FORRESTER®

The Total Economic Impact™ Of The Domino Enterprise MLOps Platform

Cost Savings And Business Benefits
Enabled By Domino Data Lab

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Table Of Contents

Executive Summary

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Forrester finds that organizations need enterprise machine learning operations (MLOps) platforms to develop, deploy, monitor, and manage AI and ML solutions at scale. This involves having platforms that support the full MLOps lifecycle — from data preparation to deployment and monitoring. They need solutions that drive collaboration, productivity, and governance to data science teams and their stakeholders and that bring enterprise-grade security and performance to open-source ML frameworks, allowing them to both leverage the latest AI and ML algorithms and attract top data science talent.

Forrester Consulting conducted a Total Economic Impact™ (TEI) study and examined the potential return on investment (ROI) enterprises may realize by deploying the enterprise MLOps platform offered by Domino. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Domino platform on their organizations.

The Domino Enterprise MLOps platform enables teams of data scientists and their collaborators to develop, deploy, monitor, and manage advanced analytics and machine learning (ML) and AI solutions in a self-service, collaborative, governed, and secure manner. It provides users with a wide array of both open source and proprietary third-party ML programming languages, frameworks, and integrated development environments (IDEs); it also automates the provisioning of infrastructure and streamlines the deployment of ML models and applications. Together with collaboration tools and shared repositories, it dramatically increases the productivity of data science teams across the MLOps lifecycle.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six customers with experience using Domino. For the purposes of this study, Forrester aggregated the experiences of the interviewed customers and combined the results into a single composite organization.

Prior to using Domino, interviewees experienced fragmented data science processes, with individuals

KEY STATISTICS

Return on investment (ROI)
542%

Net present value (NPV)
$20,226,584

creating ad hoc custom compute environments. This unnecessary effort of manually provisioning infrastructure led to:

- Disparate systems and versions that blocked collaboration and innovation.

- Suboptimal communications between business stakeholders and data scientists.

- Difficulty with model deployment and ongoing maintenance.

A subset of interviewees described their attempts to build a system internally, rather than looking to a third-party vendor. These efforts were scrapped because they didn't provide the neccesary capabilities of a full solution, and they were time-consuming to maintain.

One of the interviewed customers, a senior director of decision sciences and software services explained: "Our leadership directive is, if it's not a differentiating capability, we shouldn't be building it; we should be looking to buy it. In my experience, there is initial

excitement about building in-house tools, and they're great for two years, and then by Year 3, nobody cares about maintaining them anymore."

Forrester finds that enterprises usually have teams of data scientists who must collaborate not only among themselves but also with business stakeholders, app developers, and even infrastructure and operations pros; and enterprise MLOps platforms enable this collaboration.

KEY FINDINGS

After the investment in Domino, the customers experienced increased collaboration and increased efficiencies throughout the MLOps lifecycle.

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

- **Reduced time-to-configure compute resources worth over $9.7 million.** With Domino, data scientists can instantaneously spin up new data science environments to begin working immediately, saving on average 70 hours per instance.

- **Accelerated time-to-onboard new team members worth over $984K.** Domino's intuitive interface and support for familiar tools means that little or no training is necessary. On average, each data scientist is productive in just one day as opposed to two weeks in prior environments.

- **Increased data science efficiency through the use of new tools in a shared environment worth over $5 million.** With Domino, data scientists quickly collaborate on models, share common solutions, and build prototypes to code against. Managers estimate savings of 200 hours per year per data scientist.

- **Fewer support calls to engineering worth about $317K.** Managers estimate that engineers save about 30% of the previous hours spent responding to requests from data scientists.

- **Faster model validation worth about $1.4 million.** Domino automatically tracks all artifacts used during the model development and deployment process to save about 20 hours per model validation.

> " Before Domino, it could take two to three weeks to understand and spin up an infrastructure and then start the work. With Domino, that went from weeks to just a click of a button.
>
> — Director of data platforms, pharmaceuticals.

- **More efficient model deployment worth about $677K.** Standardized environments along with Domino deployment tools save an average of 20 hours per model deployment.

- **More efficient model maintenance worth over $343K.** Standardized environments and Domino logging tools save on average 60 hours per model on retraining and rebuilding efforts.

- **Incremental profits of over $5.1 million.** Increased collaboration and interconnections during the development cycle lead to data science solutions that are better aligned to business needs and directly impact revenue.

- **Reduced infrastructure costs of about $142K.** Moving to Domino allowed customers to retire legacy systems, saving approximately $60K per year.

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

- Democratization of data science tools and infrastructure across the organization.

- Enhanced data scientist acquisition and retention.

- Improved management visibility and oversight.

Costs. Risk-adjusted PV costs include:

- **Domino direct costs of about $3.3 million.** Domino direct costs include:

    - Initial setup/installation.

    - Base Platform License.

    - Annual Service Package.

    - Per user license fees are based on the number of data scientist users. Business consumers and administrators are included at no additional cost.

- **Domino implementation, management, and updates of almost $480K.** In addition to the

payments made to Domino, data science organizations can expect to incur costs associated with creating the standardized environment and keeping the deployed version of Domino current.

The customer interviews and financial analysis found that a composite organization experiences benefits of almost $24 million over three years versus costs of less than $3.8 million, adding up to a net present value (NPV) of over $20 million and an ROI of 542%

> **"If we hadn't invested in Domino, first, I wouldn't have been able to set up a team at all, because you can't hire a highly skilled data scientist without providing them with the state of the art working environment."**
>
> *Chief analytics officer, insurance*
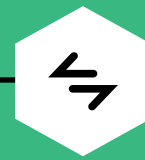
ROI	**BENEFITS PV**	**NPV**	**PAYBACK**
542%	**$23,957,671**	**$20,226,584**	**<6 months**

Benefits (Three-Year)

Benefit	Value
Reduced time to configure compute resources	$9.8M
Accelerated time to onboard new team members	$984.8K
Increased data science efficiency through use of new tools in a shared environment	$5.1M
Fewer support calls to engineering	$317.1K
Faster model validation	$1.4M
More efficient model deployment	$677.7K
More efficient model maintenance	$343.3K
Incremental Profit	$5.2M
Reduced Infrastructure Cost	$141.8K

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 Domino.

