New Technology: The Projected Total Economic Impact™ Of Explainable AI And Model Monitoring In IBM Cloud Pak For Data

Business Benefits And Cost Savings

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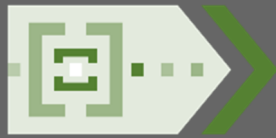
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Key Benefits

Reduced model monitoring effort:
35% to 50%

Increased models in production:
Between 3x and 8x

Increased accuracy of models:
15% to 30%

Increased profit:
$4.1 to $15.6 million

Executive Summary

IBM Cloud Pak for Data is an integrated data and artificial intelligence (AI) platform with capabilities for explaining, validating, monitoring, and mitigating bias in AI models as part of the end-to-end AI lifecycle. IBM commissioned Forrester Consulting to conduct a New Technology: Projected Total Economic Impact™ (New Tech TEI) study and examine the projected return on investment (PROI) enterprises may realize by deploying explainable AI and model monitoring capabilities in Cloud Pak for Data.

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of IBM Cloud Pak for Data on their organizations. To better understand the benefits and risks associated with this investment, Forrester interviewed four customers with experience using explainable AI in IBM Cloud Pak for Data.

Prior to using IBM Cloud Pak for Data, the interviewed organizations had no model explainability and monitoring tools in place, relying instead on data scientists to manually create explainability metrics, visualizations, and documentation and manually monitor and manage their models on an ad hoc basis. As such, interviewees reported challenges such as difficulty ensuring fairness and minimizing bias; lack of trust in the developed models, causing fewer of them to make it to production; and an inability to leverage more sophisticated but opaque algorithms because of a lack of adequate explanations.

The interviewed organizations deployed explainable AI in IBM Cloud Pak for Data because it helped address these challenges. This investment provided significant potential benefits in three areas: 1) increased number of models from higher data scientist productivity; 2) increased revenue and profit by enabling the organizations to get more models in production thanks to increased trust in the AI models; and 3) increased revenue and profit by enabling the organizations to maintain their deployed models at a high level of accuracy.

To estimate the projected total economic impact, Forrester developed a composite organization based on the experiences of the four interviewed companies that implemented explainable AI in IBM Cloud Pak for Data. Our composite company is a global organization with $2 billion in annual revenue and 8,000 employees. It deploys Cloud Pak for Data as its AI monitoring tool. Increased model production and model accuracy led to total increased profits ranging from $4.1 million to $15.6 million.

All values are reported in risk-adjusted three-year present value (PV) unless otherwise indicated.

Key Financial Findings

Quantified projected benefits. The following benefits reflect the financial analysis associated with the composite organization.

