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The Total Economic Impact™ Of Snowflake For Data Engineering
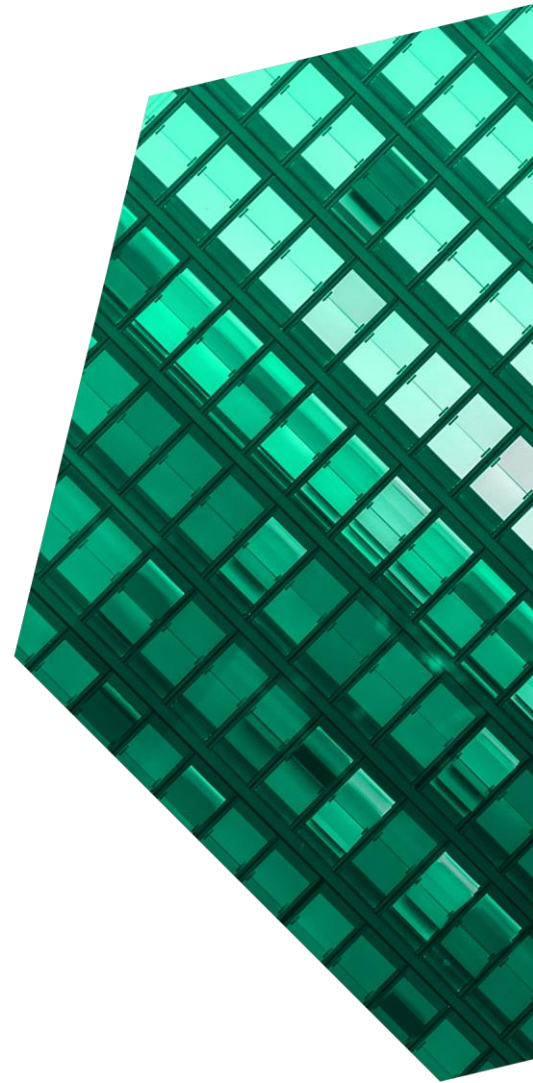
Cost Savings And Business Benefits
Enabled By Snowflake

MAY 2022

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Executive Summary

> Business executives today expect the right data to be delivered to the right people at the right times. However, limitations around traditional data architecture, the proliferation of data silos, and increasingly diverse data shapes and forms are a growing obstacle for decision-makers to address. More than ever, businesses need a solution that removes database complexities. Simplifying data pipelines and infrastructure is critical for businesses to quickly and effectively extract value from their data.

Snowflake Data Cloud consists of a global network on which thousands of organizations mobilize data with near-unlimited scale, concurrency, and performance. Within Data Cloud, organizations unite their siloed data, discover and securely share governed data, and execute diverse analytic workloads. Snowflake delivers a single and seamless experience across multiple public clouds, and its platform powers and provides access to Data Cloud, which creates a solution for data warehousing, data lakes, data engineering, data science, data application development, and data sharing.

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

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six decision-makers at four organizations with experience using Snowflake. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization.

Interviewees said that prior to using Snowflake, their organizations' scaling-out initiatives for their data platforms were becoming increasingly expensive between hardware costs and escalating manual labor

KEY STATISTICS

Return on investment (ROI)
616%

Net present value (NPV)
$10.7M

hours. Management of multiple on-prem data warehouses made it difficult for engineers to gather and format data. Without data reliably pushed through data pipelines, scientists and analysts at the organizations lost trust in data quality, and they were slow to generate new reports or insights.

Decision-makers recognized that their organizations needed a solution that would help modernize their data engineering practices. They eventually landed on Snowflake because of several key factors. They said:

- Snowflake provides a single, unified source for data that removes complexity in sharing and using data.

- Snowflake's costs scale in relation to using the solution.

- Compute is fully separable from storage to spin up multiple processing clusters at the same time.

- Snowflake is a cloud-based solution that supports integration with many other solutions in their organizations' tech stacks.

After investing in Snowflake, decision-makers saw efficiencies across the board around data-engineering work and quality of data. Improved engineering led to data scientists and analysts generating deeper insights on a reliable basis, which helped the organizations to better support the data needs of business partners, customers, and internal operations.

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Data engineers improved productivity by 66%.** Interviewees said data engineers' workloads were eased by Snowflake's automation of functions like data ingestion, micro-partitioning, pruning of data, and management of storage capacity. Simplified data management helped data engineers to produce better quality data and facilitated sharing to more teams.

- **Data scientists and data analysts doubled their bandwidth.** With Snowflake, data teams gained a single location for data gathering, so they no longer had to spend time searching for data sets. In addition, the data was of reliable quality and formatted and shaped for them to use so they could collect insights faster.