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

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Domino Data Lab 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 Domino.

Domino 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.

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

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

CUSTOMER INTERVIEWS
Interviewed six decision-makers at organizations using Domino to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewed 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 interviewed organizations.

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 Domino Data Lab Customer Journey

■ Drivers leading to the Domino investment.

Interviewed Organizations			
Industry	**Region**	**Interviewee**	**Domino Users**
Agriculture	Headquartered in United States	Cloud analytics lead	300
Insurance	Headquartered in France	Chief analytics officer	100
Pharmaceuticals	Headquartered in United States	• Director, data platforms and privacy • Data scientist	100
Information technology	Headquartered in United States	Senior manager, BI and analytics	70
Software services	Headquartered in United States	Senior director, data science	50
Financial services	Headquartered in Australia	Principal consultant, data science	45

KEY CHALLENGES

Before the use of Domino, data scientists frequently required the intervention of a DevOps engineer to set up their compute environment. The cloud analytics lead from the agriculture industry said: "People wanted different instance types, people had to get things restarted, and people wanted things installed. This created a lot of requests of the engineering team to customize and configure the development environment." But these customized environments led to a whole range of further complications.

The interviewed organizations struggled with common challenges, including:

• **Disparate systems and versions that blocked collaboration and innovation.** With different technology across departments, and even within departments, managers faced collaboration challenges both within the team and between the team and business units. Further, some environments were so difficult to configure that data scientists were not taking advantage of the latest ML innovations.

"We needed to come up with a standardized way for us to do data science so that we had consistency across the team. We were also looking to bring some capabilities forward." Senior director, data sciences, software services

• **Suboptimal communications between business stakeholders and data scientists.** Prior to adopting Domino, interviewees reported that there was a lot of back and forth between data scientists and business stakeholders in the process of getting a model to deployment. Data scientists would build a model, and then the business stakeholder would review it and request changes. The data scientist would adjust the model and send it for additional review; and the cycle continued. This lack of communication led to longer time-to-deployment, fewer models developed, and suboptimal model performance.

• **Difficulty with model deployment and maintenance.** After developing models, interviewees described the difficulties of getting models into production and maintaining them once deployed.

"We built a lot of great models, capable of great insights, but we would time and again fail at getting them into a production state. And if we did manage to get them into production, it would then take us a lot of time to continue to maintain those models in production." Principal consultant, financial services

> **"We have had a lot of acquisitions in recent years, which meant that we had data teams scattered around the country with different practices and different tools. We needed to bring them all together to work more effectively and efficiently.**
>
> *Senior director of decision sciences, software services*

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and a ROI analysis that illustrates the areas financially affected. The composite organization is representative of the six companies 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 organization is a data-forward organization that uses machine learning models to develop products and improve internal business processes. It rolls out Domino to users at a rate of 50 net-new data scientists each year, and five new engineers in various support roles each year.

- Data scientists have a fully burdened salary of $201,500 annually, or $97 hourly.

- Engineers have a fully burdened salary of $227,500 annually, or $110 hourly.

Deployment characteristics. After evaluating MLOps platform vendors, the composite organization chose Domino Data Lab and implemented a solution that includes the base platform license as well as an annual service package.

Domino users	Year 1	Year 2	Year 3
Data scientists	50	100	150
Engineers	5	10	15

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	Reduced time-to-configure compute resources	$1,612,625	$3,870,300	$6,773,025	$12,255,950	$9,753,292
Btr	Accelerated time-to-onboard new team members	$364,914	$398,088	$431,262	$1,194,264	$984,752
Ctr	Increased data science efficiency through use of new tools in a shared environment	$921,500	$2,073,375	$3,455,625	$6,450,500	$5,147,523
Dtr	Fewer support calls to engineering	$65,835	$131,670	$197,505	$395,010	$317,057
Etr	Faster model validation	$198,000	$534,600	$1,039,500	$1,772,100	$1,402,810
Ftr	More efficient model deployment	$89,100	$249,480	$519,750	$858,330	$677,678
Gtr	More efficient model maintenance	$71,280	$142,560	$213,840	$427,680	$343,279
Htr	Incremental profit	$340,875	$1,772,550	$4,545,000	$6,658,425	$5,189,529
Itr	Reduced infrastructure cost	$57,000	$57,000	$57,000	$171,000	$141,751
	Total benefits (risk-adjusted)	$3,721,129	$9,229,623	$17,232,507	$30,183,259	$23,957,671

REDUCED TIME-TO-CONFIGURE COMPUTE RESOURCES

Evidence and data. According to customer interviewees, Domino allows data scientists to begin working on new models almost instantaneously by providing automated access to infrastructure and managed environments. The interviewees reported that the previous process to provision infrastructure, create the environment, and install/maintain individual packages often took days to weeks, depending on the complexity of the build.

- The director of data platforms and privacy from the pharmaceuticals industry said, "Before Domino, it could take two to three weeks to understand and spin up infrastructure and then start the work. With Domino, that went from weeks to just a click of a button."

- The principal consultant from the data science industry said: "Immediately, all this time that people used to mess around to get up and running disappeared because it's there as a drop-down and away you go. If you need GPUs, it is there as a selection. If you run out of memory, then just try the next selection."

