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THE STATE OF AUGMENTED AND VIRTUAL REALITY

A SURVEY OF TECHNOLOGY
AND BUSINESS
STAKEHOLDERS IN
PRODUCT COMPANIES
MARCH 2018

INTRODUCTION

Virtual reality first permeated the ether through science fiction tales, television serials and movies. From the 1950s and even earlier, creative minds introduced us to virtual worlds beyond our wildest imagination even though the supporting technology was considered light years away. But with the release of the latest devices — smartphones, glasses, headsets and more — paired with superhuman supporting technology and content, augmented reality and virtual reality (AR/VR) are intersecting with real life. This whole new ecosystem promises to offer a different lens in how we see and interact with our world whether at work, home or on the go.

Yet despite the hype surrounding these technologies, the AR/VR market is still in its infancy stage and unsettled even among those driving innovation. There remains a need for both devices and content to become mainstream. Now, more than ever, product companies in every industry must reframe how they design and create products, market and manage their supply chains. What are they doing to prepare for AR/VR? What are the barriers? And, what are the expectations of the people in the trenches making day-to-day decisions about AR/VR adoption?

The following report, sponsored by Jabil, is based on a global survey of 201 team managers and executives with responsibility for AR/VR decisions at companies that design, market and/or produce manufactured products, in industries such as consumer electronics, healthcare, entertainment and retail. Questions were asked on a range of topics about current AR/VR adoption and future expectations.



DUE TO THE ABSENCE OF A SOLIDIFIED, STANDARD DEFINITION FOR THESE TECHNOLOGIES, HERE IS HOW WE DEFINE EACH:

VIRTUAL REALITY (VR)

presents a different reality on a wearable device



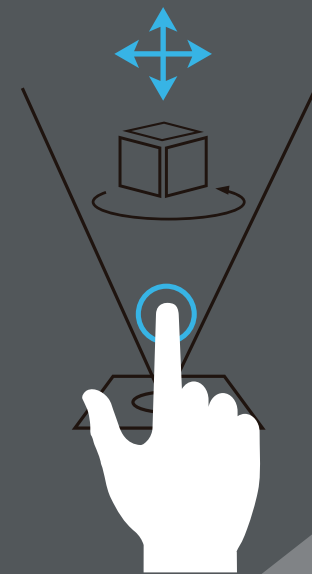
AUGMENTED REALITY (AR)

presents graphics overlaid on top of the real world



MIXED REALITY (MR)

is a version of AR that allows computer and real content to interact with the real world



KEY FINDINGS

AR/VR IS STILL EVOLVING

27% say they have a plan

Only **7%** reveal they are executing on the plan

There is no consensus on the type of “killer app”

60% think it will be for consumer use

40% think it will be for business or enterprise use

74% say innovation is needed most for technology to create content

64% say investment is needed most for devices to experience content

49% believe the long-term future is a “Minority Report”-style augmented reality

STAKEHOLDERS ARE KEEPING THEIR OPTIONS OPEN

99% state their plans are flexible

82% expect the AR/VR landscape to change too quickly to make plans

Only **37%** are very confident in their opinions about the future of AR/VR

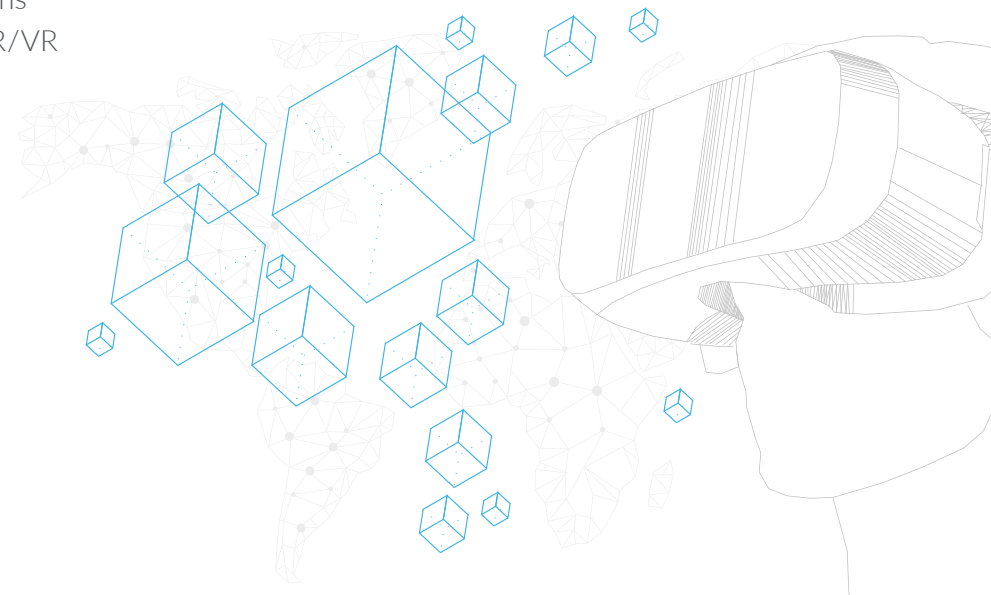
CHALLENGES EXIST, BUT WILL BE OVERCOME SOON

99% report technology challenges that must be overcome

97% report content-related challenges that must be overcome

69% predict AR/VR to become mainstream within five years

89% expect vendors to help meet AR/VR objectives





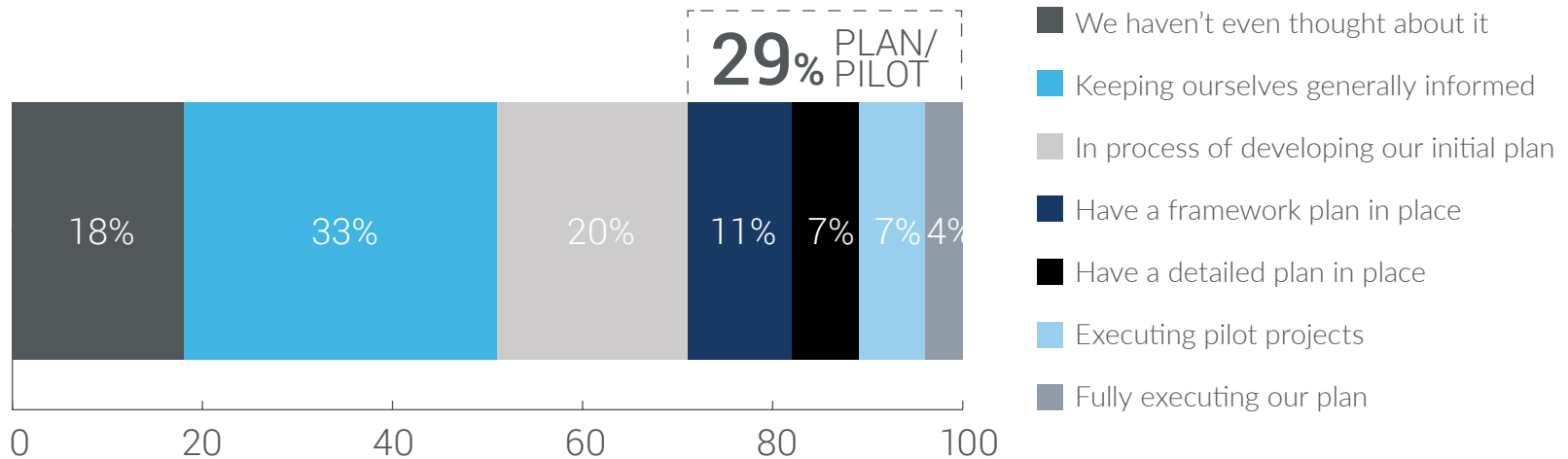
**DETAILED FINDINGS:
AR/VR IS STILL
EVOLVING**

AR/VR PLANNING AND ADOPTION ARE A WORK IN PROGRESS

AR/VR technology will impact business – from warehouses and manufacturing to retail, entertainment, and even operating rooms – in a wide range of ways. But as with integrating most new technology, AR/VR will require prodigious planning and investment before product companies make the leap into this virtual realm. Where do you begin? What problems do you try to solve?

