A Forrester Total Economic Impact™ Study

Commissioned By

Pegasystems

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The Total Economic Impact™ Of The Pega 7 Platform

FORRESTER®

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Executive Summary

Today, companies waste a lot of money on ineffective and inefficient business processes that also result in suboptimal customer experiences. More and more, these companies realize that they need to provide better flexibility and agility to quickly change processes based on new competitive and economic threats and opportunities.

Pegasystems commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying the Pega 7 Platform. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Pega 7 Platform on their organizations. This business case analyzes the value of developing business applications on the Pega 7 Platform as compared with using a more traditional development approach.

The Pega 7 Platform is an application development platform intended for large enterprises seeking to build, deploy, and evolve strategic business applications. The platform can be deployed on-premises or in the Pega Cloud.[1]

> *"The Pega 7 platform enables us to develop flexible business applications with fewer resources and in only a fraction of the time. It also provides us with analytical capabilities while protecting our existing assets."*
>
> ~ Front office program director, global insurance company

To better understand the benefits, costs, and risks associated with a Pega 7 Platform implementation, Forrester interviewed four customers from the private and public sector that had extensive experience using the Pega 7 Platform.

The interviews revealed the challenges that these organizations had with their previous development environments, using common programming languages with older development techniques. They found it hard to reconcile long development cycles with quickly changing requirements triggered by, for example, changing regulations, shifting market dynamics, or evolving customer expectations. These interviews also demonstrated how an application development platform like the Pega 7 solution might help address these challenges.

THE PEGA 7 PLATFORM HELPS LARGE ORGANIZATIONS GAIN AGILITY WHILE REDUCING DEVELOPMENT COSTS

Forrester interviewed four existing customers and built a composite organization based on the characteristics of the interviewed companies.[2] This composite company experienced the risk-adjusted benefits and costs summarized in Figure 1.[3] The composite organization analysis saw approximately $33.6 million in benefits versus costs of $8 million, which added up to a net present value (NPV) of $25.6 million over the three years of the analysis. The interviewed organizations reported that compared with their previous development practices, the development costs for a strategic business application decreased by 75% and the average time-to-market was reduced by 50%.

FIGURE 1
Financial Summary Showing Three-Year Risk-Adjusted Results

Source: Forrester Research, Inc.

› **Benefits.** The organization used in this analysis is a composite based on interviews that Forrester conducted with four Pegasystems customers to delve more deeply into the financial impact of the Pega 7 Platform. The composite organization, which serves here as an example, represents a Global 2000 organization providing communications services.[4] The company wanted to improve its customer engagement practices and saw the opportunity to leverage new business process management (BPM) and case management capabilities in order to better engage with customers as well as create internal efficiencies. Prior to deploying the Pega 7 Platform, the company used common programming languages with older development techniques. As a result of switching to the Pega 7 Platform, the organization realized the following risk-adjusted benefits that represent those experienced by the interviewed Pegasystems customers. The total benefits have a risk-adjusted present value of $33.6 million over the three years of the analysis. The benefits include:

- **Development cost savings of 75%.** With the adoption of the Pega 7 Platform, all of the interviewed organizations transitioned from traditional programming languages with older development techniques to a model-driven approach with Agile methodologies. Interviewees reported that despite higher average bill rates for developers with Pega skills, their organizations achieved significant development cost savings due to, for example, improved reusability, better collaboration between the business and IT enabled by capabilities such as Directly Capture Objectives (DCO), ease of integration, and fast user interface developments. To build a business application, the composite organization in this example requires three times less resources, and the projects are executed in half of the time on average. The development costs avoided represent 54% of the total benefits for the composite organization.
- **Increased agility or change-related development cost savings of 75%.** The interviewed organizations reported that the Pega 7 Platform, through its model-driven approach and reusability of components such as the Situational Layer Cake, made their business applications more flexible. The business is taking over the ownership of changes and evolutions from the IT department. For the composite organization, changes are now faster and easier to implement, making it possible to quickly adjust to changing internal or external requirements or shifting market imperatives. The improved agility represents 11% of the total benefits quantified in this case study.
- **Reduced time-to-market by 50%.** With the Pega 7 Platform, the interviewed organizations observed development times two to five times shorter as compared with their previous development environment and practices. This analysis assumes that the composite organization is able to launch its new business applications 90 days earlier, and thus realize truly incremental value from the following business benefits as compared with the alternative scenario, where the same business applications would have been developed with the previous, more traditional development approach. The reduced time-to-market represents 35% of the total benefits in this case study and results in the following benefits:
    - **End user productivity gains.** Interviewees reported that their end users had typically achieved 20% to 50% in productivity gains as compared with their previous, manual processes; in specific cases they even achieved up to 75% in productivity gains. Over the three years of the analysis, the composite organization deploys 15 business applications. Per application, an average of 200 end users become 50% more productive and can allocate the saved time for more value-add tasks.
    - **Incremental revenue.** Interviewees also gave examples of millions of dollars' worth of increased revenues, reduced cancellation rates, or improved customer engagement. For the composite organization, we assume that the business applications have a direct impact on revenue generation. Due to the Pega 7 Platform, the company is able to capture 90 days of incremental revenue, thus resulting in incremental profit. Only the incremental profit as opposed to entire incremental revenue with business applications is quantified in the time-to-market benefits.

› **Costs.** The composite organization decided to deploy the Pega 7 Platform on-premises and experienced the following incremental costs that have a risk-adjusted present value of $8 million over the three years of the analysis. Organizations should also evaluate the option of using the Pega Cloud instead; an annual subscription fee would replace the software license, infrastructure, and some of the installation-related costs detailed below. The costs include:

- **Software costs.** These costs are the estimated software license and maintenance costs for the Pega 7 Platform for the composite organization and represent 20% of the total costs.
- **Infrastructure-related costs.** These costs cover the server hardware, hardware maintenance, and hosting costs for the composite organization and represent 2% of the total costs.
- **Initial setup and ongoing administration and support costs.** These costs represent 1% of the total costs and take into account the initial deployment of the Pega 7 Platform as well as the incremental ongoing administration and support efforts.
- **Development costs.** Over the three years of the analysis, the composite organization develops and deploys 13 new business applications on the Pega 7 Platform. These costs cover the assumed development costs and represent 75% of the total costs.
- **Training costs.** The composite organization invests in training to make internal resources proficient with the new development environment and techniques. The training costs represent 2% of the total costs.

