

A Forrester Total Economic Impact™
Study Commissioned By Microsoft
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The Microsoft Mixed Reality Business Opportunity For Independent Software Vendors

A Total Economic
Impact™ Partner Opportunity Analysis

Table Of Contents

Executive Summary	1
Partner Revenue And Margin Opportunities	1
ISV Investments And Cost Structure	3
TEI Framework And Methodology	5
Analysis	6
Mixed Reality ISV Highlights	6
ISV Characteristics	6
Business Catalysts For Developing Mixed Reality Solutions	8
ISV Best Practices And Success Factors	8
Composite ISV	10
Financial Analysis	11
Mixed Reality Licensing Subscriptions	11
Mixed Reality Proof-Of-Concept Services	12
Mixed Reality Implementation And System Integration	13
Mixed Reality Managed Services	15
Analysis Of Investments	16
Incremental Staffing Costs	16
Research And Development Expenses	17
Marketing And SG&A Costs	18
Lab And Demo Equipment Costs	19
Financial Summary	20
Appendix A: Total Economic Impact	21

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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.

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ISVs Consuming Azure Are Larger And More Profitable



264%

Higher mixed reality practice revenues



28%

More mixed reality customers



15%

Higher mixed reality software gross margins

Executive Summary

Organizations are increasingly looking to innovative emerging technologies, such as augmented reality (AR), virtual reality (VR), and mixed reality (MR), to increase productivity, improve communications, drive collaboration, and deliver great customer experiences. Investments in mixed reality are focused on impacting the experiences of employees and customers by giving employees more training opportunities, improving customer-facing support efficiency, and building employee empathy by immersing them in their colleagues' and customers' experiences.¹ These strategic investments appear to be working: 75% of global information workers who use AR and VR on their smartphones or tablets daily for work indicate they are satisfied with these applications.²

Microsoft commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the business opportunity and return on investment (ROI) independent software vendors (ISVs) may realize by building and selling commercial-grade mixed reality solutions. In our analysis, Forrester closely examined how ISVs were leveraging Microsoft's mixed reality portfolio (e.g., [HoloLens](#), Dynamics 365 mixed reality applications, Azure services) and third-party mixed reality solutions in building their own mixed reality practices. In addition, Forrester assessed the impact that these Microsoft and third-party mixed reality technologies had on ISV performance and business outcomes.

The purpose of this study is to provide independent software vendors with a framework to evaluate the potential business opportunities associated with offering mixed reality solutions, spanning ready-built, commercial-grade mixed reality software; business and technology consulting services; and managed services.

To better understand the revenues, margins, investments, and risks associated with building and scaling a mixed reality business, Forrester interviewed 10 ISVs with years of experience building, piloting, and deploying mixed reality applications to businesses across the globe.

Partner Revenue And Margin Opportunities

The revenue and margin opportunity analysis below, built on a composite ISV representative of those interviewed by Forrester, is intended to be used as a framework to help ISVs understand the total business potential associated with building and scaling a mixed reality solution area around Microsoft and third-party hardware and applications.

- › **Mixed reality licensing subscriptions.** These recurring licensing revenues came from the sale of mixed reality software applications to end customers. In several cases, mixed reality ISV applications were packaged with HoloLens devices, Microsoft Azure services, and light configuration, installation, and ongoing support services. Sales were generated through direct selling, coselling with Microsoft enterprise sellers, joint go-to-market with Microsoft partners, and sales within Microsoft and third-party marketplaces (e.g., Windows Store, AppSource, Azure Marketplace). Over the three-year analysis, mixed reality subscriptions account for 63% of the composite ISV's gross profit (see chart titled Mixed Reality ISV Business Opportunity), with risk-adjusted gross profit margins growing to 57% by Year 3 of the analysis (see the chart titled Mixed Reality ISV Gross Profit Margins on the following page) as a result of larger deal sizes and faster, more efficient customer onboarding.

Three-Year Financial Summary (Risk- And PV-Adjusted)