› **Reduced monitoring effort by 35% to 50%, allowing the company to develop between 1.5x and 2x more AI and machine learning (ML) models.** Interviewed organizations noted that Cloud Pak for Data reduces the model monitoring effort, and, therefore, companies can increase the capacity for developing AI and ML models for a given number of data scientists.
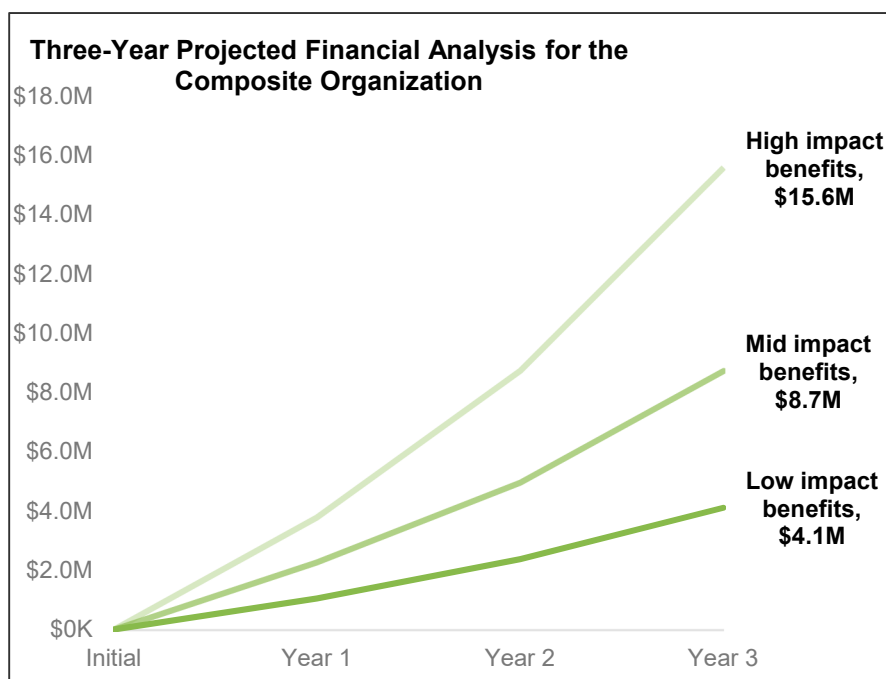
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› **Increased profits from having between 3x and 8x more models in production, totaling $3.6 million to $12 million over three years.** Interviewees noted that Cloud Pak for Data helps companies put more AI and ML models into production, as the monitoring, governance, and explainability in Cloud Pak for Data improve trust in the model (e.g., companies are less likely to be subject to regulatory penalties).

› **Increased accuracy of AI and ML models by 15% to 30%, resulting in an additional $535,312 to $3.6 million in profit.** Interviewees noted that the monitoring, governance, and explainability provided by Cloud Pak for Data enable data scientists to improve accuracy and performance of the AI and ML models.

Forrester modeled a range of projected low-, medium-, and high-impact outcomes based on evaluated risk factors. This financial analysis projects that the composite organization accrues the following three-year benefits for each scenario:

› Projected high impact of benefits totaling $15.6 million.

› Projected medium impact of benefits totaling $8.7 million.

› Projected high impact of benefits totaling $4.1 million.

**Benefits PV
$4.1 million to
$15.6 million**

Three-Year Projected Financial Analysis for the Composite Organization

$18.0M
$16.0M — High impact benefits, $15.6M
$14.0M
$12.0M
$10.0M
$8.0M — Mid impact benefits, $8.7M
$6.0M
$4.0M — Low impact benefits, $4.1M
$2.0M
$0K

Initial   Year 1   Year 2   Year 3

Qualitative projected benefits. Companies also observed and projected significant qualitative benefits associated with their investment:

› **Avoided effort in building a similar solution set internally.**

› **Competitive advantage in recruiting and retaining top data scientist talent.**

› **Reduced risk of regulatory fines from unfair or biased models, along with associated reputational damage.**

These are discussed in more detail in the study below.

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New Tech TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a New Technology: Projected Total Economic Impact™ (New Tech TEI) framework for those organizations considering implementing IBM's explainable AI and model monitoring in Cloud Pak for Data.

The objective of the framework is to identify the potential cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the projected impact that IBM's explainable AI in Cloud Pak for Data may have on an organization:

DUE DILIGENCE
Interviewed IBM stakeholders and Forrester analysts to gather data relative to explainable AI.

EARLY-IMPLEMENTATION CUSTOMER INTERVIEWS
Interviewed four organizations using explainable AI in a pilot or beta stage to obtain data with respect to projected costs, benefits, and risks.

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

PROJECTED FINANCIAL MODEL FRAMEWORK
Constructed a financial model projection representative of the interviews using the New Tech TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.

CASE STUDY
Employed four fundamental elements of New Tech TEI in modeling IBM's Explainable AI capability's potential impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to project a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the New Tech TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by IBM 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 report to determine the appropriateness of an investment in IBM's explainable AI in Cloud Pak for Data.

IBM 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.

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

> The New Tech TEI methodology helps companies demonstrate and justify the projected tangible value of technology initiatives to both senior management and other key business stakeholders.