Modeling and assumptions. Based on the Domino customer interviews, Forrester makes the following assumptions:

- There are 50 active data scientists in Year 1, this number grows to 100 in Year 2 and 150 in Year 3.

- The average annual labor cost of a data scientist is $201,500 or $97 per hour.

- Each data scientist creates, on average, five new models per year; this number increases to seven by Year 3.

- With Domino, data scientists spend 70 hours less on setup time for each compute resource instance.

Risks. The actual improvement in reduced time-to-configure compute resources may vary due to:

- The number of data scientists.

- The salary of data scientists.

- The number of models each data scientist initiates each year.

- The complexity of the technical stack required for model development.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over $9.7 million.

$9.8 million

three-year
benefit PV

41%
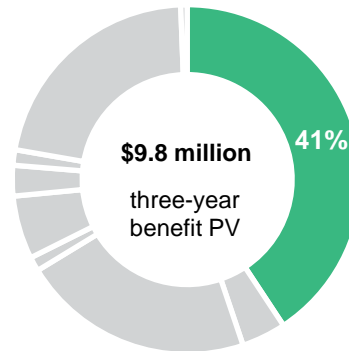
Reduced Time-To-Configure Compute Resources					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of data scientists	Composite	50	100	150
A2	Hours saved by a data scientist to configure compute resources, per project	Interviews	70	70	70
A3	Projects per year per data scientist	Interviews	5	6	7
A4	Data scientist salary (hourly)	Interviews	$97	$97	$97
At	Reduced time-to-configure compute resources	A1*A2*A3*A4	$1,697,500	$4,074,000	$7,129,500
	Risk adjustment	↓5%			
Atr	Reduced time-to-configure compute resources (risk-adjusted)		$1,612,625	$3,870,300	$6,773,025
	Three-year total: $12,255,950			Three-year present value: $9,753,292	

ACCELERATED TIME-TO-ONBOARD NEW TEAM MEMBERS

Evidence and data. Prior to implementing Domino, interviewees reported that the process of bringing on a new data scientist was weeks long. When they

initially set up their first compute environment, the process was not only lengthy, but also difficult and prone to mistakes.

- The director of data platforms and privacy said: "Onboarding has become easier for us because

everything exists. It's easy for people to add collaborators or bring in a new person; they can just add them, and they get a jumpstart on projects."

- The senior manager of BI and analytics said: "Domino has absolutely helped with our speed to productivity. It's much faster for us to get somebody up to speed, and the impact of somebody leaving from the pure modeling perspective is much less."

> **"The biggest benefit we've seen is to auto-onboard somebody into our data science analytics environment in about 20 minutes of a quick run through a tool versus weeks it would take previously for somebody to get configured on their own."**
>
> *Senior director of decision sciences, software services*

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- On average, the composite organization experiences a 10% annual turnover, and it

onboards a net gain of 50 new data scientists each year.

- Previous efforts to onboard new data scientists took two weeks.

- With Domino, new data scientists can, on average, get up to speed in one day.

Risks. The actual improvement in time to onboard new data scientists may vary due to:

- The number of data scientists brought into the organization, both through new hires and external collaborators.

- The experience level of the new data scientist.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of almost $985K.

$984,752
three-year
benefit PV

4%
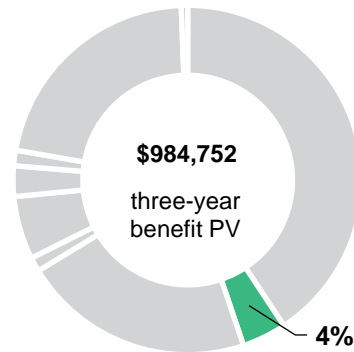
| **Accelerated Time-To-Onboard New Team Members** |
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Number of new data scientists per year	A1*10%+50	55	60	65
B2	Previous hours to train a new data scientist on systems	Interviews	80	80	80
B3	Hours to train a new data scientist with Domino	Interviews	8	8	8
B4	Data scientist salary (hourly)	Interviews	$97	$97	$97
Bt	Accelerated time-to-onboard new team members	B1*(B2-B3)*B4	$384,120	$419,040	$453,960
	Risk adjustment	↓5%			
Btr	Accelerated time-to-onboard new team members (risk-adjusted)		$364,914	$398,088	$431,262
\multicolumn{3}{l}{Three-year total: $1,194,264}	\multicolumn{3}{l}{Three-year present value: $984,752}

INCREASED DATA SCIENCE EFFICIENCY THROUGH USE OF NEW TOOLS IN A SHARED ENVIRONMENT

- **Evidence and data.** In addition to faster set-up and easier onboarding of new team members, customer interviewees reported that with Domino data scientists were making use of more tools, spending less time waiting for models and experiments to run, and utilizing visualization tools to share their work with others in new ways.

- **Internal team collaboration.** The cloud analytics lead from the agriculture industry said: "The biggest piece is collaboration. Having multiple people working in the same project and having all your data and code in the same box has been huge. It's a big way that people share code and insights across their teams, especially data science teams, and that's been a really nice thing."

  The senior director of decision sciences from the software services industry said, "We didn't want the laptop model where somebody on the east coast is doing it on one machine and somebody on the west coast who wants to collaborate with them, can't get their code to run because they've got different packages installed or something else about their environment is different."

  The director of data platforms from the pharmaceuticals industry said: "For our COVID-19 research, we needed to work with many external academics as well as hospitals. We brought them into Domino as collaborators and they were able to get up and running very quickly without any issues. We were feeding them our data and they were able to start developing deep learning models to help us predict hotspots and other things. That work went very efficiently because of Domino's collaboration tools."