Disclosures

The reader should be aware of the following:

› The study is commissioned by Pegasystems 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 the Pega 7 Platform.

› Pegasystems 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.

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

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews, Forrester constructed a Total Economic Impact (TEI) framework for those organizations considering implementing the Pega 7 Platform. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision, to help organizations understand how to take advantage of specific benefits, reduce costs, and improve the overall business goals of winning, serving, and retaining customers.

APPROACH AND METHODOLOGY

Forrester took a multistep approach to evaluate the impact that the Pega 7 Platform can have on an organization (see Figure 2). Specifically, we:

- Interviewed Pegasystems marketing, sales, and/or consulting personnel, along with Forrester analysts, to gather data relative to the Pega 7 Platform and the marketplace for the Pega 7 Platform.
- Interviewed four organizations currently using the Pega 7 Platform to obtain data with respect to costs, benefits, and risks.
- Designed a composite organization based on characteristics of the interviewed organizations (see Appendix A).
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.
- Risk-adjusted the financial model based on issues and concerns the interviewed organizations highlighted in interviews. Risk adjustment is a key part of the TEI methodology. While interviewed organizations provided cost and benefit estimates, some categories included a broad range of responses or had a number of outside forces that might have affected the results. For that reason, some cost and benefit totals have been risk-adjusted and are detailed in each relevant section.

Forrester employed four fundamental elements of TEI in modeling the impact of the Pega 7 Platform: 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 provide a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

FIGURE 2

TEI Approach

Source: Forrester Research, Inc.

Analysis

INTERVIEW HIGHLIGHTS

For this study, Forrester conducted a total of four interviews with representatives from the following large organizations, which are Pegasystems customers and are using the Pega 7 Platform for transformational projects:

- **A public sector organization.** This US public sector organization has about 13,000 employees. One of its challenges was that it had many redundant IT systems and applications. The maintenance of these systems was consuming 85% of the entire IT budget, leaving very limited funds for new projects. The main objectives for introducing the Pega platform — apart from reducing the overall maintenance costs and freeing up budget for new initiatives — were to improve the service to the citizens, gain visibility into business processes, and create internal efficiencies. In December 2013, the organization migrated from Pega 6 to the Pega 7 Platform operated in the Pega Cloud. At the time of the interview, the organization had deployed eight applications in production on the Pega 7 Platform and six more projects were about to be released. The business applications were generally around licensing and permitting requests, internal operations in the enterprise resource planning (ERP) system, or going paperless.
- **A leading technology company.** The technical services arm of this global technology company with more than 70,000 employees based in the US saw the opportunity to create case management and business process management capabilities. Its heavily customized enterprise resource planning (ERP) system made it difficult to extract and analyze data. In 2013, the organization decided to deploy the Pega 7 Platform on-premises in order to build out business processes related to service management functions such as incident, problem, or asset management. The ERP system is maintained as a system of record, but Pega is used to take out the complexity of the customized ERP environment and bring visibility into the business processes. At the time of the interview, the company had 10 business applications in production on the Pega platform and many more projects in the pipeline.
- **A large financial services organization.** A division of a Western European financial services organization with more than 60,000 employees wanted to move into a new market segment and needed to develop a new multitenant case management and fulfillment platform. Due to ever-changing and evolving regulations in the banking sector, the solution had to be very flexible. A short time-to-market and general scalability were other important requirements. The organization introduced Pega 7 on-premises in 2014. The initial development took between three and four months. At the time of the interview, the company had one active customer on the newly developed platform and was in the process of rolling the new services out to three more clients.
- **A leading global insurance company.** A division of a global insurance company with more than 100,000 employees and headquarters in Western Europe was looking for a technical solution to better support customer-facing functions. Its client-facing staff was using a number of redundant and siloed applications. Users had to key in data to various systems, resulting in challenges around process transparency and staff efficiency. The organization decided to deploy the Pega 7 Platform on-premises in July 2014. The development of the first business application took about 10 months. The solution that is related to one product offering was rolled out in 15 countries simultaneously, and the company has plans to add other business segments in the near future.

COMPOSITE ORGANIZATION

For this financial case study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of using the Pega 7 Platform. Forrester's conclusions were derived in large part from information received in a series of in-depth interviews with executives and personnel at the four organizations described above. As each of the interviewed organizations was promised anonymity, Forrester constructed a composite company, a TEI framework, and an associated ROI analysis based on our findings from these Pegasystems clients.

The composite organization represents a Global 2000 organization. The company employs about 10,000 people worldwide and provides communications services.

Situation

The composite organization was looking to transform into a digital enterprise to better engage with its customers, build efficient operations, and quickly respond to changes in the market. However, there was an execution gap between how they wanted to engage with customers and the capabilities of the existing systems. Many of the company's internal practices were still very manual or relying on rigid and unintegrated point solutions. The company's ERP was heavily customized, which made it difficult to extract and analyze data as well as optimize an end-to-end process.

The company wanted to improve its customer engagement and saw the opportunity to create new BPM, case management, mobile, social, and decision analytics capabilities in order to better engage with customers as well as create internal efficiencies.

Prior to deploying the Pega 7 Platform and similar to the interviewed customers, the company used common programming languages with older development techniques. The company was looking for a flexible, scalable, and modern enterprise platform that would provide predefined strategic applications and could easily be integrated with existing systems.

Solution

After having evaluated different options, the organization chose to deploy the Pega 7 Platform on-premises. With the transition to an Agile development practice, the company wanted to reduce the implementation risks, improve the quality of the application delivery, and increase the flexibility of the applications.

The development of the first business application took about four months and was executed by a team of 15 people, including internal resources and external consultants. Over time, as the company developed more and more applications on the Pega 7 Platform, the teams got smaller and the average length of the projects grew shorter.