When respondents were asked about their company's current AR/VR plans, only 29% say they have a plan or framework at some stage of development including just 11% that are executing on that plan today.

How would you characterize your company's current investment or plans in AR/VR?



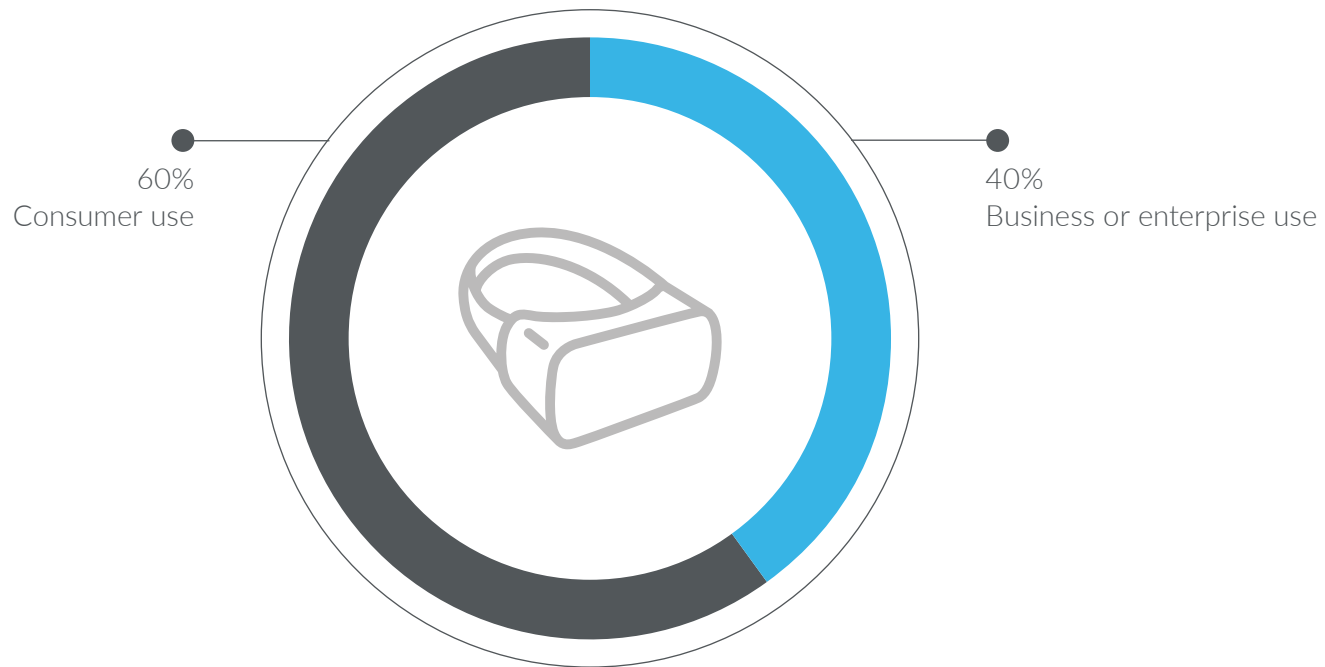
NO CONSENSUS ON THE “KILLER APP”



There are many conversations foretelling AR/VR as a technology that only comes along once in generation. Likewise, there is also much speculation about the “killer app” that will make a AR/VR a game changer for how we work, live, and enjoy our free time. Yet when asked about what types of AR/VR uses – consumer or business – will first be widely adopted, there wasn’t general agreement among AR/VR stakeholders. In fact, 60% think consumer uses will be the first to go mainstream and 40% think it will be business or enterprise use.



In your opinion, which of the following uses for AR/VR will be the first to become widely adopted?



NO CONSENSUS ON THE “KILLER APP”

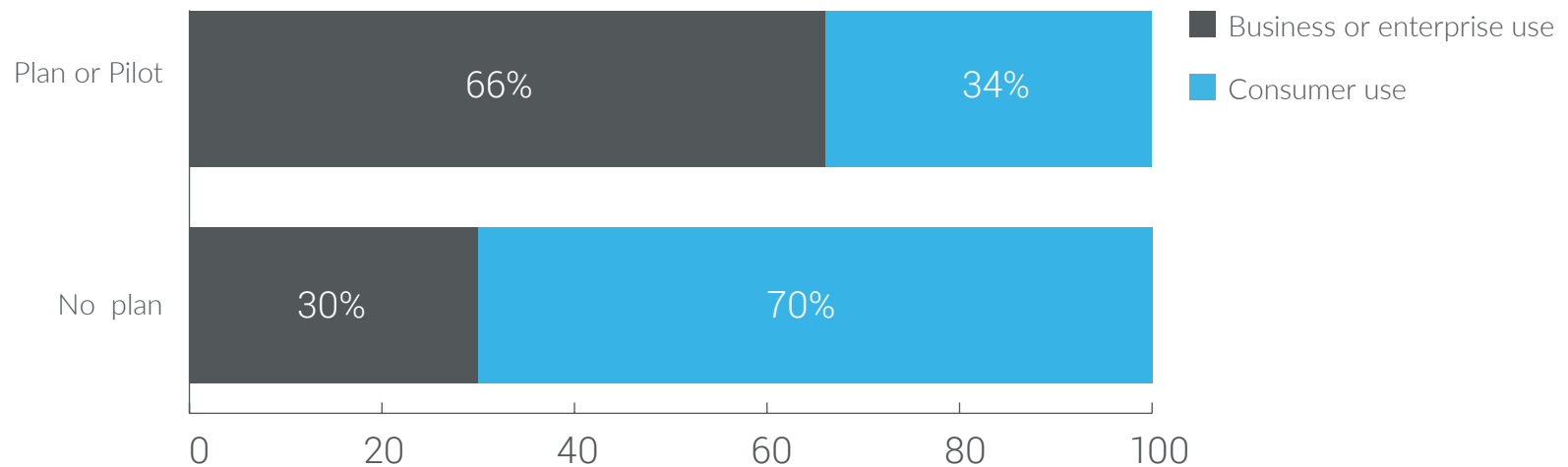


Interestingly, there is definite shift in opinion depending on a company's level of experience with AR/VR technology. Of those most experienced – with a plan or pilot – 66% predict the “killer app” will be produced for business use. At the other end of the spectrum, 70% of those without an AR/VR plan predict the “killer app” will be a consumer use.



In your opinion, which of the following uses for AR/VR will be the first to become widely adopted?

