

FORRESTER®

The Total Economic Impact™ Of Udacity For The Healthcare Industry

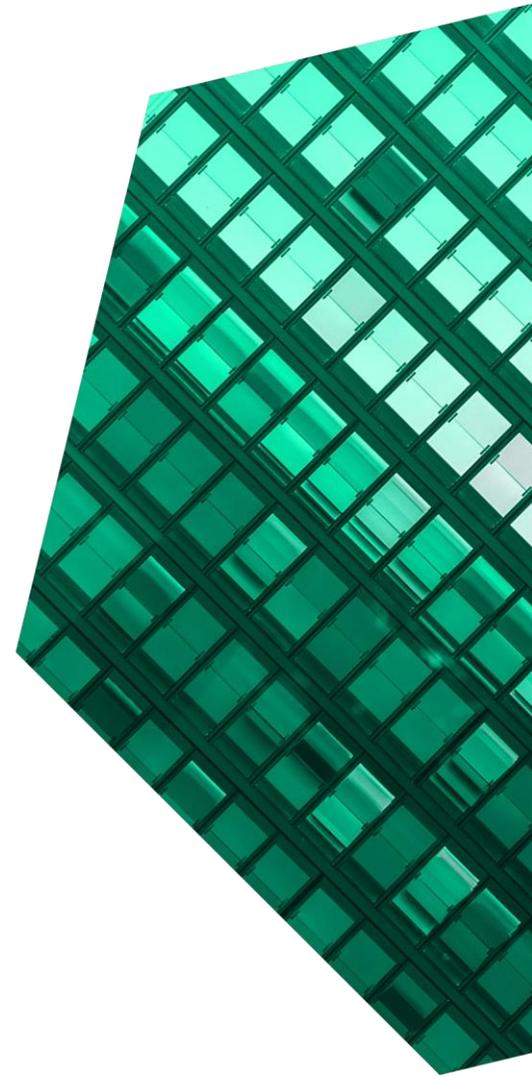
Cost Savings And Business Benefits
Enabled By Udacity's Technical Upskilling Content
Solutions For Enterprises

JULY 2021

Table Of Contents

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Executive Summary	1
The Udacity Customer Journey	6
Interviewed Organization	6
Key Challenges.....	6
Solution Requirements/Investment Objectives	6
Use Case Description	7
Analysis Of Benefits	8
Increased Productivity Of Upskilled Staff.....	8
AI Total Talent Cost Avoidance.....	9
Unquantified Benefits.....	10
Flexibility.....	10
Analysis Of Costs	12
Annual Seat Fees.....	12
cost of lost productive time of course participants offset by increased retention	13
Initial And Ongoing Costs	14
Financial Summary	16
Appendix A: Total Economic Impact	17



ABOUT FORRESTER CONSULTING

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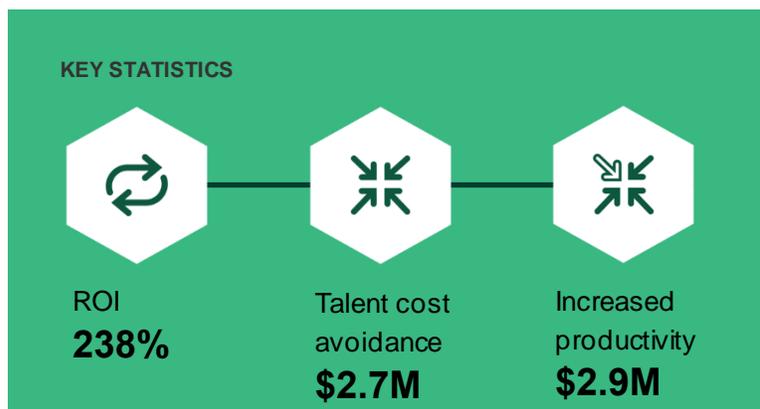
Executive Summary

To remain competitive within their industries, non-technical enterprises face challenging and burdensome digital transformations. Given the scarcity of AI talent and the high, corresponding expense of external hiring, organizations need practical solutions to meet these new digital demands in-house. Udacity effectively upskills existing technical workforces, enabling organizations to reduce the cost of outside recruiting and increase internal productivity, engagement, and pride.

Udacity commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying [Udacity's Technical Upskilling Content Solution for Enterprises](#). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Udacity on their organizations.

