

FORRESTER®

The Total Economic Impact™ Of Cognite Data Fusion

Cost Savings And Business Benefits
Enabled By Cognite Data Fusion

NOVEMBER 2022

Table Of Contents

Consulting Team: *Russell Pask, Consultant*
Jan Sythoff, Principal Consultant

- Executive Summary 1**
- The Cognite Data Fusion Customer Journey.....5**
 - Key Challenges5
 - Solution Requirements6
 - Composite Organization6
- Analysis Of Benefits7**
 - Incremental Productivity Savings Due To Improved SME Efficiency7
 - Reduced Shutdown Time9
 - Real-Time Data Efficiencies10
 - Optimized Planned Maintenance Program12
 - Energy Efficiency Savings.....13
 - Optimization Of Heavy Machinery In Continuous Production14
 - Unquantified Benefits16
 - Flexibility16
- Analysis Of Costs17**
 - Implementation Costs.....17
 - Subscription Fees.....19
 - Operating Costs20
- Financial Summary21**
- Appendix A: Total Economic Impact22**
- Appendix B: Endnotes23**



ABOUT FORRESTER CONSULTING

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

© Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to forrester.com.

Executive Summary

Data operations adoption in industrial sectors lags behind retail, fintech, and others due to the complexity of industrial data and unique requirements such as continuous real-time delivery, agile principles, and self-service. Industries like oil and gas, chemicals, and manufacturing can lack access to data and thus the means to optimize workflows. Cognite Data Fusion enables organizations to bring all data into a single repository, contextualize it, and build use cases to improve the performance of their heavy assets.

[Cognite Data Fusion](#) is a platform that begins by ingesting operational, engineering, and information data from industrial assets into a single repository so organizations are better able to build solutions and applications to improve business outcomes.

Cognite Data Fusion then creates contextualized data models that abstract away source system complexity, enabling customers to quickly and reliably build new analytics dashboards, new production solutions, and digital twins and to scale these across industrial assets.

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

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six representative customers with experience using Cognite Data Fusion. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single [composite organization](#) with 30 large industrial facilities, 25,000 employees, and revenue of \$2 billion per year.

Prior to using Cognite Data Fusion, interviewees noted how their organizations were digitally immature, experiencing challenges with siloed data,

KEY STATISTICS



Return on investment (ROI)
400%



Net present value (NPV)
\$21.56M

and were therefore unable to leverage data to optimize production, reduce costs, or improve efficiency.

However, prior attempts by these organizations to unify their complex industrial data had yielded limited success. Equally, interviewees were conscious of the potential power of machine learning (ML) in combination with new workflows to transform and optimize operations.

After the investment in Cognite Data Fusion, the interviewees observed how siloed data became accessible in a business context and that their subject-matter experts (SMEs) were able to build better dashboards and develop better plans based on what the contextualized data revealed.

Key results from the investment include major revenue gains and cost savings arising from significant improvements to production workflows, optimization of equipment use, reduction in shutdown time, and improved maintenance planning.

KEY FINDINGS

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

- **Incremental productivity savings of \$1.5 million due to improved SME efficiency.** Cognite Data Fusion empowers industrial data scientists by operationalizing and contextualizing data as well as by providing much greater data accessibility and visibility, transforming the way data scientists and SMEs are collaborating.
- **Benefits of \$4.8 million arising from reduced shutdown time.** The opportunity cost of large, industrial assets being out of production is significant. Using a digital twin and better component data visibility, SMEs are able to safely minimize shutdown periods when data anomalies arise.
- **Real-time data access enables a 1% improvement in productivity.** Live data access enhances operational flexibility and decision-making by increasing site safety, improving predictive maintenance, and raising machine performance.
- **Optimizing planned maintenance results in savings of \$4.3 million.** Cognite Data Fusion creates contextualized data to optimize planned maintenance by analyzing and interpreting available resources, workflows, and component lifecycles.
- **Energy efficiency savings of \$5.1 million.** Intelligent data can be used to reduce energy use and therefore operational costs.
- **Benefit gains of nearly \$9 million from optimizing heavy machinery.** The largest benefit arising from the deployment of Cognite Data Fusion is through the optimization of heavy machinery and industrial processes.

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

- **Health and safety.** There was evidence from customer interviews that organizations mapping incidents to facilities could reduce the amount of human movement through potentially dangerous “hot” areas, reducing risks to employee health and safety.
- **Environmental, social, and governance (ESG) reporting.** Some organizations were starting to develop use cases to examine how to contextualize data to facilitate ESG reporting.