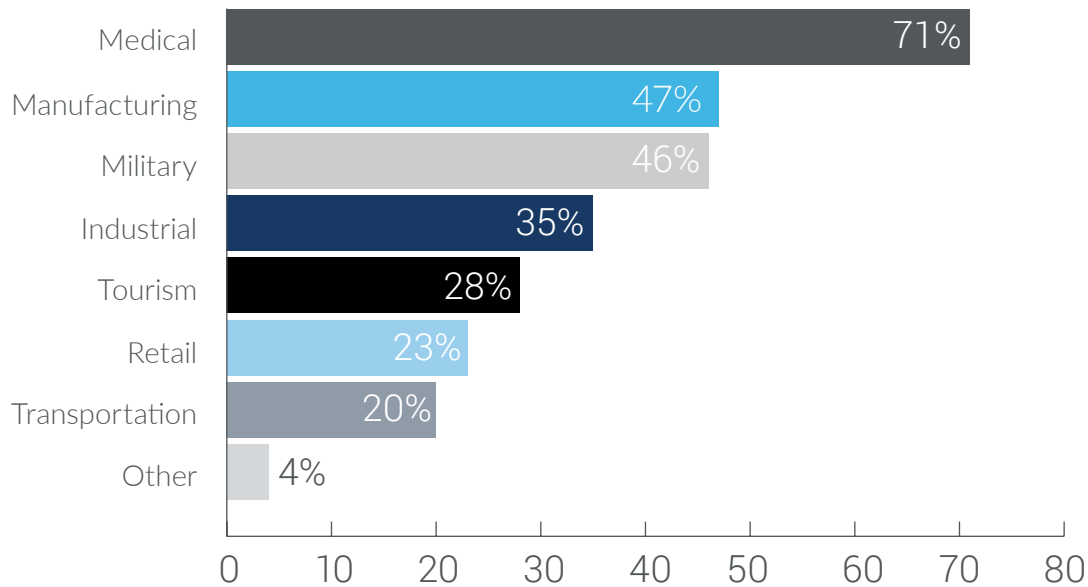
(By AR/VR maturity)



NO CONSENSUS ON THE “KILLER APP”

When considering the potential of AR/VR on the job, whether it is delivering data to employees or allowing users to see and interact with actual objects or virtual objects in unconventional ways, the possibilities are infinite. However, it is expected that key industries will be impacted the most by AR/VR use. Among AR/VR stakeholders, 71% expect medical to be the top business use followed by manufacturing (47%) and military (46%).

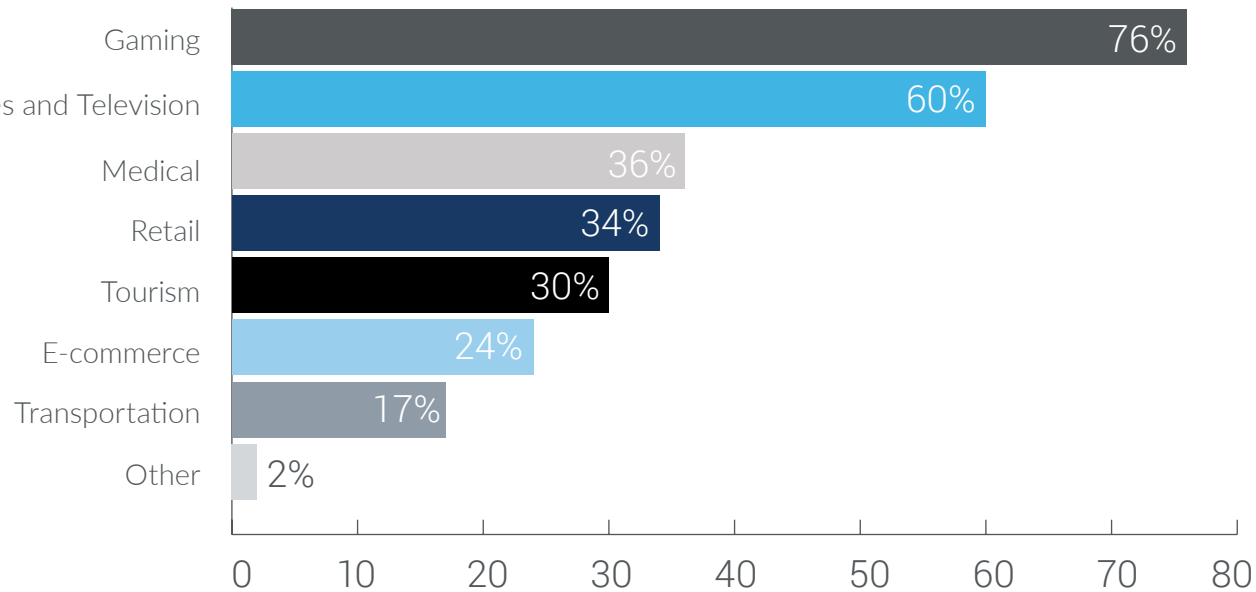
In your opinion, what are the top industries that will be impacted by AR/VR for BUSINESS use?



NO CONSENSUS ON THE “KILLER APP”

Likewise, when we drill down on specific consumer uses there are clear expectations for leading industries with 76% of AR/VR stakeholders expect gaming to feel the most impact followed by movies and television (60%). This opinion supports what is already happening today with the popularity of AR/VR inspired games such as Pokémon Go and Ingress as well as consumer-based products such as PlayStation VR, headsets, glasses and others.

In your opinion, what are the top industries that will be impacted by AR/VR for CONSUMER use?



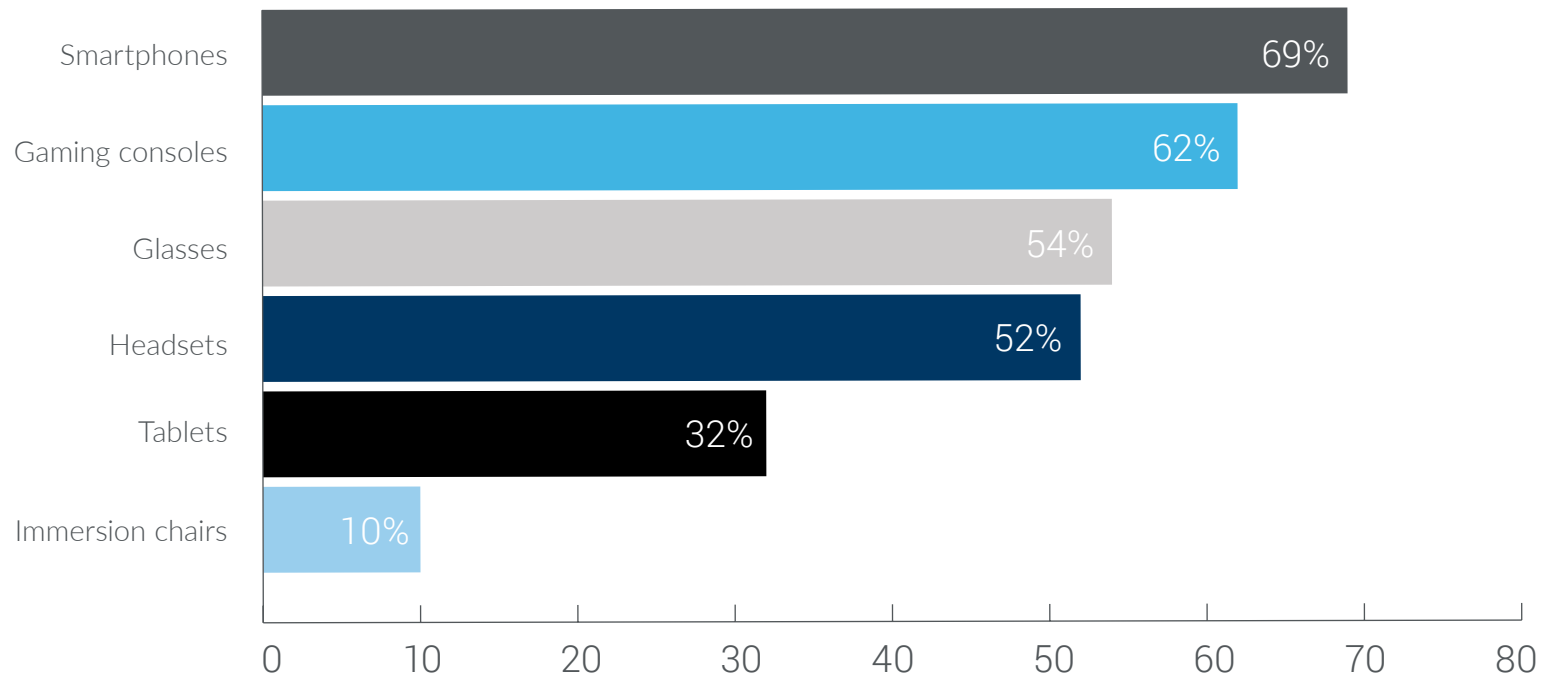
NO CONSENSUS ON THE “KILLER APP”



In respect to the most common types of devices predicted for AR/VR use, 69% report smartphones followed closely by gaming consoles (62%). Conversely, immersion chairs (10%) are the least favorable type of AR/VR devices.