Results

While the interviewed organizations had very different use cases, they all see great value in using the Pega 7 Platform. The interviews with these Pega customers revealed that:

- **The Pega 7 Platform has a comprehensive set of capabilities.** The interviewed organizations, which represent different industries, did not just want to add another business process or case management tool as a point solution. They were looking for a single and flexible platform to build enterprise-class applications for their front and back office processes. They appreciated the mobile, social, and analytical capabilities of the Pega 7 Platform, as well as the prebuilt frameworks and strategic applications.

> *"One of the big constraints we had was time-to-market. We needed to develop a brand new system within a three-month period. That was generally perceived at the time to be highly aggressive. I think we commenced the project with Pega at the beginning of May [2014], and we had it in place actually just around Fourth of July."*
>
> ~ Senior IT manager, large financial services company

"We were looking for a modern, flexible enterprise platform that would facilitate our business processes, support different devices and channels, protect our existing assets, and come with frameworks with predefined functions so that we would not have to start from scratch. The Pega 7 Platform seemed like the best match for us."
~ Front office program director, global insurance company

- **There is still a lot of potential in increasing efficiency of business processes.** Even though business process and case management practices have been around for many years, the interviewees recognized inefficiencies in their current business process implementations. These processes often rely on rigid and siloed point solutions that have to interface with heavily customized systems of records. End-to-end processes require many manual efforts, including the extraction and insertion of data from/into multiple systems. The interviewed organizations wanted to make their processes more transparent and improve staff productivity.

"Our main business objectives [for the introduction of the Pega 7 Platform] were to provide the end users with a single platform for running their whole business processes in a structured, transparent, and compliant way and, of course, to gain in efficiency and visibility."
~ Front office program director, global insurance company

- **The improvement of customer experience is a top priority — not only in the private but also in the public sector.** Besides creating more transparent and efficient business processes, one of the main objectives of the interviewed organizations was to improve the customer experience. Examples include streamlined processes that help accelerate the fulfilment of customer applications or requests, increased process visibility that speeds up resolution of customer inquiries, and self-service portals that allow clients to interact with the organization 24x7.

"Today in the public sector, the expectation is that one can interact with a public entity the same way they interact with Amazon or with some other service delivery. We focus on customer satisfaction and give them the ability to interact with us on their own terms — when they want and how they want."
~ Director of business process management, public sector organization

- **Flexibility and scalability were key requirements for the interviewed organizations.** All of the interviewed organizations were challenged by the relative rigidity of their legacy systems and tools. They all recognized the need for more flexible applications that might quickly be adjusted to changing external market imperatives or internal requirements. The flexibility and scalability of the Pega 7 Platform gave the interviewed organizations confidence.

"Banking regulations are changing quite significantly. So with Pega 7, we put in a software solution that is agile enough to be able to change with those regulations easily and quickly."
~ Senior IT manager, large financial services company

- **The Pega 7 Platform helped organizations to reduce development costs and durations.** Prior to deploying the Pega 7 Platform, all of the interviewed organizations had used common programming languages with older development techniques. After having adopted Pega's model-driven and rule-based development approach with an Agile methodology, these organizations noted that developments on the Pega platform are done faster and require fewer resources, ultimately resulting in development time and cost savings.

"Well, I guess we could have done what we're doing in Pega within our legacy platform because it has a case management module as well. But we know that the workload from a development perspective would have been much higher. Not only the costs but also the duration would have been multiplied by four or five."
~ Senior IT manager, large financial services company

- **The reusability of modules plays an important part in development time and cost savings.** The reusability of elements is an important concept in the Pega approach. It helps organizations to reduce not only application development and maintenance costs but also the time-to-market. Interviewees talked about the ease of adjusting an existing application to the varied needs of multiple countries or adding other product lines to it. One organization reported that right from the start, it had created a large inventory of modules that people could use and reuse. The same organization noted:

"Because things are architected and exposed as individual elements and not embedded in code, [it] allows us to become much more flexible. For example, adding a brand-new type of license to a licensing application is just a minor configuration change now instead of modifying code and going through the whole development life cycle. Reusability is one of the most powerful parts of Pega 7."
~ Director of business process management, public sector organization

- **The Pega 7 Platform reduced the time-to-market for new applications.** All of the interviewed organizations recognize that the Pega 7 Platform helps them to decrease the time-to-market for new applications. The corresponding impact depends on the nature of the application. For some, internal efficiencies can be created earlier; for others, a reduced time-to-market can represent a real competitive advantage, such as the ability to enter new markets or capture more market share.

"The implementation we've done with Pega is a strategic implementation, but ironically, the timeline to put it in place is one you'd normally associate with a tactical solution."
~ Senior IT manager, large financial services company

- **Business users are gaining control.** Due to Pega's model-based application development approach, there is no direct coding within the product. Configuration and business rules can be created and adjusted by trained business users with only limited involvement from the IT department.

"The business is now able to modify the business rules themselves rather than having to initiate another IT project to make changes to the existing functionality."
~ Director, global service operations, global technology company

- **Collaboration between business and IT improved.** The interviewed organizations reported that the composition of their project teams had changed. While these teams used to be very IT-centric in the past, the staffing is now more balanced between business and IT. According to the interviewees, this also improved the general collaboration between IT and the business units.

"In our traditional development projects, we need between two and five IT developers per business analyst. The experience with our Pega projects shows that we now only need one developer per business analyst."
~ Front office program director, global insurance company

- **Standardizing on one platform will bring long-term savings.** The interviewed organizations were committed to the Pega 7 Platform and were in the process of extending the scope of applications. By consolidating operations on one single platform, organizations can realize long-term operational cost savings. One organization, for example, had the long-term goal of reducing its overall IT maintenance and operations costs in order to reinvest the savings in more value-add initiatives.

"It is our belief that the IT maintenance costs will start decreasing because we're starting to harmonize our workforce on Pega as our single platform. Today, we spend about 85% of our IT budget on maintenance and operations. Our target is to get this closer to 50% within the next two years. This will allow us to spend more on new projects and developments, which will make us even more efficient."
~ Director of business process management, public sector organization

- **Pega developers are in high demand.** The interviewed organizations reported that at the time of the interviews and compared with resources with traditional development skills, developers with Pega skills were relatively more expensive. However, they also noted that higher productivity outweighs the difference in costs.