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

- **Implementation costs of \$241,000.** Deployment and integration of the Cognite platform requires both internal and external resources.
- **Subscription fees of \$3.2 million.** Cognite Data Fusion has a subscription-based licensing model centered on a range of factors including the number of industrial sites, the types of data to be fused, and the number of data fusion services being deployed. Over the three-year study period, subscription fees total \$3.2 million.
- **Operating costs of \$2 million.** These costs relate to the development of new use cases and scaling proven solutions to new facilities.

The representative interviews and financial analysis found that the composite organization experiences benefits of \$26.95 million over three years versus costs of \$5.4 million, adding up to a net present value (NPV) of \$21.56 million and an ROI of 400%.



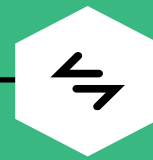
ROI
400%



BENEFITS PV
\$26.95M

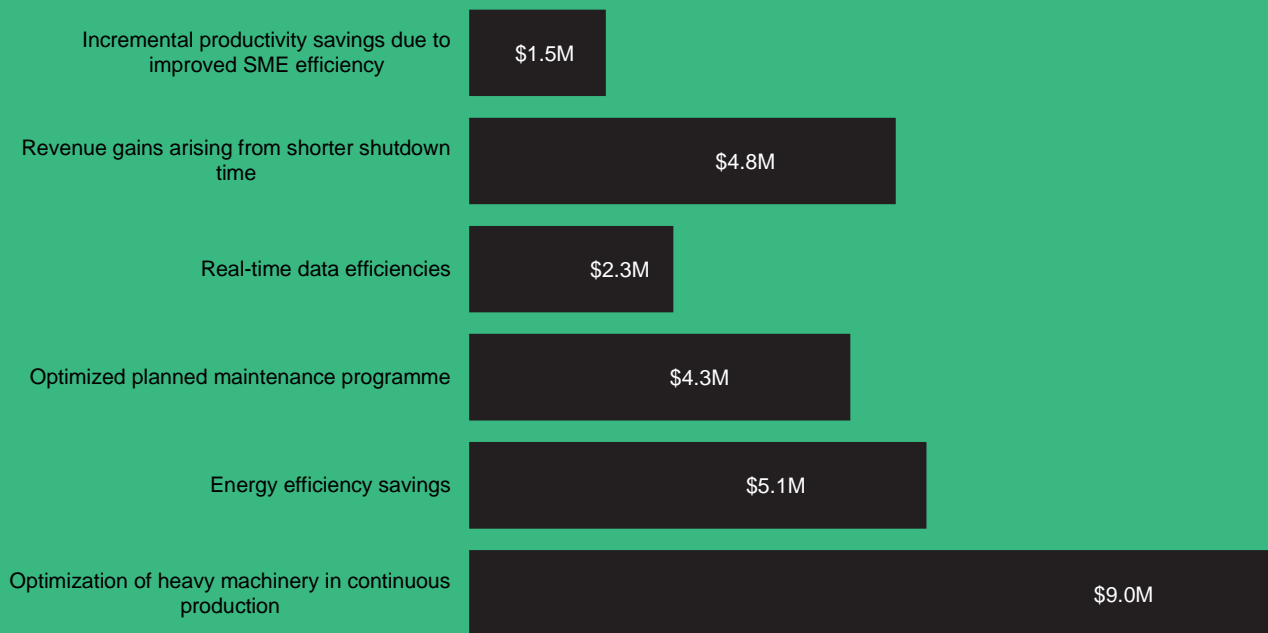


NPV
\$21.56M



PAYBACK
14 months

Benefits (Three-Year)



“A very professional customer service organization — working with me to make sure that we get the most out of Cognite Data Fusion. I look at them much more like a partner than a supplier.”

— VP, digitization, manufacturing

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Cognite Data Fusion.

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

DISCLOSURES

Readers should be aware of the following:

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

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

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

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



DUE DILIGENCE

Interviewed Cognite stakeholders and Forrester analysts to gather data relative to Cognite Data Fusion.



INTERVIEWS

Interviewed six representatives at organizations using Cognite Data Fusion to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

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



FINANCIAL MODEL FRAMEWORK

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



CASE STUDY

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

The Cognite Data Fusion Customer Journey

Drivers leading to the Data Fusion investment

Interviews			
Role	Industry	Headquarters	Revenue
Product manager	Oil and gas	Europe	\$250 billion
VP, digitization	Manufacturing	Europe	\$275 million
Senior analyst	Utility	Europe	\$3 billion
Data analytics manager	Oil and gas	US	\$7 billion
Senior VP and VP, digitalization	Marine geophysics	Europe	\$600 million
VP, data governance	Oil and gas	Europe	\$6 billion

KEY CHALLENGES

Prior to investment in Cognite Data Fusion, almost all of the interviewees' said that their organizations had multiple repositories for operational data. Typically, they had a large array of siloed data systems, and only some of this data could be analyzed in individual reporting systems.