In your opinion, what types of devices will be most popular for AR and VR?



INNOVATION STILL NEEDED FOR AR/VR

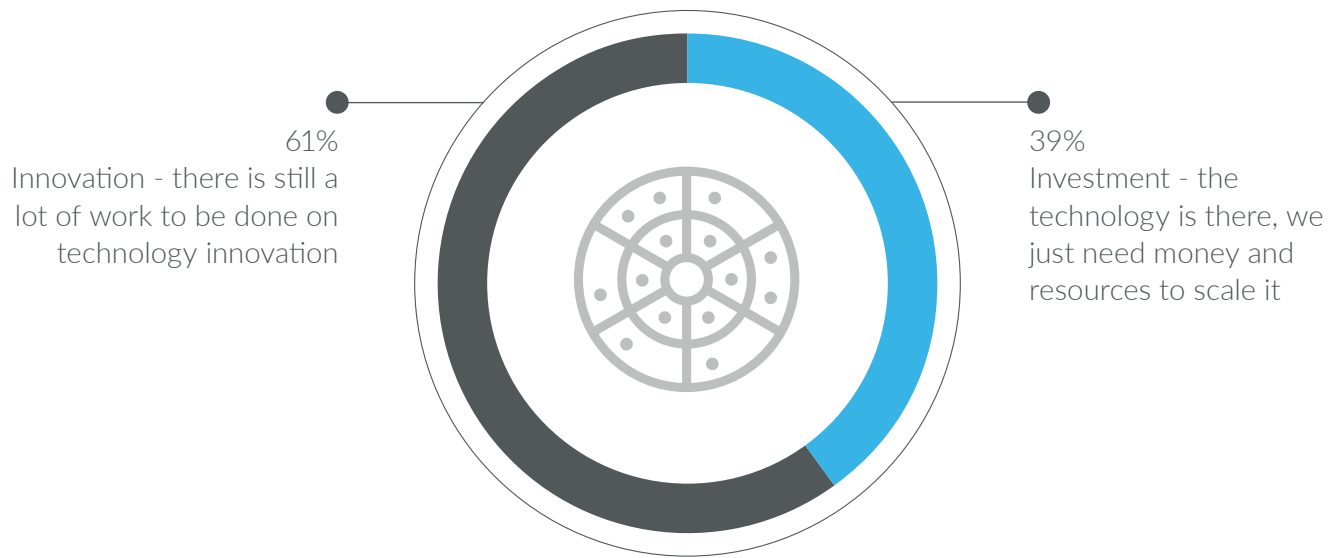


AR/VR is an emerging technology with tremendous market opportunity. But there are still big business hurdles that must be cleared before going mainstream.

Today's companies must determine how to best strategically capture the benefits of AR/VR. Should they focus more on innovation around underlying technology to soar ahead of the competition? Or, is the technology ready and they should invest more money and resources to scale AR/VR? When asked whether there is a greater need for innovation or investment for AR/VR to go mainstream, 61% say innovation is still needed.



In your opinion, is there a greater need for INNOVATION or INVESTMENT to bring AR/VR to the mainstream?



INNOVATION STILL NEEDED FOR AR/VR



At its core, AR/VR is composed of two crucial parts:

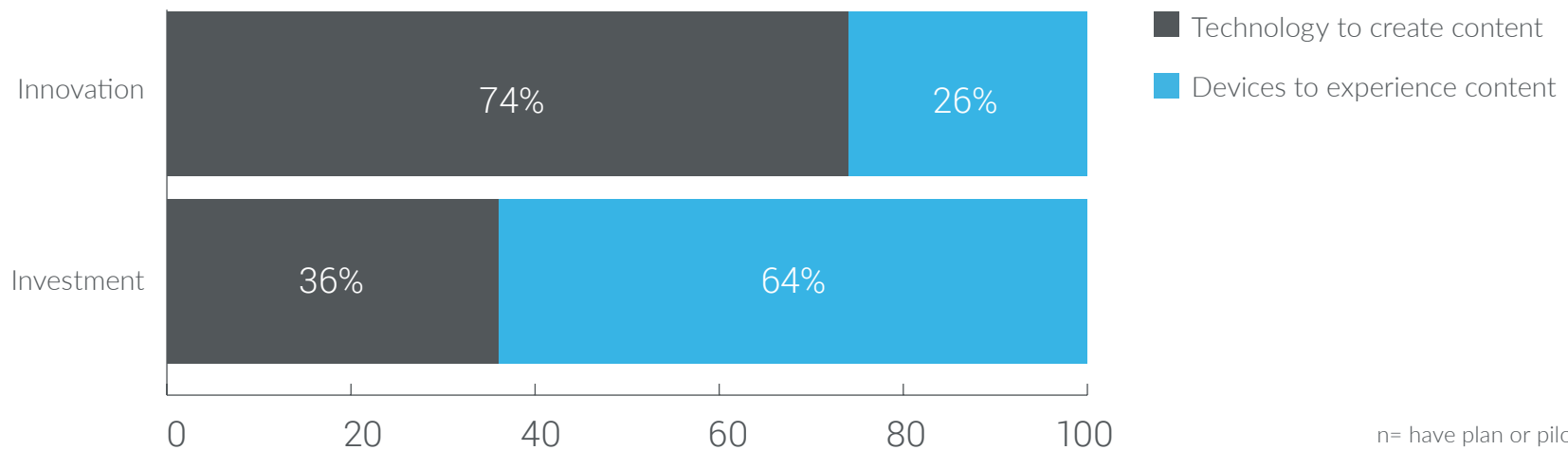
- **Technology to produce the content** (e.g., 360 cameras, hardware/software to process content)
- **Devices to run the experience on** (e.g., smartphones, glasses, headsets, consoles)

In order to recognize the AR/VR innovation gaps, we asked stakeholders with an AR/VR plan or pilot, those with the most experience, about the progress of content creation and devices. Nearly three fourths (74%) say the technology required to create the content is not there yet.

However, on the device side, the technology is further along with only 26% reporting innovation is still required.



In your opinion, which of the following areas require the most INNOVATION/INVESTMENT before AR/VR can become a mainstream technology?