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The Explainable AI Customer Journey

BEFORE AND AFTER THE EXPLAINABLE AI INVESTMENT

Interviewed Organizations

For this study, Forrester conducted four interviews with IBM's Cloud Pak for Data customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	NUMBER OF EMPLOYEES	ANNUAL REVENUE
Healthcare and insurance	North America	Supervisor of business intelligence	5,000	$2 billion
Financial services	Global	Senior data scientist	50,000+	$10 billion+
Consulting services	Global	Global analytics lead	50,000+	$10 billion+
Consulting services	Global	Managing director of artificial intelligence innovation	50,000+	$10 billion+

Key Challenges Before IBM's Explainable AI Capability

Before the investment in explainable AI, interviewees described the following challenges for their organizations and why they felt Cloud Pak for Data was the right solution for them:

› **Difficulty ensuring fairness and minimizing bias.** Companies noted that while AI and ML models provided significant opportunity for them, they were concerned with monitoring the models and controlling for fairness, as well as ensuring the models weren't recommending actions based on biased and/or illegal decision processes.

› **Lack of models making it to production.** While data scientists are creating models for companies, many of those models never make it into a production capacity, where the company can act on its insights. The lack of explainability for many models erodes trust in the results and increases the risk of regulatory penalties and reputational risk.

› **Desire to use more sophisticated but opaque algorithms — but lacking explainability.** Increasing the complexity and data that AI and ML models leverage can increase the accuracy and overall performance of those models. However, it also increases obscurity of the results, and companies tended to opt for the reduced performance in exchange for explainability of the results.

> "Without explainable AI in Cloud Pak for Data, it was difficult to look at our models and really understand the recommendations. What are the bias mitigation techniques? Are they unfairly targeting certain groups? We didn't have that level of explainability."
>
> *Managing director of artificial intelligence innovation, consulting*

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Key Projected Results With IBM's Explainable AI Capability

Our interviews indicated that clients invested in explainable AI in Cloud Pak for Data to address the challenges previously identified and were seeing early benefits indications in three areas:

› **Increased number of models developed.** Interviewed organizations noted that Cloud Pak for Data reduces the model monitoring effort, and, therefore, companies can increase the capacity for developing AI and ML models for a given number of data scientists who are freed to spend more of their time developing additional models.

› **Increased profit from more models in production.** Interviewees noted that Cloud Pak for Data helps companies put more AI and ML models into production, as the monitoring, governance, and explainability improve trust in the model and facilitate adoption (e.g., stakeholders are less worried about being subject to regulatory penalties or risks to the company's reputation).

› **Increased profit from improved model accuracy.** Interviewees noted that the monitoring, governance, and explainability provided by Cloud Pak for Data enable data scientists to improve the accuracy and performance of the AI and ML models.

Composite Organization

Forrester constructed a composite company to evaluate the projected total economic impact of explainable AI and model monitoring in Cloud Pak for Data. We designed the composite organization using the characteristics of four interviewed IBM customer companies. Our composite organization:

› Is a global enterprise with $2 billion in annual revenue and 8,000 employees.

› Has 15 data scientists responsible for building and monitoring AI and ML models, which increases to 30 data scientists by Year 3.

› Invests in explainable AI after having no AI monitoring tool in place beforehand.

Risk Treatment For Benefits Projections

Projection-based financial modeling introduces inherently more risk than analyzing actual, realized impacts. Forrester's New Technology: Projected TEI methodology therefore incorporates a risk factor to adjust projections.

For benefit calculations, Forrester incorporates risk via a range of projected outcomes based on customer interview data. In the benefit financial models, Forrester includes low, middle, and high estimates for each input variable to create a potential benefit range. We develop these ranges using expected benefits data collected from interviews as well as our own research.