Udacity is a cloud-based upskilling platform that offers industry-wide, globally recognized Nanodegree programs. Courses in high-tech fields such as AI, data science, programming, and cloud computing are presented on a user-friendly platform, allowing course participants to enhance their skill sets with information required by their industries' digital transformations. Beyond the advanced, cutting-edge content, Udacity courses are taught by actual practitioners with the latest knowledge. The courses include hands-on projects, personalized skill assessments, and real-time access to over one thousand mentors to answer participants' questions. Employees can upskill to meet new digital challenges within their fields and industries. Having an online educational platform with relevant, standardized content allows organizations to train their employees on dynamic technologies, and thereby promote from within — avoiding costly recruiting and high starting salaries of scarce talent with high-demand technology skills.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed



a director of advanced analytics in a large, managed healthcare organization with two years of experience using Udacity. Forrester used this opportunity to project a three-year financial analysis.

Prior to using Udacity, the customer did not offer a global, standardized AI upskilling program. For beginner-level training only, the organization provided materials developed in-house, inconsistently supplementing them with basic technical courses from a third-party provider.

After the investment in Udacity, the customer reported increased productivity in the upskilled talent pool, as well as a reduction in the costs associated with outside hiring. The ability to oversee the standardized delivery of technical learning content, and educating data science teams from within, allowed the organization to generate consistent outcomes and become better equipped to meet its digital transformation goals.

KEY FINDINGS

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

- **Increased productivity of upskilled staff.** Upon completion of Udacity’s Nanodegree programs, graduates can immediately apply their new skills to more advanced projects while also continuing with their previous data science tasks, allowing for a more well-rounded team with a standardized skill set. The enhanced productivity offered by Udacity enables team members to complete projects faster without having to rely on intervention by higher level, more expensive AI specialists. According to the interviewee, each upskilled Nanodegree graduate demonstrates an approximate 20% productivity gain of 35 hours per month. At \$62 per hour per graduate, the risk-adjusted impact on an organization over three-years is worth \$2.9 million.
- **AI total talent cost avoidance.** The interviewee reported that with a successful Udacity program in place, a growing number of internal junior-level data scientists are acquiring the skills needed to remain relevant and capable of meeting the challenges of their organization’s digital transformation goals. With upskilled teams meeting the organization’s technology demands, fewer outside, high-level hires are needed, enabling the organization to lower its recruitment costs and avoid high salaries demanded by skilled AI specialists, which are currently in short

“The industry is changing so fast, and Udacity is the key to embracing new trends in future digital transformations.”

Director of advanced analytics, healthcare industry

supply. For this benefit, the customer realizes a three-year, risk-adjusted PV of \$2.7 million.

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

- **Enhanced collaboration.** Udacity encourages groups of team members, or learning cohorts, to complete courses together, allowing for cross-team discussion, study groups, collaboration, and increased employee engagement. A consequential result of cohort collaboration in an outcome-driven, standardized program is improved alignment of team members, as they are now able to “speak the same language.” Additionally, Udacity courses include hands-on projects, which are assessed by live instructors. These enable course participants to get real-time human feedback on their coursework and development.
- **Improved employee experience.** Udacity course participants appreciate the organization’s investment in employee upskilling. According to the interviewee, Udacity “has had an extremely positive impact on employee church. Turnover before my tenure was up to 40%. We’re looking at a much lower number these days.” Udacity courses broaden employee skills, which they can apply in real-time to their existing roles or even

Increased productivity of upskilled staff:

\$2.9 million



carry to different roles within the organization.

- **Increased agility.** The programs afford flexibility for students to complete individualized work according to their personal schedules and learning methods. Also, with the employee acquisition of cutting-edge, technical knowledge,

organizations become more scalable and nimbler as they no longer worry about performance or skill set differences within teams.

