Return on Investment

Use this calculator to determine the return on investment over five years based on projected revenues and costs. Do not enter any numbers on this sheet but look at the following sheets (this sheet will be filled out automatically). For simplicity the discount rate can also be ignored.

Discount Rate:	10 %
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SUMMARY

Present Value of Return on Investment (PV ROI)	0 %	The sum of net present value divided by the sum of present value of costs
Net Present Value (NPV) (in Thousands)	€0	The sum of annual net present values
Internal Rate of Return (IRR)	0 %	The discount rate that yields a net present value of 0

YEAR	1	2	3	4	5
DISCOUNT FACTOR	0.91	0.83	0.75	0.68	0.62
Increased Revenue	€0	€0	€0	€0	€0
Decreased Costs	€0	€0	€0	€0	€0
ANNUAL BENEFITS	€0	€0	€0	€0	€0
PRESENT VALUE (BENEFITS)	€0	€0	€0	€0	€0

COSTS

	1	2	3	4	5
One-Time Costs	€0				
Recurring Costs	€0	€	0 €0	€0	€0
ANNUAL COSTS	€0	•	0 €0	€0	€0
PRESENT VALUE (COSTS)	€0	•	0 €0	€0	€0

NET VALUE

	1	2	3	4	5
Annual Net Value	€0	€0	€0	€0	€0
Cumulative Net Value	€0	€0	€0	€0	€0
NET PRESENT VALUE	€0	€0	€0	€0	€0
ANNUAL ROI					

Costs

Each business case is unique but you can follow a set of guidelines and the standard structure to get started [33].

To create the business case for your specific application of process mining, you first need to consider the costs. What investments are needed?

Туре	Description	One-time fee	Annual fee
Software licenses	The purchasing and maintenance and support fees, or the annual subscription fees, for your new process mining software.		
Training	The training costs for the employees who will be working with the process mining software. Training is always recommended and should include both general process mining concepts and the use of the tool. Training may or may not be included with the software license fees.		
Time investment	How much time do your employees invest in their process mining activities? Do they need to free time that is missing elsewhere? Tip: If you are using process mining instead of manual process analysis, you should compare the employee time of the process analysts and the participating departments that are incurred with the traditional, manual process analysis method with the (shorter) time process mining takes in your business case.		
Data extraction	Do your need to pay your IT department (or an external IT provider) for the data extraction?		
Consultant fees	If you use external consultants to perform the analysis, or to get your internal team started, you need to incorporate their fees as well		
TOTAL		0	