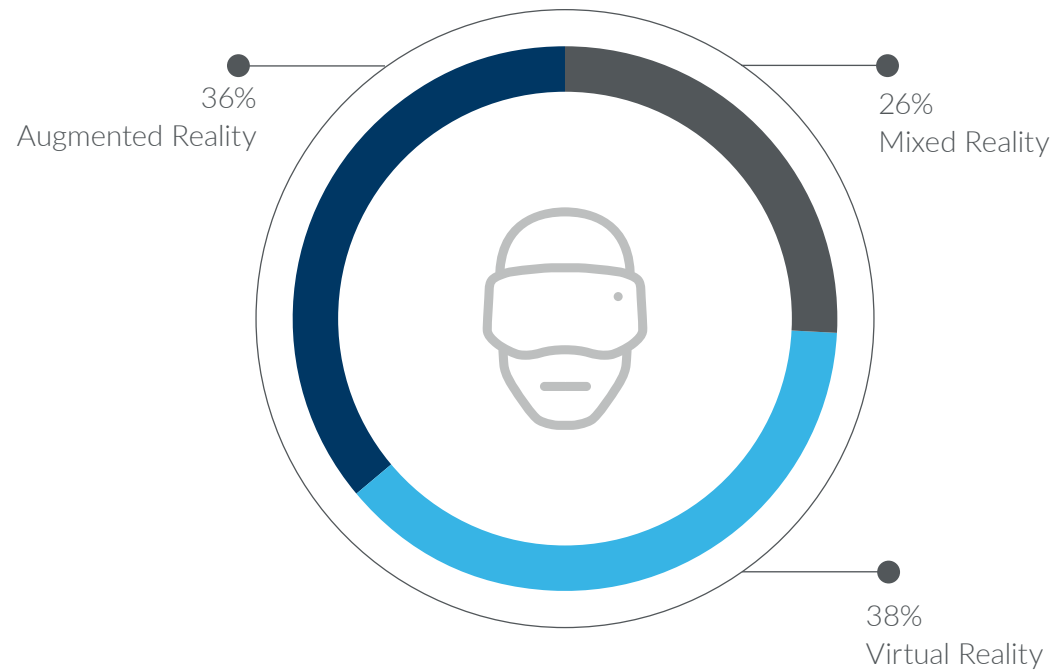


n= have plan or pilot

INNOVATION STILL NEEDED FOR AR/VR

▶ To add to the complexity of this emerging technology, there is still disagreement in the market about what is more promising – VR, AR or MR. The mixed responses from this group of AR/VR stakeholders support the view that there is no clear winner in the short term regardless of the progress in the individual arenas.

▶ **In your opinion, which will have the bigger impact in the next five years?**



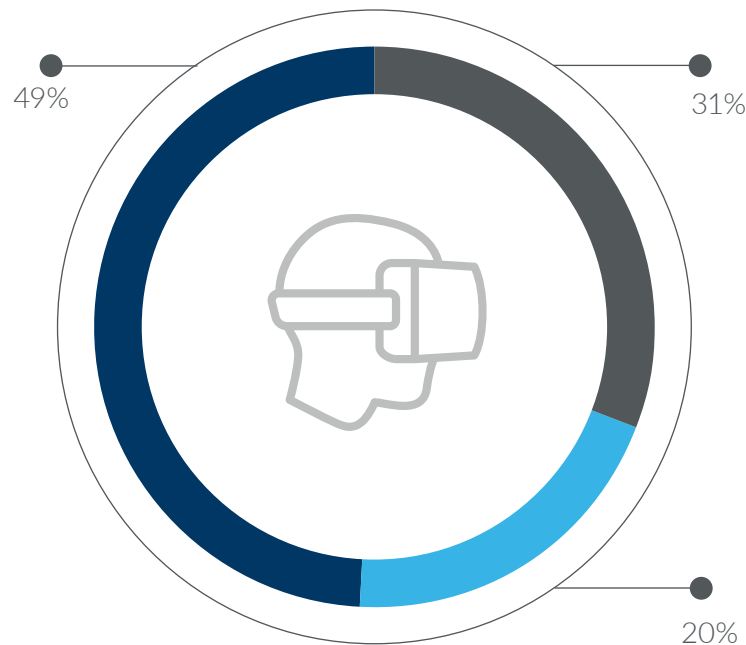
INNOVATION STILL NEEDED FOR AR/VR



There is a bit more agreement about the future of AR/VR looking further out. When gazing into the long-term future, almost half (49%) of the most experienced product stakeholders predict a Minority Report-type experience where the AR/VR environment travels with you.



Based on what you know about AR/VR, what do you expect a typical AR/VR experience to be most like in 20-25 years?



- Minority Report - the AR/VR environment travels with you
- The Matrix - a live, moving experience even though you are not moving
- Holodeck from Star Trek - a fixed environment that you move around in

n= have plan or pilot



**DETAILED FINDINGS:
STAKEHOLDERS
ARE KEEPING THEIR
OPTIONS OPEN**

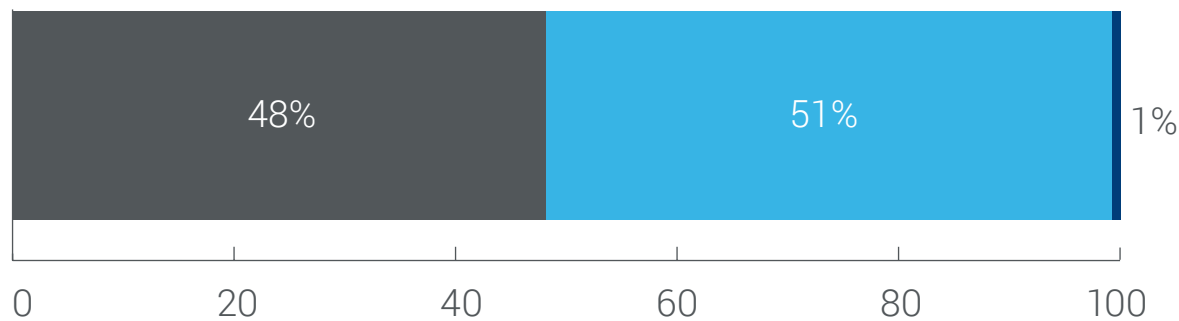
ALMOST ALL AR/VR PLANS ARE FLEXIBLE



As the AR/VR market continues to evolve, companies are embracing flexibility in respect to their AR/VR plans. In fact, 99% of stakeholders say existing plans are flexible with nearly half (48%) reporting complete flexibility with AR/VR plans and strategies.



How flexible are existing AR/VR plans and strategies?



■ Completely flexible - things are changing so fast we are ready to course-correct anytime we learn more

■ Somewhat flexible - we are pretty confident, but expect some things to change slightly

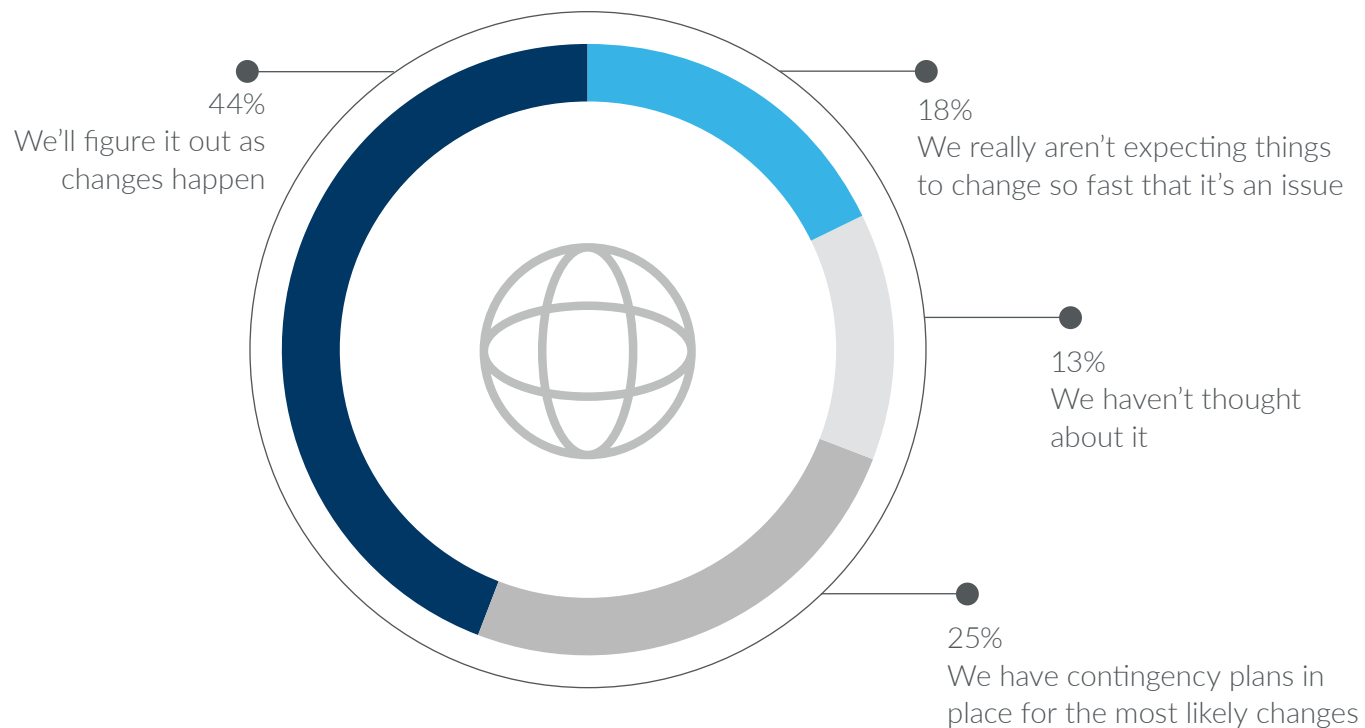
■ Not flexible - we are completely confident in our strategy