In general, the interviewees' organizations had attempted to develop their own industrial data analytics capability internally and realized that the task was much more difficult than they had first suspected. Even digitally mature organizations struggled with how to automate and scale these approaches using machine learning.

The interviewees experienced some common challenges, including:

- **Multiple data repositories.** Industrial data is difficult to access and, therefore, underutilized. The older, slower machinery often found in heavy industry runs on legacy or idiosyncratic systems that do not provide highly accessible, normalized data that can be used in an integrated fashion.

“With any type of planned downtime event, with Cognite, we have been able to reduce the time by 20% by identifying opportunities for simultaneous operations during shutdowns.”

Data analytics manager, oil and gas

- **Lack of data contextualization.** Interviewees reported that their information sits in lots of data silos. This often means time-consuming manual processes are required to perform any kind of analysis. A key challenge for these organizations was not only to bring this data together but to combine different data sources to provide new insights driven by algorithms and automation. None of the interviewees' organizations had been able to do this; they particularly struggled in bringing together structured and unstructured data.

- **Incomplete dashboards and analytics.** Modern industrial processes combine physical systems in complex workflows: data needs to operate frictionlessly so workflows can be optimized. Opportunities for improving processes and improving safety are invisible to organizations with incomplete, unintegrated data.

SOLUTION REQUIREMENTS

The interviewees' organizations searched for a solution that could:

- Provide a single operational, data-focused repository.
- Contextualize all their industrial data.
- Improve data visibility and accessibility.
- Automate and scale across industrial facilities.

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the six interviews, and it is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. This global, B2B manufacturing organization with revenues of \$2 billion provides chemicals and industrial materials to wholesalers. The composite organization has a strong brand, global operations including 30 core assets, and a large business base of 10 million customers.

Deployment characteristics. The composite has 30 large industrial facilities distributed across the globe where it processes chemicals and industrial materials. The approach taken for the deployment is to start by looking at the high-potential use cases and workflows and to build the test use cases for these on one flagship facility.

Key Assumptions

- **Global industrial company**
- **\$2 billion annual revenue**
- **30 large industrial assets**
- **Unable to use industrial data at scale**

Initially, the composite's internal team and the Cognite team work together to liberate operational technology, engineering technology, and IT data from silos in the flagship facility and ingest it into the Cognite Data Fusion platform. From there, the work shifts to building, and testing use cases on the flagship site. Once use cases are successfully deployed, teams look to scale them across the composite real estate.

In the first year, the focus is on building the use cases and testing them on the flagship asset — as each use case is fully tested before the team looks to build it out to 19 more facilities. In the second year, the benefits begin to be more fully realized, and use cases are now scaled across 25 facilities. In particular, the work on shorter shutdowns, real-time data, and improved productions workflows comes to fruition. These benefits along with energy efficiency and improved maintenance are scaled out to 30 large assets in Year 3.

Alongside this, the internal team builds its skills and understanding of the Cognite Data Fusion solutions architecture and therefore its ability to build and deploy new industrial use cases.

Analysis Of Benefits

■ Quantified benefit data as applied to the composite

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Incremental productivity savings due to improved SME efficiency	\$450,000	\$618,750	\$810,000	\$1,878,750	\$1,529,020
Btr	Reduced shutdown time	\$0	\$2,500,000	\$3,600,000	\$6,100,000	\$4,770,849
Ctr	Real-time data efficiencies	\$0	\$1,319,063	\$1,587,600	\$2,906,663	\$2,282,922
Dtr	Optimized planned maintenance program	\$0	\$0	\$5,670,000	\$5,670,000	\$4,259,955
Etr	Energy efficiency savings	\$0	\$0	\$6,804,000	\$6,804,000	\$5,111,946
Ftr	Optimization of heavy machinery in continuous production	\$0	\$5,025,000	\$6,451,200	\$11,476,200	\$8,999,775
	Total benefits (risk-adjusted)	\$450,000	\$9,462,813	\$24,922,800	\$34,835,613	\$26,954,467

INCREMENTAL PRODUCTIVITY SAVINGS DUE TO IMPROVED SME EFFICIENCY

Evidence and data. Industrial data operations often take place in hazardous environments where data is siloed with inadequate dashboards. Many firms still extensively use paper, have poor connectivity, and use legacy processes based on operations.

Cognite Data Fusion empowers industrial data scientists by operationalizing and contextualizing data and by simplifying complex data pipelines. The first benefit of Cognite Data Fusion is to make opaque, siloed data visible in an integrated way for SMEs.