cess	Dimension Time of the	Description The actual cost savings through more efficient process analysis are	Examples One-time saving Annual sav • The DMAIC cycle at the Rabobank could be reduced
ellence group	analyst	described in detail in [34]. Consider, for example, the saved time for the process analyst to map out the process, the eliminated manual data collection, and the more efficient variant analysis.	by 50% from an average of 9-12 to 4-6 weeks [6].According to the expert assessment by the Canadian
		Through a small pilot project, you can get your own reference values that you can use as a basis for your calculation.	process expert Preben Ormen, process mining can help to perform a better analysis in a few weeks than can be performed with Excel in several months [35].
			An SAP process was to harmonized across 16 different countries [22]. Instead of manually mapping each process in each of the countries, a process mining analysis could be used as a starting point to compare
			the different processes and the analyst could go back to the different countries with specific questions. This way, the overall analysis was done a a few weeks (instead of months, or even years).
	Time process expert	In addition to the time the process analyst spends on doing the process mapping, consider the time of the other process stakeholders (the process experts from the department). How much of their valuable	At ANA Airports a 1-day process mining workshop with the CIO and the process manager from the change management process in the IT department brought out
		time is currently used to to map out the 'As-is' process? With process mining, you can make much better use of the time of the process experts in interactive workshops that focus on the value-added	more than a dozen suggestions for improvement [17]. The manual process inspection would have required at least five days and would have delivered less results.
		"Why do we do that?" questions and find out "How can we make this better?" rather than wasting a lot of time to find out how the process works in the first place.	
	Avoided risks	Without an evidence-based analysis it is easy to waste resources on ineffective process improvements, or on the wrong processes altogether.	• At a Financial Services organization in the UK people were convinced that the ordering process had big problems. The problems were, however, in the sales organization.
		Furthermore, also complete process redesigns run the risk of repeating old mistakes, if the current processes are not understood well enough. Have you experienced failed projects in the past? How big would the	organization.
t / controlling	More efficient and	damage be if your planned projects would fail? How would you assess the risk? The auditing of processes is part of the audit activities and forms the	In the Central Auditing Service of the Netherlands
. / controlling	effective audits	basis for assessing the completeness of IT controls and general risks. It is usually carried out manually.	Process mining is used is to perform more efficient audits [36].
	Increased	How much time do your process audits currently cost? How much more efficient and better could they be? Data analysis for processes is normally carried out based on samples	 KPMG has used process mining in three different projects and achieved a more efficient and more comprehensive process understanding [19]. At a bank, access right violations of the 4-eyes
	assurance	(often only based on 25 or 50 cases). With process mining compliance with the prescribed processes and	principle were discovered, although that should not have been possible [18,12].
		principles like the 4-eyes principle (segregation of duties) can be automatically tested with a 100% coverage. How high can you assess the damage caused by fraud? Estimate how	During the process mining analysis of a purchasing process at a bank, where previously already a regular audit had taken place, a number of serious violations were found, which had not been uncovered in the
	Ensuring compliance	much of this damage can be avoid by a higher assurance. Compliance with statutory regulations or industry standards can be checked.	regular audit. [20,21] • In a hospital in Portugal deviations from medical guidelines were detected using process mining [15].
		What harm would bring a non-compliance with prescribed processes in your industry? How much money are you currently spending to prove compliance?	• In a Dutch hospital a mandatory preliminary check was not performed for 6% of surgical patients [16].
partment	Reduced setup cost	Often, the setup of a BI system and dashboards for monitoring a process require an understanding of the data (to know where to place the "measure points" for the KPIs). Process mining can help to	At another Dutch bank, an elaborate "process intelligence" monitoring system essentially required the manual configuration of the process beforehand. To
		understand the data and the underlying processes to speed up (and make less assumptions, and errors) during the setup of a new monitoring infrastructure.	identify the process and the relevant data fields process mining was used, wich helped to set up the system much faster.
	Reduced maintenance cost	Often, not all of the functionality and modules in existing IT applications are used, but they still need to be tested when upgraded and maintained. Process mining can reveal the actual usage of the systems and help to downsize unused parts.	• In the change management process at a subsidiary of a large IT service provider specifically requested paths were implemented but in fact almost never used [13].