n= have AR/VR plans or investment

THE QUICKLY-CHANGING AR/VR LANDSCAPE MAKES PLANNING DIFFICULT

As such, nimbleness in planning enables companies to respond to change more quickly and effectively especially in an extremely fluid market, such as AR/VR. Specifically, 69% of participants expect the AR/VR market to change quickly enough that they expect their plans to change.

How does your company plan to handle the constantly changing AR/VR landscape?



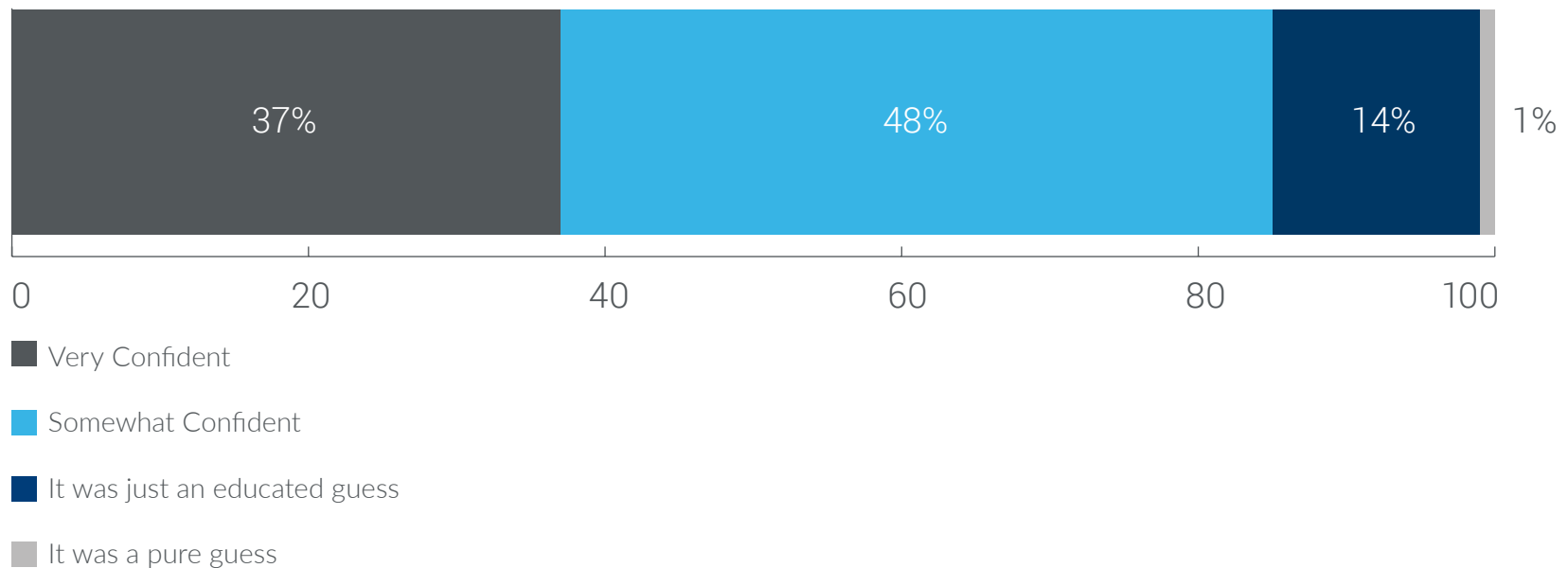
THE QUICKLY-CHANGING AR/VR LANDSCAPE MAKES PLANNING DIFFICULT



Surprisingly, even with all the market hype about the potential of AR/VR, there still seems to be disunity about its future. Only one in three (37%) stakeholders are very confident in their opinions about the future of AR/VR.



How confident are you in your opinions regarding the changing AR/VR landscape?