Costs. Risk-adjusted PV costs include:

- **Annual seat fees.** The organization pays \$4,800 per seat for 25 seats per year and offers one course per quarter. With students receiving two Nanodegrees per year, this translates to a total of 300 Nanodegrees over three years, which results in risk-adjusted costs amounting to \$298,422.
- **Cost of lost productive time of course participants offset by increased retention.** The organization invests in its employees and believes that through empowerment and knowledge, learning can benefit the employee in the form of professional development while the employer benefits in the form of efficiencies and cost avoidance. To realize these benefits, the organization incurs a cost to encouraging employees to perform half of all course activities during working hours. However, this cost is offset by increased employee retention. Completing a Nanodegree requires 13 hours per week for a period of fifty weeks while employee retention improves by 15%, resulting in a risk-adjusted PV cost of \$1.15 million over three years.
- **Initial and ongoing costs.** Initial costs include internal FTE hours that are required to obtain leadership buy-in and implement the Udacity Nanodegree program. Ongoing costs include one-half of an administrator's time. The three-year, risk-adjusted PV of these combined costs is \$197,752.

The interview and financial analysis found that this customer experiences benefits of \$5.6M over three years versus costs of nearly \$1.7M, adding up to a net present value (NPV) of \$3.9M and an ROI of 238%.



ROI
238%



BENEFITS PV
\$5.57M

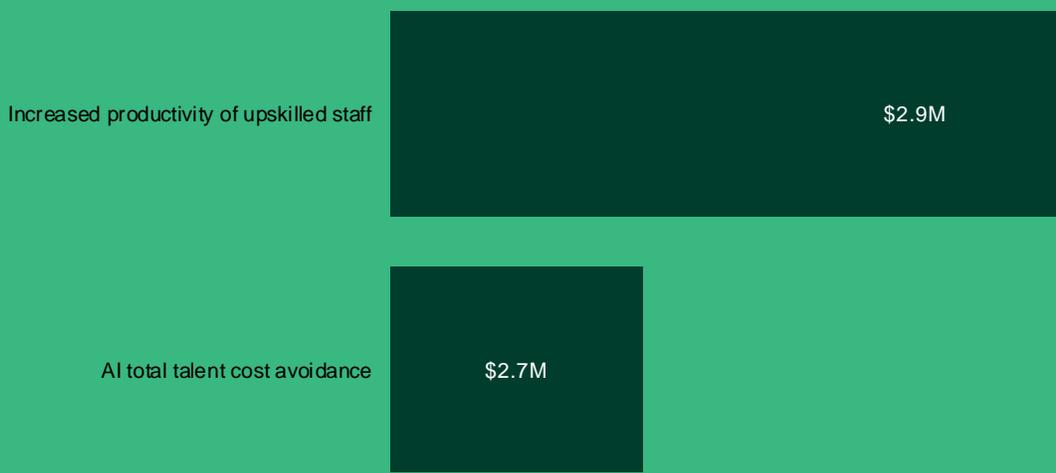


NPV
\$3.92M



PAYBACK
<3 months

Benefits (Three-Year)



35 hours are gained per upskilled employee.

TEI FRAMEWORK AND METHODOLOGY

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

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

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Udacity 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 Udacity.

Udacity 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.

Udacity provided the customer name for the interview but did not participate in the interview.



DUE DILIGENCE

Interviewed Udacity stakeholders and Forrester analysts to gather data relative to the Udacity solution.



CUSTOMER INTERVIEW

Interviewed decision-makers at an organization using Udacity to obtain data with respect to costs, benefits, and risks.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interview using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organization.



CASE STUDY

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

The Udacity Customer Journey

■ Drivers leading to the Udacity investment

INTERVIEWED ORGANIZATION

Forrester interviewed a Udacity customer with the following characteristics:

- A large, non-for-profit, managed healthcare organization that offers national hospital and insurance products.
- An in-house program that is committed to upskilling a large team of data scientists within various technology domains.

KEY CHALLENGES

Prior to implementing Udacity, the interviewed customer developed some course materials in-house and used a third-party solution for some lower-level training. To stay competitive, and to avoid the high costs of outside learning, the organization recognized the need to become current in new digital trends and machine learning skill sets.

The interviewed organization struggled with common challenges, including:

- **Workforce skill level lagging behind technological advances.** The fast pace of digital advancements creates a constant demand for specialists who understand the current technology. Without adequate, in-house technical content delivery, existing team members found themselves unable to meet their organization's increasing digital needs.
- **Excessive costs to recruit senior-level AI engineers.** To maintain its digital transformation objectives, the organization was forced to recruit external, high-level AI specialists who are in short supply in the marketplace. The associated high salary differential and exorbitant recruitment costs proved unsustainable for the organization.