More than **80,000 hours** in freed bandwidth among data teams

- **Increased business value from data initiatives by 20%.** Interviewees' organizations generated additional business in several ways, including reducing project timelines by several weeks and being able to take on more work with clients as a

result. They also shared data more quickly with customers and clients, which improved their satisfaction levels. Meanwhile, data teams used machine learning to better inform business decisions and planning that drove more revenue generation.

- **Avoided hundreds of thousands of dollars in additional data costs.** Because Snowflake is cloud-based, interviewees' organizations no longer adopted on-premises servers to scale out their warehouses. In addition, pricing for Snowflake made it easier for them to pay for services in closer alignment to the scale of work they handle through the platform.

Unquantified benefits. Benefits that are not quantified for this study include:

- **Better collaboration between teams which led to greater business results.** Data teams reallocated freed bandwidth to more data reviews and made connections between data they would have otherwise missed. Having greater accessibility to data enabled more collaboration between data teams to generate insights. The organizations applied these takeaways to improve customer and employee experiences.

- **Stronger employee experiences.** Having fewer technical obstacles for data teams around gathering, formatting, and analyzing data made for better quality of life at work. Employees took longer breaks and returned more focused to produce higher quality outcomes.

- **Reliable data security and governance.** Snowflake meets security standards for organizations across industries through features like dynamic data masking and end-to-end encryption of data at rest or in transit.

- **Ever-expanding support for new capabilities and integrations.** Snowflake continues to add support for integrations with platforms, which furthers organizations' speed and agility with data

management. Meanwhile, new features like Snowpark for Python (which was in preview at the time this study was conducted) resonate with customers. This demonstrates Snowflake's commitment to improving its platform.

Costs. Risk-adjusted PV costs include:

- **Snowflake implementation and training costs.** Interviewees said their organizations had small teams of data engineers migrate their databases to Snowflake during the course of several months. Time spent learning the platform among employees was very fast and produced a minor cost.

- **Snowflake solution costs.** Interviewees said pricing was influenced by a variety of factors, including processing and consumption of data, size of storage, and capabilities leveraged.

The decision-maker interviews and financial analysis found that a composite organization experiences benefits of $12.4 million over three years versus costs of $1.7 million, adding up to a net present value (NPV) of $10.7 million and an ROI of 616%.

> **"Snowflake allows us to do ETL and reporting faster. With other solutions it would require a lot more juggling to maintain robust data pipelines."**
>
> *Director of insights and data science, CarTrawler*

ROI
616%

BENEFITS PV
$12.4M

NPV
$10.7M

PAYBACK
<6 months

Data solution cost savings, $1.0M

Data engineering productivity, $2.0M

Increased business growth, $1.8M

$12.4 million

three-year total benefits PV

Data scientist productivity, $2.4M

Data analyst productivity, $5.2M
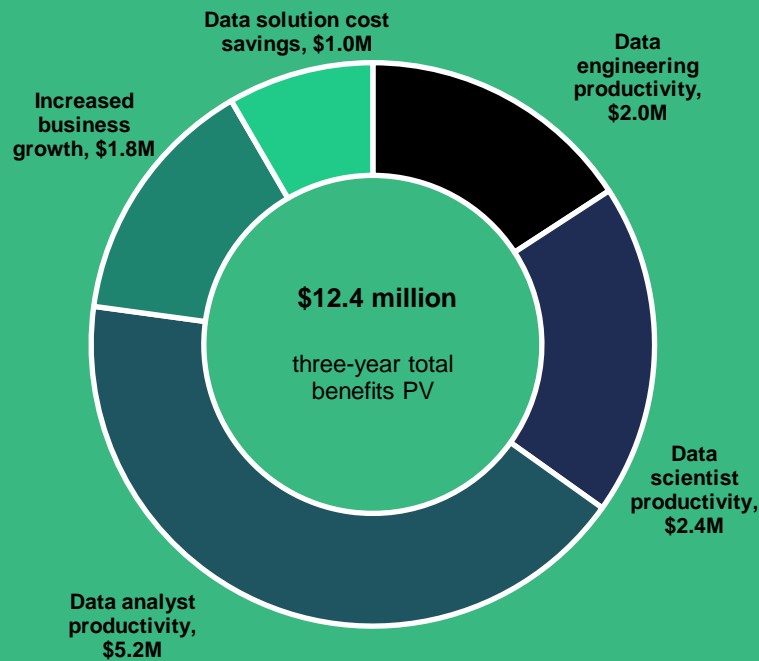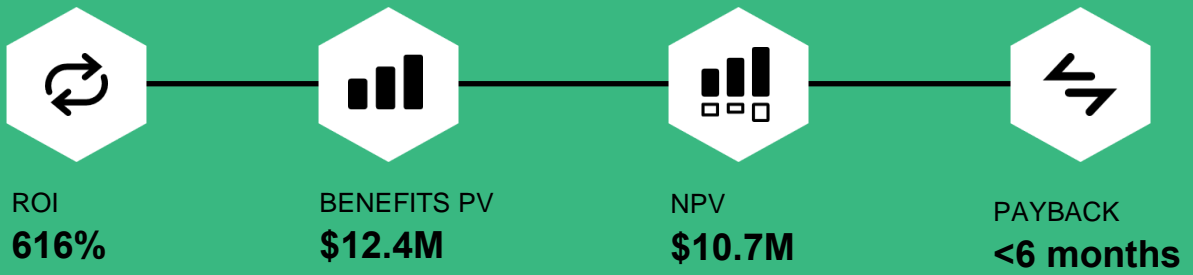
"We do almost anything faster. The ability to administer, move around, copy, and share data, instead of taking a day and lots of space and time can now take us seconds. We're much more agile to try new things."

