Technische Universiteit Eindhoven, University of Technology (Eindhoven, Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Catharina Hospital (Netherlands)	Analyze careflows of an Intensive Care Unit	The clustering approach of the DWS Algorithm was able to discover some behavioral patterns; however, the discriminants rules were hard to understand. None of them was considered	2007	Technische Universiteit Eindhoven, University of Technology

				to be useful to gain insight about exceptional medical cases (that can be translated into infrequent behavior) or about variants of careflows. To handle this problem, the author introduced the Association Rule Miner (ARM) plug-in, which aims at discovering association rules and frequent itemsets in the event log. The technique has proved to be useful to obtain behavioral patterns in the event log and to group similar patients. To improve the capabilities of the algorithm in discovering exceptional medical cases, and also to obtain simpler process models, the ARM includes a clustering technique that divides the log into clusters with similar association rules and frequent itemsets.		(Eindhoven, Netherlands)
Public	Public Administration and Government Bodies	Dutch National Public Works Department (Belgium)	Invoice Management	Dutch National Public Works Department is responsible for the construction and maintenance of the road and water infrastructure. - Using a variety of process mining techniques, they analyzed the processing of invoices sent by the various subcontractors and suppliers	2006	Department of Technology Management, Eindhoven University of Technology (Eindhoven, Netherlands)
Healthcare	Healthcare Facilities, Services & Equipment	Dutch hospital (Netherlands)	Logistic process of treating patients	Authors propose a knowledge management perspective to provide a strategy for modelling and redesigning a business process. The specific group of patients requires the involvement of different specialties for their medical treatment that leads to more efforts regarding the coordination of care for these patients.	2005	University of Groningen (Netherlands)