ROI
97%



Total gross profit (PV)
\$7.2M



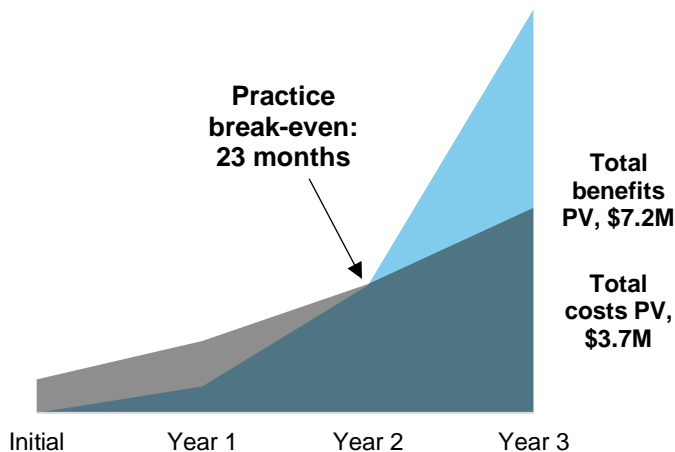
NPV
\$3.6M



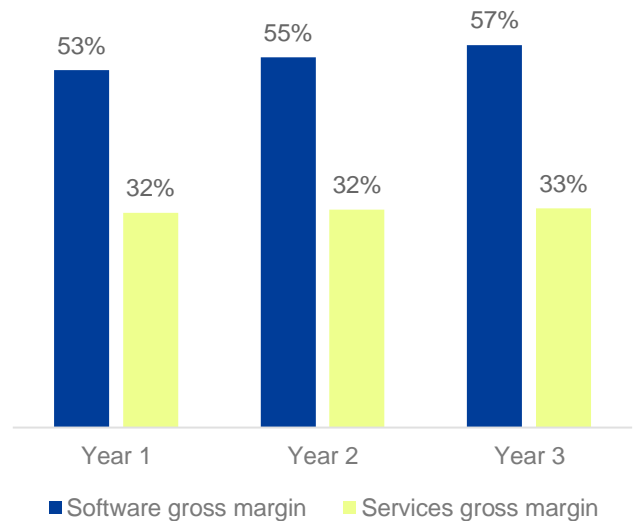
Payback
23 Months

- › **Mixed reality proof-of-concept (PoC) professional services.** Serving as the typical entry point for a net-new mixed reality customer, PoC engagements typically provide mixed reality solutions to between two and 16 users for a period of three to six months. Mixed reality PoC engagements almost always require some customization, configuration, deployment, content creation, and training services, bringing in average consulting revenues of \$45,000. Over the analysis, PoC engagements bring 33% gross margins, accounting for 12% of the composite ISV's three-year gross profit (see chart titled Mixed Reality ISV Business Opportunity).
- › **Mixed reality implementation and system integration services.** At the time of the interviews, ISVs revealed that between 20% and 90% of PoC engagements were graduating to full mixed reality deployments. Full deployments require additional services to tailor the ISVs' ready-built commercial mixed reality solutions to each customer's specific business needs and IT environment. These projects bring a diverse range of professional service needs spanning solution configuration, onsite implementation, custom 3D content design and creation, training, change management, business process reengineering, and system integration with other enterprise systems. Mixed reality implementation and system integration projects, which are detailed on page 13 of this case study, bring average gross profit margins of 35%, accounting for 24% of the composite ISV's three-year gross profit.
- › **Mixed reality managed services.** Beyond licensing and project work, several ISVs commercialized and monetized a variety of managed services spanning end user and technical support, training, HoloLens device management, and digital asset management. These ongoing services, which are detailed on page 15 of this case study, are typically sold with block consulting hours, or on a fixed-fee basis, and generate monthly recurring revenue for the ISV. Notably, several ISVs packaged basic ongoing support services into their licensing subscriptions and charged for more premium managed services, which is typically in software-as-a-service businesses. Attach rates for ISVs hovered around 50% of total mixed reality deployments. While gross profit margins varied significantly across projects, average practice-level mixed reality profit margins were 35% at the time of the interviews and account for 2% of the composite ISVs three-year gross profit.

Financial Summary



Mixed Reality ISV Gross Profit Margins



Mixed Reality ISV Pro Forma Revenue And Margin Opportunity: Three-Year Analysis (USD)

REF.	METRIC	Year 1	Year 2	Year 3
PL1	Mixed reality licensing subscription revenues	\$492,840	\$2,374,290	\$7,502,490
PL2	Mixed reality licensing gross profit (risk-adjusted)	\$262,191	\$1,308,234	\$4,276,419
PL3	Mixed reality licensing gross profit (%)	53%	55%	57%
PL4	Mixed reality and proof-of-concept professional service revenues	\$540,000	\$1,035,000	\$1,980,000
PL5	Mixed reality implementation professional services revenues	\$250,000	\$1,625,000	\$4,750,000
PL6	Mixed reality support and managed services revenues	\$12,500	\$100,000	\$337,500
PL7	Total mixed reality professional and managed services revenues	\$802,500	\$2,760,000	\$7,067,500
PL8	Mixed reality professional services gross profit (risk-adjusted)	\$256,353	\$896,285	\$2,306,418
PL9	Mixed reality professional services gross margin (%)	32%	32%	33%
PL10	Total revenue	\$1,295,340	\$5,134,290	\$14,569,990
PL11	Gross profit	\$518,543	\$2,204,519	\$6,582,837
PL12	Gross profit margin	40%	43%	45%
PL13	Staffing costs	\$550,883	\$743,385	\$943,408
PL14	Marketing and selling, general, and administrative (SG&A) costs	\$108,809	\$377,370	\$764,924
PL15	Research and development (R&D)	\$681,902	\$104,353	\$104,353
PL16	Lab and demo equipment costs	\$21,000	\$14,700	\$-
PL17	Total operating expenses	\$1,362,593	\$1,239,808	\$1,812,685
PL17	Operating income	\$(844,049)	\$964,711	\$4,770,152

ISV Investments And Cost Structure

In addition to direct delivery costs and channel discounts, which are included in the gross margin calculation in the composite ISV revenue and margin section of this study, interviewed vendors made a number of strategic investments to build, market, and sell their mixed reality applications to end customers.

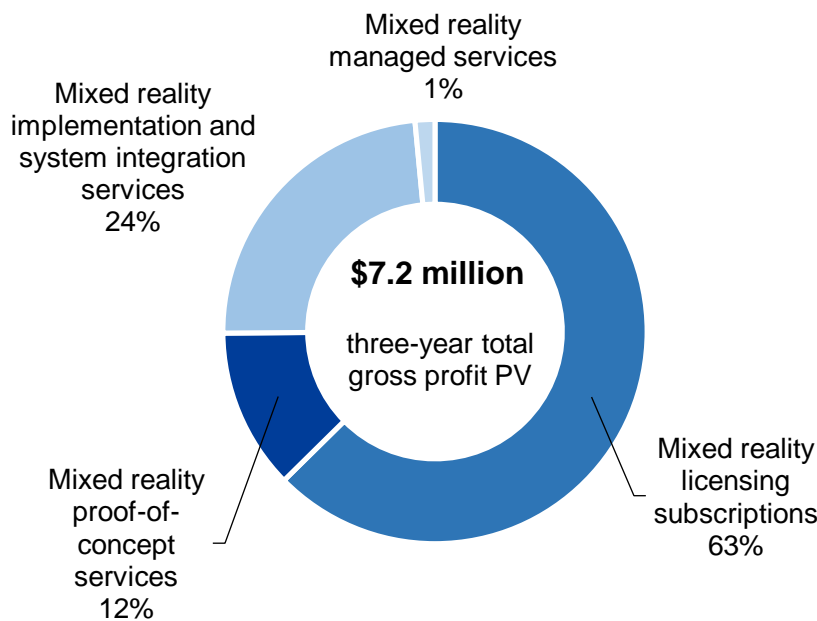
- › **Staffing costs.** These are incremental staffing costs for new hires dedicated to building and supporting the growth of the vendor's ISV mixed reality solutions in the marketplace. Common staff acquisition areas identified by interviewed ISVs included developers, 3D designers and animators, customer success managers, customer and technical support personnel, IT operations staff, and technical account managers.
- › **Research and development expenses.** These expenses include the initial and ongoing labor expenses required to build a minimum viable version of the ISV's mixed reality solutions, along with ongoing development resources required to maintain, update, and provide new feature releases for its mixed reality solutions over time.

- › **Marketing and selling, general, and administrative (SG&A) costs.** These expenses include incremental marketing costs for positioning and promoting the ISV's mixed reality applications with end customers, partners, and Microsoft. Given the relatively grassroots techniques most ISVs employed in marketing their mixed reality offerings, annual marketing expenditures used in this analysis range from 2% to 3% of annual mixed reality revenues. Additionally, SG&A costs, excluding sales staff salaries, range from 3% to 5% of annual mixed reality revenues over the three-year analysis.
- › **Lab and demo expenses.** These are for upfront and ongoing capital expenditures for HoloLens devices, network hardware, software, and other equipment for the composite ISV's developers and sales team to build, showcase, and demo its mixed reality solutions to prospective customers and partners.