		Do you have customizations in your IT systems and would like to return a standardized process as much as possible to reduce maintenance	
	Finding errors	In both the development and the configuration of IT systems, there are always errors. Process mining can help to find these errors.	In the financial services company MLP the absence of certain status messages in the ITSM system was noted through process mining. [30]
		How much time does it take for the IT department to manually inspect the log data and program calls to find errors and sources of problems?	When developing a software system for a tourism provider, the program calls were analyzed to identify
	Replacing legacy systems	Legacy systems represent a major challenge in many companies, since the original developers are often long gone when changes to these old systems still need to be made. Often the legacy systems run the most	Processes running on old IBM systems visible. [25 26] Performance problems on the server. [23] The legacy system expert Steve Kilner shows how process mining can be used to make the actual processes running on old IBM systems visible. [25 26]
		systems still need to be made. Often the legacy systems run the most mission-critical processes. Do you need to implement existing processes in new IT environments? How much time and effort you have budgeted for the understanding of	 processes running on old IBM systems visible. [25,26] In an Australian government agency for times as many processes as planned with the manual inspection could be discovered in half the time (and with higher accuracy)
ess owner	Avoiding report	How much time and effort you have budgeted for the understanding of these existing processes and systems? The process manager and other process stakeholders often have the	 be discovered in half the time (and with higher accuracy) using process mining. [24] At ING Direct, it took up to six months from
	costs	greatest benefit of using process mining because they can get answers to their questions very quickly. Instead of requesting a report from the IT, they can answer a wide range of questions themselves, autonomously, without having to already know all the questions upfront	commissioning to delivery of BI reports. With process mining the department can now analyze their own process autonomously and report costs are also saved [28].
		- only with a data extract (which can easily be repeated). Another advantage in addition to faster responses is that no custom report needs to be programmed. Depending on the internal accounting	In the private insurance branch of the insurance company Suncorp answering a question previously lasted months and now the analysts can evaluate their
		model, this amounts to savings for the process manager (if they would	own data with records of more than 50 million entries in minutes by themselves [37].
	Process-specific	Furthermore, there are many process-specific benefits and savings that category for examples). The dimensions listed here are not complete but specific cost savings.	
ess-specific	Number of process steps	A typical goal of process mining is the saving of process steps, which is often directly related to cost savings.	The analysis of the invoice handling process in the finance department of the Rabobank revealed that unnecessary response letters were sent as a response
			to reminder letters received from large suppliers before the end of the payment term. The sending of these response letters was an unnecessary cost. [12]
			• In the complaints process of the German subsidiary of an electronics manufacturer there were many missing documents (like the sales receipt) that had to be
			requested from the customer in an extra step. The identified additional effort of the external service provider could be quantified at 800 steps, each at 100 euros per step, to a total of 80,000 euros over two months (and
			 thus 480,000 euros per year). [10] In the IT Services department of the Rabobank in the Netherlands, the incident management process was
			improved through a range of process improvement workshops with managers and process analysts together. Within 6 months roughly 50,000 process steps could be reduced, each step quantified as an expense
			of between 10-20 € can be saved. The goal is a total reduction of 300,000 steps, thus saving between 3-6 million euros. [8]
			• In a British municipality about 1.5 million pounds out of a total budget of 8 million pounds would have to be saved without any loss in the service quality. After an
			extensive process mining analysis an additional screening step, and a more efficient re-organization of the processes based on the results of the screening, could achieve these savings.
			In the commercial insurance branch at Suncorp it was discovered that simple claims took a particularly long time, and many loops and duplications in the
			processing. While the leading improvement goal was a faster claim processing for their customers, they also reduced unnecessary steps in the improvement initiative and, as a result, freed resources for the employees
	Administration costs	In addition to the saving of process steps also unnecessary administrative costs can be discovered with process mining.	dedicate more time to the difficult cases. [31,32] • The Process mining analysis in an energy company revealed that documents were still partially printed
