

A Forrester Total Economic Impact™  
Study Commissioned By Dell  
July 2018

# The Total Economic Impact™ Of Dell UltraSharp Monitors

Productivity Gains, Talent Retention, And  
Operational Efficiency Enabled By Dell  
Monitors

# Table Of Contents

<b>Executive Summary</b>	<b>1</b>
Key Findings	2
TEI Framework And Methodology	3
<b>The Dell Monitor Customer Journey</b>	<b>4</b>
Interviewed Organization	4
Key Challenges	4
Solution Requirements	5
Key Results	5
<b>Analysis Of Benefits</b>	<b>6</b>
Workforce Productivity	6
Talent And Brand Impact	7
Operational Efficiency	8
Flexibility	9
<b>Analysis Of Costs</b>	<b>10</b>
Dell Monitor Cost	10
Internal Labor And Implementation	11
<b>Financial Summary</b>	<b>12</b>
<b>Dell Monitors: Overview</b>	<b>13</b>
<b>Appendix A: Total Economic Impact</b>	<b>14</b>
<b>Appendix B: Endnotes</b>	<b>15</b>

**Project Director:**  
Reggie Lau

**Contributor:**  
Sri Prakash Gupta

## ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit [forrester.com/consulting](http://forrester.com/consulting).

© 2018, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to [forrester.com](http://forrester.com).

# Executive Summary

As far back as 2006, Bill Gates was pictured with three monitors in an article detailing how he works and the direct impact a monitor area has on his productivity.<sup>1</sup> Researchers have studied productivity enabled by increased monitor real estate over two decades, as multimonitor configurations and large-format monitors have become more prominent and more affordable to deploy at scale. And while use cases and productivity gains may differ from study to study, the key finding is that more monitor real estate, inches or pixels, equates to more productivity.

The global mobile online population will exceed 3 billion people by 2020, and business users are increasingly rating messaging, collaboration, and social applications of higher importance on mobile devices.<sup>2</sup> Nonetheless, 72% of global knowledge workers still state that their role-specific apps are most important at their workstations.<sup>3</sup> One method of enabling productivity at the workstation is through increasing monitor space.

Productivity for a knowledge worker could mean answering a few emails faster, having a reference document and spreadsheet on screen while replying to an email without having to frantically flip between apps, or just working while monitoring the stock market, sports scores, and your newborn through a webcam. The definition and value of productivity varies by use case.

To move beyond productivity gains and assess the impact of modern monitors to employee experience, retention, and happiness, Dell commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Dell's UltraSharp monitors.<sup>4</sup> The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Dell UltraSharp monitors above 27-inch on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed one customer from the global financial services industry with experience of deploying Dell's monitors, specifically the 34-inch Dell UltraSharp WQHD curved monitor to replace its fleet of 19-inch FHD Dell monitors for the customer's high-value, revenue-generating staff, and the 27-inch Dell UltraSharp QHD monitor to replace 19-inch FHD Dell monitors for all other staff.<sup>5</sup>

Prior to deploying the Dell UltraSharp monitors, the interviewed customer, a global financial services organization, provided two to 12 19-inch monitors per equity trader, with the majority averaging four monitors. To modernize the organization's new headquarters office, retain talent, and improve productivity, the customer replaced the four 19-inch monitor of each equity trader with two 34-inch monitor. For all other staff, the customer replaced two 19-inch monitors with one 27-inch monitor.

## Benefits



Workforce productivity  
**\$44 million**



Talent and brand impact  
**\$163,636**



Operational efficiency  
**\$283,780**

"We were moving headquarters away from the city center, and we needed to make the new office sexy — people have to want to work there for the amenities and perks, which included 27-inch and 34-inch screens."

*Head of desktop services,*

*global financial services company*





**Productivity value per trader**  
**\$7,522**



**Productivity value per nontrader**  
**\$1,485**



**NPV**  
**\$37 million**



**Payback**  
**<6 months**

## Key Findings

**Quantified benefits.** The interviewed organization experienced the following risk-adjusted present value (PV) quantified benefits:

**Workforce productivity (\$43,910,743).**<sup>6</sup> This benefit focuses on the productivity gain by the employees who replaced their 19-inch monitors with 27-inch Dell UltraSharp and 34-inch Dell UltraSharp curved monitors. The study accounts for migrating 100 traders based in headquarters initially followed by a global migration in years 2 and 3 to 34-inch monitors. Forrester uses a productivity gain of 12% for modeling based on applying and interpreting results from academic studies and accounting for two-thirds of screen real estate that is mainly used for monitoring and alerts rather than active use.<sup>7</sup> Five thousand nontrader staff in headquarters are also accounted for at a 6% productivity gain. To further adjust for realism, the model applies a productivity conversion ratio of 50% and risk-adjustment of 20% to account for variance in results and use cases from the academic studies, due to conservativeness in financial modeling, and because not all time gained is time put back into productive work. In summation, this results in approximately 100 and 50 hours saved annually for per trader and per nontrader, respectively.<sup>8</sup>

**Talent and brand impact (\$163,636).** The interviewed customer understood a risk of staff attrition as it moved the headquarters office from a convenient part of the city to a less convenient location. To counteract the attrition, increase retention, and attract future talent, the company built its new headquarters with modern employee perks and technology. Dell UltraSharp monitors is one aspect of the customer's retention strategy. The model accounts for a 10% reduction in attrition for the majority of staff during the headquarters migration, while attributing 10% of this to monitors.

Although the study considers the customer's benefit based on their office migration, readers can consider potential effects to retention and brand based on different scenarios. Some to consider include a global deployment based on modernizing the workplace, rebranding to seem more digitally savvy, or even hardware refresh.

**Operational efficiency (\$283,780).** Building towards their vision for a modern office space, the customer highlighted that the traders' new setups would eliminate the need to move the team to different floors in a given year. The effort to move a floor of 100 traders and the associated monitors and reconfigure the mounts would take one weekend's time for eight staff.

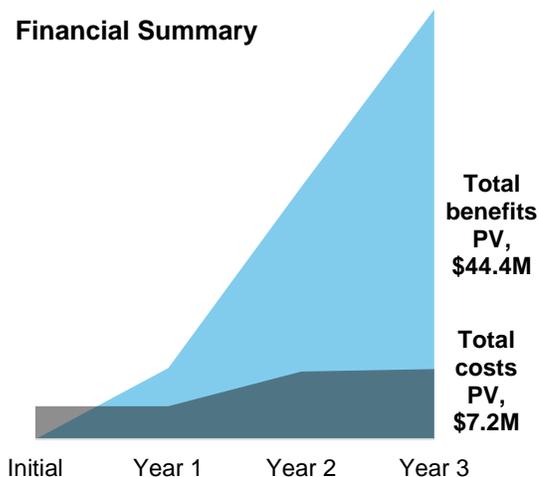
**Costs.** The interviewed organization experienced the following risk-adjusted PV costs:

**Dell monitor cost (\$7,149,790).** This cost focuses on the total cost of monitors and associated mounting equipment. Pricing is taken from Dell's website. Readers are encouraged to get a tailored quote from Dell based on their needs and volume.

**Internal labor and implementation (\$100,016).** This cost centers on the total labor cost to deploy and configure the monitors.

Forrester's interview with an existing customer and subsequent financial analysis found that the interviewed organization experienced benefits of \$44,358,159 over three years versus costs of \$7,249,806, adding up to a net present value (NPV) of \$37,108,353, made up primarily from the productivity value of \$7,522 per trader and \$1,485 per nontrader.

## Financial Summary



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 Framework And Methodology

From the information provided in the interview, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering deploying Dell's UltraSharp monitors.

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 Dell's UltraSharp monitors can have on an organization:



### **DUE DILIGENCE**

Interviewed Dell stakeholders and Forrester analysts to gather data relative to Dell's UltraSharp monitors.



### **CUSTOMER INTERVIEW**

Interviewed one organization using Dell's UltraSharp monitors 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 Dell monitors' impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

## DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Dell 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 Dell's monitors.

Dell 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.

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

# The Dell Monitor Customer Journey

## BEFORE AND AFTER THE DELL ULTRASHARP MONITOR INVESTMENT<sup>9</sup>

### Interviewed Organization

For this study, Forrester interviewed a Dell monitor customer:

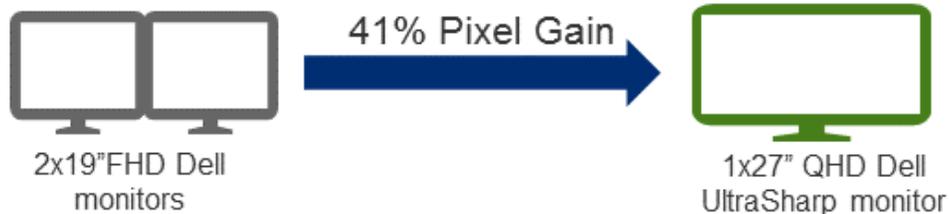
- › The customer is a large, global financial services company with multiple offerings ranging from retail banking to asset management.
- › The customer has more than \$431 billion in revenue and 150,000 staff.
- › Of that staff, 2,000 are equity traders, 100 of whom are in the headquarters office.
- › Corporate offices previously used 19-inch Dell monitors, which have been replaced with 27-inch Dell UltraSharp monitors, except for those of the equity trading team.
- › The equity trading team replaced an average of four 19-inch Dell monitors per person with two 34-inch Dell UltraSharp curved monitors per person.