— Data and business intelligence architect, consumer packaged goods company

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 Snowflake.

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 Snowflake can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Snowflake 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 the Snowflake.

Snowflake 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.

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

DUE DILIGENCE
Interviewed Snowflake stakeholders and Forrester analysts to gather data relative to Snowflake.

DECISION-MAKER INTERVIEWS
Interviewed six decision-makers at four organizations using Snowflake 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 decision-makers.

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.

Interviewed Decision-Makers				
Interviewee	**Company**	**Industry**	**Region**	**Environment**
Senior director of decision science Data and business intelligence architect Data science analyst	Consumer packaged goods (CPG) company	CPG	Headquartered in North America	<5 TB of data, 10,000+ employees
Senior engineering manager	Coalition, Inc.	Insurance	Headquartered in North America, global operations	>5 TB of data, <500 employees
VP of data analytics	iPipeline	Insurance	Headquartered in North America, global operations	Hundreds of TB of data, <1,000 employees
Director of insights and data science	CarTrawler	Travel	Headquartered in Western Europe	200+ TB of data, <500 employees

KEY CHALLENGES

According to a Forrester survey of data and analytics decision-makers, the most cited challenge for executing around data, data management, data science, and analytics is the inability to process big data and to act on it at the speeds needed by operations, business, and customers.[2] This was true for 20% of respondents. And 19% of respondents cited the challenges of accessibility, availability, and/or readiness of data to use.

Interviewed decision-makers reiterated the significance of these obstacles and said specific challenges include:

- **Complex data pipelines and architecture.** Data engineers managed large numbers of systems with complicated technical requirements that required significant time to address. As a result, interviewees' organizations struggled to effectively harness data for both internal and external demands.

- **Unreliable performance and scalability led to broken pipelines.** Interviewees said their organizations' legacy systems and storage caps made work for data engineers more complex as

they constructed data pipelines between aging on-prem servers. Using this previous approach, extract, transform, and load (ETL) job failures were frequent, and data pipelines regularly required maintenance. Compounding matters, engineers could only spin up one data cluster at a time, and trying to do more would slow down other existing production workflows. Data engineers' systems limited their ability to scale out their organizations' data warehouses.

- **Time-consuming management of a wide variety of data forms.** Data engineers dealt with troves of structured and unstructured data spread across silos that took significant time to locate and clean. Management of these data structures through complex data pipelines that often broke made for lengthy processing-cycle times and unreliable data quality. These data challenges frustrated employees and third parties that expected quick access to high-quality data.

INVESTMENT OBJECTIVES

The interviewees' organizations searched for a data management solution that:

- Offers simplicity around data pipelines that can guarantee reliable, accelerated data processing.

- Is a scalable data platform with a cost-effective, usage-based business model.

- Is cloud agnostic and provides support for multiple storage vendors and facilitates a single platform for data access.

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 decision-makers that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite is a multinational, industry-agnostic organization with various revenue streams that rely on data to maintain and drive business operations. Annual revenue totals $5 billion annually and the organization employs the full-time equivalent (FTE) of 75 data analysts, engineers and scientists, with reports generated that serve more than 1,000 employees. The organization has upwards of 500 TB of data that runs through Snowflake.

Deployment characteristics. Prior to using Snowflake, the composite had on-prem servers and a legacy data management system that limited the scalability of its database, access to data, and required hours of manual labor to leverage effectively. Moving forward, much of the organization's data operations are cloud-based, and Snowflake supports this initiative.

After selecting Snowflake, the organization migrates its database to the platform within six months. This requires six FTEs working during that time to support migration efforts.