- **Lack of a standardized, cutting-edge upskilling program.** A small number of existing data scientists were qualified to work in the AI realm. However, the organization needed its AI talent pool to grow in order to remain digitally competitive. Lacking an effective upskilling program, the organization was unable to address these needs with impactful, hands-on experiences that could translate into a more productive workforce.

“Udacity gives us a standardized way to provide new, relevant knowledge to the team members that directly helps them in their specific roles.”

Director of advanced analytics, healthcare industry

SOLUTION REQUIREMENTS/INVESTMENT OBJECTIVES

The interviewed organization searched for a solution that could:

- Provide advanced technical upskilling content that would allow the organization to remain competitive and a leader in the industry.
- Improve the employee experience and increase retention.
- Offer a standardized, cloud-based, user-friendly platform.
- Translate to increased productivity for its technical team and reduce hiring costs.

USE CASE DESCRIPTION

The organization adopted Udacity to proactively manage the upskilling of its technical workforce to meet its dynamic, digital transformation needs. Udacity offers teams the ability to expand technical knowledge and skill sets, leading to empowered, more confident employees and internal efficiencies.

Key assumptions

- **National managed healthcare organization**
- **25 Udacity seats purchased per year**
- **Upskilled employees save 35 hours per month**
- **AI engineer cost to recruit equals 50% of annual salary**

Analysis Of Benefits

■ Quantified benefit data

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Increased productivity of upskilled staff	\$1,171,800	\$1,171,800	\$1,171,800	\$3,515,400	\$2,914,093
Btr	AI total talent cost avoidance	\$1,067,175	\$1,067,175	\$1,067,175	\$3,201,525	\$2,653,906
	Total benefits (risk-adjusted)	\$2,238,975	\$2,238,975	\$2,238,975	\$6,716,925	\$5,567,999

INCREASED PRODUCTIVITY OF UPSKILLED STAFF

Evidence and data. The interviewee revealed the following about their organization’s use of Udacity:

- Upskilled employees reported that they are now able to apply their new knowledge directly to their jobs. The director stated that program graduates are more engaged and more independent as they can stay abreast of changing digital advancements and trends.
- The acquisition of advanced, applicable knowledge resulted in higher productivity. Upskilled teams were able to complete existing projects faster without the reliance on higher level AI specialists. The interviewee noted: “As we are a leader in the industry, we needed to find a way to cost effectively remain competitive. Udacity allowed us to do that.”

Modeling and assumptions. For the financial model, Forrester assumes that:

- Each upskilled employee saves 35 hours per month upon completing a Udacity Nanodegree.
- The number of annual upskilled graduates total 50 per year.
- The hourly rate of an upskilled graduate is \$62.

Risks. Increased productivity of upskilled staff will vary with:

- Number of annual Udacity seats purchased.
- The original skill level and efficiency of the upskilled staff.
- Salaries, depending on geographical location, size, and industry of an organization.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of \$2,914,093.

“Employee satisfaction has changed dramatically since adopting Udacity. Investing in our employees shows them that we believe in them and their professional development.”

Director of advanced analytics, healthcare industry

Increased Productivity Of Upskilled Staff

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of upskilled graduates	Interview	50	50	50
A2	Hours saved per upskilled graduate	35 hours per month*12 months	420	420	420
A3	Hourly rate of upskilled graduate	\$129,600 salary/2080 hours per year	\$62	\$62	\$62
At	Increased productivity of upskilled staff	A1*A2*A3	\$1,302,000	\$1,302,000	\$1,302,000
	Risk adjustment	↓10%			
Atr	Increased productivity of upskilled staff (risk-adjusted)		\$1,171,800	\$1,171,800	\$1,171,800
Three-year total: \$3,515,400			Three-year present value: \$2,914,093		

AI TOTAL TALENT COST AVOIDANCE

Evidence and data. The interviewee revealed the following about their organization’s use of Udacity:

- By implementing Udacity’s analytics learning program, the organization was able to upskill junior members of the existing data science team, meet its strategic, digital goals, and avoid the high salaries and recruitment costs of hiring AI specialists from outside the organization.
- The interviewee noted: “AI engineers are in short supply, they’re expensive, and you never really know what you’re going to get. Udacity eliminates these issues and unknowns of hiring from outside.”