> "Our models are now more accurate, which means we can better forecast our required cash reserve requirements. A 1% improvement in accuracy frees up millions of dollars for us to lend or invest."
>
> *Data scientist, financial services industry*

> "You get more transparency. Explainable AI in Cloud Pak for Data helps you explain to the business lines the outcomes you're getting and why. It saves time explaining these highly data-intensive outcomes, and it automates it in such a way that it's easier to understand."
>
> *Global analytics lead, consulting services industry*

Key assumptions
- Global organization
- $2 billion annual revenue
- 8,000 employees

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in a range of overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

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Analysis Of Projected Benefits

**QUANTIFIED PROJECTED BENEFIT DATA AS APPLIED TO THE COMPOSITE**

Total Projected Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
	Total projected benefits (Low)	$1,150,000	$1,610,000	$2,300,000	$5,060,000	**$4,104,057**
	Total projected benefits (Mid)	$2,500,000	$3,250,000	$5,000,000	$10,750,000	**$8,715,251**
	Total projected benefits (High)	$4,160,000	$5,980,000	$9,100,000	$19,240,000	**$15,560,931**
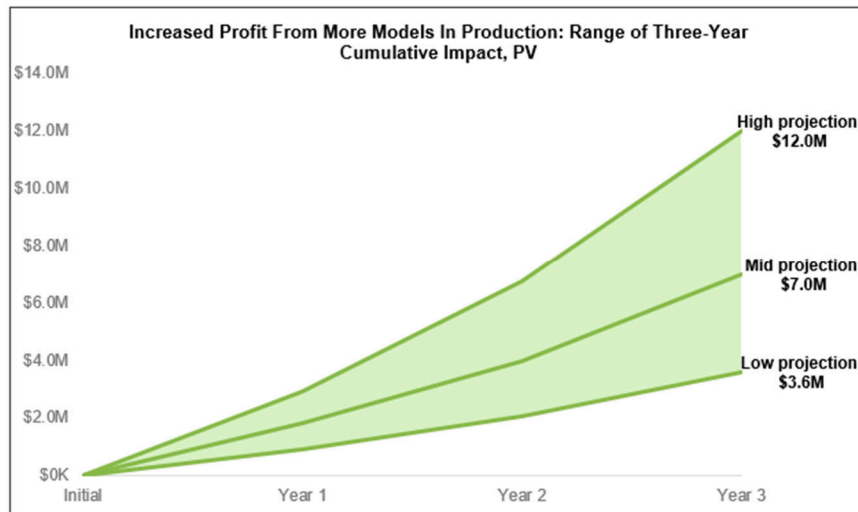
The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to have a projected PV range of $4.1 million to $15.6 million.

The graphs to the left show the projection range for each benefit category quantified. Adding these benefits together (detailed below, from increased model production and increased model accuracy) will result in the total benefits values listed in the table above.
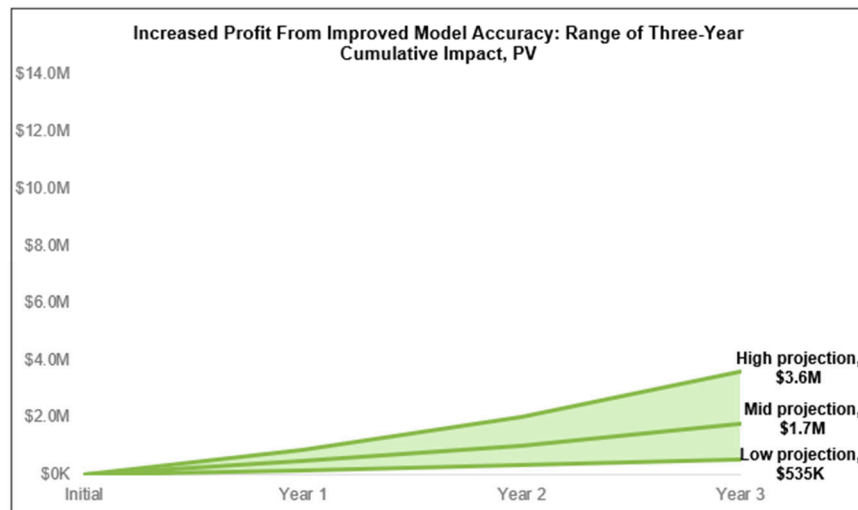
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Benefit 1: Increased Number Of Models Developed