“We want a brand image of a digital company, so we built flex seats with 27-inch monitors where users can bring [any device] and plug right in, use cloud apps, and not worry about telephony.”

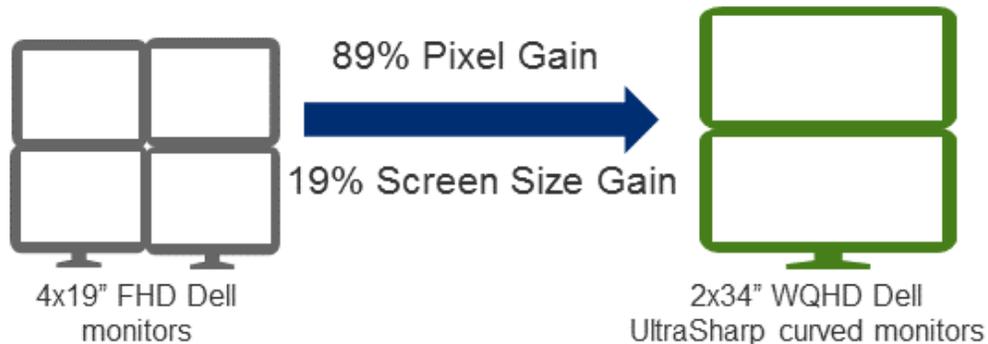
*Head of desktop services,  
global financial services company*



### Nontrader Staff Monitor Journey



### Equity Trader Monitor Journey



### Key Challenges

The interviewed customer faced the following challenges:

- › **Modernizing during headquarters office migration to avoid attrition.** The customer was scheduled to migrate its headquarters office from a central, convenient location to a less convenient location at the edge of the city. It had concerns of attrition as staff would prefer to work in a more convenient location. To address these concerns, the company observed the most employee-friendly and modern offices in the world and built onsite attractions and perks that would act partially as a retention and recruiting mechanism.

- › **Providing the most suitable monitor solution for high-value, revenue-generating staff.** Part of the modernization effort included replacing older 19-inch monitors with newer 27-inch Dell UltraSharp monitors for all flex desks at the office. The equity traders posited that a single 27-inch monitor was not fitting in configuration or sufficient in size to replace a dual 19-inch configuration; the company deployed 34-inch Dell UltraSharp curved monitors for the equity trading team instead. This answered the call of high-value staff in order to maintain and even improve employee morale during the migration and provided a boost to productivity.

## Solution Requirements

The interviewed organization searched for a solution that could:

- › Make the office look “cool” and aesthetically pleasing; position it as a modern, digital company; and become the envy of professionals who did not work there.
- › Play a part in its flex-desk solution for the new headquarters.
- › Provide productivity gains for high-value staff.

## Key Results

The interview revealed key results from the Dell monitor investment:

- › **The new headquarters realized its vision and avoided mass attrition.** The customer used some of the world’s leading companies and their innovative offices as inspiration to build a modern office. The vision was to use the amenities and uniqueness of the office to retain and attract talent, especially during its migration from a convenient location to a less convenient location in the city. The company achieved its goal of avoiding mass staff attrition; Dell’s monitors played a role in that achievement.
- › **Suitable format monitors were deployed for the high-value, revenue-generating team to replace the legacy monitors.** The customer highlighted that not only existing but also future, interviewing high-value staff can be peculiar regarding the types of devices, displays, and configuration they use. After proposing and rejecting dual 27-inch monitors as a suitable replacement for four 19-inch monitors, the 100 equity traders at headquarters ultimately accepted and received two 34-inch Dell UltraSharp curved monitor as replacement. Dell Display Manager’s “Easy Arrange” feature, along with the customer’s role-specific applications, enabled the most efficient use of display space and windows.
- › **The customer achieved some operational efficiency due to its new office setup and monitor strategy.** Because of its new flex-desk strategy, the customer no longer had to regularly move teams and their respective equipment and devices. The equity team would have been especially difficult previously, as each employee had 12 monitors, which would have required monitor-moving staff to reconfigure mounts, arms, and cabling. The new setup for 34-inch curved monitors is simpler with fewer cables. Though the customer does use a mount for its two 34-inch curved monitor configuration which has a similar cost to a mount for its older four 19-inch monitor configuration, readers should note that mounts are not required and could be a cost saving if monitor stands are used rather than mounts.