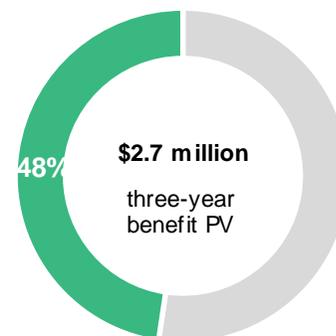
Modeling and assumptions. For the financial analysis, Forrester assumes that:

- To maintain original productivity levels, the number of outside AI engineer hires required to supervise lower-level technicians would total approximately 10% of the upskilled workforce.
- The fully loaded salary of an outside AI engineer hire is \$167,400.
- The cost to recruit an outside AI engineer hire equals 50% of annual salary

Risks. The AI total talent cost avoidance will vary depending on:

- Number of outside AI specialists required to maintain productivity levels and project completion.
- The salary and skill level of the outside AI engineer hire.
- Cost and time to recruit, depending on industry and geographical location.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of \$2,653,906.



AI Total Talent Cost Avoidance

AI Total Talent Cost Avoidance					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Number of outside AI engineer hires required as an alternative to upskilling	Forrester	5	5	5
B2	Fully loaded salary of outside AI engineer hire		\$167,400	\$167,400	\$167,400
B3	AI engineer cost to recruit	$\$167,400 \times 50\%$	\$83,700	\$83,700	\$83,700
Bt	AI total talent cost avoidance	$B1 \times (B2 + B3)$	\$1,255,500	\$1,255,500	\$1,255,500
	Risk adjustment	↓15%			
Btr	AI total talent cost avoidance (risk-adjusted)		\$1,067,175	\$1,067,175	\$1,067,175
Three-year total: \$ 3,201,525			Three-year present value: \$2,653,906		

UNQUANTIFIED BENEFITS

Additional benefits that the customer experienced but was not able to quantify include:

- Enhanced collaboration.** The ability for course participants to learn together in a collaborative environment with live instructor assessments assures the organization that the team of upskilled employees has consistent, standardized skill sets and technical knowledge. Additionally, the collaboration promoted by Udacity generates higher self-confidence and sense of worth. An enhanced sense of value and pride in the workplace correlates to greater employee productivity.
- Improved employee experience.** By offering the staff a solution to learn needed technical skills and enhance existing talents, the organization enjoys a more content workforce. The employees feel valued and recognize that their tasks can diversify as their capabilities expand. The interviewee commented: “They are very appreciative that the company values them and their professional paths.”
- Increased agility.** As Udacity programs are cloud-based, course participants can perform their individualized coursework from anywhere on

their personal schedules. Additionally, as organizations can now meet their digital transformation needs in-house and virtually, the cost of acquiring outside talent, which traditionally includes travel and in-person interviews, is considerably reduced. The interviewee noted that Udacity is especially relevant as the organization expands its work-from-home (WFH) models, driven by the COVID-19 pandemic.

FLEXIBILITY

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

- Accessibility to cutting-edge technical content.** With technologies rapidly advancing, maintaining a knowledgeable workforce is a challenge. Udacity offers a solution for the organization to obtain current, cutting-edge technical content more quickly than in its legacy environment, giving the organization a competitive advantage.
- Customization of content.** Udacity helps companies select content and design upskilling programs that best meet organizational business goals, which can vary based on industry.

Additionally, according to the interview, Udacity will be providing healthcare industry specific content. “Udacity helped us choose the right kind of Nanodegree courses that corresponded to our goals.”

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

Analysis Of Costs

■ Quantified cost data

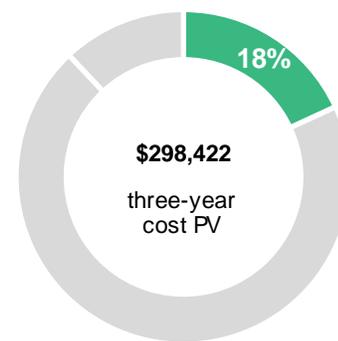
Total Costs							
Ref.	Cost	Initial	Year 1	Year 2	Year 3	Total	Present Value
Ctr	Annual seat fees	\$0	\$120,000	\$120,000	\$120,000	\$360,000	\$298,422
Dtr	Cost of lost productive time of course participants offset by increased retention	\$0	\$462,825	\$462,825	\$462,825	\$1,388,475	\$1,150,977
Etr	Initial and ongoing costs	\$14,720	\$73,600	\$73,600	\$73,600	\$73,600	197,752
	Total costs (risk-adjusted)	\$14,720	\$656,425	\$656,425	\$656,425	\$1,983,995	\$1,647,151

ANNUAL SEAT FEES

Evidence and data. The interviewee revealed the following about their organization's use of Udacity:

- Udacity charges annual seat fees of \$4,800.
- The organization purchases 25 seats per year.