> **"Scaling out warehouses can be extremely expensive and hard to manage with compute. It's also hard to understand what your use cases are going to be and what's going to be needed. We needed a solution that could be flexible with our use cases."**
> *VP of data analytics, iPipeline*

Key assumptions
- **$5 billion in revenue**
- **500 TB of data in Snowflake**
- **Mix of on-premises and cloud-based data**

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	Data engineering productivity	$787,644	$787,644	$787,644	$2,362,932	$1,958,754
Btr	Data scientist productivity	$947,700	$947,700	$947,700	$2,843,100	$2,356,790
Ctr	Data analyst productivity	$2,106,000	$2,106,000	$2,106,000	$6,318,000	$5,237,310
Dtr	Increased business growth	$380,160	$836,352	$1,003,622	$2,220,134	$1,790,836
Etr	Data solution cost savings	$260,000	$410,000	$615,000	$1,285,000	$1,037,265
	Total benefits (risk-adjusted)	$4,481,504	$5,087,696	$5,459,966	$15,029,166	$12,380,955

DATA ENGINEERING PRODUCTIVITY

Evidence and data. Interviewees said Snowflake's ability to auto-ingest structured, semi-structured, and unstructured data from various data sources (e.g., enterprise applications, online transaction processing databases, third-party platforms, etc.) into one cloud-based platform was critical to driving productivity for data engineers.

Teams no longer had to manually copy and move files, which often led to errors and delays to projects. With Snowflake enabling multicluster compute, engineers could conform multiple data sets from different sources at the same time.

Engineers saw additional time savings from Snowflake's other automated capabilities, including micro-partitioning of data, pruning of unnecessary data, and managing storage capacity. Support for unstructured data also took the lift off data engineers writing code to turn unstructured data into structured data, as analysts can self-service that in Structured Query Language (SQL).

A senior engineering manager at Coalition, Inc. shared that their organization would have needed three more engineers to accomplish what it currently does with the equivalent of 1.5 employees using Snowflake. Altogether, data engineers faced fewer headaches as a result of reduced complexity of their work, and they began producing higher data quality, which helped data analysts and scientists to become faster with their work as well.

> **"The separation of compute from storage allows multiple jobs to run on the same data set without bumping into each other. This change has been really useful because data engineers can work on their tasks without needing to coordinate resource utilization with other people."**
>
> *Senior engineering manager, Coalition, Inc.*

Modeling and assumptions. For the composite organization, Forrester assumes:

- There is the equivalent of 10 full-time data engineers in place.

- Snowflake improves productivity on the engineers' work by 66%, which leads to more than 13,000 hours in time savings annually.

- Of the time saved, 75% is recaptured toward additional work efforts, while the remaining 25% is reallocated to longer work breaks and fewer late nights or weekends of work. This all leads to a better employee experience.

- The average fully loaded hourly compensation for a data engineer is $85.

Risks. Differences in organizations that may impact the benefit results include:

- The number of data engineers at the organization.

21%

$1.2 million

three-year
benefit PV
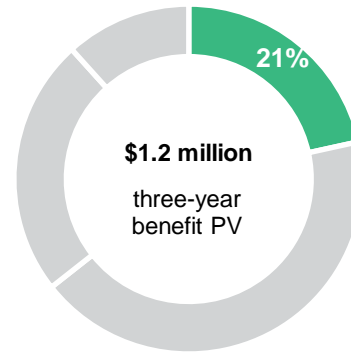
Data engineering productivity share of total benefits

- Whether or not the organization previously leveraged data management solutions that already generated some productivity for engineers.

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 $2.0 million.

Data Engineering Productivity					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
A1	Number of data engineer FTEs	Assumption	10	10	10
A2	**Improvement in productivity with Snowflake**	**Interviews**	**66%**	**66%**	**66%**
A3	Subtotal: Total data engineering work hours reallocated with Snowflake	A1*2,080 hours*A2	13,728	13,728	13,728
A4	Productivity recapture rate	Assumption	75%	75%	75%
A5	Fully burdened hourly rate for developers and data engineers	TEI Standard	$85	$85	$85
At	Data engineering productivity	A3*A4*A5	$875,160	$875,160	$875,160
	Risk adjustment	↓10%			
Atr	Data engineering productivity (risk-adjusted)		$787,644	$787,644	$787,644
	Three-year total: $2,362,932		**Three-year present value: $1,958,754**		

DATA SCIENTIST PRODUCTIVITY

Evidence and data. Interviewees said data scientists' work accelerated in part from improved data engineering, but also from readily accessible live data and Snowflake's data marketplace to share across various teams. Self-service among data scientists increased as they regularly leveraged ready-to-query data sets from the marketplace and sourced high-quality data from pipelines that was already formatted and shaped for them to use. Data scientists no longer spent time deciphering days old and complex data sets from unreliable reporting. Teams also avoided spending time searching for data sets spread across data silos as a result of them being accessible from one location and instant sharing without ETL.