**DETAILED FINDINGS:
CHALLENGES
EXIST, BUT WILL BE
OVERCOME SOON**

COMPANIES FACE BOTH TECHNOLOGY AND CONTENT CHALLENGES

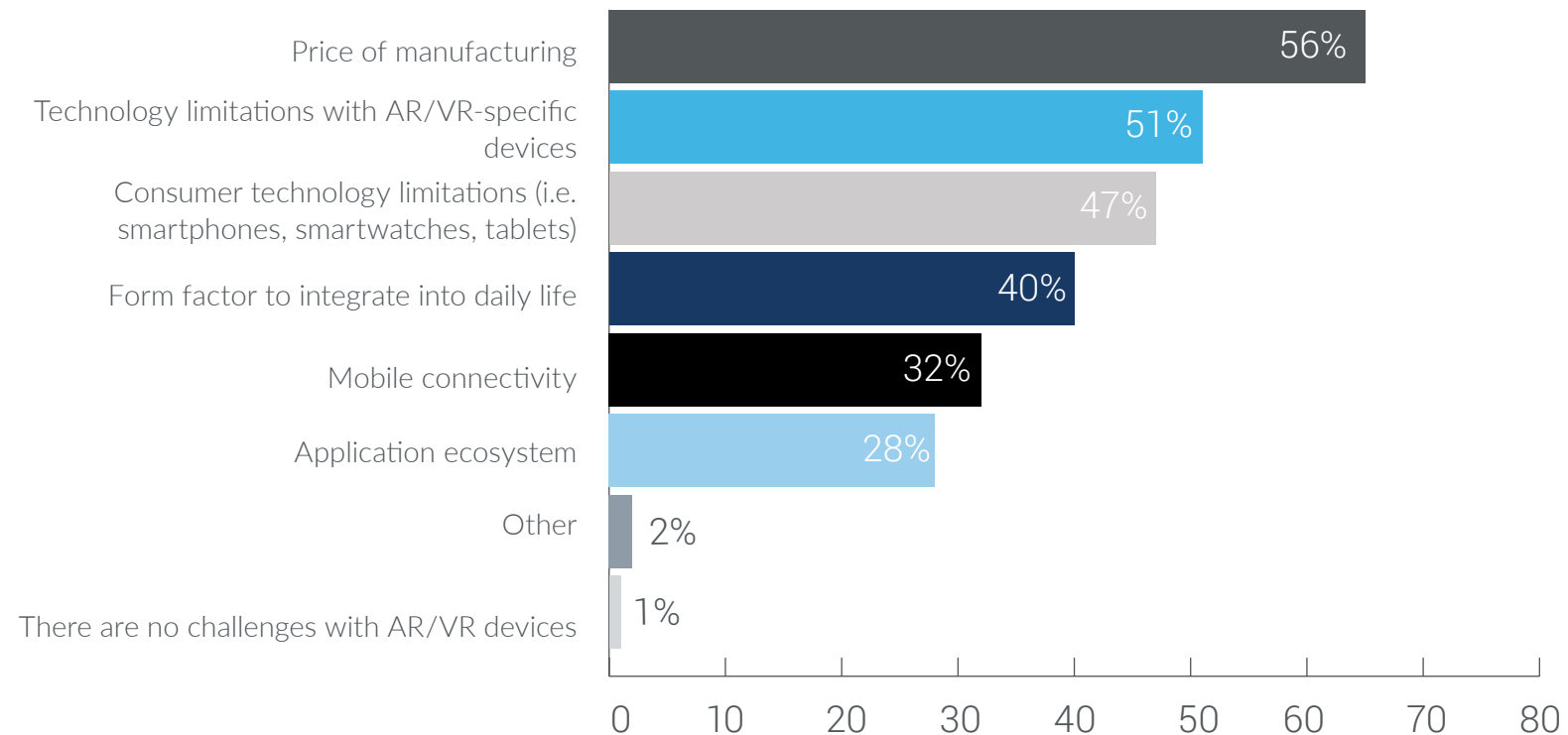


To capture the evolving insights from those in the trenches who are making day-to-day decisions about AR/VR, we asked if there are technology and content challenges that must be conquered.

Almost everybody, 99%, report there are technology challenges to overcome for AR/VR to become mainstream. The leading three technology challenges included price of manufacturing (56%), technology limitations with AR/VR-specific devices (51%) and consumer technology limitations (47%).



What challenges related to TECHNOLOGY need to be overcome for AR/VR to become mainstream?



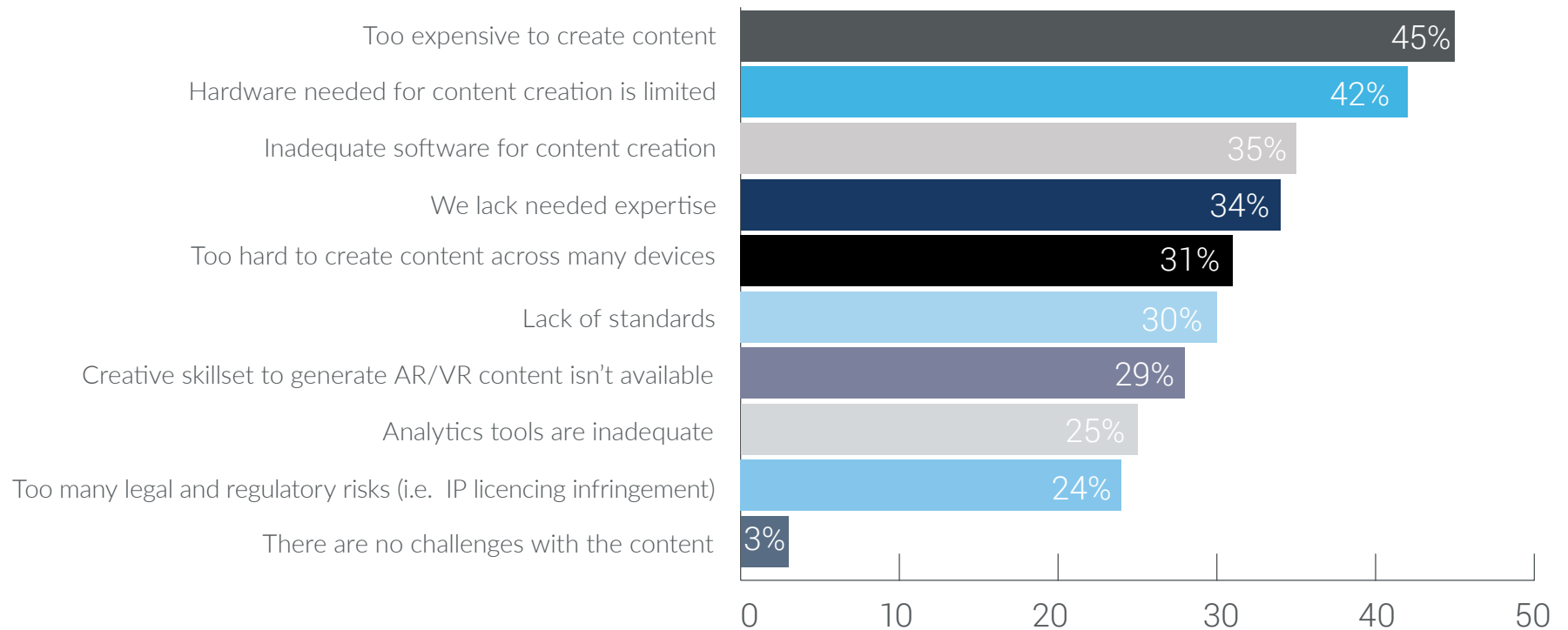
COMPANIES FACE BOTH TECHNOLOGY AND CONTENT CHALLENGES



Similarly, 97% of participants cite AR/VR content challenges to overcome with high content expenses (45%), limited hardware (42%) and inadequate software (35%) at the top of the list.



What challenges related to CONTENT need to be overcome for AR/VR to become mainstream?



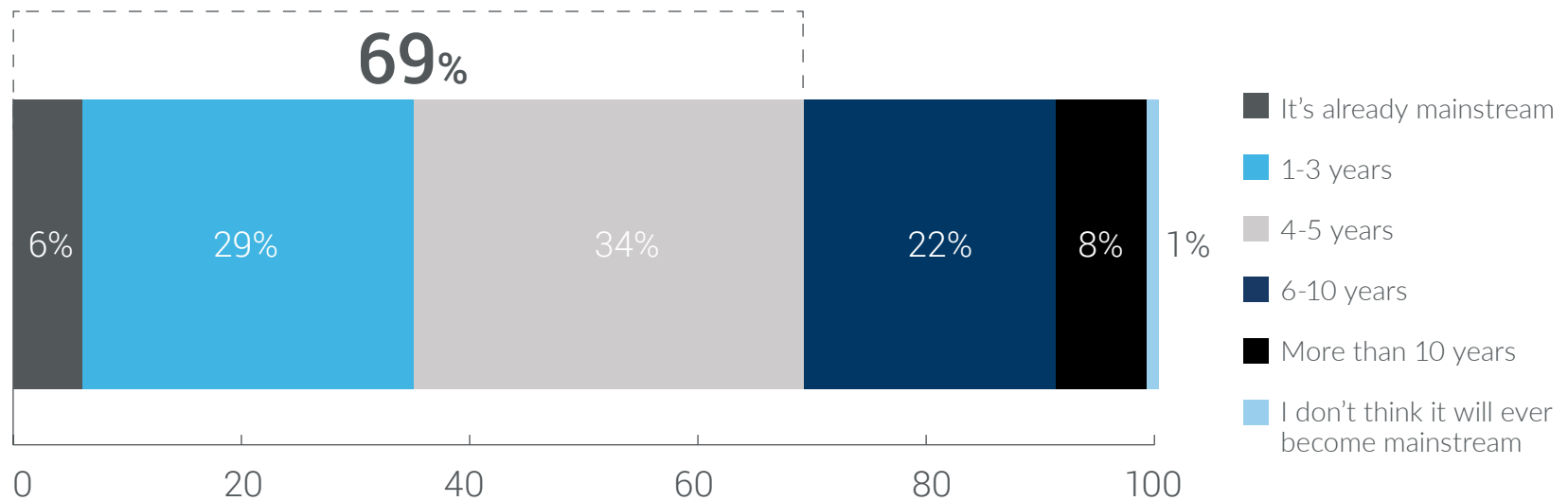
AR/VR IS PREDICTED TO BECOME MAINSTREAM WITHIN FIVE YEARS



But there is good news despite the AR/VR challenges that still must be overcome. AR/VR is predicted to be on the fast track to mainstream with product companies hoping to prosper from its success. More than two thirds (69%) of participants predict AR/VR to become mainstream within five years. And, a confident 6% believe AR/VR is already mainstream.