"To develop on the Pega 7 Platform, you need specialized skills, which are in relatively high demand. So, for an equivalent resource, we're paying a higher bill rate. But this is offset by the increased productivity you get in application development and the speed of development."
~ Director, global service operations, global technology company

› **Organizations recommend to carefully choose the right staff and focus on the low-hanging fruit first.** Two recommendations were repeatedly mentioned during the interview process. The first was to carefully select the right skills with the relevant experience for one's projects. The second was to focus on achievable goals first and then scale, rather than directly building this all-encompassing foundational platform that will only delay the realization of the benefits and thus might create frustrations and doubts with regard to the commenced journey.

"Make sure you identify the skills that are required early on and focus on developing the people that you need to be successful."
~ Director, global service operations, global technology company

"I think that for us, one of the lessons learned is to focus on small goals that can be quickly achieved and allow the application to scale organically over time."
~ Director of business process management, public sector organization

BENEFITS

The Pegasystems clients who were interviewed for this study described a range of hard and soft benefits that they have accrued from their deployment and use of the Pega 7 Platform. The most significant benefits described to Forrester were around development time and cost savings, increased flexibility of applications, and reduced time-to-market.

Another important benefit mentioned by the interviewed organizations was improved customer experience. However, the lack of concrete measures, along with the wide variety of potential impacts on the financial bottom line of the organization, prevent us from taking this benefit into account quantitatively in this business case. Readers, however, should evaluate the potential impact that improved customer experience and satisfaction can have on their organizations and decide whether or not they want to include it in their specific business case.

Development Cost Avoidance

Prior to using the Pega 7 Platform, all of the interviewed organizations were using traditional programming languages with older development techniques. They realized that their business applications were lacking flexibility. They found it hard to reconcile long development cycles (12 to 18 months was not unusual) with quickly changing requirements triggered by, for example, changing regulations, shifting market dynamics, or evolving customer expectations. With the deployment of the Pega 7 Platform, these organizations also adopted more Agile development techniques. Mainly due to the 100% model-driven approach, Agile development methodologies, and reusability of components, organizations reported not only improved development time but also cost savings. One of the interviewees stated:

> "The nice thing about Pega is that the number of people that have to be involved in a project is relatively small. I would estimate that we would have required five times more resources with our traditional development approach. In addition, with Pega, the development time is cut in half."
> *~ Front office program director, global insurance company*

Comparing their traditional development approach with the developments made on the Pega 7 Platform, the interviewed organizations estimated that their traditional approach would have required between three and five times the number of resources and the development times would have been two to five times longer. However, the interviewed organizations also noted that developers with Pega skills are harder to find than those with traditional developer skills; therefore, companies should expect higher average bill rates.

For the sake of this business case, we assume that the composite organization uses the Pega 7 Platform to develop two business applications in Year 1, five in Year 2, and eight in Year 3 of the analysis. The detailed development cost assumptions are shown in Table 8 in the Costs section. To estimate the avoided development costs, we further assume that, on average, the developments — if done with the traditional approach — would have taken twice as long (Year 1) to 2.5 times as long (years 2 and 3) and would have required three times more resources. In order to take into account the difference in bill rates in this analysis, the average daily rate of a Pega developer is fixed at $500 (see row G4 in Table 8), whereas we assume an average daily rate of $300 for traditional developer skills (see row A4 in Table 1).

To take into account the uncertainty of the assumptions made, we took the lower end of the estimations provided by the interviewees and additionally risk-adjusted this benefit down by 5%. The risk-adjusted development cost avoidance over the three years had a present value of $18 million for the composite organization. The avoided costs shown in Table 1 have to be compared with the $4.5 million (PV) of actual development costs indicated in row G5 in Table 8.

TABLE 1

Development Cost Avoidance

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of projects	G1	2	5	8
A2	Assumed average number of staff	G2 * 3	45	36	30
A3	Assumed average number of days per project	G3 * 2 (Year 1) G3 * 2.5 (years 2 and 3)	180	150	150
A4	Average fully loaded daily rate	$78,000/ 260 days	$300	$300	$300
At	Development cost avoidance	A1*A2*A3*A4	$4,860,000	$8,100,000	$10,800,000
	Risk adjustment	↓ 5%			
Atr	**Development cost avoidance (risk-adjusted)**		**$4,617,000**	**$7,695,000**	**$10,260,000**

Source: Forrester Research, Inc.

Agility-Related Cost Savings

The development cost savings described above not only apply to the initial developments; the same rationale also holds true for future change and evolution requests. The interviewed organizations reported that changes are now much easier to implement; for example, creating variations of an application for a different customer, geography, product, or channel is made simpler due to the reutilization of elements and Pega's layered approach. One of the interviewees reported:

"In the past, there has been a lot of frustration within the business community about the time and the expenses it took to make changes. With Pega, the business is able to take on more ownership. Business users can now go in and just change a rule and probably build a whole new capability from that. Traditionally, we had to go through development cycles that would have taken months to implement."
~ Director, global service operations, global technology company

In this example, we assume that the composite organization executes four major change requests in Year 1; 10 in Year 2; and 16 in Year 3 of the analysis. Similar to the assumptions for the avoided development costs described above, we assume that, on average, the changes — if done with the traditional approach — would have taken twice as long (Year 1) to 2.5 times as long (years 2 and 3) and would have required three times more resources.

To take into account the uncertainty of the assumptions made, we risk-adjusted this benefit and reduced it by 5%. The risk-adjusted agility-related cost avoidance over the three years had a present value of $3.7 million for the composite organization. The agility-related cost savings shown in Table 2 have to be compared with the $920,000 (PV) of actual change-related costs indicated in row G9 in Table 8.