“People ask IT for a second or larger monitor to use when they work from home, so we know there’s demand, and there’s lower efficiency when working from home without a second or larger monitor.”

*Head of desktop services,  
global financial services company*



# Analysis Of Benefits

## QUANTIFIED BENEFIT DATA

### Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Workforce productivity	\$7,920,000	\$22,470,480	\$24,144,471	\$54,534,951	\$43,910,743
Btr	Talent and brand impact	\$180,000	\$0	\$0	\$180,000	\$163,636
Ctr	Operational efficiency	\$8,185	\$168,603	\$182,344	\$359,132	\$283,780
	Total benefits (risk-adjusted)	\$8,108,185	\$22,639,083	\$24,326,816	\$55,074,083	\$44,358,159

## Workforce Productivity

The customer deployed Dell UltraSharp 27-inch and 34-inch curved monitors in a two-for-one replacement of 19-inch monitors. Thirty-four-inch monitors were for the equity trading group, and 27-inch monitors were for all other staff. The first wave of change included the 100 traders in the customer's headquarters as each trader gave up four 19-inch monitors for two 34-inch curved monitors. The customer also deployed 5,000 27-inch monitors in its new office building to replace the two 19-inch monitors per employee that staff used in the old office. In Year 2, the remaining 1,900 traders globally received 34-inch curved monitors, and all other staff experienced organic growth of 150 people. In Year 3, an additional 100 traders and 155 nontrader staff joined the company.

The model considers an 18% productivity gain as noted in academic research that details the benefits of migrating from dual monitors to one suitable monitor.<sup>10</sup> This study's scenario and model do not consider all monitors used by a trader as active. One-third of the real estate is marked for passive monitoring of specific charts and alerts. Considering the passive use of certain pixels, Forrester has adjusted the productivity gain from 18% to 12%. Forrester has halved the 12% productivity gain for traders to 6% for the smaller jump in monitor size for a larger volume of employees.

The model also adjusts for a 50% productivity conversion ratio because not every minute gained is a minute put back into productive work for the company.

Lastly, per foundational TEI practice, the model adjusts for risk based on the following factors:

- › Applying academic study and scenarios that do not completely match the interviewed customer's scenario.
- › Inconclusive research on maximum or optimal monitor real estate before diminishing returns for traders.
- › Potential that some equity trading teams and general staff do not spend 8 hours each day actively utilizing monitors.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$43,910,743.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total benefits to be a PV of \$44.4 million.

### DID YOU KNOW?

The productivity impact to the equity trading group is enough to hire 210 full-time equivalents (FTEs) at an average annual salary of \$150,000. Based on the customer's equities trading revenue, the incremental staff could potentially gain \$138 million in annual revenue.

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

## Workforce Productivity: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Traders	Customer provided	100	2,000	2,100
A2	Legacy monitor (19"x2) per user	Customer provided	4	4	4
A3	Total legacy monitors	A1*A2	400	8,000	8,400
A4	Monitor (34"x1) per user	Customer provided	2	2	2
A5	Total monitors (34")	A1*A4	200	4,000	4,200
A6	Productivity gain	Assumption	12%	12%	12%
A7	Workable hours	A1*2,080	208,000	4,160,000	4,368,000
A8	Productivity impact (hours)	A6*A7	24,960	499,200	524,160
A9	Annual salary	Year 1: Assumption Years 2 and 3: A9 <sub>py</sub> *103%	\$150,000	\$154,500	\$159,135
A10	Productivity impact (dollars)	(A9/2,080)*A8	\$1,800,000	\$37,080,000	\$40,102,020
A11	Nontrader staff	Customer provided	5,000	5,150	5,305
A12	Legacy monitor (19"x2) per user	Customer provided	2	2	2
A13	Total legacy monitors	A11*A12	10,000	10,300	10,609
A14	Monitor (27"x1) per user	Customer provided	1	1	1
A15	Total monitors (27")	A11*A14	5,000	5,150	5,305
A16	Productivity gain	Assumption	6%	6%	6%
A17	Workable hours	A11*2080	10,400,000	10,712,000	11,033,360
A18	Productivity impact (hours)	A16*A17	624,000	642,720	662,002
A19	Annual salary	Year 1: Assumption Years 2 and 3: A19 <sub>py</sub> *103%	\$60,000	\$61,800	\$63,654
A20	Productivity impact (dollars)	(A19/2080)*A18	\$18,000,000	\$19,096,200	\$20,259,159
A21	Productivity conversion	Assumption	50%	50%	50%
At	Workforce productivity	(A10+A20)*A21	\$9,900,000	\$28,088,100	\$30,180,589
	Risk adjustment	↓20%			
Atr	Workforce productivity (risk-adjusted)		\$7,920,000	\$22,470,480	\$24,144,471