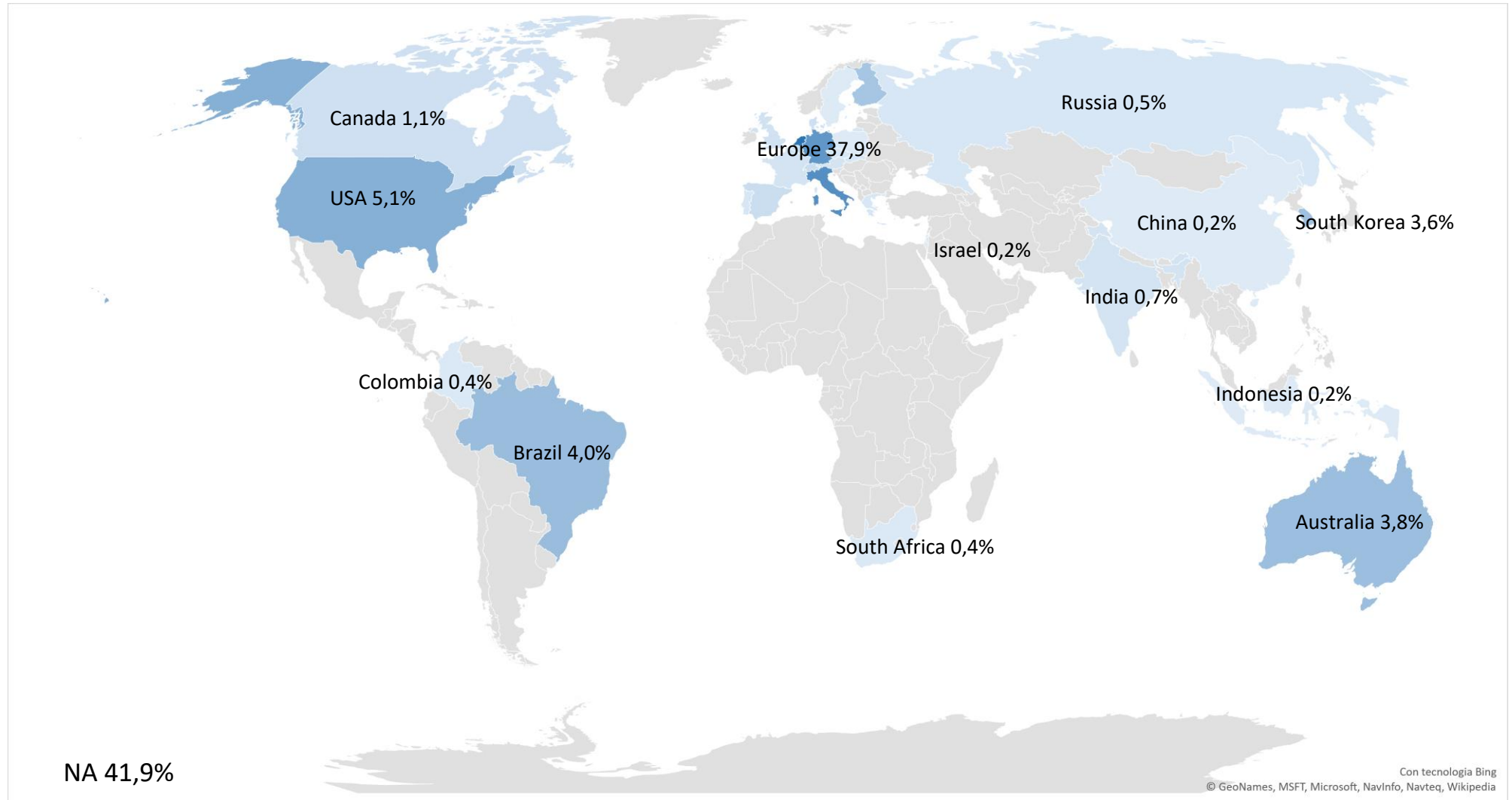
Infographics

Only cases with fulfilled description have been considered for infographics.

In general, the results of the study confirm that business projects relying on process mining tools and techniques are becoming more popular in recent years. The histogram shows that in the last three years there has been an increase, achieving the peak in 2018 (report has been done on November 2019, therefore it's possible to have ongoing projects, not considered in the data collection); at present, the cases collected in 2019 are 75.