TABLE 2

Agility-Related Cost Savings

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Average number of major change/evolution requests	G6	4	10	16
B2	Assumed average number of staff for changes/evolutions	G7*3	24	18	15
B3	Assumed average number of days per change/evolution project	G8*2	36	30	30
B4	Average fully loaded daily rate	$78,000/ 260 days	$300	$300	$300
Bt	Agility-related cost savings	B1*B2*B3*B4	$1,036,800	$1,620,000	$2,160,000
	Risk adjustment	↓ 5%			
Btr	**Agility-related cost savings (risk-adjusted)**		**$984,960**	**$1,539,000**	**$2,052,000**

Source: Forrester Research, Inc.

Reduced Time-To-Market

Shorter application development cycles and thus reduced time-to-market were mentioned by all of the interviewed organizations as important benefits of the Pega 7 Platform. It means that the business benefits of a new application can take effect earlier as compared with the alternative scenario, where the same business application would have been developed with a more traditional development approach. The associated financial impact might vary depending on the nature and objectives of the business applications.

Based on their specific use cases, interviewees reported a range of business benefits. Typically, interviewees had seen an improvement of between 20% and 50% in end user productivity; in specific cases they saw improvements even up to 75%. The time saved by the business users can be reallocated to more value-add tasks. Interviewees also reported millions of dollars' worth of increased revenues, reduced cancellation rates, or improved customer engagement. One interviewee even mentioned that the reduced time-to-market might create completely new business opportunities and result in a competitive advantage.

"Pega definitely helped us to reduce the time-to-market for new applications. Our business development and marketing teams can now very confidently go to pitch for new business knowing that we can turn around anything new in Pega in a very short timeframe."
~ Senior IT manager, large financial services company

Therefore, readers should evaluate if there is a potential of new revenue streams due to faster time-to-market in their particular case and then decide whether or not they want to include it in their specific business case.

For the sake of this business case, we assume that the new Pega applications developed by the composite organization streamline different business processes and that the applications have a direct impact on revenue generation. Because each of the new business applications gets into production in half of the time, the organization realizes truly incremental end user productivity gains and incremental revenues as compared with the alternative scenario of developing the same business applications with the traditional development approach.

In this example, the end users of the composite organization start realizing 50% productivity gains 90 days earlier. For the sake of this business case, we further assume that, on average, the full-time equivalent (FTE) of 200 end users are affected by a given business application. The average fully loaded daily salary rate of a business user is estimated at $150. Forrester further assumes that only a portion of the time gained from improved productivity will actually be realized by the organization. In this analysis, we assume that 75% of the time saved will actually be converted into productive output.

In addition, the business applications have a direct impact on revenue generation. Due to the faster time-to-market, the organization is able to capture 90 days more of the associated revenue and thus realize an incremental profit. For this example, we assume an average incremental annual revenue of $2 million per application and a gross profit margin of 40%. The resulting incremental profit is shown in row C10 of Table 3.

Finally, to take into account the uncertainty of the above assumptions, this benefit was risk-adjusted and reduced by 20%. The total present value of the risk-adjusted time-to-market gains over the three years was valued at approximately $11.6 million for the composite organization.

TABLE 3

Reduced Time-To-Market

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Number of new business applications		2	5	8
C2	Average number of days saved per application	A3-G3	90	90	90
C3	Assumed average number of full-time equivalents (end users) dedicated per application		200	200	200
C4	End user productivity gains		50%	50%	50%
C5	Average fully loaded daily rate (end user)		$150	$150	$150
C6	Productivity captured		75%	75%	75%
C7	End user productivity gains captured	C1*C2*C3*C4*C5*C6	$2,025,000	$5,062,500	$8,100,000
C8	Assumed average annual incremental revenue per business application		$2,000,000	$2,000,000	$2,000,000
C9	Gross profit margin		40%	40%	40%
C10	Incremental profit	C1*(C8/365 days* C2)*C9	$394,521	$986,301	$1,578,082
Ct	Reduced time-to-market	C7+C10	$2,419,521	$6,048,801	$9,678,082
	Risk adjustment	↓ 20%			
Ctr	**Reduced time-to-market (risk-adjusted)**		**$1,935,616**	**$4,839,041**	**$7,742,466**

Source: Forrester Research, Inc.

Total Benefits

Table 4 shows the total of all benefits across the three areas listed above, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of approximately $33.6 million.

TABLE 4

Total Benefits (Risk-Adjusted)

Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Development cost avoidance	$4,617,000	$7,695,000	$10,260,000	$22,572,000	$18,265,267
Btr	Agility-related cost savings	$984,960	$1,539,000	$2,052,000	$4,575,960	$3,709,017
Ctr	Reduced time-to-market	$1,935,616	$4,839,041	$7,742,466	$14,517,123	$11,575,888
	Total benefits (risk-adjusted)	**$7,537,576**	**$14,073,041**	**$20,054,466**	**$41,665,083**	**$33,550,172**

Source: Forrester Research, Inc.

COSTS

This section describes and lists the incremental costs incurred by the composite organization for deploying, using, and maintaining the Pega 7 Platform over a three-year period.

Software Costs

The composite organization had decided to deploy the Pega 7 Platform on-premises. The software costs described in this section take into account the upfront license and annual maintenance costs for the Pega 7 Platform. For the type of scenario described in this case study, we assume upfront license costs of $1 million and an annual maintenance fee of $210,000.

An alternative option to an on-premises deployment is to use the Pega Cloud environment instead. One of the interviewees had used this option and was very satisfied with it. In this case, organizations would pay an annual subscription fee.

The software costs vary from organization to organization, considering different licensing agreements, the number of environments and users, and other discounts. To compensate, this cost was risk-adjusted up by 5%. The risk-adjusted software costs over the three years had a present value of nearly $1.6 million.

TABLE 5
Software Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
D1	Perpetual license		$1,000,000			
D2	Software maintenance fee	D1*21%		$210,000	$210,000	$210,000
Dt	Software costs	D1+D2	$1,000,000	$210,000	$210,000	$210,000
	Risk adjustment	↑ 5%				
Dtr	**Software costs (risk-adjusted)**		**$1,050,000**	**$220,500**	**$220,500**	**$220,500**

Source: Forrester Research, Inc.