Risks. Given Udacity's standard pricing structure across industries, Forrester did not apply a risk adjustment to this cost. It did however yield a three-year total PV cost of \$298,422.



Annual Seat Fees

Annual Seat Fees						
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
C1	Number of seats purchased	Interview		25	25	25
C2	Cost per seat	Interview		\$4,800	\$4,800	\$4,800
Ct	Annual seat fees	C1*C2	\$0	\$120,000	\$120,000	\$120,000
	Risk adjustment	0%				
Ctr	Annual seat fees (risk-adjusted)		\$0	\$120,000	\$120,000	\$120,000
Three-year total: \$360,000			Three-year present value: \$298,422			

COST OF LOST PRODUCTIVE TIME OF COURSE PARTICIPANTS OFFSET BY INCREASED RETENTION

Evidence and data. The interviewee revealed the following about their organization’s use of Udacity:

- Udacity Nanodegree participants completed half of all coursework during working hours and lost time to complete their day-to-day responsibilities while engaged in the upskilling courses.
- Course participants experienced increased engagement in their roles due to the investment in their career development.
- The team realized a considerable increase in employee retention upon the completion of Nanodegrees.

Modeling and assumptions. For the financial analysis, Forrester assumes that:

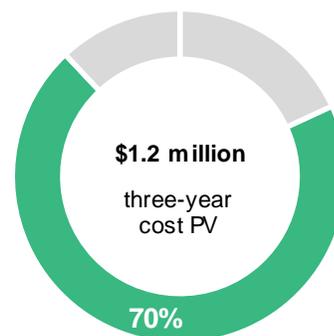
- Udacity course participants are required to spend 13 hours per week for three months to complete a Nanodegree program.
- Fifty team members complete two courses per year.
- The average annual, fully loaded salary of a course participant is \$129,600, which translates to \$62 per hour.
- Forrester assumes an engagement capture of 90% because the organization’s commitment to employee development could result in a 10% cost recapture due to increased employee engagement.
- Forrester assumes a reduced turnover rate of 15%.
- The cost to replace a team member equals 50% of annual salary.

Risks. The cost of lost productive time of course participants will vary with:

- The number of annual course participants and the types of technological skills required.
- The organization’s commitment to employee personal development and contribution to employee course time.
- The baseline skill levels in the legacy environment.
- The baseline turnover rate.
- Salary levels (which can vary by location and employee experience).
- The organization’s size, industry, and location.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$1,150,977.

“After a one-year proof of concept and collecting buy-in from leadership, Udacity became our exclusive upskilling solution.”
Director of advanced analytics, healthcare industry



Cost of Lost Productive Time of Course Participants Offset by Increased Retention

Total Cost Of Lost Productive Time Of Course Participants Offset By Increased Retention						
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
D1	Number of upskilled graduates	Interview		50	50	50
D2	Lost productive time per course participant (organization pays 50% for employee time)	13 hours per week*50 weeks* (\$129,600/2,080 hours per year)		\$20,150	\$20,150	\$20,150
D3	Increased engagement capture due to human capital investment	Assumption		90%	90%	90%
D4	Cost of lost productive time of course participants	D1*D2*D3		\$906,750	\$906,750	\$906,750
D5	Number of upskilled graduates	Interview		50	50	50
D6	Percentage decrease in turnover	Interview		15%	15%	15%
D7	Cost of replacement	\$129,600 salary*50%		\$64,800	\$64,800	\$64,800
D8	Decrease in turnover offsetting cost of program	D5*D6*D7		\$486,000	\$486,000	\$486,000
Dt	Total cost of lost productive time offset by increased retention	D4-D8		\$420,750	\$420,750	\$420,750
	Risk adjustment	↑ 10%				
Dtr	Total cost of lost productive time offset by increased retention (risk-adjusted)		\$0	\$462,825	\$462,825	\$462,825
Three-year total: \$1,388,475			Three-year present value: \$1,150,977			