Some interviewees said that a key reason for investing in Cognite Data Fusion was that it would enable their digital transformation by making disparate data visible and highly available.

Others began from a position of analyzing their significant known levels of unproductive time and understanding that if they could unlock this, it could make their operational and development teams much more effective. Incremental improvements can have

a substantial effect on the bottom line — especially in large-scale industrial environments.

Another interviewee described how information silos resulted in the creation of manual workarounds connecting time series data with site meter readings or production data. Greater data visibility as well as the opportunity to automate these processes had a significant impact on the effectiveness of industrial data scientists to provide key insights and for operations teams to work in more optimal fashion.

Once the SMEs and data scientists began to harness the power of the data, they were able to apply it to multiple challenges such as shutdowns, planned maintenance, health and safety, heavy equipment optimization, workflow optimization, and energy efficiency.

Modeling and assumptions. Based on the interview data, Forrester assumes the following:

- The model is based on a three-year deployment scaling from 20 large assets in Year 1 to 30 in Year 3.

- The blended salary costs of the SME team per large asset per day is \$5,000.
- The composite experiences 10 days' worth of productivity savings per asset in Year 1, rising to 12 days in Year 3.

“With Cognite, we can see a 3D model of the facility and tie that into a database that monitors the condition of each piece of equipment.”

Data analytics manager, oil and gas

Risks. The risks that can potentially impact this benefit are:

- Issues with legacy industrial IT systems.
- The degree of information compatibility among assets.
- Issues with the range of different operational data systems to be integrated.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of \$1.5 million.

Incremental Productivity Savings Due To Improved SME Efficiency					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Number of large assets using Cognite Data Fusion	Composite	20	25	30
A2	Average cost of SME team per large asset per day	Interviews	\$5,000	\$5,000	\$5,000
A3	Productivity gain from an extra days SME output arising from Cognite Data Fusion implementation	A1*A2	\$100,000	\$125,000	\$150,000
A4	Number of extra days productivity gained through greater data availability	Interviews	10	11	12
A5	Percentage of productivity recaptured	TEI standard	50%	50%	50%
At	Incremental productivity savings due to improved SME efficiency	A3*A4*A5	\$500,000	\$687,500	\$900,000
	Risk adjustment	↓10%			
Atr	Incremental productivity savings due to improved SME efficiency (risk-adjusted)		\$450,000	\$618,750	\$810,000
Three-year total: \$1,878,750			Three-year present value: \$1,529,020		

REDUCED SHUTDOWN TIME

Evidence and data. A key performance indicator for industrial data operations is how much time assets spend in production. The opportunity cost of large, industrial assets being out of production is significant and an essential part of the successful management of industrial installations. Leadership, operations teams, and industrial data scientists are all looking for ways to safely reduce the necessary amount of shutdown time to stay at full production for as long as possible.

One interviewee said that they used Cognite Data Fusion to find opportunities to conduct simultaneous operations during shutdowns to potentially deliver a 20% time savings. Another described how they could better monitor individual pieces of equipment and so reduce the risk of failure.

Modeling and assumptions. Based on the interview data, Forrester makes the following assumptions:

- This use case is implemented from the end of the first year, scaling from 25 large assets in Year 2 to 30 in Year 3.
- For the composite, the average revenue gain per day from a large asset is \$200,000.
- In Year 2, it is possible for five days to be gained per asset through optimizing shutdowns. In Year 3, this rises to six days.

Risks. Revenue from reduced shutdown times will vary from organization to organization with respect to:

- Productivity of the asset.
- The level of the shutdown overhaul and its complexity.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of \$4.8 million.

Reduced Shutdown Time					
Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of large assets using Cognite Data Fusion	Composite		25	30
B2	Average revenue gain per day of large asset operation	Composite		\$200,000	\$200,000
B3	Total productivity gain per day of large assets operation	B1*B2		\$5,000,000	\$6,000,000
B4	Number of extra days of operation from shutdown tasks	Interview data		5	6
B5	Operating margin	TEI standard		12.5%	12.5%
Bt	Reduced shutdown time	B3*B4*B5		\$3,125,000	\$4,500,000
	Risk adjustment	↓20%			
Btr	Reduced shutdown time (risk-adjusted)		\$0	\$2,500,000	\$3,600,000
Three-year total: \$6,100,000			Three-year present value: \$4,770,849		

REAL-TIME DATA EFFICIENCIES

Evidence and data. Real-time data visibility is transformative for organizations that have struggled with data silos. Live data access enhances operational decision-making, therefore increasing site safety, predictive maintenance, and machine performance. One interviewee described how the availability of real-time data enabled by Cognite Data Fusion supported superior training of their machine learning model in production, which led to increased performance levels in production processes. Another explained how the insurance risk associated with their organization's heavy equipment was reduced significantly by being able to provide their insurer with live data.