Interviewed organizations noted that Cloud Pak for Data reduces the model monitoring effort, and, therefore, companies can increase the capacity for developing AI and ML models for a given number of data scientists. With Cloud Pak for Data, data scientists:

› Have automated reporting capabilities and therefore do not need to write, deploy, and schedule code scripts for model monitoring.

› Can shift the monitoring burden to other roles (e.g., data engineers, data analysts, or operations professionals).

› Can spend less time checking models and documentation for bias and fairness.

› May spend more time retraining models thanks to improved monitoring capabilities, as it is more apparent when retraining is needed.

Based on the customer interviews, Forrester modeled the financial impact for the composite organization with the following estimates:

› The composite organization has 15 data scientists available to develop and monitor models in Year 1, which grows to 30 data scientists by Year 3.

› Before Cloud Pak for Data, each model in production required 0.3 data scientist full-time equivalents (FTEs) for monitoring (including retraining efforts). With Cloud Pak for Data, this decreases by between 35% and 50%.

› It takes a data scientist two months to develop a model (to include requirements gathering, data collection/discovery, feature engineering, algorithm selection, training, hyperparameter tuning, validation, and documentation). With 15 data scientists, that puts a theoretical cap on development to 90 models per year.

  • Note: For the purposes of this simplifying this calculation, we assume that the decreased model build time is offset by the monitoring effort associated with the increased number of models in production. The full calculation is much more complex, with multiple simultaneously changing variables, and this variation likely falls within the uncertainty bands of the overall analysis.

These calculations show that with Cloud Pak for Data, the composite organization has the capacity to develop between 27 and 100 more AI and ML models over three years, or between 1.5x and 2x more models compared to before Cloud Pak for Data implementation. The table below shows the detailed calculations for each projection.

Reduced monitoring effort:
35% to 50%

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Benefit 1: Increased Number Of Models In Production: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Number of data scientists (FTEs)	Composite organization	15	20	30
A2	Effort to monitor each model in production, before Explainable AI (FTEs)	Composite organization	0.3	0.3	0.3
A3	*Subtotal: Maximum number of models developed, before Cloud Pak for Data (rounded)*	*A1/A2*	*50*	*67*	*100*
A4$_{Low}$			35%	35%	35%
A4$_{Mid}$	Reduced monitoring effort with Explainable AI	Composite organization	40%	40%	40%
A4$_{High}$			50%	50%	50%
A5$_{Low}$	*Subtotal: Theoretical maximum number of models developed (based on monitoring requirements), with Cloud Pak for Data (rounded)*	*A3/(1-A4)*	*77*	*103*	*154*
A5$_{Mid}$			*83*	*112*	*167*
A5$_{High}$			*100*	*134*	*200*
A6	Number of data scientists to develop a model (FTEs)	Composite organization	1	1	1
A7	Number of months to develop a model	Composite organization	2	2	2
A8	*Capacity constraints on number of models developed*	*(12 months/year)/A7*A1/ A6 + A8$_{PY}$*	*90*	*210*	*390*
A9$_{Low}$	*Subtotal: Actual maximum number of models developed, with Cloud Pak for Data*	*Minimum of A5 and A8*	*77*	*103*	*154*
A9$_{Mid}$			*83*	*112*	*167*
A9$_{High}$			*90*	*134*	*200*
A10$_{Low}$	**Increased number of models in production**	A9-A3	27	36	54
A10$_{Mid}$			33	45	67
A10$_{High}$			40	67	100

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Benefit 2: Increased Profit From More Models In Production

Organizations can develop AI and ML models to increase company revenue (e.g., improved marketing and targeting, increased revenue from identifying cross-sell or upsell opportunities for call center employees) or improve operating efficiencies (e.g., reduced working capital requirements, improved process efficiencies).