ISV Outcomes

Based on in-depth interviews with 10 ISVs with mixed reality solutions built around Microsoft technologies, Forrester built a financial analysis based on a representative composite ISV that sells mixed reality solutions. Forrester's analysis found that a composite ISV based on these interviews experiences total present value-adjusted gross profits of \$7.2 million over three years versus present value-adjusted investment and overhead expenses of just under \$3.7 million, adding up to a net present value (NPV) of \$3.6 million, a practice-level ROI of 97%, and a practice break-even period of 23 months.

Mixed Reality ISV Business Opportunity



The TEI methodology helps companies demonstrate, justify, and realize the tangible value of business initiatives to both senior management and other key business stakeholders.

TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for ISVs considering investing in the development of mixed reality solutions as part of the Microsoft partner ecosystem.

The objective of the framework is to identify the revenue, margin, investment, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the business impact of building mixed reality solutions using Microsoft technologies for ISVs.



DUE DILIGENCE

Interviewed Microsoft stakeholders and Forrester analysts to gather data relative to the mixed reality business opportunity and to understand how Microsoft technologies and programs are leveraged by ISVs.



ISV INTERVIEWS

Interviewed 10 ISVs building and selling commercial-grade mixed reality applications to customers to obtain data with respect to investments, revenues, margins, and risks.



COMPOSITE ISV

Designed a composite ISV based on characteristics of the interviewed organizations.



FINANCIAL MODEL FRAMEWORK

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



CASE STUDY

Employed four fundamental elements of TEI in modeling the ISV business opportunity in mixed reality in partnership with Microsoft: margins, investments, 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.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Microsoft 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 building mixed reality solutions.

Microsoft 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.

Microsoft provided the ISV names for the interviews but did not participate in the interviews.

Analysis

Mixed Reality ISV Highlights

For this study, Forrester interviewed 10 ISVs with experience developing, selling, and delivering commercial-grade mixed reality applications to businesses across the globe. Interviewed ISVs had the following attributes.

USE CASES	MR EMPLOYEES	INTERVIEWEE	REGION
<ul style="list-style-type: none"> Maintenance, operations, and training Remote assist 	60 employees	CEO and founder	Americas & Europe
Virtual surgery intelligence	20 employees	CEO and CTO	Europe
3D content creation platform	17 employees (including custom development)	Executive producer	Europe
<ul style="list-style-type: none"> Remote assist Jobsite productivity 3D design Holographic overlay 	20 to 30 employees	Senior director	North America
Healthcare simulation and training	10 employees	Product manager, digital solutions and acceleration	Global
<ul style="list-style-type: none"> Augmented retail Maintenance Logistics 	15 employees	Chief innovation officer	Europe
Industrial task remote support	20 employees	Co-founder & CTO	North America & Europe
<ul style="list-style-type: none"> Spatial data visualization Proprietary 3D rendering engine 	~15 employees	Founder & CEO	North America, Europe, APAC
<ul style="list-style-type: none"> Sales and marketing Training Field service Design and layout 	40 employees	Founder & CEO	North America, Europe, APAC
<ul style="list-style-type: none"> GIS and CAD data visualization 	20 employees	Managing director	Europe

ISV Characteristics

The interviewed ISVs had the following characteristics in common:

- Low seven-digit average annual mixed reality revenues with nearly triple-digit year-over-year practice growth targets.** At the time of the interviews, mixed reality ISVs had total mixed reality revenues ranging from \$500,000 to over \$6 million annually. However, average projected mixed reality revenue growth across interviewed ISVs was an astounding 91% over the next 12 calendar months, which many attributed to the imminent release of HoloLens 2 and better market visibility into the business impact of mixed reality within the enterprise. In addition, many partners attributed the advancement of pilots into full rollouts as a major driver of future mixed reality sales growth.



19

Average number of deals closed in previous 12 months

“Today, we currently have around 30 to 40 licensed customers, and we’re planning to double our revenues year over year. This growth won’t only come in terms of our customer count, but in terms of the deal size and the user count in our licensing agreements.”

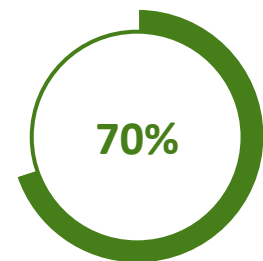
CEO and founder, global ISV



- › **A majority of mixed reality deals remain in proof-of-concept stage.** The majority of mixed reality deals today are squarely in the PoC and pilot stages of maturity. Our ISV interviews revealed that mixed reality PoC engagements averaged 12 users and lasted between three and eight months. ISVs varied in their ability to convert these PoCs into larger deployments, with ISVs revealing conversion rates ranging from 20% to 90% of PoCs graduating to full deployments. ISVs with the best conversion rates identified client champions to engage and collaborate with through the PoC process and continuously improved their mixed reality solutions through the PoC process based on user feedback.
- › **Capitalizing on the downstream services opportunity for mixed reality.** ISVs were rapidly building in-house and third-party professional and managed service capabilities around their mixed reality applications at the time of the interviews. ISVs looking to partner horizontally with system integrators and other service providers had a very compelling value proposition to offer. When speaking about the downstream mixed reality service opportunity, the CEO of one mixed reality ISV noted, “I would think that a service provider could do two to five times the amount of revenue in downstream services than the actual license revenue itself.”
- › **Nontraditional buyers outside of IT . . . for now.** The Forrester Analytics Global Business Technographics® Software Survey, 2016³, reveals that 65% of software buying decisions are led or influenced by leaders within the lines of business. The percentage of mixed reality purchasing decisions made today by the lines of business is undoubtedly even higher than this, with most purchasing decisions made by innovation and research and development business units. As described in more detail in the ISV Best Practices And Success Factors section of this study, the need to get IT involved early and often is becoming much more acute for full mixed reality deployments.
- › **Consuming Microsoft technologies and building for a mixed device future.** Seventy percent of interviewees built mixed reality applications that were consuming Azure services at the time of the interviews. ISVs revealed that customer adoption of HoloLens as part of mixed reality pilots and deployments was varied, ranging from a low of 5% of mixed reality users to a high of 100%. ISVs were unanimous in their opinion that a growing percentage of mixed reality customers were adopting HoloLens and that this trend was accelerating. A CEO of a mixed reality ISV said: “I believe mobile devices will remain at the center of [mixed reality] rollouts for the long run. It will always be a device mix in the end, but the percentage of headsets included in deployments will continue to grow, especially with HoloLens 2.”
- › **Shrinking sales cycles.** At the time of the interviews, average mixed reality sales cycles ranged from three to six months for proof-of-concept deals and from nine months to a year for full mixed reality deployments. However, ISVs revealed that sales cycles were shrinking due to the increasing maturity of mixed reality technologies and growing market interest. One CEO stated: “The sale cycle is getting shorter, and there are plenty of reasons for that. Our products can be deployed and tested easier than ever before, and the market is becoming more educated on the business impact of mixed reality. Also, companies are willing to spend more money.” Another ISV saw its partnership with Microsoft as another way it was able to grow market awareness and reduce the length of sales cycles for its mixed reality offerings.