“We are saving \$1 million because we now have real-time data on equipment deployment.”

Senior VP, digitalization, marine geophysics

Modeling and assumptions. Based on the interview data, Forrester makes the following assumptions:

- This use case is implemented from Year 2 on 25 large assets and scaled to all 30 in Year 3.
- For the composite, the average revenue per day from a large asset is \$200,000.

“First and foremost, they understood our problem. It wasn't about selling a service — it was about solving your problems.”

Senior VP, digitalization, marine geophysics

- In Year 2, each asset is open, on average, for 335 days and in Year 3 for 336 days.
- Forrester assumes a 1% gain in productivity.
- The operating margin is 12.5%.
- Seventy percent of the real-time data gains are attributable to Cognite Data Fusion.

Risks. Real-time data efficiencies will vary from organization to organization with respect to:

- Average level of asset productivity.
- Revenue per large asset.
- Operating margin.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$2.3 million.

Real-time Data Efficiencies					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of large assets using Cognite Data Fusion	Composite		25	30
C2	Average productivity per day per large asset	Composite		\$200,000	\$200,000
C3	Average number of days large asset remains in production	Interviews		335	336
C4	Total annual revenue of large assets using Cognite Data Fusion	$C1 \times C2 \times C3$		\$1,675,000,000	\$2,016,000,000
C5	Productivity gain from real-time data efficiencies	Interviews		1%	1%
C6	Total productivity gains from real-time data efficiencies across large assets	$C4 \times C5$		\$16,750,000	\$20,160,000
C7	Operating profit margin	TEI standard		12.5%	12.5%
C8	Productivity gains attributable to Cognite Data Fusion	Interviews		70%	70%
Ct	Real-time data efficiencies	$C6 \times C7 \times C8$	\$0	\$1,465,625	\$1,764,000
	Risk adjustment	↓10%			
Ctr	Real-time data efficiencies (risk-adjusted)		\$0	\$1,319,063	\$1,587,600
Three-year total: \$2,906,663			Three-year present value: \$2,282,922		

OPTIMIZED PLANNED MAINTENANCE PROGRAM

Evidence and data. Cognite Data Fusion creates contextualized data that enables SMEs to optimize planned maintenance through reviewing available resources, workflows, and component lifecycles. Industrial data scientists can model what will happen using a digital twin of the facility setup to see how they can bring down a particular subset of the overall workflow and continue production.

One interviewee noted that since using Cognite Data Fusion to contextualize data, their large-asset downtime had dropped from 34% to 4% by utilizing these kinds of processes. Others agreed that a 5% avoided loss for this use case was typical. Another described efficiencies from leveraging predictive maintenance on key assets.

Modeling and assumptions. Based on the interview data, Forrester makes the following assumptions:

- Optimizing planned maintenance comes onstream in Year 3 across all 30 large assets.
- For the composite, the average revenue per day from a large asset is \$200,000 and in Year 3, on average, the assets are open for 336 days.
- The composite achieves a gain of 5%.

Risks. The likely risks in reaching optimized maintenance planning are:

- Variation in the productivity of large assets.
- The avoided loss available in output is lower because production is more effective than predicted.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$4.3 million.

Optimized Planned Maintenance Program					
Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Number of large assets using Cognite Data Fusion	Composite			30
D2	Average revenue per day per large asset	Composite			\$200,000
D3	Average number of days each large asset remains in production	Interviews			336
D4	Avoided loss in output	Interviews			5%
D5	Total avoided lost revenue	$D1 \times D2 \times D3 \times D4$			\$100,800,000
D6	Operating profit margin	TEI standard			12.5%
D7	Avoided loss attributable to Cognite Data Fusion	Assumption			50%
Dt	Optimized planned maintenance program	$D5 \times D6 \times D7$	\$0	\$0	\$6,300,000
	Risk adjustment	↓10%			
Dtr	Optimized planned maintenance program (risk-adjusted)		\$0	\$0	\$5,670,000
Three-year total: \$5,670,000			Three-year present value: \$4,259,955		

ENERGY EFFICIENCY SAVINGS

Evidence and data. Large industrial units use considerable amounts of power and heat. Modern industrial equipment and work practices offer significant potential energy efficiency savings, particularly in the face of high and volatile energy pricing.

In interviews, customers said that they typically achieved energy savings of 15% with Cognite Data Fusion.

One interviewee used Cognite Data Fusion data contextualization to examine the optimum speed for their large sea vessels to save money on engine fuel consumption, which was then scaled to the entire fleet of 78 vessels.

