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CONNECTED HOME & BUILDING TECHNOLOGY TRENDS

A SURVEY OF MANUFACTURING DECISION STAKEHOLDERS

June 2018

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dimensional research

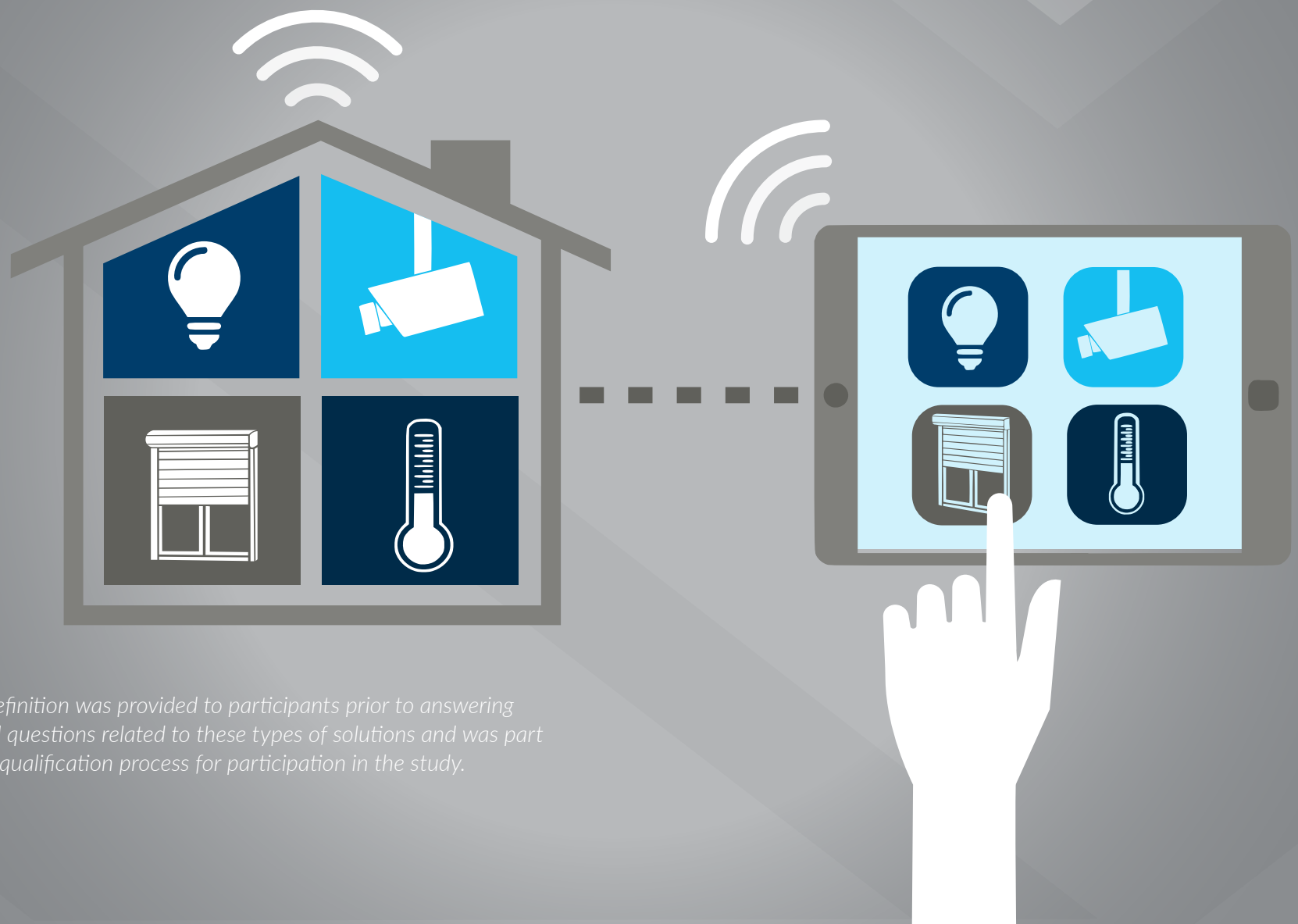
INTRODUCTION

Visions of a future where IoT-enabled devices connect all aspects of our daily lives have always centered on the homes and buildings where we live and work. Examples of how this world will be connected are often very personal: fridges that automatically reorder before you run out of milk, doors that unlock just for the people authorized to go through them and rooms that automatically adjust the environment for the individuals present.