“I think in the end, the services and content revenue — for larger rollouts — is definitely higher than the actual license revenue. I would think that a service provider could do two to five times the amount of revenue in downstream services than the actual license revenue itself.”

CEO and founder, global ISV



70%
of interviewed ISVs were driving Azure consumption through their MR applications.

“The sale cycle is getting shorter, and there are plenty of reasons for that. Our products can be deployed and tested easier than ever before, and the market is becoming more educated on the business impact of mixed reality. Also, companies are willing to spend more money.”

CEO, North American ISV



Business Catalysts For Developing Mixed Reality Solutions

The interviewed ISVs experienced a common set of business challenges and opportunities that drove them to build commercial-grade mixed reality solutions.

- › **Retention and conversion of legacy customers.** While several interviewed ISVs were mixed reality startups or businesses with standalone, greenfield mixed reality applications, others had legacy businesses and large customer installed bases. A product manager at a global healthcare ISV saw mixed reality as a strong complement to its existing advancing medical training and education product portfolio. This product manager stated: “We are adding mixed reality to supplement our existing healthcare training products. We can upsell existing clients, sell [our] mixed reality [application] together with our other products, or sell them individually.”
- › **Competitive edge for ISVs in the mixed reality realm.** Historically, custom-built mixed reality projects were the best way to get your foot in the door with customers. As such, the vast majority of system integrators and other service providers in the mixed reality space were focused on custom development projects. This paradigm provided ISVs with ready-built, scalable, and easy-to-deploy mixed reality applications a competitive advantage in the marketplace. The CEO of spatial data visualization mixed reality start up explained: “We try to dissuade clients from doing custom builds. Custom mixed reality projects take several months to conceptualize, prototype, and build, and the proof of concept usually ends there.” As such, the CEO shifted the business away from custom development project to repeatable IP sales. The move made strategic sense, with the CEO stating: “We are building a scalable platform because instead of designing every solution from scratch, we want to provide all the tools and components to do a Lego-block like environment. It simplifies and speeds up development.”
- › **Low consumer adoption of augmented reality solutions.** The Forrester Analytics Consumer Technographics North American Technology, Media, and Telcom Survey, 2019, finds that 79% of US online adults have never used augmented reality, and 45% hadn’t heard of it before taking the survey.⁴ However, Forrester’s research shows that commercial-grade mixed reality solutions are more easily adopted in the enterprise and are a great current fit for boosting employee productivity and ability to improve customer experience.

“We are adding mixed reality to supplement our existing healthcare training products. We can upsell existing clients, sell [our] mixed reality [application] together with our other products, or sell them individually.”

Product manager, healthcare ISV



“We are building a scalable platform because instead of designing every solution from scratch, we want to provide all the tools and components to do a Lego-block like environment. It simplifies and speeds up development.”

CEO and founder, spatial visualization ISV



ISV Best Practices And Success Factors

The interviews revealed the following ISV best practices and key success factors learned from their journeys to building and scaling their mixed reality solution areas:

- › **Cloud-based solutions have better adoption.** Seventy percent of interviewed ISVs built mixed reality applications that were consuming Microsoft Azure services at the time of the interviews. Those that had not built cloud-connected technologies revealed that they had a difficult time tracking user adoption of these technologies during the initial PoC stage, making it difficult to justify the business case during the course of the PoC. ISVs consuming Microsoft Azure also exhibited better practice economics than their peers not consuming Azure through their applications; they had 264% higher mixed reality practice revenues, 28% more customers, and 15% higher software gross margins than their non-Azure consuming peers.
- › **Land and expand.** ISVs were building multiple mixed reality solutions at the time of the interviews and were seeking to land with a single product and expand by deploying those products more broadly and by offering additional mixed reality solutions tailored for new lines-of-business. In some cases, ISVs built applications for remote assist and training applications as an entry point product with customers, with the intention of cross-selling other mixed reality solutions in the future. In all instances, ISVs wanted to build flexible IP that they could integrate into future, more sophisticated solutions. The CEO of one ISV said, “Our go-to market strategy is to land with [remote assist] and then expand with a concentration on our mixed reality content creation platform, because this is where we will actually grow.”
- › **Implement coselling and partner-to-partner collaboration.** Achieving the Azure consumption targets to become Microsoft cosell ready was worth the investment for many ISVs. The CTO of a North American ISV stated: “Today, we are getting almost 40% of our leads from Microsoft, and the conversion rate has been pretty good. Over the last three months, we are converting 50% of our opportunities, up from 10% last year.”
- › **Establish a customer success team to manage churn.** While churn was low across interviewed ISVs, the most advanced ISVs Forrester spoke to were investing in customer success programs to ensure customer retention and increase the conversion from PoC to full deployment.
- › **Explore unique pricing models to expand mixed reality market share.** At the time of the interviews, ISVs were experimenting with unique pricing models, including freemium, bundled offers, pay-per-use pricing, per-location pricing, and pricing benchmarked to performance and key performance indicator (KPI) improvements. For one ISV, a freemium pricing model — or the idea of providing limited seats or solution functionality for no cost in the hopes of converting these accounts to paying customers — was helpful in introducing the concept of mixed reality to customers. These unique pricing models bolstered customer adoption of mixed reality while increasing recurring subscription revenues.
- › **Engage with IT early and often.** Mixed reality purchasing decisions have traditionally been made in the lines of business. However, the product manager at one ISV warned, “While IT is woefully uninvolved in the sales process, they might come block it after we deploy the app.” As PoCs begin to graduate into full deployments, IT will have a seat at the table to ensure these technologies are secure and compatible with other enterprise IT systems. This will significantly impact how ISVs engage with current and prospective clients around mixed reality going forward.

“Today, we are getting almost 40% of our leads from Microsoft, and the conversion rate has been pretty good. Over the last three months, we are converting 50% of our opportunities, up from 10% last year.”

CTO, North American ISV



“While IT is woefully uninvolved in the sales process, they might come block it after we deploy the app.”