Modeling and assumptions. Based on the interview data, Forrester makes the following assumptions:

- The composite sees energy efficiency savings beginning in Year 3 across all 30 large assets.

- A large asset, based in the US, will consume \$10,000 of energy per day and remains in production for 336 days.

Risks. The main risks affecting the possibility of energy saving efficiencies are as follows:

- Assets with smaller power requirements than those described in the composite and that are not in active production for as many days.
- Price volatility in the gas and oil production markets.
- Inability to capture savings because peak production aligns to peak energy pricing.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of more than \$5.1 million.

Energy Efficiency Savings					
Ref.	Metric	Source	Year 1	Year 2	Year 3
E1	Number of large assets using Cognite Data Fusion	Composite			30
E2	Average energy costs per large asset per day	Composite			\$10,000
E3	Average number of days each large asset remains in production	Interviews			336
E4	Average savings from increased energy efficiency	Interviews			15%
E5	Proportion of energy savings attributable to Cognite Data Fusion	Assumption			50%
Et	Energy efficiency savings	$E1 * E2 * E3 * E4 * E5$	\$0	\$0	\$7,560,000
	Risk adjustment	↓10%			
Etr	Energy efficiency savings (risk-adjusted)		\$0	\$0	\$6,804,000
Three-year total: \$6,804,000			Three-year present value: \$5,111,946		

OPTIMIZATION OF HEAVY MACHINERY IN CONTINUOUS PRODUCTION

Evidence and data. The largest benefit arising from the deployment of Cognite Data Fusion is through the optimization of heavy machinery and industrial processes. The longer an asset is in production and operating effectively, the greater the revenues and margins will be from that asset.

Interviewees observed important improvements in performance from the combination of heavy machinery and machine learning. In one case, an interviewee described that by using ML and real-time data, they were able to optimize performance to the best levels previously achieved. Other interviewees highlighted how the improvement in data visibility meant that the SMEs and data scientists were able to optimize processes and settings, which kept production running longer.

Modeling and assumptions. Based on the interview data, Forrester makes the following assumptions:

- The model is based on a two-year scaling process, from 25 large assets in Year 2 to 30 in Year 3.
- For the composite, the average revenue per day from a large asset is \$200,000 and in Years 2 and 3, on average, each asset is open for 335 and 336 days, respectively.

- A 15% productivity gain is possible in Year 2, increasing to 16% in Year 3.

Risks. The key factors likely to dampen the benefits of heavy machinery optimization in continuous production are:

- An asset that is already performing at a high level.
- An asset that has fewer opportunities to calibrate the interactions of heavy machinery along its workflow.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of nearly \$9.0 million.

“The drilling speed rate of penetration — it's the weight on the drill, how quickly you're turning the bit, and the floor rate. So you can vary those three [with Cognite Data Fusion], and that way we get the best performance.”

Product manager, oil and gas

Optimization Of Heavy Machinery In Continuous Production					
Ref.	Metric	Source	Year 1	Year 2	Year 3
F1	Number of large assets using Cognite Data Fusion	Composite		25	30
F2	Average productivity gain per day of large asset operation	Composite		\$200,000	\$200,000
F3	Average number of days large asset remains in production	Interviews		335	336
F4	Total annual revenue of large assets using Cognite Data Fusion	$F1 * F2 * F3$		\$1,675,000,000	\$2,016,000,000
F5	Productivity improvement	Interviews		15%	16%
F6	Productivity gains	$F4 * F5$		\$251,250,000	\$322,560,000
F7	Operating profit margin	TEI standard		12.5%	12.5%
F8	Total production gain attributable to Cognite Data Fusion	Interviews		20%	20%
Ft	Optimization of heavy machinery in continuous production	$F6 * F7 * F8$	\$0	\$6,281,250	\$8,064,000
	Risk adjustment	↓20%			
Ftr	Optimization of heavy machinery in continuous production (risk-adjusted)		\$0	\$5,025,000	\$6,451,200
Three-year total: \$11,476,200			Three-year present value: \$8,999,775		

UNQUANTIFIED BENEFITS

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

- **Health and safety.** By using Cognite Data Fusion, some interviewees reported that their organizations are able to map incidents and near-misses on large assets which could reduce the amount of human movement through potentially dangerous hot areas, reducing risks to employees.
- **ESG reporting.** Some organizations had begun to develop use cases to examine how they might use contextualized data to help with ESG reporting.