Freed bandwidth for data scientists allowed them to spend more time on their research. They reached deeper insights on their projects aided by greater accessibility to data and increased sharing of data sets between teams, as well as from improved visibility over data that revealed connections between data sets that they previously would have missed.

Modeling and assumptions. For the composite organization, Forrester assumes:

- There is the equivalent of 15 full-time data scientists.

- With a significant amount of prep work on data and time spent sourcing data eliminated, Snowflake improves productivity on data scientists' work by 50%. This leads to more than 15,600 hours in time savings annually.

- Like for data engineers, Forrester applied a recapture rate of 75% to the time savings.

- The average fully loaded hourly compensation for a data scientist is $90.

Risks. Differences in organizations that may impact the benefit results include:

- The number of data scientists at the organization.

- The amount of work that data scientists did with data that Snowflake can help them manage.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $2.4 million.

> **"Snowflake is uniquely configured in terms of deployment of databases, warehouses, and data sharing, [which makes] it advantageous to drive self-service initiatives among data scientists. We wouldn't be able to move at this speed and scale without Snowflake."**
>
> Senior director of decision science, consumer packaged goods company

Data Scientist Productivity

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of data scientist FTEs	Assumption	15	15	15
B2	**Improvement in productivity with Snowflake**	**Interviews**	**50%**	**50%**	**50%**
B3	Subtotal: Total data scientist work hours reallocated with Snowflake	B1*2,080 hours*B2	15,600	15,600	15,600
B4	Productivity recapture rate	Assumption	75%	75%	75%
B5	Fully burdened hourly rate for data analysts	TEI Standard	$90	$90	$90
Bt	Data scientist productivity	B3*B4*B5	$1,053,000	$1,053,000	$1,053,000
	Risk adjustment	↓10%			
Btr	Data scientist productivity (risk-adjusted)		$947,700	$947,700	$947,700
	Three-year total: $2,843,100		Three-year present value: $2,356,790		

DATA ANALYST PRODUCTIVITY

Evidence and data. Interviewees said data analysts were better able to service internal projects and customers with Snowflake, which drove increased agility to deliver reporting and insights. Like data scientists, analysts benefit from reliable data quality and reduced time searching for data. Critically, time spent waiting on query results to process was reduced, and encryption of data while at rest or in transit ensured secure sharing.

Increased speed toward accessing data helped grow the number of tables and cuts of data concurrently created for reporting, which drove self-service among analysts. The director of insights and data science at CarTrawler shared that since using Snowflake, their organization's use of dashboards has more than tripled among employees. It went from 30 regularly leveraged around the company to 100, with more specialist dashboards created for specific reporting.

The interviewee said: "We use it a lot for reporting on operations. When we make tables with interesting cuts of data that you want to show to analysts every morning or in near-real time overnight, we feed those tables and reports to teams through our dashboards. We've automated a lot of reports to answer questions that come to analysts, [which saves] them a ton of time."

Interviewees said customer service was a key beneficiary of greater self-service among analysts. Customer requests at their organizations ranged from financial reports to expected costs on investments or travel plans. The volume of requests previously meant that it could take days for analysts to complete customer requests. But with Snowflake, customers could input requests and receive results within

> **"A key differentiator of Snowflake is the ability to share data securely to a customer in real time. Setup of that in the past required us to build APIs. Now a customer can ask for data access and receive it in within a day."**
>
> *VP of data analytics, iPipeline*

moments. Analysts reallocated this saved time toward developing more reporting to meet customer needs.

Modeling and assumptions. For the composite organization, Forrester assumes:

- There are the equivalent of 50 full-time data analysts at the organization, which is representative of the reach reporting and analytical work done at organizations.

- As with data scientists, most of the prep work on gathering data is removed. Snowflake improves productivity on data analysts' work by 50%, resulting in more than 52,000 hours in time savings annually.

- Forrester applied a recapture rate of 75% to the time savings.

- The average fully loaded hourly compensation for data analysts blended across various business, operations, and technical business lines is $60.

Risks. Differences in organizations that may impact benefit results include the number of data analysts across business lines, time spent on analysis and average salaries.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $5.2 million.