Interviewees noted that Cloud Pak for Data helps companies put more AI and ML models into production, as the AI monitoring, governance, and explainability improve trust in the model (e.g., companies are less likely to be subject to regulatory penalties). With Cloud Pak for Data:

› Increased trust in the AI and ML models by end users increases adoption of the models and their results.

› Adoption increases as data scientists can iterate on the models faster and improve alignment to business needs.

› Additionally, companies can potentially deploy new, improved models to production faster as they have an easier time satisfying regulators' concerns over fairness and bias in the models.

› End users are more likely to act on model insights since the enhanced explainability makes it clearer why the AI and ML models are recommending a particular action.

Based on the customer interviews, Forrester modeled the financial impact for the composite organization with the following estimates:

› Before Cloud Pak for Data, 5% of developed models made it into production.

› With Cloud Pak for Data, between 10% and 20% of models make it into production.

› Each model in production contributes $200,000 in bottom-line impact (profit) annually.

  • Note: AI and ML models can impact the organization either by increasing revenue (top-line benefit) or by improving operational efficiencies (bottom-line benefit). For the purposes of this calculation, we're simplifying the impact of models to the average bottom-line impact. For top-line benefits, this is the equivalent effect of applying a profit margin adjustment to any increased revenue values from AI and ML models.

› This benefit, combined with the benefit of the increased number of models quantified in Benefit 1: Increased Number Of Models Developed, results in a projected 3x to 8x increase in the number of models in production.

This yields a three-year projected PV ranging from $3.6 million to $12 million. The table below shows the detailed calculations for each projection.
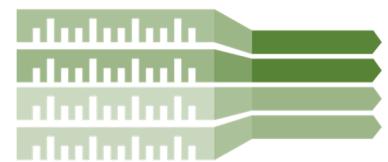
Models in production before Cloud Pak for Data: 5%

Models in production with Cloud Pak for Data: 10% to 20%

Projected **3x to 8x increase** in the number of models in production

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							PRESENT
Benefit 2: Increased Profit From More Models In Production: Calculation Table							
REF.	**METRIC**	**CALC.**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**VALUE**
B1	Percent of developed models that make it into production, before Cloud Pak for Data	Composite organization	5%	5%	5%		
B2$_{Low}$	Percent of developed models that make it into production, with Cloud Pak for Data	Composite organization	10%	10%	10%		
B2$_{Mid}$			15%	15%	15%		
B2$_{High}$			20%	20%	20%		
B3$_{Low}$	*Subtotal: Increased number of models in production with Cloud Pak for Data (rounded)*	*B2*A9 - B1*A3*	*5*	*7*	*10*		
B3$_{Mid}$			*10*	*13*	*20*		
B3$_{High}$			*16*	*23*	*35*		
B4	Average bottom-line impact (profit) generated per model annually	Composite organization	$200,000	$200,000	$200,000		
Bt$_{Low}$	**Increased profit from more models in production**	**B3*B4**	$1,000,000	$1,400,000	$2,000,000	$4,400,000	$3,568,745
Bt$_{Mid}$			$2,000,000	$2,600,000	$4,000,000	$8,600,000	$6,972,201
Bt$_{High}$			$3,200,000	$4,600,000	$7,000,000	$14,800,000	$11,969,947

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Benefit 3: Increased Profit From Improved Model Accuracy

Interviewees noted that the monitoring, governance, and explainability provided by Cloud Pak for Data enable data scientists to improve accuracy and performance of the AI and ML models.

Based on the customer interviews, Forrester modeled the financial impact for the composite organization, estimating a 15% to 30% increase in model accuracy.