Infrastructure Cost

Three of the four interviewed organizations had chosen to deploy the Pega 7 Platform on-premises. They described that the infrastructure required to run the Pega 7 Platform is very similar to any other development platform. For the sake of this business case, we assume that the composite organization has to invest $100,000 in new servers. We further assume incremental hardware maintenance costs of $10,000 per year and annual hosting fees of another $10,000.

The infrastructure costs are based on high-level estimations. To take into account the uncertainty of these estimations, this cost was risk-adjusted up by 5%. The risk-adjusted infrastructure costs over the three years had a present value of approximately $157,000 for the company described in this case study.

Organizations that decide to use the Pega 7 Cloud environment instead do not incur these infrastructure-related charges.

TABLE 6

Infrastructure Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
E1	Hardware costs		$100,000			
E2	Hardware maintenance costs	10%		$10,000	$10,000	$10,000
E3	Hosting costs			$10,000	$10,000	$10,000
Et	Infrastructure costs	E1+E2+E3	$100,000	$20,000	$20,000	$20,000
	Risk adjustment	↑ 5%				
Etr	**Infrastructure costs (risk-adjusted)**		**$105,000**	**$21,000**	**$21,000**	**$21,000**

Source: Forrester Research, Inc.

Initial Installation And Ongoing Admin And Support Costs

The initial installation costs take into account the installation of the servers, the deployment of the Pega 7 Platform, and integrations with the ERP and other systems, such as an Active Directory server, database servers, or web servers. For the composite organization, we assume a project of 20 man-days and an average daily rate of $500. For the ongoing administration and support of the Pega 7 Platform, the company allocates the equivalent of 25% of a full-time resource with an annual fully loaded rate of $130,000.

However, in order to take into account the uncertainty of the estimated labor costs, the installation and ongoing costs were risk-adjusted up by 5%. For the composite organization, the present value of the total risk-adjusted installation and ongoing administration and support costs was approximately $95,000.

TABLE 7

Initial Installation And Ongoing Admin And Support Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
F1	Initial installation efforts (in man-days)		20			
F2	Average fully loaded daily salary rate	$130,000/260 days	$500			
F3	Ongoing admin and support efforts (in FTE)			0.25	0.25	0.25
F4	Average fully loaded annual salary	$130,000				
Ft	Initial installation and ongoing admin and support costs	(F1*F2)+(F3*F4)	$10,000	$32,500	$32,500	$32,500
	Risk adjustment	↑ 5%				
Ftr	**Initial installation and ongoing admin and support costs (risk-adjusted)**		**$10,500**	**$34,125**	**$34,125**	**$34,125**

Source: Forrester Research, Inc.

Development Costs

Following the success of the initial application, the interviewed organizations were progressively adding more and more applications onto the Pega 7 Platform. While they usually heavily relied on professional services from either Pegasystems or other third parties for the first few projects, they soon started training their internal resources and gradually took over more and more of the development and maintenance efforts. The interviewees reported that over time the project teams decreased in size and project durations shortened. One of the reasons evoked was the reusability of components.

For the case of the composite organization, we assume that it uses the Pega 7 Platform to develop two business applications in Year 1, five in Year 2 and eight in Year 3 of the analysis. We also assume that the initial applications start with a limited scope and are then adjusted and extended by a number of subsequent change requests. The assumptions taken for the number of staff required and assumed development times are indicated in rows G2, G3, G7, and G8 of Table 8 below. According to the feedback from the interviewed organizations, we also assume a higher average daily rate for a developer with Pega skills, i.e., $500 per day (see row G4 below) compared with $300 per day for a developer with traditional development skills (see row A4 in Table 1).

However, in order to take into account the uncertainty of the estimations above, the development costs were risk-adjusted up by 10%. For the composite organization, the present value of the total risk-adjusted development costs was approximately $6 million.

TABLE 8

Development Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
G1	Number of new business applications			2	5	8
G2	Average number of staff			15	12	10
G3	Average number of days per project			90	60	60
G4	Average fully loaded daily rate	$130,000/260 days		$500	$500	$500
G5	Initial development costs	G1*G2*G3*G4		$1,350,000	$1,800,000	$2,400,000
G6	Assumed number of major change/evolution requests	G1 * 2		4	10	16
G7	Assumed number of staff for changes/evolutions	G2/2 (rounded up)		8	6	5
G8	Assumed average number of days per change/evolution project	G3/5		18	12	12
G9	Change/evolution-related costs	G4*G6*G7*G8		$288,000	$360,000	$480,000
Gt	Development costs	G5+G9	$0	$1,638,000	$2,160,000	$2,880,000
	Risk adjustment	↑ 10%				
Gtr	**Development costs (risk-adjusted)**		**$0**	**$1,801,800**	**$2,376,000**	**$3,168,000**

Source: Forrester Research, Inc.

Training Costs

The interviewed organizations were aware that by adopting the Pega 7 Platform with its model-driven development approach and Agile development techniques, they would have to invest in training to build up the required skills. They usually had mixed teams of external consultants and internal resources working on these projects. The aim often was to gradually take over more and more of the development and maintenance tasks.

The composite organization trains a team of 12 developers, 12 business analysts, and two system architects. We assume a training budget of $50,000 in the initial phase and $30,000 for years 1 to 3.

Of course, training costs vary from organization to organization, considering different skillsets that are available within the company. To compensate, this cost was risk-adjusted up by 5%. The risk-adjusted training costs over the three years had a present value of nearly $131,000.

TABLE 9

Training Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
Ht	Training costs		$50,000	$30,000	$30,000	$30,000
	Risk adjustment	↑ 5%				
Htr	**Training costs (risk-adjusted)**		**$52,500**	**$31,500**	**$31,500**	**$31,500**

Source: Forrester Research, Inc.

Total Costs

Table 10 shows the total of all costs as well as associated present values, discounted at 10%. Over three years, the composite organization experienced total costs with a net present value of approximately $8 million.