## Talent And Brand Impact

Although this benefit does not have the highest value in this study, it is the foundational benefit and was the primary concern for the interviewed customer. Beyond any type of productivity gain or operational saving, the customer wanted to deploy new hardware that would match its vision for branding itself as a digital company and setting the tone for the new headquarters office. This played into the company's retention strategy specifically to avoid attrition due to migrating offices; it has also further contributed to the company's recruiting strategy.



The company's expected attrition rate was 20% for 5,000 general staff, but it reduced attrition to 10%. Attrition avoidance is quantified based on the cost of hiring or replacing an employee: The model uses \$4,000 for general staff. As Dell's monitors were only part of the customer's strategy that achieved attrition avoidance, the model attributes 10% of the value to the monitors.

Although the study considers the customer's benefit based on their office migration, readers can consider potential effects to retention and brand based on different scenarios. Some to consider include a global deployment based on modernizing the workplace, rebranding to seem more digitally savvy, or even hardware refresh.

Risks that may reduce the value of benefits include:

- › Overattribution of attrition avoidance to monitors.
- › Nonapplicability in scenarios outside of the headquarters migration.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$163,636.

**DID YOU KNOW:**  
New hires and prospects often asked the customer's recruiters what kind of laptop and technology devices are provided to staff.

### Talent And Brand Impact: Calculation Table

REF.	METRIC	CALC.	YEAR 1
B1	Staff migrated to new office	Customer provided	5,000
B2	Expected attrition	Assumption	20%
B3	Actual attrition	Assumption	10%
B4	Staff attrition avoided	$(B2-B3)*B1$	500
B5	Hiring and onboarding cost for majority staff	Assumption	\$4,000
B6	Attrition avoided value	$B4*B5$	\$2,000,000
B7	Attribution rate	Assumption	10%
Bt	Talent and brand impact	$B6*B7$	\$200,000
	Risk adjustment	↓10%	
Btr	Talent and brand impact (risk-adjusted)		\$180,000

### Operational Efficiency

Prior to migrating headquarters and building monitors into all flex desks, the IT team moved the trading team twice each year for various reasons. Each move for 100 employees took one weekend's time for a team of eight people. They had to disconnect all monitors, mounts, arms, and cables; move the equipment to a new space; and reassemble and reconfigure everything.

This equates to 256 total hours for moving each group of 100 high-value staff. With the expansion of the office strategy and new displays globally, these frequent moves may be reduced globally and workspace moving time can be reduced at scale.



Risks that could lower the benefit value include:

- › Nonapplicability in scenarios outside of the headquarters migration.
- › Customer deciding not to expand modern office strategy to global locations.
- › Continuing prior frequency of office moves.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of \$283,780.

**DID YOU KNOW:**  
Depending on the model of legacy monitors to be replaced, readers should also consider potential power consumption savings.

#### Operational Efficiency: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Monitor moving staff	Customer provided	8	8	8
C2	Hours to move per 100 high-value staff	Customer provided	16	16	16
C3	Annual salary	Year 1: Assumption Years 2 and 3: $C3_{py} * 103\%$	\$70,000	\$72,100	\$74,263
C4	Cost to move per 100 high-value staff	$(C3/2,080) * C1 * C2$	\$4,308	\$4,437	\$4,570
C5	Frequency of move	Assumption	2	2	2
C6	Total cost to move 100 high-value staff	$C4 * C5$	\$8,615	\$8,874	\$9,140
C7	Units of 100 high-value staff	$A1/100$	1	20	21
Ct	Operational efficiency	$(C6 * C7)$	\$8,615	\$177,477	\$191,941
	Risk adjustment	↓5%			
Ctr	Operational efficiency (risk-adjusted)		\$8,185	\$168,603	\$182,344

## Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Dell's monitors in one setting or location and later realize additional uses, applicability, and business opportunities, including:

- › Expanding the geographic footprint globally to over 2,000 traders.
- › Exploring large-format conference room monitors (55-inch and 86-inch).
- › Investigating the usability and relevance of virtual and augmented reality apps for trading, collaboration, and interactions with virtual property visits.