This yields a three-year projected PV ranging from $535,312 to $3.6 million, above and beyond the additional profit recorded in Benefit 2: Increased Profit From More Models In Production. The table below shows the detailed calculations for each projection.
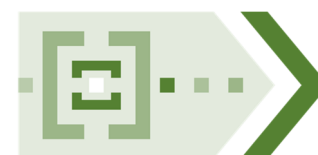
Increased accuracy of AI and ML models:
15% to 30%

Benefit 3: Increased Profit From Improved Model Accuracy: Calculation Table							
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
$C1_{Low}$	Baseline bottom-line impact (profit) from models in production	Bt	$1,000,000	$1,400,000	$2,000,000		
$C1_{Mid}$			$2,000,000	$2,600,000	$4,000,000		
$C1_{High}$			$3,200,000	$4,600,000	$7,000,000		
$C2_{Low}$	Improved model accuracy	Composite organization	15%	15%	15%		
$C2_{Mid}$			25%	25%	25%		
$C2_{High}$			30%	30%	30%		
Ct_{Low}	**Increased profit from improved model accuracy**	C1*C2	**$150,000**	**$210,000**	**$300,000**	**$660,000**	**$535,312**
Ct_{Mid}			**$500,000**	**$650,000**	**$1,000,000**	**$2,150,000**	**$1,743,050**
Ct_{High}			**$960,000**	**$1,380,000**	**$2,100,000**	**$4,440,000**	**$3,590,984**

Qualitative Benefits

While there were strong and quantifiable projected benefits that the interviewed organizations observed by using IBM's explainable AI capability in Cloud Pak for Data, organizations experienced significant qualitative benefits as well. These could potentially be quantified in a financial analysis if given the appropriate data and metrics.

› Interviewees noted that investing in Cloud Pak for Data meant they did not have to invest resources in building out a similar solution set internally. One company estimated this effort to potentially take five engineering FTEs a year to develop, requiring input from data scientists and data engineers along the way.

› Interviewees noted that having a toolset like explainable AI and model monitoring in IBM Cloud Pak for Data gives them a competitive advantage in recruiting and retaining top data scientist talent, as they see increased overall engagement from their data scientists.

› Having the improved explainability reduces the risk of regulatory fines from unfair or biased models, along with the associated reputational damage. There is also an improved perception among employees and customers that the company is taking steps to ensure an ethical approach to AI.

> "Brand reputation is at stake when you're using artificial intelligence to make decisions. Just look at the lawsuits and penalties different industries are seeing due to biased or unfair models. Explainable AI in Cloud Pak for Data helps us avoid that."
>
> *Managing director of artificial intelligence innovation, consulting services industry*

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Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED PROJECTED METRICS

Benefits Chart
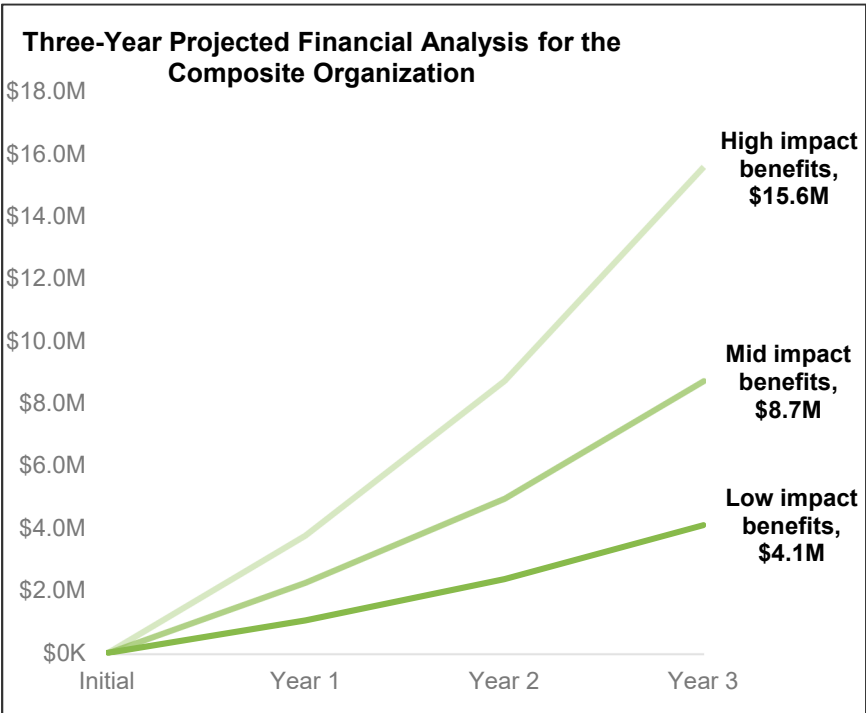
The financial results calculated in the Benefits section can be used to determine the PROI and NPV for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