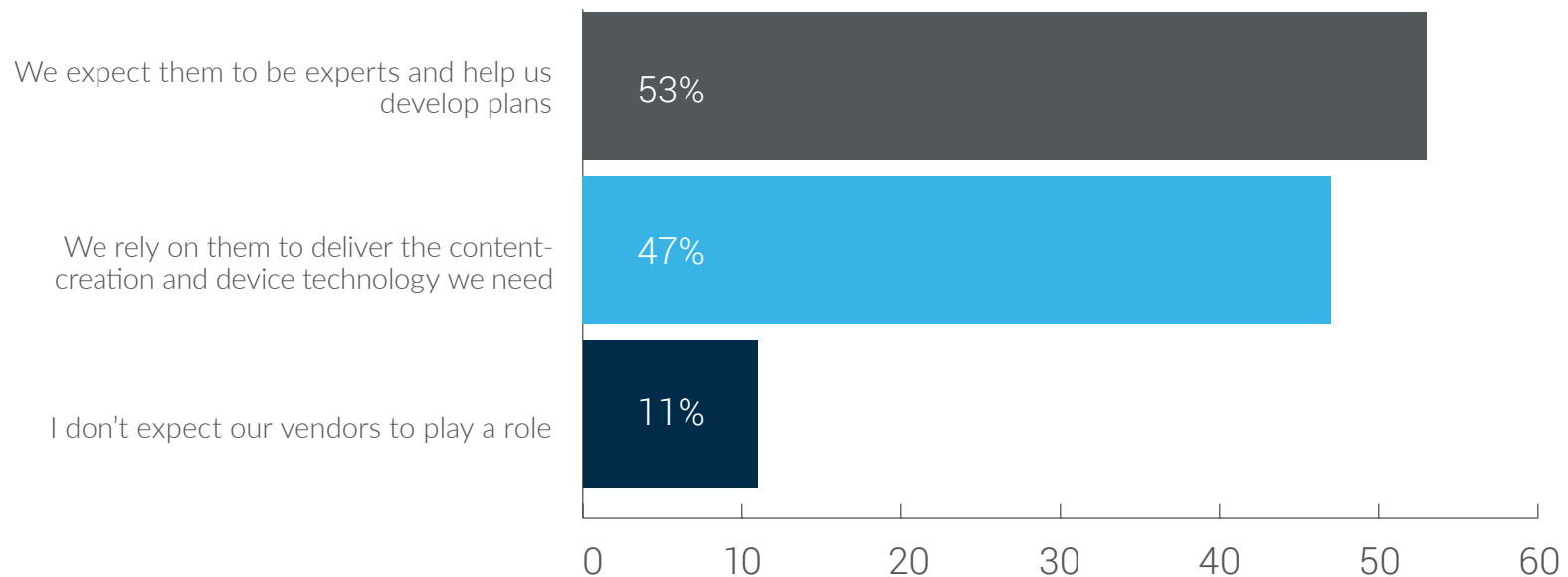
When do you expect AR/VR to become mainstream?



DEMAND FOR VENDORS TO HELP MEET AR/VR OBJECTIVES IS HIGH

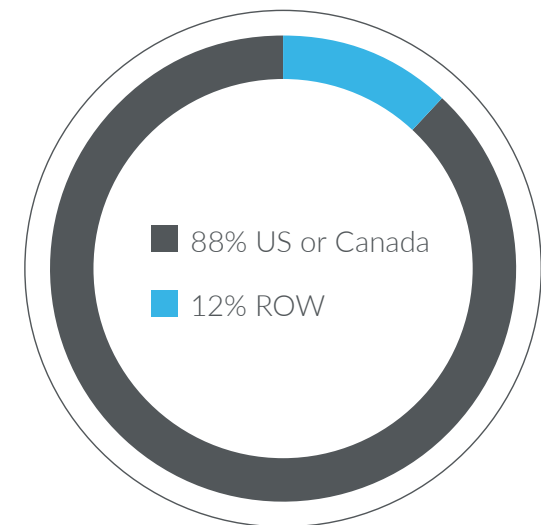
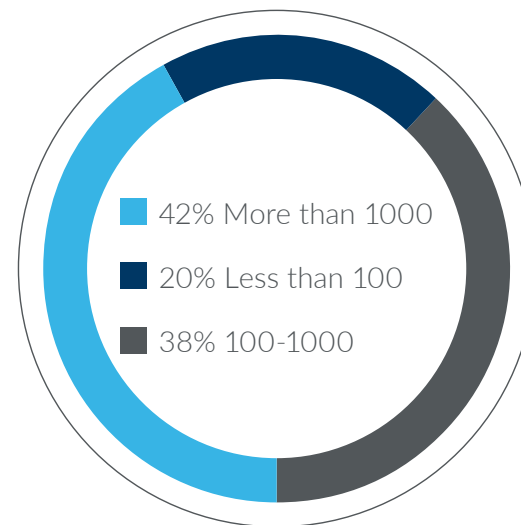
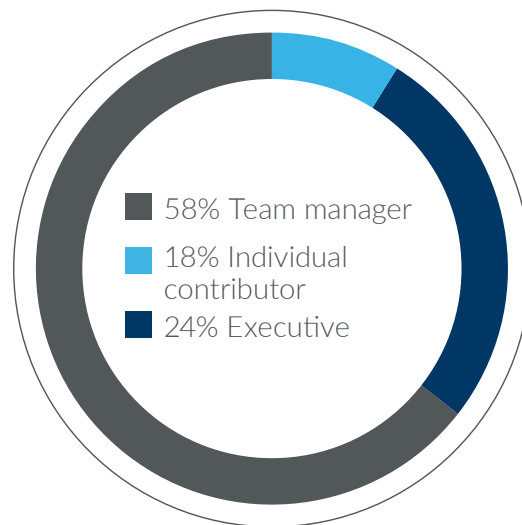
▶ To successfully conquer the challenges involved with building out AR/VR technologies while moving at the speed of light, product companies may want to consider partnering with experienced vendors who can provide end-to-end product development with comprehensive engineering capabilities. By leveraging outside AR/VR talent and technology, companies can focus on their core strengths while also delivering an out-of-this-world immersive experience. In fact, nearly nine in 10 (89%) expect vendors to help meet AR/VR requirements – anything from planning to content creation and device technology. Only 11% say they don't expect vendors to play a role in AR/VR.

▶ What role do you expect your vendors to take to help you meet your objectives for AR/VR?



SURVEY METHODOLOGY AND PARTICIPANT DEMOGRAPHICS

An online survey was sent to AR/VR stakeholders at product companies to capture hard data on trends the adoption of AR/VR. A range of questions were asked about adoption and future expectations about AR/VR. A total of 201 individuals from around the globe completed the survey. All participants had responsibility for AR/VR decisions and were very knowledgeable about the topic. Participants included a mix of job levels in decision making, company sizes and regions.



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