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

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a 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.

# Analysis Of Costs

## QUANTIFIED COST DATA

### Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Dtr	Dell monitor cost	\$3,370,500	\$0	\$4,284,000	\$317,835	\$7,972,335	\$7,149,790
Etr	Internal labor and implementation	\$58,800	\$0	\$46,005	\$4,253	\$109,058	\$100,016
	Total costs (risk-adjusted)	\$3,429,300	\$0	\$4,330,005	\$322,088	\$8,081,393	\$7,249,806

### Dell Monitor Cost

The Dell monitor cost is based on the volume of monitors, cost per monitor, volume of mounting kits and related equipment, and cost per mounting kit and related equipment. Assuming a list price of \$800 for each Dell UltraSharp 34 curved monitor - U3417W, \$600 for each Dell UltraSharp 27 InfinityEdge monitor - U2717D, and a \$500 mounting kit that can hold two monitors, the total initial cost for the headquarters migration was \$3.3 million. Over three years, the organization incurred additional costs when deploying new monitors. Most additional deployments were in Year 2 when the remainder of the global equity trading team was migrated.

To account for risks based on volume estimates and pricing, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of \$7,149,790.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total costs to be a PV of more than \$7.2 million.

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

### Dell Monitor Cost: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
D1	Monitors (34")	Initial: A5 Years 2 and 3: $A5_{cy} - A5_{py}$	200		3,800	200
D2	Cost per monitor	Assumption	\$800		\$800	\$800
D3	Mounting equipment	D1/2	100		1,900	100
D4	Cost per mounting set	Assumption	\$500		\$500	\$500
D5	Monitors (27")	Assumption	5,000		150	155
D6	Cost per monitor	Assumption	\$600		\$600	\$600
Dt	Dell monitor cost	$(D1 * D2) + (D3 * D4) + (D5 * D6)$	\$3,210,000	\$0	\$4,080,000	\$302,700
	Risk adjustment	↑5%				
Dtr	Dell monitor cost (risk-adjusted)		\$3,370,500	\$0	\$4,284,000	\$317,835

## Internal Labor And Implementation

While the customer mentioned that maintenance effort was immaterial for monitors, the model factors in the labor cost to deploy more than 9,000 new monitors over three years. Assuming one weekend's time of eight staff to deploy per 100-person unit, the deployment time per monitor is 19 minutes.

To account for risks based on moving time estimates and unplanned footprint growth, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of \$100,016.



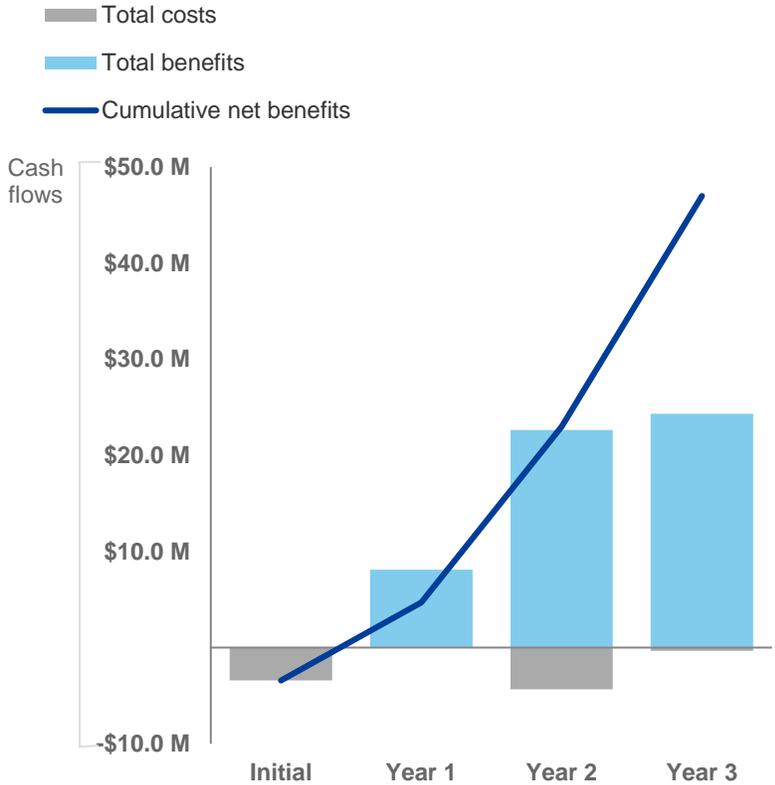
**Internal Labor And Implementation: Calculation Table**