While progress has been made in many areas, our homes and buildings are still limited in connectivity. Smart lightbulbs and intelligent security sensors are the rare exception, rather than the norm. This research checks in with the people who have hands-on responsibility for delivering these connected solutions to gain a deeper understanding of their current reality. Where are the opportunities? What is getting in the way? What needs to change to achieve the full potential? This report goes beyond the hype associated with predictions of a future connected world and takes a practical look at today's realities.

The following report, sponsored by Jabil, is based on an online survey of 201 individuals responsible for decisions related to the delivery of their company's connected home and building solutions. Questions were asked on a variety of topics related to adoption, opportunities and challenges faced.

In this survey, the term **“connected home and building solutions”** refers to any IoT-connected device used to automate, monitor and control houses, offices or other types of buildings. This is sometimes referred to as “smart buildings,” “digital homes,” or similar terms. Solutions include but are not limited to home speakers, connected appliances, smart thermostats, security systems, lighting and occupancy sensors.



This definition was provided to participants prior to answering topical questions related to these types of solutions and was part of the qualification process for participation in the study.

KEY FINDINGS

CONNECTED HOME AND BUILDING SOLUTIONS ARE CHANGING THE MARKET LANDSCAPE

- Top market opportunities include **security and access control (61%), energy efficiency (54%), smart buildings (54%)** and **smart appliances (44%)**
- Participants believe consumers are motivated primarily by **convenience (40%), improved physical security and safety (33%)** and **cost savings (29%)**
- Only **28%** report they invested to enable new business models, but **97%** see opportunities for them
- Top opportunities for new business models include **new solutions based on data (54%)** and **subscription payments (44%)**

SOLVING EXISTING CHALLENGES WILL BE KEY TO THE SUCCESS OF CONNECTED SOLUTIONS

- **99%** report they face challenges developing connected solutions
- Top challenges reported include **delivering user interfaces (50%), high costs (44%), difficulties integrating with other devices (43%)** and **security and privacy concerns (43%)**
- **98%** would benefit from data and communication standards for connected devices
- **73%** say data and communication standards would be "very valuable"
- **69%** report innovations in IoT cybersecurity would accelerate the adoption of their connected solutions
- **99%** report partners are important to their connected solution strategy

PRIVACY ISSUES ARE FORCING DATA COLLECTION AND USE PLANS TO EVOLVE

- **99%** say their connected solutions will collect data
- **100%** of those that collect data have plans to use it
- **69%** have reconsidered their plans to use data based on recent news about data privacy

DISTINCT CULTURAL SPLIT EXISTS ON BEST WAY TO INTEGRATE DEVICES

- **45%** prefer to deliver needed functionality within their own ecosystem to retain full control of the user experience
- **47%** prefer to follow industry standards to enable interoperability within a broad ecosystem of vendors and device types