Increase in reporting for CarTrawler through Snowflake: **3x**

Data Analyst Productivity

Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of data analysts FTEs	Assumption	50	50	50
C2	**Improvement in productivity with Snowflake**	**Interviews**	**50%**	**50%**	**50%**
C3	Subtotal: Total data analyst work hours reallocated with Snowflake	C1*2,080 hours*C2	52,000	52,000	52,000
C4	Productivity recapture rate	Assumption	75%	75%	75%
C5	Blended fully burdened hourly rate for data analysts	TEI Standard	$60	$60	$60
Ct	Data analyst productivity	C3*C4*C5	$2,340,000	$2,340,000	$2,340,000
	Risk adjustment	↓10%			
Ctr	Data analyst productivity (risk-adjusted)		$2,106,000	$2,106,000	$2,106,000
	Three-year total: $6,318,000		**Three-year present value: $5,237,310**		

INCREASED BUSINESS GROWTH

Evidence and data. Reduced complexity around data management and accessibility had a dramatic impact on several use cases at the interviewees' organizations, which led to additional business. The VP of data analytics at iPipeline shared that a proof-of-concept project with a client that would have taken three months to complete took just one month with Snowflake.

Analysts were able to query and slice and dice data in real time while interfacing with clients. This increased speed helped analysts establish a 90-minute check-in twice a week with their clients during which they asked questions about the data and continued to evaluate it. Increased customer engagement and satisfaction led to more business generation opportunities with clients.

More self-service among analysts helped analysts take on more client work and pull in fewer colleagues for support. A senior engineering manager at Coalition, Inc. estimated that their organization took on 20% more projects or had at least one day a week to dedicate to another project that it wouldn't have had previously. Meanwhile, interviewees from a consumer packaged goods company shared that their organization would have taken on 10% to 20% fewer projects if it had to continue managing infrastructure technical challenges like it did prior to Snowflake.

Interviewees also said their organizations lean on Snowflake's support for machine learning tools, specifically for data preparation, feature engineering, and machine learning operations (MLOps) to help become more efficient with business. Through machine learning with Snowflake's support, the CPG company regularly creates bottom-up forecasts to project sales-order levels and recreate historical snapshots of sales periods to inform business decisions. Similarly, the data team at a travel company used machine learning to change prices

> **"Customer satisfaction from self-service is a huge aspect. We're able to do analysis without having bottlenecks or waiting for professional services to come to the table.**
>
> **And our customers don't have to pay us every time to run a custom analysis. They can do it. Improved satisfaction makes for better customer retention."**
>
> *VP of data analytics, iPipeline*

and the order of listings on its website in real time to attract more business.

Modeling and assumptions. For the composite organization, Forrester assumes:

- Prior to adopting Snowflake, the organization generated revenue directly from data insights and reporting efforts.

- The organization increases revenue generation by 10% in Year 1 after it starts to create best practices and develops use cases to effectively leverage Snowflake for business purposes. In Year 2, additional revenue generation grows to 20% as the organization deploys more of these best practices and use cases.

- Of the additional value generated, 66% is attributed to Snowflake. The rest of the value is attributed to employees and various factors that influence conversions on additional business.

- The assumed operating margin for the organization is 12%.

Risks. Differences in organizations that may impact benefit results include:

- Business demographics including industry, company size, and customer types.

- The amount of business generated from data insights and reporting.

- The organization's maturity with data-informed decision-making prior to using Snowflake.

  Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of $1.8 million.

Increased Business Growth					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
D1	Revenue generated directly related to data insights and reporting before Snowflake	Y1 and Y2: D1$_{PY}$+D3	$60,000,000	$66,000,000	$79,200,000
D2	**Increase in revenue from improved agility/reduced complexity with Snowflake**	**Interviews**	**10%**	**20%**	**20%**
D3	Subtotal: Additional revenue generated	D1*D2	$6,000,000	$13,200,000	$15,840,000
D4	Percentage of value generated attributed to Snowflake	Assumption	66%	66%	66%
D5	Operating profit margin	Assumption	12%	12%	12%
Dt	Increased business growth	D3*D4*D5	$475,200	$1,045,440	$1,254,528
	Risk adjustment	↓20%			
Dtr	Increased business growth (risk-adjusted)		$380,160	$836,352	$1,003,622
	Three-year total: $2,220,134		**Three-year present value: $1,790,836**		

DATA SOLUTION COST SAVINGS

Evidence and data. Interviewees' organizations avoided costs in several areas by moving to Snowflake. From a hardware perspective, decision-makers could embrace cloud storage and end their reliance on on-prem servers. The cost of each server and the physical space it took up increased incrementally, all while taking time to set up with their networks. Cloud storage mitigated these headaches for data teams.

On the licensing side, prior data-focused platforms had tiered pricing where it increased based on an expected range of data that it would manage. Snowflake was more one to one with pricing, helping decision-makers to avoid spending more than they needed to on a data platform.

Modeling and assumptions. For the composite organization, Forrester assumes:

- Data solution costs would have cost at least $20,000 more in Year 1 based on hardware and licensing costs from its previous approach.