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Monitors to deploy	D1+D5	5,200		3,950	355
E2	Total hours to deploy per 100 high value staff	C1*C2	128		128	128
E3	Legacy monitors per high-value staff	A2	4		4	4
E4	Deployment time per monitor (minutes)	$(E2/(E3*100))*60$	19.2		19.2	19.2
E5	Total deployment time (hours)	$(E4*E1)/60$	1,664		1,264	113
E6	Monitor deployment annual salary	C3	\$70,000		\$72,100	\$74,263
Et	Internal labor and implementation	$(E6/2,080)*E5$	\$56,000		\$43,815	\$4,050
	Risk adjustment	↑5%				
Etr	Internal labor and implementation (risk-adjusted)		\$58,800	\$0	\$46,005	\$4,253

# 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 interviewed 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 Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$3,429,300)	\$0	(\$4,330,005)	(\$322,088)	(\$8,081,393)	(\$7,249,806)
Total benefits	\$0	\$8,108,185	\$22,639,083	\$24,326,816	\$55,074,083	\$44,358,159
Net benefits	(\$3,429,300)	\$8,108,185	\$18,309,078	\$24,004,728	\$46,992,690	\$37,108,353
Payback period						<6

# Dell Monitors: Overview

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

Dell offers monitors in a range of sizes to suit use case-specific and role-specific needs. Each series has a focus on the following benefits for end users:

- › **See more. Do more.**
  - Larger/curved monitors for more viewing area and effective multitasking.
  - InfinityEdge (four-sided) and three-sided narrow bezels for seamless views. Perfect for multimonitor setup.
  - Dell Display Manager with Easy Arrange — great for multitasking on large monitors.
  - Large interactive monitors and projectors.
- › **Rich colors and details for remarkable work.**
  - Dell PremierColor.
  - Complete portfolio of Ultra HD products.
  - HDR10 option provides the highest contrast and most realistic color for content creators.
  - PC HDR (VESA standard) for color and contrast.
  - Up to 600 nits peak brightness for detail and clarity.
- › **Workspace productivity.** Adapted for the modern office setup (hot desking, smaller desk). Maximize office utilization, saving time and real estate costs. Improve office atmosphere and talent retention.
- › **Ecosystem productivity.** Latest flexible connectivity options included USB-C, backward compatible, and future proof.

**THE RIGHT MONITOR MAKES ALL THE DIFFERENCE**

Focus on your data and boost your productivity with our innovative and award-winning monitors.

**PRODUCTIVITY**

**INCREASED SCREEN SPACE. EFFORTLESS MULTITASKING.**

UP TO **18%** BOOST IN PRODUCTIVITY<sup>1</sup>

INFINITY EDGE VIRTUALLY BORDERLESS DISPLAY VIEWS<sup>1</sup>

CURVED MONITORS IMMERSIVE VIEWS

**EASY ARRANGE**

UP TO **91%** MORE SATISFIED<sup>1</sup> WITH DUAL MONITORS

LARGE FORMAT DISPLAYS FOR **SEAMLESS COLLABORATION**

WITH UP TO **20** SIMULTANEOUS TOUCH POINTS<sup>1,2</sup>

ARRANGE APPLICATIONS UP TO 18 DIFFERENT WAYS

**WHY DELL**

At Dell, we design products with purpose—giving you a truly immersive, productive experience—so you can reach your goals day in and day out.

**DELL'S FIRST**

- InfinityEdge Monitor
- 32" Ultra HD 4K Monitor
- 4K Premium Certified 40" Monitor

**ECO-CONSCIOUS DESIGN**

For more information, please visit [www.dell.com](http://www.dell.com).