DETAILED FINDINGS: CONNECTED HOME AND BUILDING SOLUTIONS ARE CHANGING MARKET LANDSCAPES

MULTIPLE OPPORTUNITIES EXIST FOR CONNECTED HOME AND BUILDING SOLUTIONS

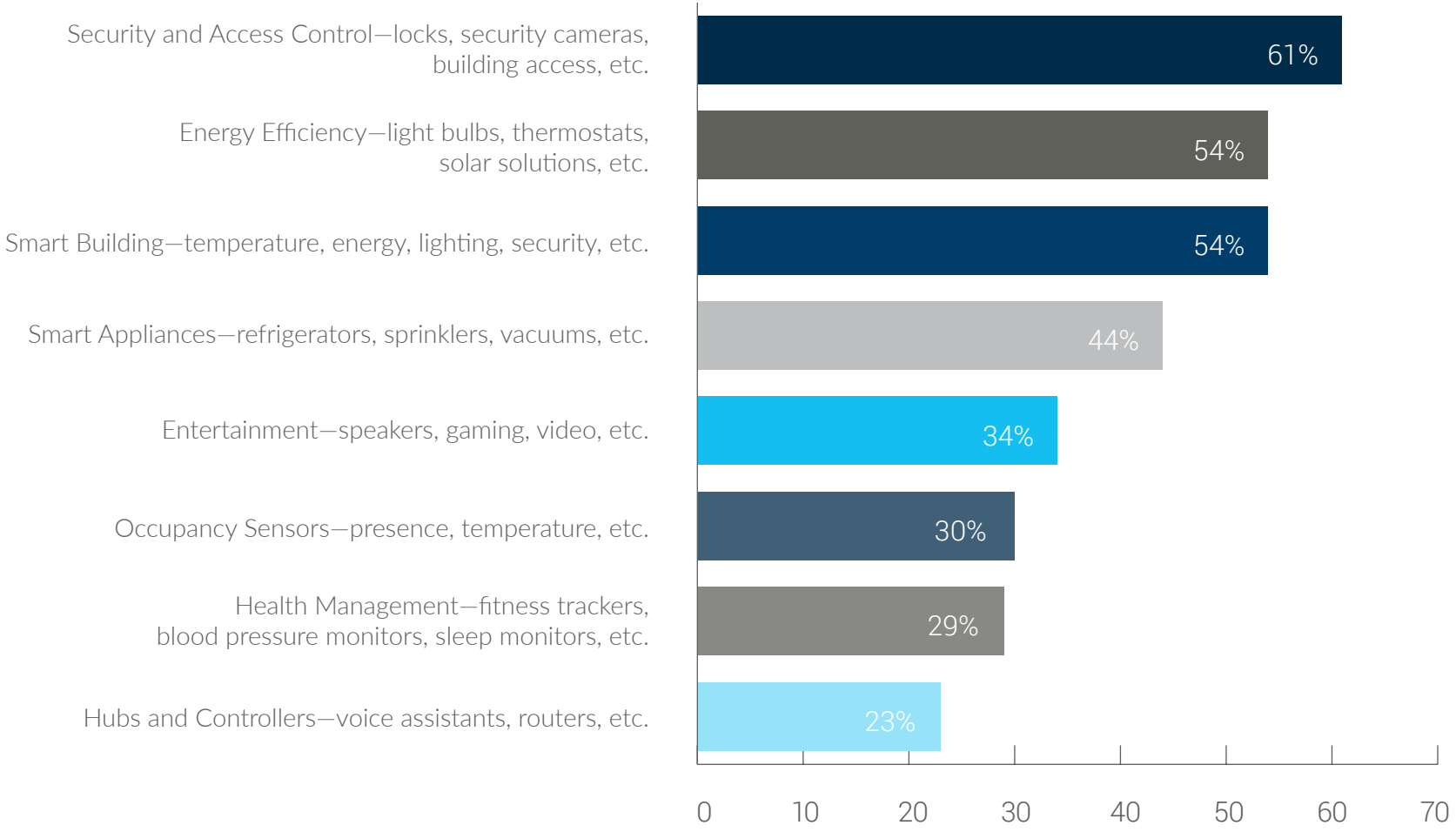
Connected home and building solutions include a tremendous range of possibilities. If there is an object with the ability to utilize data for efficiency, there is potential to connect it. However, not all connected solutions are equal, and as with any new market, there will be winners and losers. Given our survey participants' experiences with both customer demand and the reality of current technology solutions, we asked where they saw the biggest opportunities for connected home and building solutions. The answers were enlightening.

There are clear opportunities in each of the eight categories of connected home and building solutions we surveyed: security and access control, energy efficiency, smart buildings, smart appliances, entertainment, occupancy sensors, health management and hubs and controllers. However, the top opportunities identified by this group leaned toward pragmatic solutions that give control of items that are physically integrated into the structure of homes and buildings. The most frequently named area of opportunity was in the area of security and access control including connected locks, security cameras and building access (61%). Energy efficiency solutions such as smart lightbulbs, thermostats and solar solutions were tied for second with smart building solutions that delivered intelligent temperature, energy, lighting and security. Both of these categories had just over half (54%) identifying them as a top market opportunity.