		G T T T T T T T T T T T T T T T T T T T	 The sending of unnecessary response letters at Rabobank not only cost effort for the employee but also
			unnecessary postal expenses. [12]In the Dutch tax authorities an analysis revealed that
	Execution to	Process mining can year accurately and abit at the contract of	over a million euros in postage costs could be saved by merging of letters that are sent to the same person on the same day. • At the callcenter of a Dutch electronics manufacturer
	Execution times	Process mining can very accurately and objectively identify the points within the process that consume the most time in the process. If the time to perform that step can be reduced, this can lead to cost savings (often due to the fact that less time is needed for the employee	• At the callcenter of a Dutch electronics manufacturer trainings of the call center staff lead to less forwarding of calls to the (more expensive expert) back office staff and, as a result, also reduced call times overall. At a
		performing the step).	cost of about one euro per minute on the phone, the savings in high-volume processes like callcenters can add up very quickly.
			• In the same electronics manufacturer also the placement of the chat feature on the website was optimized, because at the call centers agents who are handling chats can deal with two customers at the
			same time, which leads to lead a chat costing just 50 Cents per minute (compared to the phone, which costs 1 Euro).
			In a process of translating legal texts an extra step to provides an automated Pre-translation a first rough draft can reduce the time needed by the translator (who applicate the translation factor based on correcting the
	Nima	Samatimas analyzing the results	completes the translation faster based on correcting the pre-translation compared to translating the whole text from from scratch).
	Number of cases	Sometimes analyzing the process brings up opportunities to avoid some cases altogether. In this case, all the steps of that whole avoided case are saved.	At a Dutch e-commerce company a process mining analysis could lead to insights for improvements of the FAQ on the website, so that fewer service calls are coming into the call center in the first place (because
			customers find the solution online). The savings were quantified at around 100,000 euros per year as a result of a single, 5-10 days process mining analysis.
			At a purchasing process a lot of duplicate requests were discovered half-way through the process and then abandoned / closed. However, all the steps that were performed until the discovery of the duplicate was
			performed until the discovery of the duplicate was unnecessary, and after avoiding the duplicate cases in the system through a better search feature the process cost could be reduced.
	Case durations	Although a reduction of the overall throughput time fo the cases cannot always be directly translated into cost savings, it is often a critical success metric that is important to provide the customers with quality service (which can lead to more revenue through higher retention)	The processing of simple claim at the commercial insurance arm at Suncorp could be reduced from on average 30-60 days to 1-4 days (and after further outsourcing even to a few hours). This is a burge.
		service (which can lead to more revenue through higher retention, productivity, or more new business). If there are cost savings, then these come often through the saving or automation of steps in the process, but it is good to think through the impact of the reduction of	outsourcing even to a few hours). This is a huge success and important for the competitiveness of the insurer. [31,32]
		case durations by itself as well.	 An African company could complete new credit credit inquiries 40% faster after a process mining analysis. At the Rabobank in the Netherlands, the travel cost
			reimbursement process for employees could be reduced from an average of 11 days to an average of 1.2 days through the automation of a manual step. Employee satisfaction was increased by this process
	Penalties	In some processes, process improvements can lead to avoided penalties.	 Employee satisfaction was increased by this process improvement. [8] In a payment process there may be penalty fees for late payments.
			• In some SLA-based contracts the customer may only pay for the service if the agreed service level was met.
			[29]
			There may be legal requirements that, if they are not met, result in non-compliance penalties.
	Quality	Improved quality can often not directly but only indirectly be quantified (for example, through expert assessments). Although such indirect estimates are generally "softer" than hard cost savings in other areas, they are very important to the everyll process context for the customer.	met, result in non-compliance penalties. • If the process produces a product with an error, they often have to be thrown away. For example, if a printing company makes a mistake in the setup of the prints,
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To actual realize FTE savings in a business case, one also has to consider how the freed FTE will be used in the company. Often, they are moved to other areas, or phased out over time (no new hires while people do retire), which then does not lead to actual savings immedieately.