- **Cross-functional communication.**
  The senior director of decision sciences from the software services industry said: "When we build models, we can publish an application now and a product manager can look at it and say, 'Oh, now I see how it works. I see how this is going to impact something that I'm building.' Being able to take advantage of those publishing capabilities or provide a dummy API that engineering can code against is great. We've seen dramatic improvements and adoption rates of that. Anyone on my team can do that in less than a week, and some can do it in a couple of hours."

  The director of data platforms from the pharmaceuticals industry said: "We have seen a huge uptake in the deployment of R, Shiny, or Python apps to share results with data consumers. Data scientists like to use apps because they are one way to showcase and share their work."

- **Avoidance of missed opportunities**
  The director of data platforms from the pharmaceuticals industry said: "We are using Domino's on-demand Spark clusters for deep learning algorithms. Spinning up your own Spark was a nightmare in our cloud. No one wanted to do that, so we weren't leveraging it. There were a lot of opportunities that were missed because of the difficulty in getting the infrastructure set up."

> **"We certainly are implementing more accurate models or even models that we couldn't have done before with more complicated workflows. And that's probably an improvement of about 20% of where we might have been."**
>
> *Principal consultant, financial services*

- **Faster model run times.**
  The data scientist from the pharmaceuticals industry said: "Before Domino we were limited to having one instance, which means the biggest instance you get is with eight GPUs. But now, with Ray clusters on Domino we have access to 30 GPUs, increasing the number of models a data scientist can run at once."

  The senior manager of BI and analytics said: "Before Domino, we had some models that would literally run for days before they would complete because we were using the data scientist's laptop. And now, those models run in a matter of an hour or two because of parallelism and everything else."

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- There are 50 active data scientists in Year 1, this number grows to 100 in Year 2 and 150 in Year 3.

- In Year 1, there are 200 hours per year in efficiency gains, this amount increases to 250 hours in Year 3.

Risks. The actual improvement in increase of data science efficiency may vary due to:

- The number of Domino users in an organization.

- The adoption of external collaboration tools.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of just over $5 million.

$5.1 million three-year benefit PV

21%
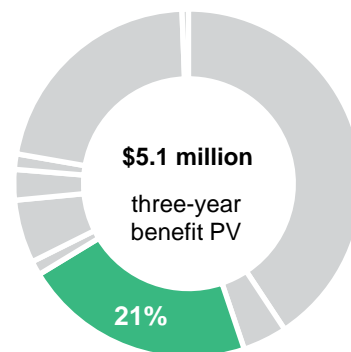
Increased Data Science Efficiency Through Use Of New Tools In A Shared Environment					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Number of data scientists	A1	50	100	150
C2	Increased efficiency with Domino (hours per year)	Interviews	200	225	250
C3	Data scientist salary (hourly)	Interviews	$97	$97	$97
Ct	Increased data science efficiency through use of new tools in a shared environment	C1*C2*C3	$970,000	$2,182,500	$3,637,500
	Risk adjustment	↓5%			
Ctr	Increased data science efficiency through use of new tools in a shared environment (risk-adjusted)		$921,500	$2,073,375	$3,455,625
	Three-year total: $6,450,500			Three-year present value: $5,147,523	

FEWER SUPPORT CALLS TO ENGINEERING

Evidence and data. As mentioned above, managers report that the simple onboarding process for new data scientists not only allows them to quickly become productive, but data engineers can also experience a substantial reduction in the demands on their time to support data scientists.

- The senior director of decision sciences from the software services industry said: "Prior to Domino we had a 10-page runbook for spinning up an environment. We also had a 10-page runbook for connecting that environment to your database. We had pages and pages and pages of documentation and anytime somebody made a mistake, or something was wrong in any one of those areas, we were troubleshooting it with them."

- The cloud analytics lead from the agriculture industry said: "We were spending 30 to 60 hours a month on requests for things like restarting a server, access issues, assistance in sharing data, a request to install a library, etc. With Domino, they have [the] self-service ability to spin up or spin down workspaces without having to involve an engineer."

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- On average, there is a 30% reduction on the prior state base of 420 hours spent answering ad hoc calls from data scientists.

- Engineer full loaded salary of $227,500 or $110 per hour.

Risks. The actual improvement in fewer support calls to engineers may vary due to:

- The number of models built annually.

- The increase in model quality.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over $300K.

$317,057
three-year
benefit PV

1%
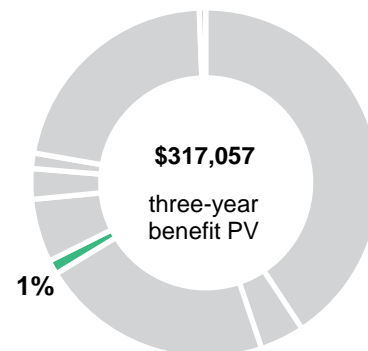
Fewer Support Calls To Engineering					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
D1	Number of engineers	A1/10	5	10	15
D2	Prior annual hours spent on support calls, per engineer	Interviews	420	420	420
D3	Reduction with Domino	Interviews	30%	30%	30%
D4	Engineer salary (hourly)	Interviews	$110	$110	$110
Dt	Fewer support calls to engineering	D1*D2*D3*D4	$69,300	$138,600	$207,900
	Risk adjustment	↓5%			
Dtr	Fewer support calls to engineering (risk-adjusted)		$65,835	$131,670	$197,505
	Three-year total: $395,010		Three-year present value: $317,057		

FASTER MODEL VALIDATION

Evidence and data. Interviewees report that Domino allows them to audit and validate models faster. All interviewees found this feature beneficial, but this is particularly important in industries such as financial services or life sciences that must demonstrate replicability of results or answer to regulatory audit requests.