Three-Year Projected Financial Analysis for the Composite Organization

High impact benefits, $15.6M

Mid impact benefits, $8.7M

Low impact benefits, $4.1M

These risk-adjusted benefit values are determined by applying ranges to the results in each Benefit section.

Benefits Table

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total benefits (low)	$0	$1,150,000	$1,610,000	$2,300,000	$5,060,000	$4,104,057
Total benefits (mid)	$0	$2,500,000	$3,250,000	$5,000,000	$10,750,000	$8,715,251
Total benefits (high)	$0	$4,160,000	$5,980,000	$9,100,000	$19,240,000	$15,560,931

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Explainable AI And Model Monitoring In IBM Cloud Pak For Data: Overview

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

Building and scaling AI with trust and transparency is an imperative for any organization. In order to track and measure AI outcomes, business leaders are deploying explainable AI and model monitoring capabilities as part of the end-to-end AI lifecycle. By building, running and managing models in a unified data and AI environment, they can ensure that the AI models remain fair, explainable and compliant anywhere. This end-to-end AI approach also uniquely empowers an organization to detect and help correct model drift and bias, and manage model risk when an AI model is in production.

IBM Cloud Pak® for Data is a fully integrated data and AI platform that modernizes how businesses collect, organize and analyze data to infuse AI throughout their organizations. Cloud-native by design, the platform unifies market-leading services spanning the entire analytics lifecycle. From data management, DataOps, governance, business analytics and automated AI, IBM Cloud Pak for Data helps eliminate the need for costly, and often competing, point solutions while providing the information architecture needed to implement AI successfully. In short, explainable AI and model monitoring are best deployed in IBM Cloud Pak for Data where you can build, run and manage AI models anywhere across any cloud.

Building on the streamlined hybrid-cloud foundation of Red Hat® OpenShift®, IBM Cloud Pak for Data simplifies infrastructure management and lowers total cost of ownership. The solution fully supports multicloud environments such as IBM Cloud®, Amazon Web Services (AWS), Microsoft Azure and Google Cloud. IBM Cloud Pak for Data also integrates seamlessly with a wide range of solutions from a **growing ecosystem** of technology partners and system integrators, including Anaconda, MongoDB, NetApp, Cockroach Labs and Appen.

This open data and AI platform can help you build a successful AI strategy, optimize talent and deploy AI at scale, so that your business can stay innovative and agile for years to come.

To learn more, please visit https://www.ibm.com/products/cloud-pak-for-data.

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Appendix A: New Technology: Projected Total Economic Impact

New Technology: Projected Total Economic Impact (New Tech TEI) 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 New Tech TEI methodology helps companies demonstrate and justify the projected tangible value of IT initiatives to both senior management and other key business stakeholders.

Total Economic Impact Approach

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

Projected Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The projected cost category within New Tech TEI captures incremental costs over the existing environment for ongoing costs associated with the solution. Note, these are not evaluated in this study.

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.

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.

Projected return on investment (PROI)

A project's expected return in percentage terms. PROI is calculated by dividing net projected benefits (projected benefits less costs) by projected 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%. A 10% discount rate is used for this analysis.

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.

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