FLEXIBILITY

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

- **Flexibility with source data and data contextualization.** Cognite Data Fusion combines a wide range of different industrial data types — structured and unstructured data, time series, IoT data, ERP, events, work orders, 3D, and photogrammetry from a wide range of common platforms. The Cognite Data Fusion platform contextualizes all this data using a common, flexible data model. New data is continuously contextualized, providing many potential additional use cases and opportunities to leverage such rich data for machine learning and scaling across assets.
- **Flexibility in tools and services.** Cognite Data Fusion is an open architecture combining 3D/CAD visualization, digital dashboards, software development kits (SDKs), low-code development for use cases for SMEs, and a physics simulator. Cognite Data Fusion is

designed to work with the full range of industrial organizations and is compatible with all common third-party apps; it also works with end-user apps, bespoke apps, and its own out-of-the-box Cognite applications.

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

“We were able to reduce the number of people and the time they spent in potentially hazardous areas.”

VP, data governance, oil and gas

Analysis Of Costs

■ Quantified cost data as applied to the composite

Total Costs							
Ref.	Cost	Initial	Year 1	Year 2	Year 3	Total	Present Value
Gtr	Implementation costs	\$240,768	\$0	\$0	\$0	\$240,768	\$240,768
Htr	Subscription fees	\$0	\$682,500	\$1,155,000	\$2,100,000	\$3,937,500	\$3,152,761
Itr	Total operating costs	\$0	\$698,500	\$918,500	\$808,500	\$2,425,500	\$2,001,529
	Total costs (risk-adjusted)	\$240,768	\$1,381,000	\$2,073,500	\$2,908,500	\$6,603,768	\$5,395,058

IMPLEMENTATION COSTS

Evidence and data. Implementing Cognite Data Fusion involved collaboration between the client organization and the Cognite team to deploy and integrate the Cognite Data Fusion platform.

Given the challenges and complexity of industrial data, interviewees said that it took time to prepare their large assets for data ingestion with Cognite Data Fusion.

Modeling and assumptions. The implementation costs for the organization are composed both of the internal effort to prepare assets for integration as well as the integration process itself.

- Based on interview data, costs related to internal development effort are estimated at six FTEs for planning, coordination, and integration for a period of four months.

- Forrester assumes a fully burdened blended hourly rate for members of the implementation team of \$57 per hour.

Risks. There are a range of risk factors that will affect the implementation of Cognite Data Fusion:

- The greater the number of facilities where data is being ingested, the more chance there is of experiencing challenges with legacy systems.
- The complexity and digital maturity of the industrial data systems on the large assets.
- The size of the large assets.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of \$241,000.

Implementation Costs						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Total number of FTEs required for implementation	Interviews	6			
G2	Average fully burdened hourly salary for developers building integrations	TEI standard	\$57			
G3	Developer hours for implementation	Interviews	640			
Gt	Implementation costs	$G1 * G2 * G3$	\$218,880	\$0	\$0	\$0
	Risk adjustment	↑10%				
Gtr	Implementation costs (risk-adjusted)		\$240,768	\$0	\$0	\$0
Three-year total: \$240,768			Three-year present value: \$240,768			

SUBSCRIPTION FEES

Evidence and data. Cognite Data Fusion has a subscription-based licensing model based on a range of factors including the number of large assets (sites), the number of tags used by clients, the types of data to be fused, and the number of data fusion services deployed. The data fusion services in the core platform include application frameworks, manage and configure data, explore and build, contextualize data, and data integration.

- Interviewed customers said that the subscription provided them with data contextualization that created relationships between a range of siloed data sources including time series data, ERP and work orders, 3D/CAD, and IoT logs.
- Customers said that the subscription also provided them with Cognite training, SDKs and open APIs, and solution support, as well as dashboard creation for SMEs.

Modeling and assumptions. Given the interviewee responses, Forrester makes the following assumptions:

- The subscription over the three-year period for the composite was based on implementation on 20 large assets in Year 1, 25 in Year 2, and all 30 in Year 3.
- The subscription price is based on the composite using all data fusion services and all data types.

Risks. Forrester understands that subscription fees may vary markedly by organization, and the best way to determine the costs is to speak directly with a Cognite representative. Factors to consider when estimating subscription fees include:

- Number of large assets.
- Number of tags used.
- Data fusion services required.
- Types of data for ingestion.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of \$3.2 million.

Subscription Fees						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
H1	Subscription fees	Interviews		\$650,000.00	\$1,100,000.00	\$2,000,000.00
Ht	Subscription fees	Interviews	\$0	\$650,000	\$1,100,000	\$2,000,000
	Risk adjustment	↑5%				
Htr	Subscription fees (risk-adjusted)		\$0	\$682,500	\$1,155,000	\$2,100,000
Three-year total: \$3,937,500			Three-year present value: \$3,152,761			

OPERATING COSTS

Evidence and data. Using Cognite Data Fusion introduced a set of ongoing costs for organizations to develop new use cases and scale proven solutions to further large assets. These additional costs took the form of management and oversight of the work with Cognite and not the delivery team, who would be working on data operations solutions regardless.