INITIAL AND ONGOING COSTS

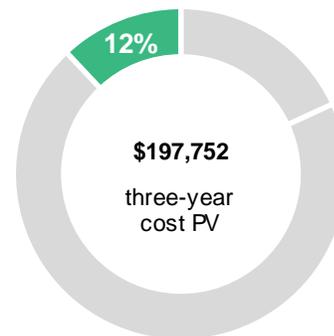
Evidence and data. The interviewee revealed the following about their organization’s use of Udacity:

- Initial costs include 10% of a director of training and development for one year earning \$128,000 annually.
- The ongoing management of the Udacity program requires one-half time of a director of training and development with a fully loaded salary of \$128,000.

Risks. The initial and ongoing costs will vary with:

- The length of the proof of concept or pilot period.
- The salary levels of involved employees, depending on skill set, competency, geographical location, and industry.

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of \$197,752.



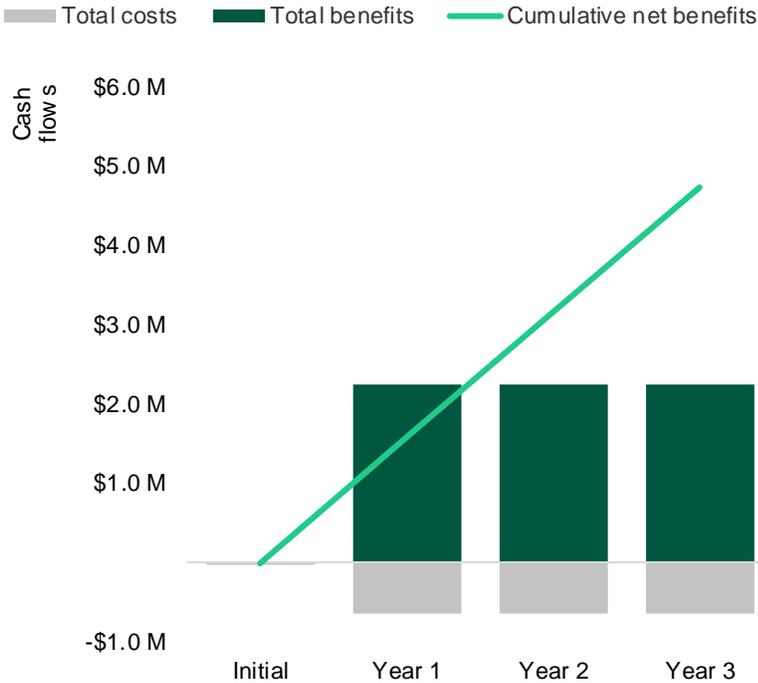
Initial and Ongoing Costs

Initial And Ongoing Costs						
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
E1	Administrative labor implementation cost	1 FTE*\$128,000*10%	\$12,800			
E3	Ongoing management	\$128,000*50%		\$64,000	\$64,000	\$64,000
Et	Initial and ongoing costs	E1+E2	\$12,800	\$64,000	\$64,000	\$64,000
	Risk adjustment	↑15%				
Etr	Initial and ongoing costs (risk-adjusted)		\$14,720	\$73,600	\$73,600	\$73,600
Three-year total: \$235,520			Three-year present value: \$197,752			

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



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

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

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	(\$14,720)	(\$656,425)	(\$656,425)	(\$656,425)	(\$1,983,995)	(\$1,647,151)
Total benefits	\$0	\$2,238,975	\$2,238,975	\$2,238,975	\$6,716,925	\$5,567,999
Net benefits	(\$14,720)	\$1,582,550	\$1,582,550	\$1,582,550	\$4,732,930	\$3,920,848
ROI						238%
Payback						<3 months

Appendix A: Total Economic Impact

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

TOTAL ECONOMIC IMPACT APPROACH

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

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

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

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

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



PRESENT VALUE (PV)

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



NET PRESENT VALUE (NPV)

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



RETURN ON INVESTMENT (ROI)

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



DISCOUNT RATE

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



PAYBACK PERIOD

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

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