Product manager, ISV



Composite ISV

Based on the interviews, Forrester constructed a TEI framework, a composite ISV, and an associated ROI analysis that illustrates the areas financially affected. The composite organization is representative of the 10 ISVs that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite ISV that Forrester synthesized from the customer interviews has the following characteristics:

- › The composite ISV is a US-headquartered mixed reality software-as-a-service (SaaS) vendor. The composite organization serves small, medium-, and enterprise-size customers across North America and Western Europe.
- › The composite ISV develops its mixed reality application from the ground up using a team of four in-house developers and designers over a 12-month period. In addition, the organization has three development resources spending approximately 25% of their time maintaining, managing, and providing new feature releases for its mixed reality solution. The composite ISV's mixed reality solution is built on Microsoft Azure and consumes a number of Azure services including Remote Rendering, Cosmo DB, and Artificial Intelligence services.
- › The composite ISV brings in \$3,300 per year, per user for its mixed reality application and has a 5% annual churn rate.



Number of mixed reality PoCs per year

Year 1: 12

Year 2: 23

Year 3: 44

Financial Analysis

COMPOSITE ISV REVENUE AND MARGIN OPPORTUNITIES

Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Mixed reality licensing subscriptions	\$262,191	\$1,308,234	\$4,276,419	\$5,846,844	\$4,532,477
Btr	Mixed reality proof-of-concept services	\$169,290	\$324,473	\$620,730	\$1,114,493	\$888,423
Ctr	Mixed reality implementation and system integration services	\$83,125	\$540,313	\$1,579,375	\$2,202,813	\$1,708,715
Dtr	Mixed reality managed services	\$3,938	\$31,500	\$106,313	\$141,750	\$109,487
	Total benefits (risk-adjusted)	\$518,543	\$2,204,519	\$6,582,837	\$9,305,899	\$7,239,102

Mixed Reality Licensing Subscriptions

Forrester interviewed ISVs building and selling mixed reality software applications covering a variety of use cases and industries. In addition, these software applications are sold under a variety of pricing and packaging models. For instance, at the time of the interviews, several ISVs were packaging HoloLens devices with their offerings into a simple per-user or per-device monthly subscription.

Several ISVs have more unique pricing and business models built around their mixed reality solutions. For instance, several ISVs have tiered pricing models that start with freemium pricing, where a user could utilize the application with very limited functionality at no cost, to premium tiers, which could be tailored to a customer's specific business needs and include more advanced features such as Azure GPU capabilities. Other ISVs were experimenting with novel business models including pay-per-use, per-location pricing, and pricing benchmarked to performance and key performance indicator improvements resulting from the use of mixed reality. Annual licensing revenues on a per-seat basis varied significantly from a low of \$720 per year, per user to a high of over \$12,000 per user, per year. ISV software licensing sales were generated through direct selling, coselling with Microsoft and Microsoft partners, and sales within Microsoft marketplaces (Windows Store, AppSource, Azure Marketplace).

The typical entry point for a net-new logo was a PoC or pilot engagement, which averaged 12 licensed users at the time of the interviews. Mixed reality PoC engagements generally lasted between three and six months before they either graduated to a full deployment or remained stuck in the PoC stage. Specifically, our interviews found that 40% of PoCs graduated to full deployments after an average of three to six months. Full mixed reality deployments averaged 40 to 50 licensed users across interviewed ISVs, although several had examples of mixed reality rollouts that reached thousands of users.

In modeling the revenue impact of building, marketing, and selling mixed reality software, Forrester assumes the following for the composite ISV:

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite partner expects risk-adjusted total gross profit to be a PV of over \$7.2 million.

- › The composite ISV brings in three new PoC accounts each quarter in Year 1 of the analysis. Consistent with our findings, the number of PoC projects brought in annually grows to 23 deals in Year 2 and 44 deals in Year 3, as the ISV has more mature software and makes additional investments in market and sales.
- › PoC projects bring an average of eight paid licenses while full deployments bring an additional 40 seats, for a total of 48 seats for an average full deployment deal. Full deployment deals only register nine months of recurring revenues (or 75% of annual license cost) in the year that they are deployed.
- › The average per-user, per-year licensing fee is \$3,330, or just over \$277 per user, per month.
- › Annual licensing churn is benchmarked at 5% of license sales. Interviewed ISVs had notably low churn rates at the time of the interviews.
- › Gross profit margins on licensing sales grow from 56% in Year 1 of the analysis to 60% by Year 3 of the analysis as the composite ISV sees larger deal sizes and invests in faster and more efficient onboarding.

Actual mixed reality software licensing revenues, deal sizes, churn rates, and gross profit margins may be impacted by a number of outside factors beyond the ISV's control, including general macroeconomic conditions, business spending budgets, and competitive forces. To account for these variants, Forrester risk-adjusted this gross profitability figure downward by 5%. Over the three-year analysis period, gross profit from mixed reality license subscriptions totals a three-year risk-adjusted PV of over \$4.5 million.

Mixed Reality Licensing Subscriptions: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Number of net new PoCs, annually		12	23	44
A2	Average number of seats per PoC		8	8	8
A3	Number of full deployments		2	13	38
A4	Average number of seats per full deployment		40	40	40
A5	Total net-new MR licenses sold, annually	$(A1 \cdot A2) + (A3 \cdot A4 \cdot 75\%)$	156	574	1,492
A6	Annualized MR licenses sold (net-new)	$(A1 \cdot A2) + (A3 \cdot A4)$	176	704	1,872
A7	Cumulative MR licenses sold to date	$A5_{CY} + A6_{PY}$ (cumulative)	156	750	2,372
A8	Churn rate		5%	5%	5%
A9	Churn-adjusted cumulative licenses deployed (rounded)	$A7 \cdot (1 - A8)$	148	713	2,253
A10	Average price per license, per year		\$3,330	\$3,330	\$3,330
A11	Gross licensing revenues (churn-adjusted)	$A9 \cdot A10$	\$492,840	\$2,374,290	\$7,502,490
A12	Gross profit margin		56%	58%	60%
At	Mixed reality licensing subscriptions	$A11 \cdot A12$	\$275,990	\$1,377,088	\$4,501,494
	Risk adjustment	↓5%			
Atr	Mixed reality licensing subscriptions (risk-adjusted)		\$262,191	\$1,308,234	\$4,276,419

Mixed Reality Proof-Of-Concept Services

ISVs revealed that PoC engagements were the most common revenue-generating entry point in delivering mixed reality solutions to customers. While PoC engagements brought in software licensing for an average of eight users, as accounted for in the mixed reality licensing subscriptions revenue category above, these projects also pulled through consulting and professional service revenues averaging \$45,000 per deal. Consulting and professional services provided during the PoC stage of the project often included 3D content authoring, custom

development work, security services, training, and change management. Professional services efforts during the PoC phase of a customer's mixed reality journey were considerably smaller than during the full deployment phase, given that mixed reality applications were rarely integrated with other enterprise systems during this early, mostly exploratory stage.