The opportunity for standalone solutions also exists, although not at the same level as the ones that are integrated into the structure of homes and buildings. Close to half (44%) saw smart appliances such as intelligent fridges, sprinklers and vacuums as the major opportunities. A third (34%) reported big opportunities with entertainment including smart speakers, gaming or video. Just under a third (29%) were focused on the opportunities in health management such as connected fitness trackers, blood pressure monitors and sleep monitoring.

MULTIPLE OPPORTUNITIES EXIST FOR CONNECTED HOME AND BUILDING SOLUTIONS

What are the biggest market opportunities for connected home and building solutions?

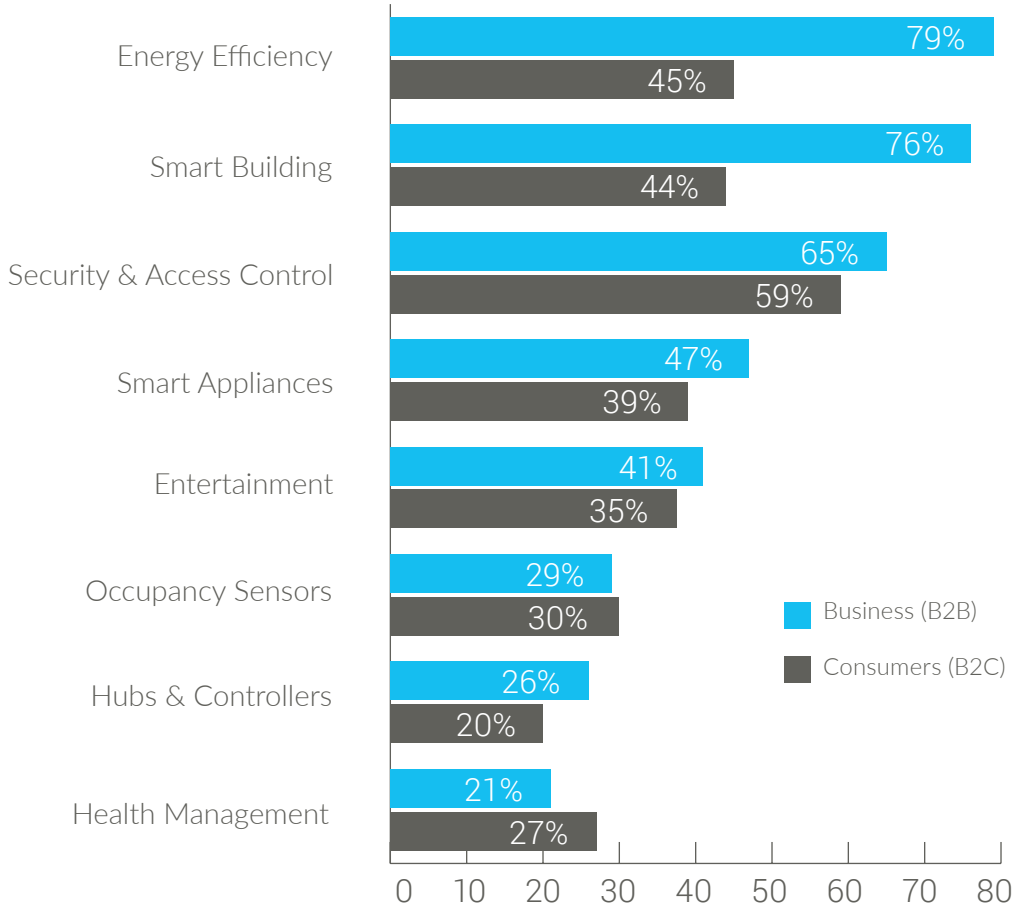


MULTIPLE OPPORTUNITIES EXIST FOR CONNECTED HOME AND BUILDING SOLUTIONS

There were some very extreme, although unsurprising, differences in reported market opportunities between stakeholders in B2B and B2C companies. It is important to note that the question asked specifically about market opportunity overall, as opposed to their own company or market, so this difference can be attributed to the perception of the market based on experiences with their own customers, not on actual business results of their company.