> **"The biggest thing for us is you can put as much data as you need in it and not have to worry about scaling. I didn't realize we had so much data going through Snowflake because it doesn't slow down at all."**
>
> *Senior engineering manager, Coalition, Inc.*

- Scaling out the warehouse with the previous approach would have cost an additional $40,000 in Year 2 and $60,000 in Year 3.

Risks. Differences in organizations that may impact benefit results include the organization's previous setup for managing data and scale of warehouse.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of $1.0 million.

Data Solution Cost Savings					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
E1	Data solution costs	Snowflake	$275,000	$412,500	$618,750
E2	Additional cost each year to support growth and scale with previous setup	Assumption	$50,000	$100,000	$150,000
Et	Data solution cost savings	E1+E2	$325,000	$512,500	$768,750
	Risk adjustment	↓20%			
Etr	Data solution cost savings (risk-adjusted)		$260,000	$410,000	$615,000
Three-year total: $1,285,000			**Three-year present value: $1,037,265**		

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Deeper insights and higher quality business results.** Data scientists and analysts reallocated freed bandwidth toward further reviews of data, making connections between data they would have otherwise missed due to lack of time, trust of data, and visibility over data sets. The removal of data silos and duplicates also enabled different teams to collaborate more efficiently from the same copy of data and to have deeper discussions around their findings.

  Faster querying of data empowered teams to build upon ideas and to further prove out assumptions. Enhanced analysis of data helped teams create more informed business roadmaps that improved customer and employee experiences.

- **Improved employee experiences.** The quality of life for employees improved because they faced fewer technical obstacles around gathering, formatting, and analyzing data. Increased self-service mitigated frustrations around waiting for information and increased collaboration between employees. Teams were able to take longer breaks and be more focused when working with data.

- **Strong data security and governance.** Snowflake met the organizations' security standards and offered several security features like dynamic data masking and end-to-end encryption for data. Snowflake is also compliant with HITRUST, ITAR, PCI DSS, and SOC 2 Type 2 to meet security requirements across industries, including government. Data can be shared securely and directly without cumbersome secure file transfer protocols.

> **"The security features in Snowflake far exceeded what we had in our warehouse at the time. We weren't as mature with encryption for data at rest or in-transit and Snowflake eased that burden for us [and lowered] our risk of security breaches."**
>
> *Senior director of decision science, consumer packaged goods company*

> **"Snowflake allows us to do ETL and reporting faster. With other solutions, it would require a lot more juggling to maintain robust data pipelines."**
>
> *Director of insights and data science, CarTrawler*

FLEXIBILITY

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

- **Support for new capabilities and integrations.** Interviewees said customers appreciated that Snowflake supports integrations with platforms like Alteryx, dataiku, and H20.ai among others to support delivery and analysis of data. Snowflake continues to add features like Snowpark for Python and Java developers, which reassures organizations that Snowflake is committed to supporting them. Customers Interviewees also expressed strong interest in leveraging these features to further their agility with data management and explore their application to various business cases.

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

> **"[Snowflake has] a new feature called Snowpark where we can use Python codes to interface directly with Snowflake to query and process data.**
>
> **Snowpark would empower our data scientists more, and we're looking into it. [Snowflake keeps] launching new capabilities, and we do plan to take advantage of them."**
>
> *Senior engineering manager, Coalition, Inc.*

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**
Ftr	Snowflake implementation and training costs	$556,920	$9,188	$1,838	$1,838	$569,783	$568,171
Gtr	Snowflake solution costs	$0	$302,500	$453,750	$680,625	$1,436,875	$1,161,364
	Total costs (risk-adjusted)	$556,920	$311,688	$455,588	$682,463	$2,006,658	$1,729,535

SNOWFLAKE IMPLEMENTATION AND TRAINING COSTS

Evidence and data. Interviewees described their organizations' migration over to Snowflake as a multimonth-long process that required several data engineers for support. The interviewees estimated that their organizations would have needed comparable efforts for other solutions, so the time investment was expected. They also said Snowflake was supportive in answering questions along the way and that the interface was user-friendly and took only a few hours to learn, which led to negligible training costs.

Modeling and assumptions. For the composite organization:

- The equivalent of six full-time data engineers spend six months planning and migrating the organization's database over to Snowflake.

- The assumed fully loaded annual salary of a data engineer is $176,800.

- Twenty-five data engineers and scientists spend half a day learning the Snowflake platform in Year 1. In following years, new engineers at the company quickly learn how to use Snowflake, too.

- The blended fully loaded hourly rate of these engineers and scientists is $88.

Risks. The results are risk adjusted to account for any variance in time spent on migration or training time.