- The principal consultant from the financial services industry said: "Our model integrity framework asserts that the model is accurate, and we've tested it. Domino absolutely plays a key part in that process because it maintains an audit log of everything that has happened."

- The principal consultant from the financial services industry said: "Everything that data scientists do is captured and fully audited. So, if they make a mistake or want to revert to a model they were working on last week they could just go back and recover that. This avoids a lot of mistakes, which also leads to productivity gains."

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- The number of models built annually is calculated from Table A, and that number increases from 250 in Year 1 to 1,050 in Year 3.

- The number of built models that are tested each year increases from 40% in Year 1 to 50% in Year 3.

- Engineers spend 20 hours less on manual validation per model due to Domino.

Risks. The actual improvement in faster model validation may vary due to:

- The number of models built annually.

- The increase in model quality.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over $1.4 million.

$1.4 million

three-year benefit PV

6%
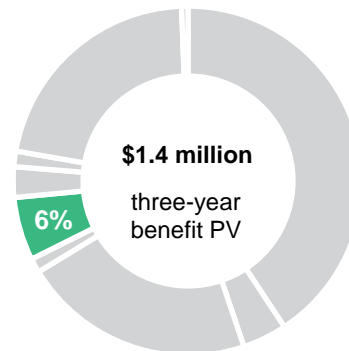
Faster Model Validation

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
E1	Models built annually	A1*A3	250	600	1,050
E2	Models tested annually	Interviews	40%	45%	50%
E3	Hours saved per model audit with Domino	Interviews	20	20	20
E4	Engineer salary (hourly)	Interviews	$110	$110	$110
Et	Faster model validation	E1*E2*E3*E4	$220,000	$594,000	$1,155,000
	Risk adjustment	↓10%			
Etr	Faster model validation (risk-adjusted)		$198,000	$534,600	$1,039,500
	Three-year total: $1,772,100		Three-year present value: $1,402,810		

MORE EFFICIENT MODEL DEPLOYMENT

Evidence and data. Interviewees reported that having Domino enabled them to deploy models more efficiently.

- The principal consultant from the financial services industry said: "The problem that we had was actually getting our models into a production state, deploying into other systems, and making those integrations. Domino allowed us to really accelerate our adoption of technologies that we were unable to use before, and that let us productionize our models in ways we couldn't before."

- The principal consultant from the financial services industry said: "Without Domino, getting a model into production was quite an involved process; let's say that took us maybe four weeks after talking to everyone. Now it's down to maybe a one-week process."

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- Just as more models are validated annually, more models are deployed, growing from 18% in Year 1 to 25% in Year 3.

- On average, 20 hours are saved in each model deployment.

Risks. The actual improvement in more efficient model deployment may vary due to:

- The number of models validated.

- The hours saved per model.

- Engineer salary paid.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over $675K.

3%

$677,678
three-year benefit PV
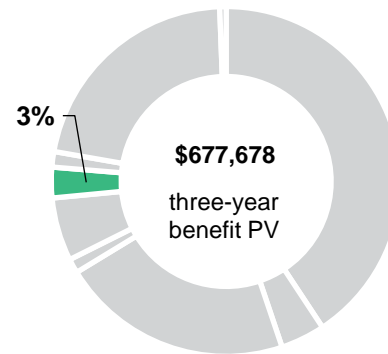
More Efficient Model Deployment					
Ref.	**Metric**	**Calculation**	**Year 1**	**Year 2**	**Year 3**
F1	Models built annually	A1*A3	250	600	1,050
F2	Models deployed annually	Interviews	18%	21%	25%
F3	Hours saved per model deployment with Domino	Interviews	20	20	20
F4	Engineer salary (hourly)	Interviews	$110	$110	$110
Ft	More efficient model deployment	F1*F2*F3*F4	$99,000	$277,200	$577,500
	Risk adjustment	↓10%			
Ftr	More efficient model deployment (risk-adjusted)		$89,100	$249,480	$519,750
	Three-year total: $858,300		**Three-year present value: $677,678**		

MORE EFFICIENT MODEL MAINTENANCE

Evidence and data. Managers report that Domino allows data engineers to maintain the increased number of models that data scientists can produce because of the efficiencies gained through working in a shared environment with complete logs of all actions.

- The principal consultant from the financial services industry said: "As an example, we had a model that had been running for a year or so, and we wanted to make some changes to adjust it. It took one of my people three weeks to get the right mix of packages to be able to develop against that model. We found that time and time again, recreating the environment always took longer than you would think it would."

- The senior manager of BI and analytics from the IT industry said: "We have some applications that run multiple times per hour to augment tasks that allow us to train more models and retrain them more frequently. I feel confident saying this is enabled by Domino."

Modeling and assumptions. Based on the customer interviews, Forrester estimates for the composite organization:

- As more models go into production, the number of models requiring maintenance grows from 12 in Year 1 to 36 in Year 3.

- On average, 60 hours per model are saved on model maintenance.

Risks. The actual improvement in more efficient model maintenance may vary due to:

- The number of models in production.

- Engineer salary paid.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over $340K.

1%

$343,279
three-year
benefit PV
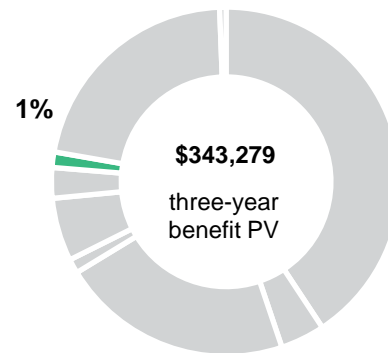
More Efficient Model Maintenance					
Ref.	**Metric**	**Calculation**	**Year 1**	**Year 2**	**Year 3**
G1	Models updated annually	Interviews	12	24	36
G2	Reduced time per model with Domino	Interviews	60	60	60
G3	Engineer salary (hourly)	Interviews	$110	$110	$110
Gt	More efficient model maintenance	G1*G2*G3	$79,200	$158,400	$237,600
	Risk adjustment	↓10%			
Gtr	More efficient model maintenance (risk-adjusted)		$71,280	$142,560	$213,840
	Three-year total: $427,680		**Three-year present value: $343,279**		

INCREMENTAL PROFIT

Evidence and data. A greater volume of models, coupled with a higher success rate for model deployment, leads to higher incremental profit.