Mixed reality PoC engagements generally lasted between three and six months. At the time of the interviews, ISVs revealed that between 20% and 90% of PoC engagements graduated to full mixed reality deployments, with a 40% average conversion rate to full deployments from a PoC project. The professional service component of PoC engagements brought average gross profit margins of 33%.

For the composite ISV, this analysis assumes a varying number of net-new mixed reality deals over the three-year analysis, which are documented in row B1 in the table below. In modeling the revenue and margin impact of mixed reality POC engagements for the composite ISV, Forrester assumes the following:

- › Consistent with our analysis, average deal sizes for the professional services provided during mixed reality proof-of-concept engagements bring in average deal sizes of \$45,000.
- › The consulting and professional services component of proof-of-concept engagements bring gross profit margins averaging 33%, the average identified across ISVs interviewed for this study.

Mixed reality proof-of-concept revenues and margins will vary depending on a number of factors, including average hourly billable rates, the ease of deployment of future application versions, and the unique project scope defined by each client. To account for these variants, Forrester risk-adjusted the gross profitability figure for these PoC services by 5%. Over the three-year analysis period, gross profit from mixed reality PoC services totaled a three-year risk-adjusted PV of over \$888,000.

Mixed Reality Proof-Of-Concept Services: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Number of closed deals, per year		12	23	44
B2	Average deal size, proof of concept		\$45,000	\$45,000	\$45,000
B3	Gross revenue run rate	B1*B2	\$540,000	\$1,035,000	\$1,980,000
B4	Gross profit margin (%)		33%	33%	33%
Bt	Mixed reality proof-of-concept services	B3*B4	\$178,200	\$341,550	\$653,400
	Risk adjustment	↓5%			
Btr	Mixed reality proof-of-concept services (risk-adjusted)		\$169,290	\$324,473	\$620,730

Mixed Reality Implementation And System Integration

While most ISVs interviewed for the case study were aiming to ensure their mixed reality applications required the least implementation and configuration effort possible, all ISVs saw downstream services potential stemming from the use of their mixed reality solutions. Downstream revenues included configuration, onsite implementation, custom 3D content design and development, training, change management, business process reengineering, and system integration with other enterprise systems, including learning management systems (LMS), product life-cycle management (PLM), and computer-aided design (CAD) technologies. In addition, mixed reality ISVs indicated that between 50% and 100% of their full mixed reality deployments required at least some level of customization to tailor the their ready-built commercial-grade mixed reality solutions to each customer's specific business needs.

ISVs varied on whether they would provide these services in-house or through a third-party consultancy or system integrator. The CTO at one interviewed ISV was proactively looking to get out of the services business, revealing: "As we continue to grow, we will be increasingly relying on [global system integrators] for larger-scale deployments. We just want to be a software company."

Several of the interviewed ISVs came from digital agency and system integration backgrounds, and downstream mixed reality services were not only strategic, but lucrative. One ISV revealed that content creation

work coming from its mixed reality license holders could bring in revenues that are two to five times the size of the licensing revenues. For another ISV, professional services were business-critical, with the CEO stating: “Our revenue comes from three sources: immersive content creation, custom development services, and our SaaS licensing fees. We’re using our software as a loss leader to get more immersive content work.”

At the time of the interviews, 40% of mixed reality proof-of-concept engagements were graduating to full deployments on an annual basis, with this number ranging from 20% of PoCs to 90% of PoCs across interviewed ISVs. There was unanimous consensus that this number was trending upward, with several ISVs indicating the release of HoloLens 2 alone would drive stalled PoCs into full deployments.

In modeling the revenue and margin impact of mixed reality implementation and system integration services for the composite ISV, Forrester assumes the following:

- › Twenty percent of PoC projects graduate to full deployments in Year 1 of the analysis with this number quickly growing to 60% by Year 3 of the analysis. The number of full deployment projects each year can be found in row C3 in the table below.
- › Average mixed reality implementation and system integration project deal sizes are \$125,000 for full deployment projects, as seen in row C5. ISVs interviewed for this study that offered professional services supporting larger mixed reality rollouts saw per-project professional services as high as \$300,000.
- › Implementation and system integration projects bring gross profit margins of 35%.

Mixed reality implementation and system integration services varied significantly across interviewed ISVs. Average deal sizes will vary depending on the nature of the underlying mixed reality use case, the enterprise systems involved in system integration services, and the unique application customization and training requirements of each customer. To account for variance in average deal sizes and gross profitability levels, Forrester adjusted this revenue stream downward by 5%, yielding a three-year total PV gross profit on the composite ISV’s mixed reality revenue of over \$1.7 million.

“Our revenue comes from three sources: immersive content creation, custom development services, and our SaaS licensing fees. We’re using our software as a loss leader to get more immersive content work.”

CEO, Global ISV



Mixed Reality Implementation And System Integration Services: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Number of PoC-phase projects, cumulative	$B1_{CY} + C4_{PY}$	12	33	64
C2	Percentage of proof-of-concept projects graduating to full deployments		20%	40%	60%
C3	Number of full deployment projects closed (rounded)	$C1 * C2$	2	13	38
C4	Number of projects remaining in PoC phase	$C1 - C3$	10	20	26
C5	Full deployment and system integration average deal size		\$125,000	\$125,000	\$125,000
C6	Full deployment and system integration consulting revenues	$C3 * C5$	\$250,000	\$1,625,000	\$4,750,000
C7	Gross profit margin (%)		35%	35%	35%
Ct	Mixed reality implementation and system integration services	$C6 * C7$	\$87,500	\$568,750	\$1,662,500
	Risk adjustment	↓5%			
Ctr	Mixed reality implementation and system integration services (risk-adjusted)		\$83,125	\$540,313	\$1,579,375

Mixed Reality Managed Services

Several ISVs found that the recurring revenue opportunities for their mixed reality business went beyond software licensing to include managed services. These ongoing services are typically sold with block consulting hours or on a fixed-fee basis with various service tiers ranging from basic to premium. Notably, several ISVs packaged basic ongoing support services into their licensing subscriptions, which is typical in software-as-a-service businesses. The most common managed services ISVs were providing at the time of the interviews included:

- › End user and technical support for mixed reality applications and devices.
- › Ongoing training and/or change management services.
- › HoloLens device management and security services.
- › Ongoing content creation-as-a-service and digital asset management services and 3D design services complete with CAD artists.

Today, attach rates for ISV-provided mixed reality managed services hover around 50% of total mixed reality full deployment projects, although one ISV saw an 80% attach rate for its managed support services. For the composite ISV, Forrester assumes that:

- › Fifty percent of full mixed reality deployment customers purchase ongoing support and managed services each year, with the cumulative number of mixed reality managed services customers seen in row D3 in the table below.
- › Annual contract values for managed services are \$12,500, or 10% of the full deployment project size, consistent with our findings from the analysis.
- › While gross profit margins varied significantly across managed services projects, average practice-level gross profit margins are 35%.