Results. Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $568,000.

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
**Snowflake Implementation And Training Costs**
F1	Number of data engineers migrating database to Snowflake solution	Interviews	6			
F2	Fully loaded annual salary	A5*2,080 hours	$176,800			
F3	Time spent planning and migrating database to Snowflake (months)	Interviews	6			
F4	Number of data engineers and data scientists learning Snowflake solution	A1+B1		25	5	5
F5	Time spent in training (hours)	Assumption		4	4	4
F6	Blended fully loaded hourly rate for data engineers and data scientists	TEI Standard		$88	$88	$88
F7	Training costs	F4*F5*F6		$8,750	$1,750	$1,750
Ft	Snowflake implementation and training costs	Initial: F1*F2*(F3/12 months) Years 1 to 3: F7	$530,400	$8,750	$1,750	$1,750
	Risk adjustment	↑5%				
Ftr	Snowflake implementation and training costs (risk-adjusted)		$556,920	$9,188	$1,838	$1,838
	Three-year total: $569,783			Three-year present value: $568,171		

SNOWFLAKE SOLUTION COSTS

Evidence and data. The annual cost of Snowflake is based on a variety of factors, including size of storage and capabilities leveraged among others. The cost increased for interviewees' organizations as they leaned more heavily on Snowflake for more use cases.

Modeling and assumptions. Forrester assumes the composite organization pays $275,000 in Year 1, $412,500 in Year 2, and $618,750 in Year 3.

Risks. The results are risk-adjusted to account for variance in regard to:

- The size and scale of the deployment.

- The workload handled with the Snowflake platform.

- The amount of analytics performed at the organization and its overall use of the platform.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $1.2 million.

Snowflake Solution Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Average consumption rate of credits with Snowflake	Assumption		$275,000	$412,500	$618,750
Gt	Snowflake solution costs	Interviews	$0	$275,000	$412,500	$618,750
	Risk adjustment	↑10%				
Gtr	Snowflake solution costs (risk-adjusted)		$0	$302,500	$453,750	$680,625
	Three-year total: $1,436,875			**Three-year present value: $1,161,364**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

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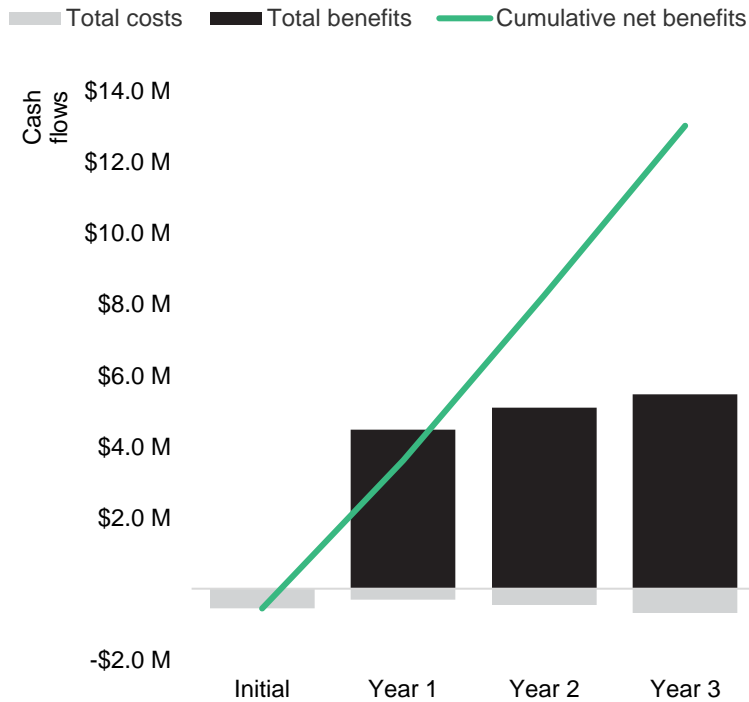
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

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	($556,920)	($311,688)	($455,588)	($682,463)	($2,006,658)	($1,729,535)
Total benefits	$0	$4,481,504	$5,087,696	$5,459,966	$15,029,166	$12,380,955
Net benefits	($556,920)	$4,169,817	$4,632,109	$4,777,504	$13,022,509	$10,651,420
ROI						616%
Payback						<6 months

Appendix A: Total Economic Impact

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

TOTAL ECONOMIC IMPACT APPROACH

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

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

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

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

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

PRESENT VALUE (PV)

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

NET PRESENT VALUE (NPV)

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

RETURN ON INVESTMENT (ROI)

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

DISCOUNT RATE

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

PAYBACK PERIOD

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

Appendix B: 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.

[2] Source: Forrester Analytics Business Technographics Data And Analytics Survey, 2021.