Typically, this delivery team working on new use cases and scaling production will be a team of six to eight FTEs, including project lead, link to SME operations, software developers, industrial data scientists, industrial data analysts, and software engineers. This team will be working full-time in agile sprints on use cases viewed through the prism of Cognite Data Fusion.

From the interviews, customers also highlighted that a key part of the operating costs were ongoing professional services from Cognite. These professional services could include developing challenging use cases, work around scalability or support for additional operational services like industrial robots.

Modeling and assumptions. Based on interview responses, Forrester makes the following assumptions:

- It takes two FTEs at the composite to manage and maintain the integration, the use cases, and the scaling across assets.
- The average fully burdened cost per year for each member of the oversight and software development team is \$100,000.

Risks. The operating costs will vary in terms of the complexity of use cases, the range of data, the digital maturity, and the sheer scalability of the large assets.

- The complexity of the use cases may lead to challenges in being able to transform data quickly and in an organized fashion.
- The more types of different data that are being ingested and transformed in the data fusion process, the more involved the organizational and operational delivery will be.
- The digital maturity of data systems on large assets will affect data ingestion and integration.

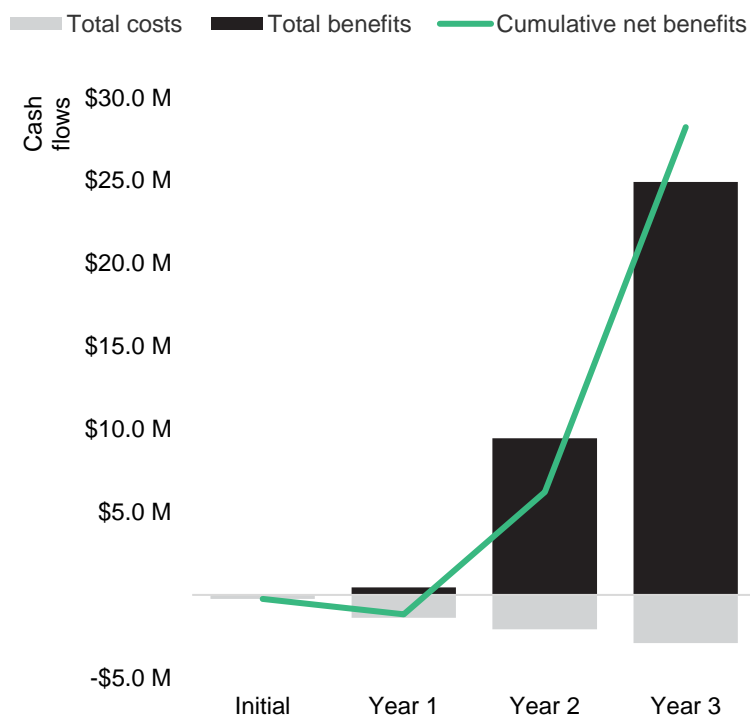
Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$2 million.

Operating Costs						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
I1	Developer FTEs maintaining and managing with Cognite Data Fusion	Interviews		2	2	2
I2	Average fully burdened annual salary for a developer salary (fully burdened)	TEI standard		\$100,000	\$100,000	\$100,000
I3	Total cost of FTEs maintaining and managing Cognite Data Fusion	I1*I2		\$200,000	\$200,000	\$200,000
I4	Professional services	Interviews		\$435,000	\$635,000	\$535,000
It	Operating costs	I3+I4	\$0	\$635,000	\$835,000	\$735,000
	Risk adjustment	↑10%				
Itr	Operating costs (risk-adjusted)		\$0	\$698,500	\$918,500	\$808,500
Three-year total: \$2,425,500			Three-year present value: \$2,001,529			

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



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

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

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	(\$240,768)	(\$1,381,000)	(\$2,073,500)	(\$2,908,500)	(\$6,603,768)	(\$5,395,058)
Total benefits	\$0	\$450,000	\$9,462,813	\$24,922,800	\$34,835,613	\$26,954,467
Net benefits	(\$240,768)	(\$931,000)	\$7,389,313	\$22,014,300	\$28,231,845	\$21,559,409
ROI						400%
Payback period (months)						14

Appendix A: Total Economic Impact

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

TOTAL ECONOMIC IMPACT APPROACH

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

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

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

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

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



PRESENT VALUE (PV)

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



NET PRESENT VALUE (NPV)

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



RETURN ON INVESTMENT (ROI)

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



DISCOUNT RATE

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



PAYBACK PERIOD

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

Appendix B: Endnotes

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

FORRESTER®