TOTAL

The saving of FTE as a cost optimization is a sensitive issue and different companies approach it in different ways. It is not specific to process mining but generally a topic related to process improvement and cost savings. It is a frequent issue, because in many processes the employees are the biggest cost factor and reducing them can look like a quick and substantial cost cutting success. However, one has to be careful and balance the resulting process quality and make sure that the remaining employees have not to do now twice the work.

To actual realize FTE savings in a business case, one also has to consider how the freed FTE will be used in the company. Often, they

Where will you be able to generate additional revenue that you are missing at the moment?

Process owner	Role	Dimension	Description	Examples	One-time revenue	Annual revenue
Process owner Process owner			reorganization projects faster. This also means that you can change your business faster, and thus faster reap the fruits of improvement (the corresponding cost savings, increased revenue, increased	into the production process, because the necessary changes to the process were made so obvious by the		
management question that they would have affected of having to sea the months of the most		_	comprehensive results based on large data sets, the quality of the analysis is higher. Due to the better analysis, better results can be	about possible causes of the slow processing of commercial claims, but the implementation of these improvement measures had no great effect. Only through the process mining analysis the real causes		
process-specific Process-spec	Process owner	-	questions that they would have (instead of having to wait for months on their IT department to generate specific reports). Most of the questions will not be relevant after waiting for such a long time and are therefore the reports are not requested in the first place. This then leads to less insight in the process and a more reactive management style (reacting to the problems once the come up through customer complaints, rather than proactively having a good overview of the process and the	Suncorp [37], it took in some instances up to six months from commissioning to the delivery of a BI report. Therefore, such requests were virtually never		
Process-specific More orders Process-specific More revenue In a comprehensive state that was a formation or a contract process or a submitted process or a submitted process or a submitted process. The contract increases shall associated and particularly to more revenue from execution that does increased particularly to more revenue from execution that does increased particularly to more contract in the contract of the value of otherwise lost otherwise lost of otherwise lost of otherwise lost of otherwise lo			should be used just to control the process in the first place. Process mining can help to understand the process and the underlying mechanisms and to establish an appropriate KPI system for the	of process mining analysis results in the weekly jour fixe meetings with the external IT service provider helped to identify what the right KPIs were to focus on in the		
but also investments in the process (such as additional employees or never more corder or customers, can be mapped directly to more neveral. More customers If great service performances or product quality lead to more satisfied but from substing customers, recommendations to new customers and more revenue from substing customers may mault. **Customer service departments often calculate their butsomers relay mault. **Customer service departments often calculate their butsomers of the manual of the products of orders. **Customer service departments often calculate their butsomers relay mault. **Customer service departments often calculate their butsomers of the products soon (PSPS, II the NPS can be increased by improving service performance, then the assumption the translet service development of the site service development of the products soon (PSPS, II the NPS can be increased by improving service performance, then the assumption the required that a process of new translet and containing customers which is the department of the required that process of new translet patterns, where the required that processing times can also be translated directly in additional translet and the processing times can also be translated directly in additional translet and the processing times can also be translated directly in additional translet and translet and the process of new translet and the process and the color of the site and the color of t		Process-specific	examples). Again, the listed dimensions are not complete but provide a s			
business cases based on customer salistation metrics business cases based on customer salistation metrics business cases based on customer salistation metrics and increased by improving sorvice performance, then the capected revenue from new customers and additional business from existing customers will be increased as a result. A customer journey analysis like the one performed at a job board social platform, where the registration process of new users (and their dropport, points) were analyzed [27], novide huge opportunities to increasing the solution of new users, and the relation of existing users, by a continuous improvement of the site and its activation of new users, and the relation of least single users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, by a continuous improvement of the site and its users, and the relation of personnel of the site and its users, by a continuous improvement of the site and its users, and the relation of the site and its users, by a continuous improvement of the site and its users, and the relation of the site and its users, and the relation of process faster payments are not currently said if the sortic lovel is not met, can directly bring in more relations of the site and its users. The site is a site of the site and its users and the site of the site and its users. The site is a site of the site and its users and the site of th	Process-specific	More orders	but also investments in the process (such as additional employees) - create more orders or customers, can be mapped directly to more	orders for a new type of service was lost because the ordering process was not working well. The solution of the problem led directly to an increase in revenue in the		
shorter processing times can also be translated directly in additional revenue. • SLA-based contracts, that are not currently paid if the service level is not met, can directly bring in more revenue if the SLA are met for more cases. That was the case in the process mining analysis at a security company [29]. • If the process is about finding a new tenant for an apartment, any speed-up of the process will result in additional rental income (less time the apartment is vacant). • In the bankruptcy process of a truck repayments process at in a car manufacturer (in case of an insolvency of the forwarding company), a higher resale value could be achieved by selling the vehicle on the second hand market more quickly. Sustaining improvements A major challenge for process improvement projects is that it is easy to fall back into old patterns. Even if the process improvement was initially effective, old behavioral patterns can often re-appear and the benefits vaporize over time.		More customers	customers, recommendations to new customers and more revenue	business cases based on customer satisfaction metrics such as the Net Promoter Score (NPS). If the NPS can be increased by improving service performance, then the assumption is that the expected revenue from new customers and additional business from existing customers will be increased as a result. • A customer journey analysis like the one performed at a job board social platform, where the registration process of new users (and their dropout points) were analyzed [27], provide huge opportunities to increasing the activation of new users, and the retention of existing users, by a continuous improvement of the site and its		
fall back into old patterns. Even if the process improvement was initially effective, old behavioral patterns can often re-appear and the benefits vaporize over time.		More revenue	shorter processing times can also be translated directly in additional	 SLA-based contracts, that are not currently paid if the service level is not met, can directly bring in more revenue if the SLA are met for more cases. That was the case in the process mining analysis at a security company [29]. If the process is about finding a new tenant for an apartment, any speed-up of the process will result in additional rental income (less time the apartment is vacant). In the bankruptcy process of a truck repayments process at in a car manufacturer (in case of an insolvency of the forwarding company), a higher resale value could be achieved by selling the vehicle on the 		
were achieved remain effective, and thus ensure that the improvements are permanent and continue to bring you benefit in the future.		_	fall back into old patterns. Even if the process improvement was initially effective, old behavioral patterns can often re-appear and the benefits vaporize over time. Process mining can help you to check regularly whether the results that were achieved remain effective, and thus ensure that the improvements			
TOTAL 0		TOTAL			•	0