- The cloud analytics lead for the agriculture industry said: "We use predictive models and data science to better understand the needs of our farmer customers. This allows us to offer customized pricing options and enables new business models that share in their financial risk."

- The principal consultant from the financial services industry said: "Our use of Domino has had a strong impact on revenues in the millions of dollars, tens of millions of dollars, in fact. Some models are part of the quote flow, and we've got some measurable business benefits from that."

**Modeling and assumptions.** Based on the customer interviews, Forrester estimates for the composite organization:

- Revenue directly impacted by Domino in Year 1 is $150 million, this number grows to $500 million in Year 3.

- The composite organization realizes a 5% increase in Year 1, this number grows 20% in Year 3.

Risks. The actual improvement in increased revenues may vary due to:

- The number of direct revenue-impacting models developed annually.

- The organization's operating margin.

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

22%

$5.2 million

three-year benefit PV
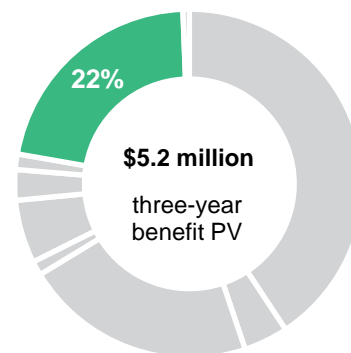
Incremental Profit					
Ref.	**Metric**	**Calculation**	**Year 1**	**Year 2**	**Year 3**
H1	Annual revenue impacted by Domino based models	Composite	$150,000,000	$325,000,000	$500,000,000
H2	Percentage increase in revenue due to Domino based models	Interviews	5%	12%	20%
H3	Increased revenue due to Domino	H1*H2	$7,500,000	$39,000,000	$100,000,000
H4	Operating margin	NYU Stern	5.05%	5.05%	5.05%
Ht	Incremental profit	H3*H4	$378,750	$1,969,500	$5,050,000
	Risk adjustment	↓10%			
Htr	Incremental profit (risk-adjusted)		$340,875	$1,772,550	$4,545,000
	Three-year total: $6,658,425		**Three-year present value: $5,189,529**		

REDUCED INFRASTRUCTURE COST

Evidence and data. Interviewees retired legacy servers when they adopted Domino.

- The cloud analytics lead from the agriculture industry said: "We decommissioned one server, rolled back the usage of another, and decommissioned an API and a deployment pipeline because we had Domino. Together, that saved us about $60K per year."

Modeling and assumptions. The composite organization retires legacy systems that save $60K per annum.

Risks. The benefit may vary due to:

- The complexity of the existing environment in the prior state.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of just over $140K.

1%

$141,751
three-year
benefit PV
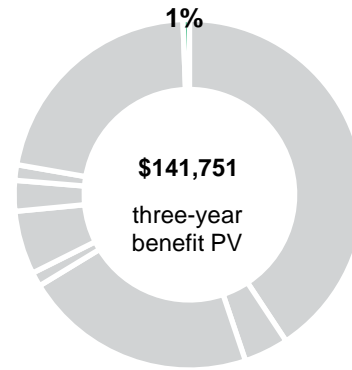
Reduced Infrastructure Cost					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
I1	Retired servers	Interviews	$60,000	$60,000	$60,000
It	Reduced infrastructure cost	J1	$60,000	$60,000	$60,000
	Risk adjustment	↓5%			
Itr	Reduced infrastructure cost (risk-adjusted)		$57,000	$57,000	$57,000
	Three-year total: $171,000		Three-year present value: $141,751		

UNQUANTIFIED BENEFITS

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

- **Democratization of data science tools and infrastructure across the organization.** Data consumers across interviewed organizations can access data more readily. Previously, these business unit leaders would need to contact the data scientist who created the model to run a report.

  Domino's base platform license includes unlimited access by data consumers and administrators at no additional cost. Interviewees reported that this helped them to develop a wider understanding of the importance of data science to the success of the overall organization.

  The cloud analytics lead from the agriculture industry said: "For data consumers, their time savings is probably going to be less, but the impact is more. Maybe 3 hours a month times 12, say 36 hours a year. But I think that the insights they get out of that are probably a bigger deal."

- **Enhanced data scientist acquisition and retention.** Interviewees reported that data scientists felt empowered by having access to Domino; as stated by the cloud analytics lead from the agriculture industry: "I have also heard some senior data scientists say they very much appreciate having Domino. In fact, one person said that anywhere that he works, he'll be impressed if that company provides him with a platform like Domino."

- **Management visibility and oversight.** Managers reported that Domino helped them manage their data science team more effectively and efficiently because they have enhanced visibility into data scientist's work. The senior director of decision sciences from the software sciences industry said: "Our managers and leaders can drop into anything that anyone is

doing and see all the code, outputs, results, and version history. It's all self-contained."

The chief analytics officer from the insurance industry said, "Without Domino, every country would have invested in many various ways and set up its own local system for model hosting and model implementation, and I wouldn't have been able to set up the global watchtower of what is done regarding data science worldwide."

FLEXIBILITY

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

- **Agile team composition.** The onset of COVID-19 has demanded unprecedented flexibility.