Managed service gross profit varied significantly across interviewed ISVs and by specific mixed reality project. To account for variance in annual contract values, attach rates, and gross profit margins between ISVs and projects, Forrester adjusted this revenue category downward by 10%, yielding a three-year total PV gross profit of just shy of \$110,000.

“Assets in the real-world change faster than the digital world. We provide customers with engineering and CAD resources on an ongoing basis as changes in a factory’s physical layout need to be reflected in their digital models.”

Managing director, European ISV



Mixed Reality Managed Services: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Number of full deployment deals	C3	2	13	38
D2	Ongoing application support services (attach rate)		50%	50%	50%
D3	Total number of managed service contracts sold (rounded)	$D1 * D2 + D3_{PY}$ (cumulative)	1	8	27
D4	Annual contract value for managed services		\$12,500	\$12,500	\$12,500
D5	Total gross managed services billings	$D3 * D4$	\$12,500	\$100,000	\$337,500
D6	Gross profit margin		35%	35%	35%
Dt	Mixed reality managed services	$D5 * D6$	\$4,375	\$35,000	\$118,125
	Risk adjustment	↓10%			
Dtr	Mixed reality managed services (risk-adjusted)		\$3,938	\$31,500	\$106,313

Analysis Of Investments

QUANTIFIED INVESTMENT AREAS AS APPLIED TO THE COMPOSITE ISV

Total Costs							
REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Etr	Incremental staffing costs	\$0	\$550,883	\$743,385	\$943,408	\$2,237,675	\$1,823,966
Ftr	Research and development expenses	\$577,549	\$104,353	\$104,353	\$104,353	\$890,607	\$837,059
Gtr	Marketing and SG&A costs	\$0	\$108,809	\$377,370	\$764,924	\$1,251,103	\$985,492
Htr	Lab and demo equipment expenses	\$21,000	\$0	\$14,700	\$0	\$35,700	\$33,149
	Total costs (risk-adjusted)	\$598,549	\$764,044	\$1,239,808	\$1,812,685	\$4,415,086	\$3,679,666

Incremental Staffing Costs

Beyond the direct mixed reality product and service delivery costs, including the salary expenses for software developers, solution architects, engineers, and delivery consultants, which are included in the gross margin calculations in the Financial Analysis section of this case study, partners made a number of ongoing strategic investments in staffing and talent acquisition. At the time of the interviews, ISVs were both repurposing talent from their legacy businesses and making new hires specifically for their mixed reality practices.

The most common areas for ISV talent acquisition uncovered in the analysis include developers, 3D designers and animators, customer success managers, IT operations staff, customer and technical support personnel, and technical account managers. Overall, the areas in which ISVs struggled most to find talent were C++ development, Unity development, artificial intelligence, and, in some instances, 3D content design.

For the composite ISV, Forrester assumes the following incremental salary and benefit expenses:

- › In Year 1 of the analysis, the composite ISV hires a 3D designer/ animator, two additional developers with Unity experience, a customer support and IT operations resource, and a technical account manager. For a complete inventory of resources accounted for in this analysis, see rows E1 through E4 in the table below.
- › All staff salary expenses, shown in rows E5 through E8 below, include a salary overhead burden rate to account for benefits and payroll taxes, which is 30% of annual salary expenses in this analysis.

Forrester realizes that salaries will vary by region, skill set, exact position, and level of experience. As such, incremental salary expenses have been risk-adjusted upward by 5%. Over the three-year analysis, incremental salary costs total a PV of just over \$1.8 million for the composite ISV.

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 composite organization expects risk-adjusted total costs to be a PV of just under \$3.7 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.

Incremental Staffing Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
E1	3D designer/ animator		1.0	1.0	1.0
E2	Developers		2.0	3.0	4.0
E3	Customer support and IT operations hires		1.0	1.5	2.0
E4	Technical account manager hire		1.0	1.0	1.0
E5	Average 3D designer/ animator fully loaded annual salary		\$83,298	\$84,963	\$86,663
E6	Average developer fully loaded annual salary		\$132,512	\$135,162	\$137,865
E7	Average customer support/success fully loaded annual salary		\$77,749	\$79,304	\$80,890
E8	Average technical account manager fully loaded annual salary		\$98,580	\$98,580	\$98,580
Et	Incremental staffing costs	$(E1 * E5) + (E2 * E6) + (E3 * E7) + (E4 * E8)$	\$524,650	\$707,985	\$898,484
	Risk adjustment	↑5%			
Etr	Incremental staffing costs (risk-adjusted)		\$550,883	\$743,385	\$943,408

Research And Development Expenses

All ISVs interviewed for this study made sizable upfront research and development (R&D) investments in designing and building their mixed reality offerings. The time, resources, and cost of building a mixed reality minimum viable product (MVP) varied significantly across interviewed ISVs, with interviewees building their mixed reality applications with development teams ranging in size from two full-time equivalent (FTE) employees to 12 FTE employees. Time-to-market for ISVs' minimum viable products ranged from six months to 18 months. Total initial development costs, inclusive of time and labor, to build mixed reality MVPs ranged in total cost from a few hundred thousand dollars to nearly \$4 million. Notably, several ISVs, particularly those with agency or consulting backgrounds, were able to leverage IP built on previous paid projects for their own resalable mixed reality applications, significantly reducing out of pocket R&D expenses.

ISVs also invested significantly in ongoing product development across the life cycles of their mixed reality solutions. To maintain, update, and provide new feature releases for their mixed reality solutions over time, interviewees dedicated between 20% and 30% of the billable hours of multiple C++ and Unity developers and 3D design resources. For the composite ISV, Forrester assumes:

- › To build the MVP of its mixed reality solution, the composite ISV dedicates a team of four FTE design and development resources with significant Unity, 3D design and modeling, and other critical skill sets. The four-person team works over a period of 12 months to build out the ISV's MVP.
- › The organization allocates 25% of the billable hours for three development resources for ongoing product development and maintenance.
- › The ISV spends \$20,000 in hardware for research and development purposes.

The salaries for mixed reality development resources will vary across regions, and actual R&D costs for each ISV will vary significantly depending on the use case, industry focus, and specific product capabilities. To account for variance in R&D costs across ISVs, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of \$837,059.