TABLE 10

Total Costs (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Total	Present Value
Dtr	Software costs	$1,050,000	$220,500	$220,500	$220,500	$1,711,500	$1,598,351
Etr	Infrastructure costs	$105,000	$21,000	$21,000	$21,000	$168,000	$157,224
Ftr	Initial installation and ongoing admin and support costs	$10,500	$34,125	$34,125	$34,125	$112,875	$95,364
Gtr	Development costs	$0	$1,801,800	$2,376,000	$3,168,000	$7,345,800	$5,981,802
Htr	Training costs	$52,500	$31,500	$31,500	$31,500	$147,000	$130,836
	Total costs (risk-adjusted)	**$1,218,000**	**$2,108,925**	**$2,683,125**	**$3,475,125**	**$9,485,175**	**$7,963,576**

Source: Forrester Research, Inc.

FLEXIBILITY

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the “right” or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to implement the

Pega 7 Platform and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix B).

The increased flexibility of business applications is seen as a major benefit of the Pega 7 Platform by the interviewed organizations and has already been taken into account in the financial model (see the agility-related cost savings).

However, there are many more opportunities to leverage the platform and create additional flexibility benefits. Interviewees mentioned, for example, the possibility of defining and deploying new products and services, or entering new markets in a much faster and more cost-efficient way. One of the interviewees explained:

> "Fundamentally, Pega 7 enabled us to move into a new market segment. We needed a platform that was flexible to enable us to catch up very quickly with what others were using within that segment."
> *~ Senior IT manager, large financial services company*

The Pega 7 Platform can be used in many different ways. Due to its agility and the time-to-market benefits, organizations can think of ways to capture more market share, create additional revenue streams for the company, or just better engage with their customers or the citizens.

RISKS

Forrester defines two types of risk associated with this analysis: "implementation risk" and "impact risk." Implementation risk is the risk that a proposed investment in the Pega 7 Platform may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the organization may not be met by the investment in the Pega 7 Platform, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

TABLE 11
Benefit And Cost Risk Adjustments

Benefits	Adjustment
Development cost avoidance	↓ 5%
Agility-related cost savings	↓ 5%
Reduced time-to-market	↓ 20%

Costs	Adjustment
Software costs	↑ 5%
Infrastructure costs	↑ 5%
Initial installation and ongoing admin and support costs	↑ 5%
Development costs	↑ 10%
Training costs	↑ 5%

Source: Forrester Research, Inc.

Quantitatively capturing implementation risk and impact risk by directly adjusting the financial estimates results provides more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as "realistic" expectations since they represent the expected values considering risk.

The following impact risks that affect benefits are identified as part of the analysis:

- The amount of development cost avoidance and agility-related cost savings that a company can realize depends on the previous development practices. Therefore, these benefits have been risk-adjusted down by 5%.
- The reduced time-to-market benefit includes assumptions for end user productivity gains and incremental revenues that depend on the previous processes and the nature of the new applications. To compensate for the uncertainty, this benefit has been risk-adjusted down by 20%.

The following implementation risks that affect costs are identified as part of this analysis:

- The software, hardware, deployment, administration, support, and training costs are based on high-level estimations according to the scenario described within this case study. To compensate for the uncertainty, these costs have been risk-adjusted up by 5%.
- A slightly higher risk adjustment has been attributed to the development costs in order to take into account the risk of the transition from traditional programming languages with older development techniques to the Pega model-driven approach with Agile methodologies. Therefore, the development costs have been risk-adjusted up by 10%.

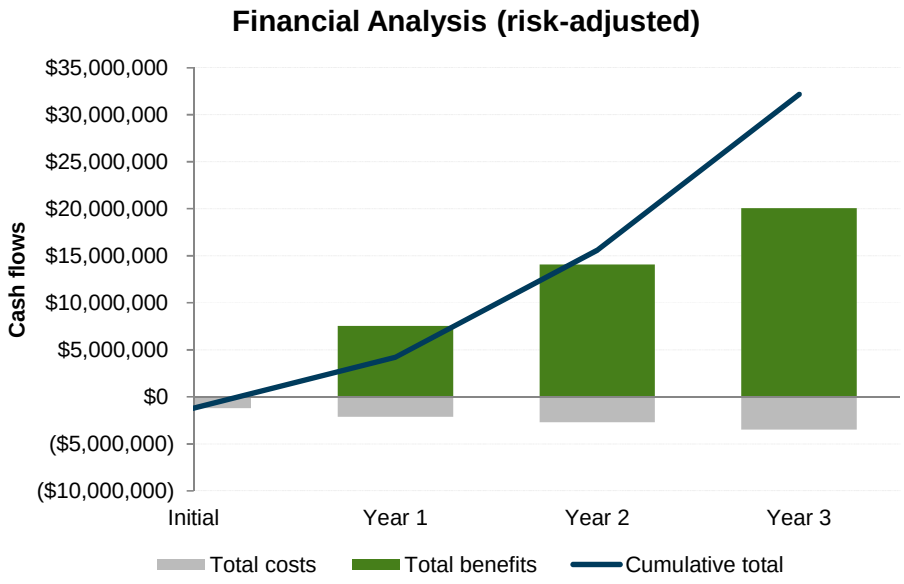
Table 11 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates for the composite organization. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Financial Summary

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 in the Pega 7 Platform.

Table 12 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 11 in the Risks section to the unadjusted results in each relevant cost and benefit section.

FIGURE 3
Cash Flow Chart (Risk-Adjusted)



Source: Forrester Research, Inc.

TABLE 12
Cash Flow (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($1,218,000)	($2,108,925)	($2,683,125)	($3,475,125)	($9,485,175)	($7,963,576)
Total benefits	$0	$7,537,576	$14,073,041	$20,054,466	$41,665,083	$33,550,172
Total	**($1,218,000)**	**$5,428,651**	**$11,389,916**	**$16,579,341**	**$32,179,908**	**$25,586,596**
ROI						321%
Payback period						Within 12 months

Source: Forrester Research, Inc.

The Pega 7 Platform: Overview

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

Pega 7 is a single, model-driven application development platform intended for large enterprises seeking to build, deploy, and evolve strategic business applications. The platform can be deployed on-premises or used as a cloud solution.

Pega 7 enables the development and deployment of BPM, dynamic case management, and decision management applications. Pega 7 employs a model-based application development approach and dynamic runtime architecture.