- **Ability to make use of the latest tools.** Data scientists want to take advantage of the latest tools; as stated by the senior director of decision sciences from the software sciences industry, "If something new comes out, we should be able to take advantage of it, and Domino is fairly unopinionated about what you put in their containers."

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

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
Jtr	Domino direct costs	$110,000	$838,750	$1,292,500	$1,746,250	$3,987,500	$3,252,665
Ktr	Implementation, management, and updates	$180,000	$120,000	$120,000	$120,000	$540,000	$478,422
	Total costs (risk-adjusted)	$290,000	$958,750	$1,412,500	$1,866,250	$4,527,500	$3,731,087

DOMINO DIRECT COSTS

Evidence and data. Domino offers three deployment configurations with pricing that varies based on the complexity of the existing environment. For the purposes of this TEI, Forrester has assumed the most complex deployment type. For environments that comply with prescribed configurations, Domino installations have a lower initial setup cost as well as a lower cost for the annual service package.
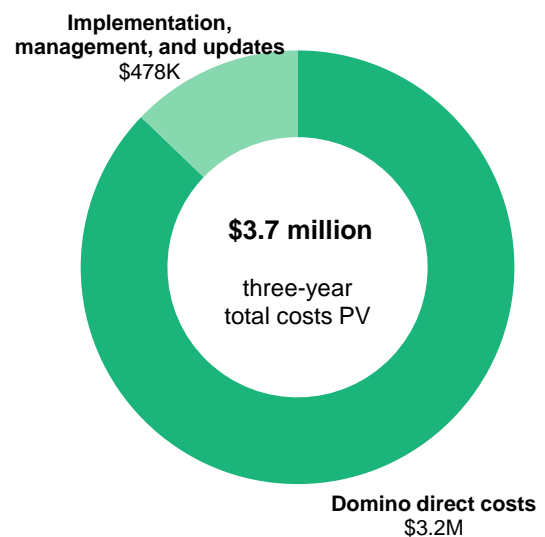
Domino's per-user pricing can vary based on the total number of Domino users and the length of the contract.

Modeling and assumptions. This analysis reflects Domino's current pricing model.

Risks. The actual cost may vary due to:

- The complexity of the environment into which Domino is deployed.

- The number of Domino users.

- The length of the contract.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of just about $3.25 million

Implementation, management, and updates
$478K

$3.7 million
three-year total costs PV

Domino direct costs
$3.2M

Domino Direct Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
J1	Initial setup	Domino	$100,000			
J2	Base platform license	Domino		$50,000	$50,000	$50,000
J3	Service package	Domino		$300,000	$300,000	$300,000
J4	Number of Domino users	A1+D1		55	110	165
J5	Domino license fees (per user)	Domino		$7,500	$7,500	$7,500
Jt	Domino direct costs	K2+K3+(K4*K5)	$100,000	$762,500	$1,175,000	$1,587,500
	Risk adjustment	↑10%				
Jtr	Domino direct costs (risk-adjusted)		$110,000	$838,750	$1,292,500	$1,746,250
	Three-year total: $3,987,500			**Three-year present value: $3,252,665**		

IMPLEMENTATION, MANAGEMENT, AND UPDATES

Evidence and data. Engineers periodically need to install tool updates, add capabilities, and perform other minor maintenance tasks. Domino also releases new versions. Engineers can schedule updates and improvements rather than answering ad hoc calls from data scientists.

- The cloud analytics lead from the agriculture industry said: "Initial implementation takes some time and thought from various stakeholders. Domino helps to enforce standards and practices, but someone has to define them, and that is up to the data science organization."

- The principal consultant from the financial services industry said, "Keeping Domino current with the latest version only takes one of our engineers a few days."

Modeling and assumptions. Interviewees estimated a cost of about $100K per year, with a somewhat larger effort initially.

Risks. The actual cost may vary due to:

- Organizational experience with Domino.

- The complexity of the data stored.

- The frequency of updates.

To account for these risks, Forrester adjusted this cost upward by 20%, yielding a three-year, risk-adjusted total PV of just over $475K.
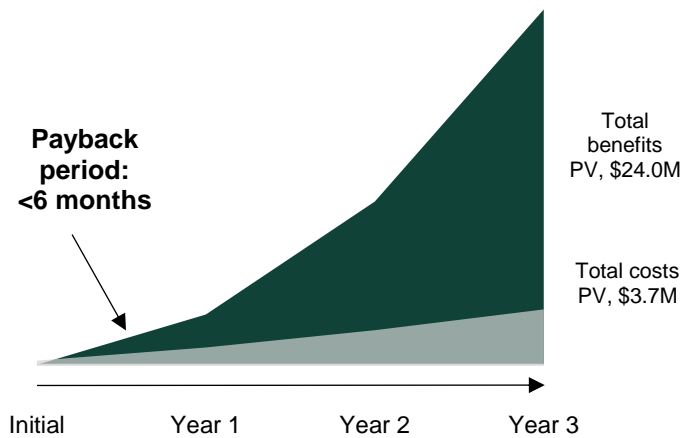
Implementation, Management, And Updates						
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
K1	Implementation	Interview	$150,000			
K2	Management and updates	Interview		$100,000	$100,000	$100,000
Kt	Implementation, management, and updates	L1+L2	$150,000	$100,000	$100,000	$100,000
	Risk adjustment	↑20%				
Ktr	Implementation, management, and updates (risk-adjusted)		$180,000	$120,000	$120,000	$120,000
	Three-year total: $540,000			**Three-year present value: $478,422**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash flow analysis (risk-adjusted estimates)						
	INITIAL	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**PRESENT VALUE**
Total costs	($290,000)	($958,750)	($1,412,500)	($1,866,250)	($4,527,500)	($3,731,087)
Total benefits	$0	$3,721,129	$9,229,623	$17,232,507	$30,183,259	$23,957,671
Net benefits	($290,000)	$2,762,379	$7,817,123	$15,366,257	$25,655,759	$20,226,584
ROI						542%
Payback period (months)						<6

Financial Summary

Payback period: <6 months

Total benefits PV, $24.0M

Total costs PV, $3.7M

Initial   Year 1   Year 2   Year 3

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.