Companies that sold primarily to other businesses (B2B) were almost twice as likely to see that the greatest opportunities were in security and access control, 79%, compared to only 45% of companies that sold to consumers (B2C). A similar extreme difference was observed in the opportunity for energy efficiency solutions, with 76% of those involved in selling to businesses identifying this as a top opportunity compared to only 44% of those that sell to consumers. For all other categories of connected home and building solutions, the expectation of market opportunity was similar for both B2B and B2C stakeholders.

What is the biggest market opportunity for connected home and building solutions? *By type of customer*



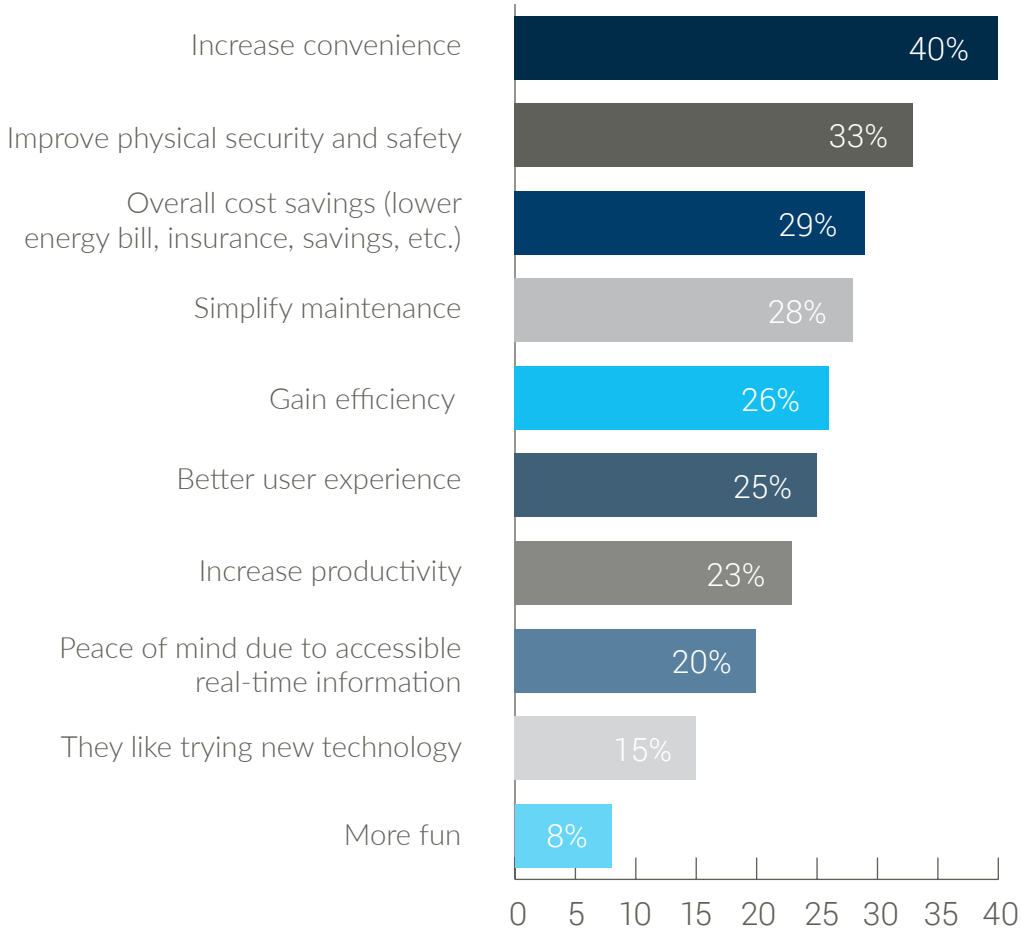
BUYERS OF CONNECTED HOME AND BUILDING SOLUTIONS ARE PRIMARILY MOTIVATED BY CONVENIENCE

Buyers of cutting-edge technology are a special breed. They are willing to put up with clunky interfaces, high levels of defects and unnatural use models in order to have access to something that is new and different.