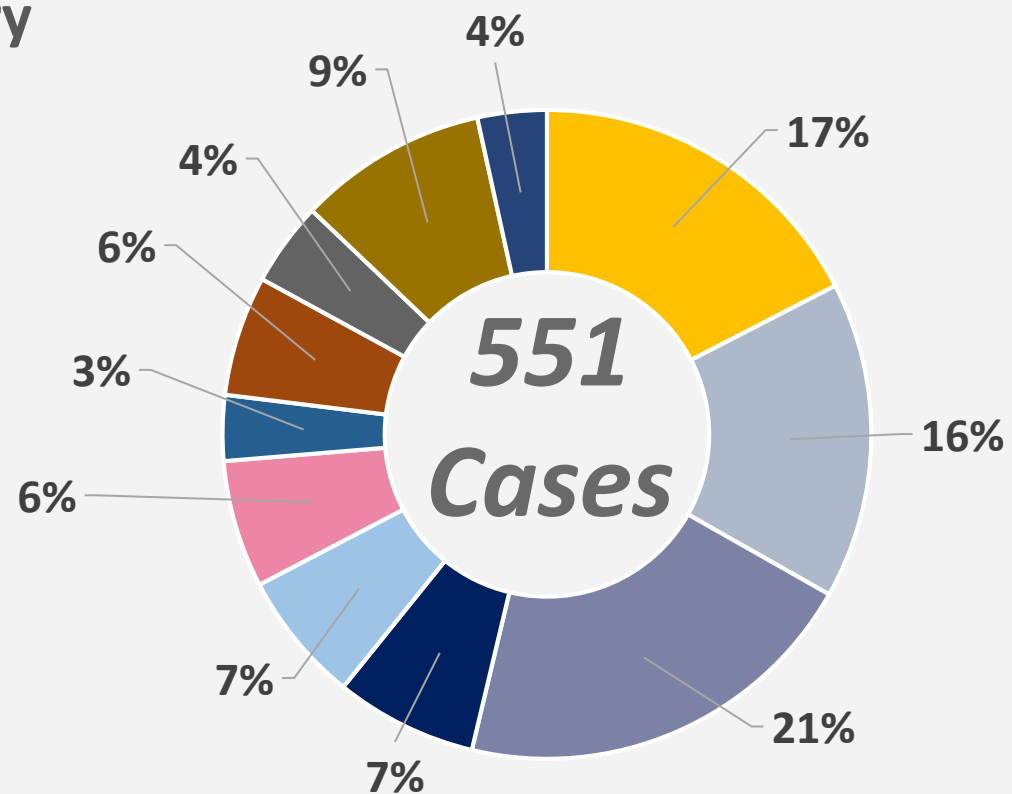
Case distribution per Country



The worldwide cases distribution depicts a situation in which process mining's main users remain concentrated in Europe, North America, Brazil and Australia. Indeed, more than 37% of the global process mining applications collected are located in **Europe**, partially thank to the spread of the *Industry 4.0 master plans and initiatives* that are taking place in several European Countries in recent years.

Case distribution per Industry

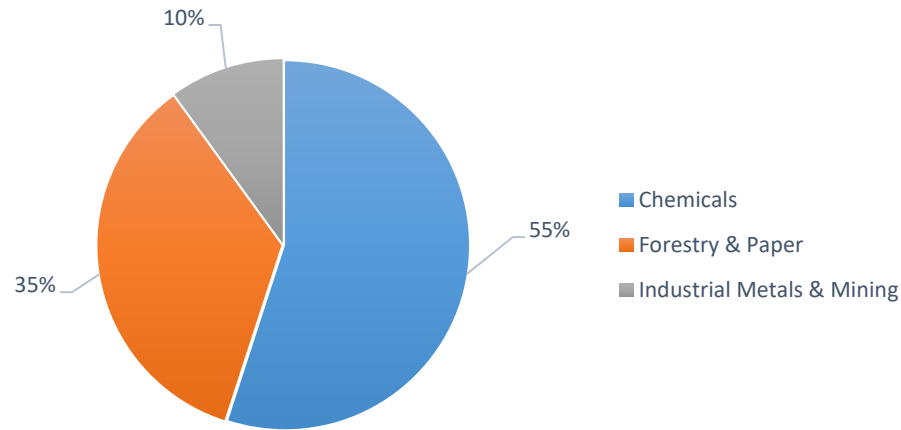
- Financials
- Healthcare
- Industrials
- Public
- Technology
- Consumer Services
- Utilities
- Basic Materials
- Consumer Goods
- Telecommunications
- Services



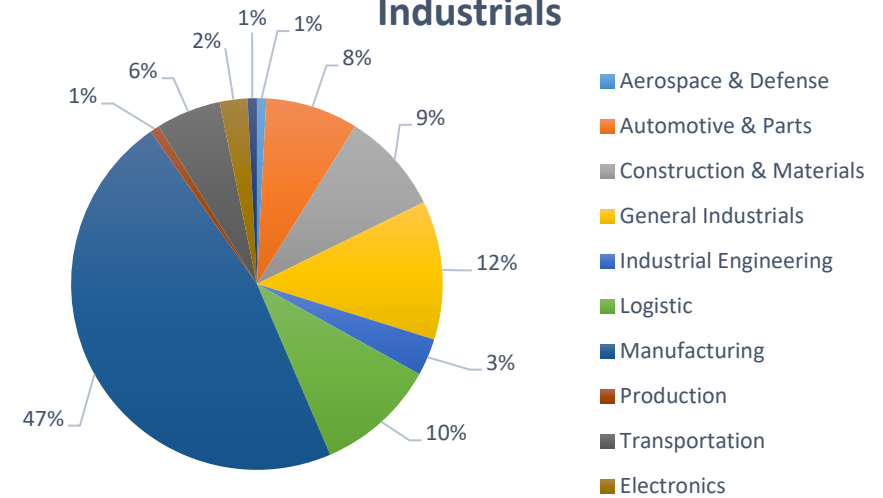
In accordance to the data the most frequent using of process mining tools and techniques are organizations operating in **Industrials** (21%), followed by the ones working in **Financials** (17%) and **Healthcare** (16%). In particular, the cases listed in the industry group are analysed more in depth in the pie charts.

Below, the focus on the main sectors.