Domino Enterprise MLOps Platform: Overview

The following information is provided by Domino. Forrester has not validated any claims and does not endorse Domino or its offerings.

Distributed Data Science Leads to Risk, not Scale

Over the last ten years, companies have been focusing on how to become more "data-driven," but today that's just not good enough. The companies that are beating competitors, driving unprecedented growth, and upending industries are the ones that are putting models at the heart of their business. Models evolve and learn at machine speed, much faster than human speed. Models automate decision-making. Models enable companies to improve exponentially, take action faster, and make higher quality decisions.

In most larger companies, the development of models has happened in siloes, with each team or business function recruiting a data science team to solve their specific needs. They build the local infrastructure, pick their preferred tools, piece together some cloud services to deploy a model, and achieve some initial success. But when they try to replicate this process and scale capacity – more data scientists, more models into production, more value, etc. – they quickly run into other challenges that scale along with it, including:

1. **Balancing infrastructure agility with IT governance.** Data science work requires access to powerful compute resources, high-value and often sensitive data, and the latest open-source tools and packages. Providing this agility is challenging when data scientists are spread across different departments and use a variety of different tool stacks. This practice increases support burden, support cost, and security risks for IT organizations. Companies feel stuck between two bad choices: restrict data scientists' agility and innovation or run the risk of 'ungoverned' data science.

2. **Eliminating siloed work.** When data science grows organically outside the purview of IT, core business processes are automated in silos. 'Shadow IT' practices place company IP on unsecured laptops, local servers, or in unmanaged cloud environments – making tracking work and knowledge difficult. There's limited visibility into the progress being made on data science projects, let alone insight into who built each model, how they were built, where the data/models live, and which applications or processes use them. This lack of governance and compliance is why many companies face backlash over biased models and societal pressure for greater transparency.

3. **Managing models in production.** Deploying a model takes months since the path to production involves different data, different sets of tools, different infrastructure, etc. And once in production, nonexistent or inconsistent model monitoring practices risk bad decisions based on models that don't represent current business conditions. Data science teams spend a significant amount of time analyzing models or developing ad hoc monitoring solutions for each model instead of doing new research. Overburdened IT departments, using traditional IT tools for monitoring infrastructure, uptime, and latency, are ineffective at monitoring models that are based on statistical methods.

Becoming a model-driven business requires more than merely providing the algorithms or infrastructure to let one data scientist train and deploy a model. Nor is it merely about supporting larger volumes of data or speeding up extract, transform, load (ETL) tasks. Before a company can put models at the heart of their business, they must solve the problem of *scaling data science as a discipline* — across people, processes, and infrastructure.

Domino is the Leader in Enterprise MLOps

Domino is the Enterprise MLOps platform used by over 20% of the Fortune 100 to centralize all data science work and weave models into the core fabric of their business. Data science teams get the tools they desire, the freedom and flexibility to experiment, and visibility into all prior work and knowledge so they can focus on solving their

company's most pressing problems. And, IT teams can immediately satisfy their requirements for security, governance, compliance, collaboration, reproducibility, auditability – all of the necessary elements to safely scale data science within an organization.

Domino offers a unique open architecture that allows enterprises to consolidate multiple tools (e.g., RStudio, SAS, Jupyter, MATLAB) on central infrastructure, allowing those tools to sit on elastic, scalable compute and to be managed and governed by IT. This creates self-serve, governed sandboxes so that data scientists are free to use the tools and infrastructure they want to use. Domino also supports and often exceeds the stringent and sophisticated security requirements from some of the most security-conscious, complex IT organizations in the world.

Domino automatically tracks all data science work to make it fully reproducible, searchable, and discoverable. Data scientists can find and build on past work rather than reinventing the wheel, and freely collaborate with their peers to unlock new ideas and breakthrough insights. Data science team leaders can enforce best practices and manage their teams more effectively, with insight into in-flight projects and any blockers their team may be facing.

Domino enables models to be consumed in a variety of ways to maximize business value and impact. Automated model monitoring constantly watches over the health of hundreds or even thousands of models in production to keep them operating at peak performance. Proactive alerts suggest when data scientists need to retrain or rebuild a model so they can focus on at-risk models, or better yet, new value-generating work.

The Value Speaks for Itself

There are many benefits of purchasing a field-proven platform for centralizing data science work versus trying to piece together an internal data science system from a variety of vendors that ultimately limits innovation and doesn't scale. With Domino, data science projects shift from being a chore fraught with a lack of adequate resources and constant DevOps challenges to an enterprise-grade MLOps environment where simplicity, collaboration, self-service, and best practices come naturally.

Making the transition from being data-driven to model-driven requires a re-wiring of your business. This is similar in scope to how stores tried to migrate from brick and mortar to e-commerce – some made the transition well and continue to thrive, while others didn't and are now out of business. The longer companies wait, the greater the chance that more nimble competitors are going to pass them by.

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 account for 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: Supplemental Material

Related Forrester Research

"The Forrester Wave™: Notebook-Based Predictive Analytics And Machine Learning, Q3 2020," Forrester Research, Inc., September 10, 2020

"Unlock The Power Of Data To Transform Your Business," a commissioned study conducted by Forrester Consulting on behalf of IBM, November 2018

"Now Tech: Predictive Analytics And Machine Learning," Forrester Research, Inc., May 1, 2020