# Appendix A: Total Economic Impact

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

## Total Economic Impact Approach



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



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



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



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

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



### Present value (PV)

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



### Net present value (NPV)

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



### Return on investment (ROI)

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



### Discount rate

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



### Payback period

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

## Appendix B: Endnotes

---

<sup>1</sup> Source: “How I Work: Bill Gates,” Fortune Magazine (now hosted on CNN), April 7, 2006 ([http://money.cnn.com/2006/03/30/news/newsmakers/gates\\_howiwork\\_fortune/index.htm](http://money.cnn.com/2006/03/30/news/newsmakers/gates_howiwork_fortune/index.htm)).

<sup>2</sup> Source: “Forrester Data: World Online Population Forecast, 2017 To 2022 (Global),” Forrester Research, Inc., March 22, 2017.

<sup>3</sup> Source: “Forrester Data Global Business Technographics® Applications and Collaboration Workforce Survey, 2016: Overview,” Forrester Research, Inc., March 29, 2017.

<sup>4</sup> Dell offers a series of larger-format and wide monitors. Readers should consider which series and size are the best fit for their respective use cases and employee roles. The models considered for this study are the U2717D, U3417W, U3818DW, and P4317Q.

<sup>5</sup> The Dell UltraSharp 34 curved monitor refers to the U3417W, the Dell UltraSharp 27 QHD monitor refers to either U2715H, the Dell UltraSharp 27 InfinityEdge monitors refers to the U2717D, and the Dell 19 monitor refers to the P1914S. The customer in this study has deployed U2715H, but as this line is no longer available to be purchased online, this study uses the U2717D for cost modeling.

<sup>6</sup> Total productivity value is made up of different productivity gains for trader and nontrader staff. Each group’s productivity gain is adjusted by a 50% productivity conversion ratio and a 20% risk ratio. To find the value per trader and nontrader, the resulting figure is divided by the interviewed customer’s “fully ramped” state of 2,000 traders and 5,000 nontraders.

<sup>7</sup> Several academic studies were used as reference, including “Productivity, Screens, and Aspect Ratios” by James A. Anderson, Jennifer Hill, Paul Parkin, and Autumn Garrison at the University of Utah (2007); “Lightweight Task/Application Performance using Single versus Multiple Monitors: A Comparative Study” by Youn-ah Kang and John Stasko at the Georgia Institute of Technology (2008); and “Are two computer monitors better than one?” by Justin W. Owens, Jennifer Teves, Bobby Nguyen, Amanda Smith, and Mandy Phelps at the Wichita State University (2012).

<sup>8</sup> Total productivity impact (hours) value is made up of different productivity gains and multiplied by total workable hours for trader and nontrader staff. To find the value of productivity increment (by hours) per trader and nontrader – each group’s productivity impact (hours) is adjusted by a 50% productivity conversion ratio and a 20% risk ratio. The resulting figure is divided by the interviewed customer’s 100 traders and 5,000 nontraders. Results show 1) close to a 100 hours of annual incremental productivity per trader, and 2) close to a 50 hours of annual incremental productivity per nontrader.

<sup>9</sup> Screen size gain is calculated by comparing the screen area as measured by multiplying length and height. Screen size gain is not a measurement of total screens multiplied by the diagonal of the screen. In this case, it does not mean four times 19” compared with two times 34”. The U3417W has an area of 415 squared inches whereas the P1914S has an area of 174 squared inches. When multiplied by the study’s configuration, the comparison is 697 squared inches with four 19” monitors versus 830 squared inches with two 34” monitors, which represents a 19% gain. Likewise, for pixel gain, the comparison is between: 1) 2.62 million pixels for two 19” monitors versus 3.69 million pixels for one 27” monitor which results in 41% pixel gain; 2) 5.24 million pixels for four 19” monitors versus 9.90 million pixels for two 34” monitor which results in 89% pixel gain.

<sup>10</sup> Endnote 7 provides a list of relevant academic research that provides reference figures for productivity gains in different scenarios, including going from a single small monitor to dual small monitors to a single large monitor. Each study uses its own testing parameters, methodology, and scenarios for test subjects to try. This study uses the clearest and closest finding of an 18% productivity gain when migrating from dual 18-inch monitors to a single 24-inch monitor. This assumes that, at the least, the 18% productivity gain stays the same even though this study’s customer migrated from dual 19-inch monitors to a single 34-inch monitor or 27-inch monitor, which is a steeper gain in inches and pixels. To adjust for conservativeness, the model adjusts 18% to 12% for 34-inch

---

migration and 6% for 27-inch migration. Readers should use the most relevant test scenario and respective productivity gain for modeling. Use cases and inch or pixel gains may not be a direct match; thus, readers should use study results as reference material and contact Dell to test out any specific use cases in a live trial.