Research And Development Expenses: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Number of developers		4	3	3	3
F2	Percentage of time spent on research and development initiatives		100%	25%	25%	25%
F3	Average full loaded salary per developer (annual)		\$132,512	\$132,512	\$132,512	\$132,512
F4	Hardware and GPU expenses		\$20,000			
Ft	Research and development expenses	$F1 * F2 * F3 + F4$	\$550,046	\$99,384	\$99,384	\$99,384
	Risk adjustment	↑5%				
Ftr	Research and development expenses (risk-adjusted)		\$577,549	\$104,353	\$104,353	\$104,353

Marketing And SG&A Costs

ISVs pursued a number of unique avenues to market and sell their mixed reality solutions in the marketplace. Given the relative nascency of mixed reality within the enterprise and the start-up status of many ISVs interviewed for this study, the majority of interviewees maintained total marketing budgets of less than \$50,000, with some relying on only inbound leads generated from grassroots marketing techniques. Common marketing techniques leveraged by mixed reality ISVs include social media campaigns, paid search campaigns, event marketing, and content marketing.

In addition, many interviewees were in the One Commercial Partner (OCP) catalog and were actively coselling with Microsoft at the time of the interviews. Others were selling through the Windows store and other Microsoft marketplaces. Lastly, ISVs were in the very early stages of engaging in horizontal partnerships with system integrators, distributors, and value-added resellers to expand the market footprint for their mixed reality solutions.

For the composite ISV, Forrester assumes:

- › Annual marketing expenditures used in this analysis range from 2% to 3% of annual revenues across the three-year analysis.
- › SG&A costs, excluding sales staff salaries, range from 3% to 5% of annual mixed reality revenues over the three-year analysis.

Given the variance in partner marketing strategies, tactics, and budgets across interviewees, Forrester risk-adjusted this figure upward by 5%. Over the three-year analysis, the composite ISV spends a total of just under \$1 million on market expenditures and SG&A costs after adjusting for risk and present value.

Marketing And SG&A Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
G1	Total mixed reality revenues		\$1,295,340	\$5,134,290	\$14,569,990
G2	Selling, general, and administrative costs (% of revenue)		5%	4%	3%
G3	Marketing costs (% of revenue)		3%	3%	2%
G4	Total selling, general, and administrative costs	G1*G2	\$64,767	\$205,372	\$437,100
G5	Total marketing costs	G1*G3	\$38,860	\$154,029	\$291,400
Gt	Marketing and SG&A costs	G4+G5	\$103,627	\$359,400	\$728,500
	Risk adjustment	↑5%			
Gtr	Marketing and SG&A costs (risk-adjusted)		\$108,809	\$377,370	\$764,924

Lab And Demo Equipment Costs

ISVs interviewed for the study purchased HoloLens devices and other equipment for their product development and sales teams to showcase and demo mixed reality solutions with end customers and partners. Interviewees purchased anywhere from five to 10 HoloLens devices and invested in other hardware to build out their demonstration environments and product development labs.

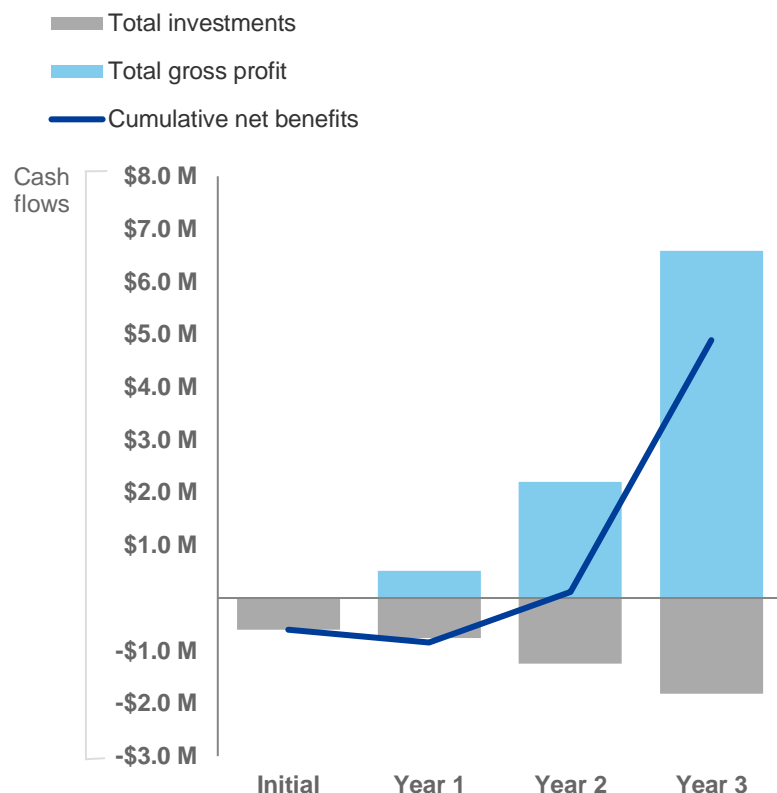
Forrester assumes that the composite ISV purchases four HoloLens devices and additional hardware during the development of the MVP, with another four devices purchased in the second year of the analysis. Forrester risk-adjusted this figure by 5% to account for variance in incurred lab and demo costs across interviewed ISVs. Over the three-year analysis, lab and demo equipment costs total a PV of \$33,149.

Lab And Demo Equipment Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	HoloLens purchased for Demos		4		4	
H2	HoloLens price		\$3,500		\$3,500	
H3	HoloLens costs	H1*H2	\$14,000		\$14,000	
H4	Other demo equipment costs		\$6,000			
Ht	Lab and demo equipment costs	H3+H4	\$20,000	\$0	\$14,000	\$0
	Risk adjustment	↑5%				
Htr	Lab and demo equipment costs (risk-adjusted)		\$21,000	\$0	\$14,700	\$0

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS



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 Margin and Cost section.

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total investments	(\$598,549)	(\$764,044)	(\$1,239,808)	(\$1,812,685)	(\$4,415,086)	(\$3,679,666)
Total gross profit	\$0	\$518,543	\$2,204,519	\$6,582,837	\$9,305,899	\$7,239,102
Operating profit	(\$598,549)	(\$245,501)	\$964,711	\$4,770,152	\$4,890,813	\$3,559,436
ROI						97%
Practice break-even (months)						23.0

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.

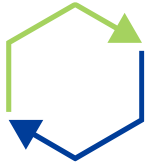
Total Economic Impact Approach



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

¹ Source: “The Extended Reality Opportunity Today: Your Employees,” Forrester Research, Inc., April 4, 2019.

² Source: Forrester Analytics Global Business Technographics® Workforce Benchmark Survey, 2018.

³ Source: Forrester Analytics Global Business Technographics® Software Survey, 2016

⁴ Source: Forrester Analytics Consumer Technographics North American Technology, Media, And Telecom Topic Insights 2 Survey, 2018.