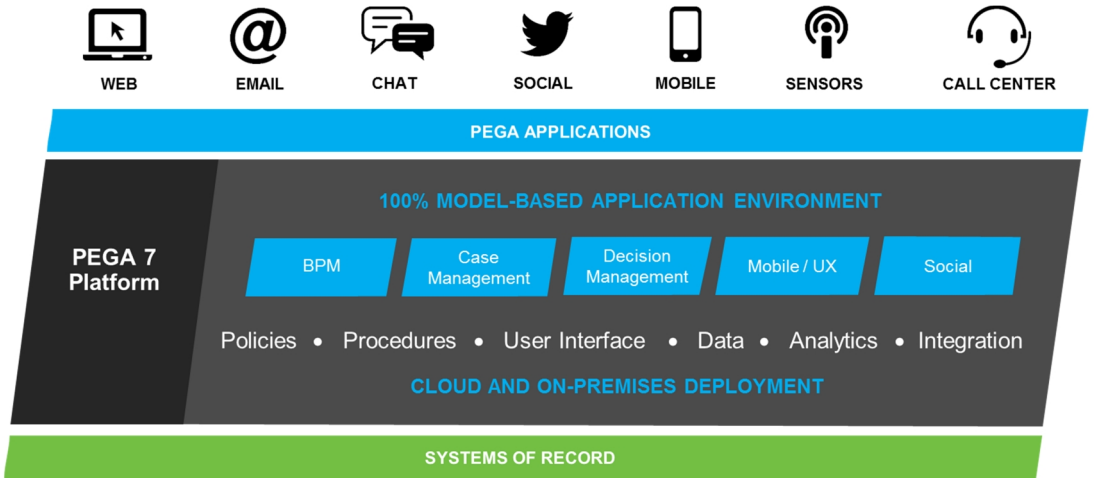
The Pega 7 Platform supports dynamic and situation-based user experiences across different devices and channels for user-centric applications. Applications can be specialized by multiple dimensions to meet the varied needs of multiple geographies, customer segments, product lines, and channels. Enterprise-class quality of service (QoS) features ensure production performance for both Pega Cloud and on-premises deployment.

The Pega 7 Platform provides a set of capabilities, including:

- **Directly Capture Objectives.** Visual tools that facilitate requirements management and foster business-IT collaboration.
- **Situational Layer Cake.** The capability of reusing common policies and procedures and applying them in multiple business units, channels, geographies, and customer segments.
- **Omni-channel UX.** A user interface that works across all channels.
- **Case Lifecycle Management**. Organization of work by goals, stages, and steps instead of processes and transactions, simplifying the comprehension.
- **Next Best Action.** Leveraging big data, historical data, and event streams to optimize the customer experience.

FIGURE 4

Pega 7 Platform



Source: Pegasystems

Appendix A: Composite Organization Description

For this case study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of using the Pega 7 Platform.

Forrester's conclusions were derived in large part from information received in a series of in-depth interviews with executives and personnel at four organizations using the Pega 7 Platform. As each of the interviewed organizations was promised anonymity, Forrester constructed a composite company, a TEI framework, and an associated ROI analysis based on our findings from these Pegasystems clients.

The TEI study illustrates the financial impact of using the Pega 7 Platform by aggregating the findings from the four customer interviews and portraying a composite organization that is achieving value from the Pega 7 Platform.

The composite organization represents a Global 2000 organization. The company employs about 10,000 people worldwide and provides communications services.

The company was looking to transform into a digital enterprise to better engage with its customers, build efficient operations, and quickly respond to changes in the market. However, there was an execution gap between how it wanted to engage with customers and the capabilities of the existing systems. Many of the company's internal practices were still very manual or relying on rigid and unintegrated point solutions. The company's ERP was heavily customized, which made it difficult to extract and analyze data as well as optimize an end-to-end process.

The company wanted to improve its customer engagement and saw the opportunity to create new BPM, case management, mobile, social, and decision analytics capabilities in order to better engage with customers as well as create internal efficiencies.

Prior to deploying the Pega 7 Platform, the company used common programming languages with older development techniques. The company was looking for a flexible, scalable, and modern enterprise platform that would provide predefined strategic applications and could easily be integrated with existing systems.

After having evaluated different options, the organization chose to deploy the Pega 7 Platform on-premises. With the transition to an Agile development practice, the company wanted to reduce the implementation risks, improve the quality of the application delivery, and increase the flexibility of the applications.

Appendix B: Total Economic Impact™ Overview

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. TEI assists technology vendors in winning, serving, and retaining customers.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, flexibility, and risks.

BENEFITS

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often, product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place 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. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

COSTS

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

FLEXIBILITY

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point. However, having the ability to capture that benefit has a PV that can be estimated. The flexibility component of TEI captures that value.

RISKS

Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections and 2) the likelihood that the estimates will be measured and tracked over time. TEI risk factors are based on a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the risk factor around each cost and benefit.

Appendix C: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Companies set their own discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organizations to determine the most appropriate discount rate to use in their own environment.

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.

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.

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.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A NOTE ON CASH FLOW TABLES

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in years 1 through 3 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 are not calculated until 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.

TABLE [EXAMPLE]

Example Table

Ref.	Metric	Calculation	Year 1	Year 2	Year 3

Source: Forrester Research, Inc.

Appendix D: Supplemental Material

Related Forrester Research

"The Forrester Wave™: CRM Suites For Large Organizations, Q1 2015," Forrester Research, Inc., March 25, 2015

"TechRadar™: Customer-Centric BPM Technology, Q4 2014," Forrester Research, Inc., December 22, 2014

"Getting Down To Basics On Smart Process Apps," Forrester Research, Inc., August 28, 2014

"New Development Platforms Emerge For Customer-Facing Applications," Forrester Research, Inc., June 9, 2014

"The Forrester Wave™: Dynamic Case Management, Q1 2014," Forrester Research, Inc., March 28, 2014

Appendix E: Endnotes

[1] For a more detailed overview of the Pega 7 platform, please refer to page 26.

[2] See Appendix A for a description of the composite organization.

[3] Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information, see the section on Risks.

[4] See Appendix A for more details on the composite organization.