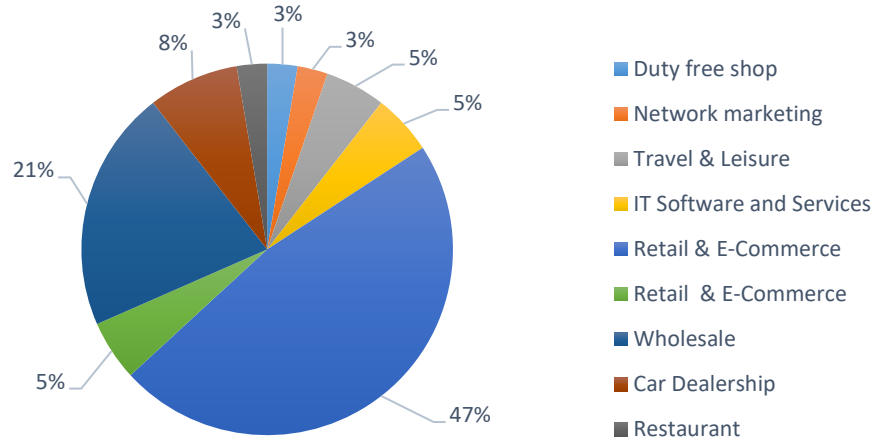
Basic Materials



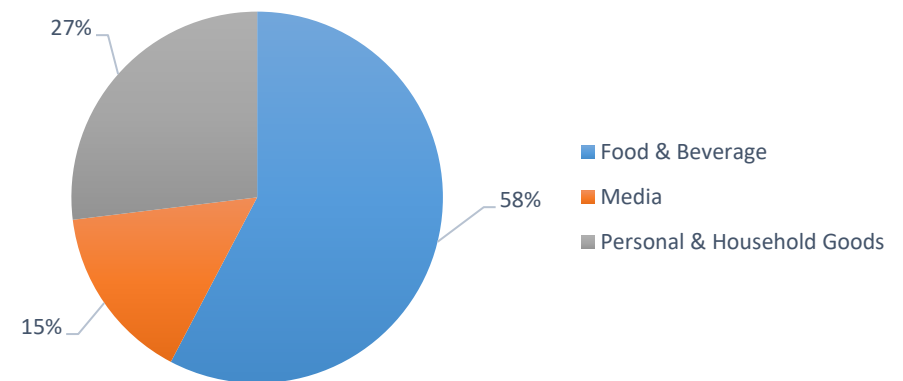
Industrials



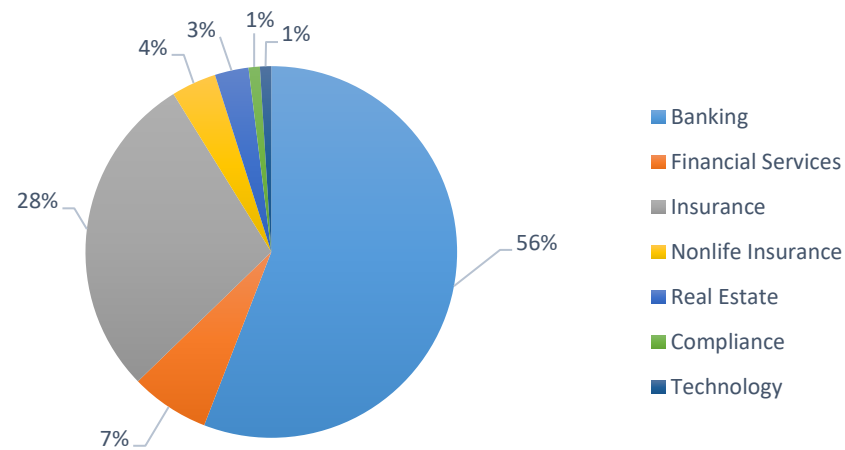
Consumer Services



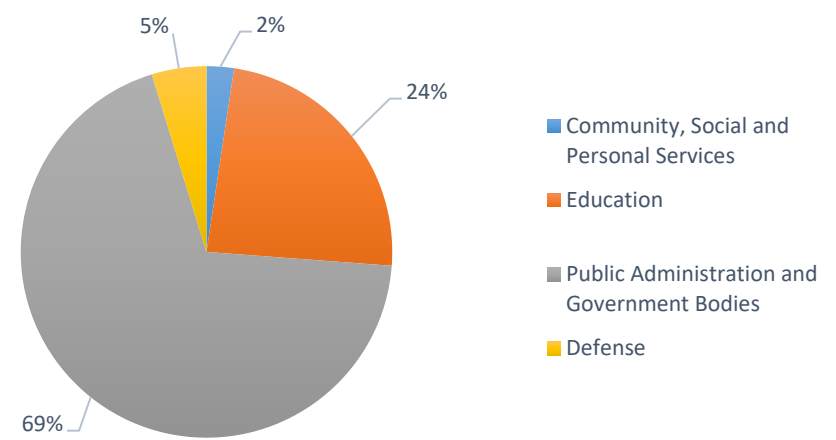
Consumer Goods



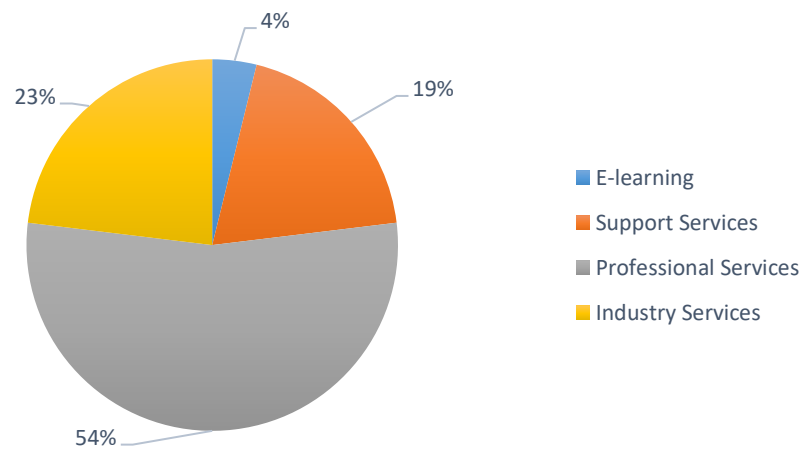
Financials



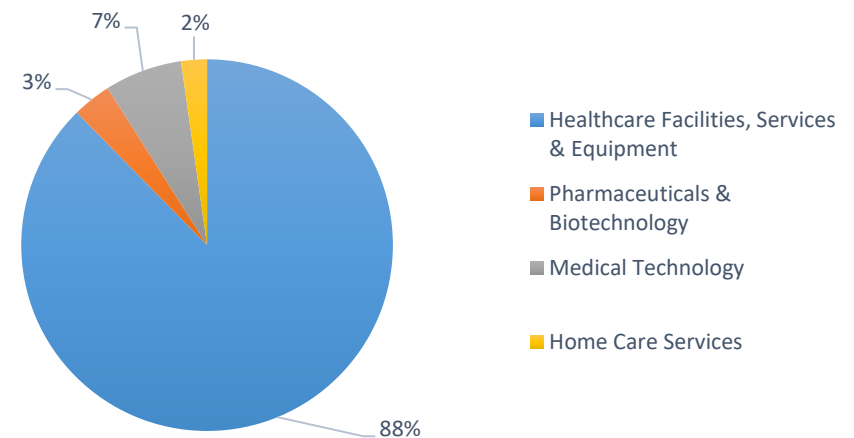
Public



Services



Healthcare



Remarks

In the last decade the field of process mining gained attention from research and practice. The current general discussions about process mining seem unoptimistic about its potentials, as the critiques mostly focus on how process mining is too technical to be a stand-alone tool **without consultancy services**, and that it is not providing real time analytics for instant actions and results. In HSPI we believe that Process Mining will become the **main process management technique** and the **decision-support tool in real time**.

References and Contacts

Authors:

Soraya Sortino, HSPI SpA

Matteo Dell'Orto, HSPI SpA

Giorgio Cotroneo, HSPI SpA

Roberto Carbone, HSPI SpA

Paolo Riccardi, Hesplora SpA

Contact:

process-mining@hspi.it

The company:

HSPI SpA - Management Consulting

Viale Aldo Moro 16 - 40127 Bologna (Italy)
Tel. +39 051509861 | Fax. +39 051 509737
BOLOGNA | ROME | MILAN
www.hspi.it | e-mail: info@hspi.it