Benefits: Soft Benefits

There are many benefits in addition to the cost savings and additional revenue that are less tangible factors but no less important. Try to include also these "softer", more qualitative factors in your process mining business case to complete the picture. Process mining opens up completely new possibilities for process analysis, process control and communication in your company. Here are some of the factors you should consider:

Factor	Description
Facts instead of assumptions	Often people have different opinions about who to blame or where the problems are. This can lead to heated discussions that may not be possible to dissolve [13]. Because Process Mining makes the real processes visible based on the IT data, workshops and discussions can be conducted in a fact-oriented and constructive manner.
Pro-active vs. reactive	Because departments can perform process analyses very quickly and flexibly, problems can be identified early and addressed structurally. As a result, fewer emergency situations must be solved in a "fire fighting mode". The process is better under control.
New ideas for process improvement	Do not underestimate the value of exploratory analysis, in which one often stumbles across process problems that nobody ever had thought of. Once they see it, process experts know exactly what is going wrong and they can address it.
Ability to act	If you do not have to rely on assumptions and gut feeling, but instead you can be sure, it will be much easier to make decisions. Process mining makes it possible to obtain a fact-supported view of the process, also across departments, and for one-off analyses, to provide evidence-based support for action.
Strategic alignment	Fact-based decisions and process orientation are often mentioned as objectives in strategic initiatives, but it is unclear how exactly these goals can be achieved. Process mining provides the opportunity to fill this gap and to make fact-based process analysis a reality in your company. Tying your project to these strategic guidelines can help you get more support for it and will strengthen your business case.
Not being left behind	Although process mining seems easy at first glance it requires quite some rethinking of the organization. Do not underestimate this and start small. With quick wins through small projects you can clarify your use cases and get the buy-in from other colleagues, learn together and establish the best best next steps to continue with the process mining journey in your company [8,37]. It is worth it. Think back to the time just after the invention of the spreadsheet. Where previously you had to manually type your formulas into a calculator and write down the result with pencil and paper, you could now use a spreadsheet program to create much more complex calculations and re-run these calculations with new data. Instead of rows and columns as you have in Excel, Disco has Case IDs, timestamps,
	and activity names. Process mining is as revolutionary for processes as spreadsheets were for numbers. Think about it! Process mining will find its way into the standard approach for process improvement initiatives. Frank van Geffen from the Rabobank recommends to give process mining as process innovation topic the space that it needs to develop [8]. Lean Six Sigma initiatives in companies are also not usually started by hard business cases, but supported by the conviction that the approach is right. Start your Process mining activities also based on the belief that evidence-based process analysis are the right way to go and it will pay off.

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