The market for connected home and building solutions is far past this point in adoption. The motivations for buying are those of a typical buyer, not a technology early adopter. The most common motivation reported is an increased level of convenience (40%), followed closely by improved physical security and safety (33%). Cost savings also ranked as a very common motivation (29%) along with simplified maintenance (28%), higher levels of efficiency (26%), better user experience (25%) and increased productivity (23%).

The traditional motivations of early technology adopters were the least common reasons for buyers to purchase. Only 15% said their customers were motivated because they liked trying new technology and only 8% cited the fun-factor as a key motivator.

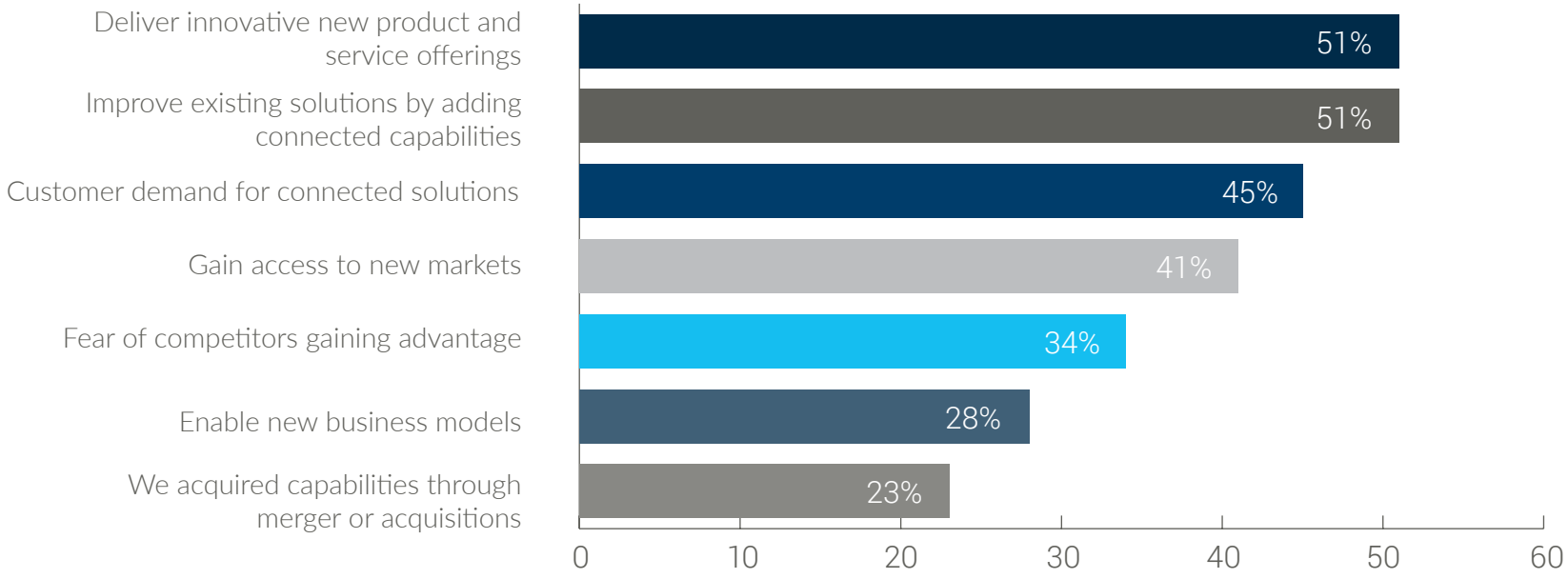
What are the primary reasons why buyers purchase connected home and building solutions?



COMPANIES ARE INVESTING IN CONNECTED SOLUTIONS FOR A WIDE RANGE OF REASONS

Business investments are often made for a variety of reasons, and connected home and building solutions are no exception. It is unsurprising that product companies, whose businesses are focused on delivering devices to their customers, are primarily motivated by delivering more or better devices. Delivering innovative new product and service offerings (51%) and delivering new capabilities to existing solutions (51%) were reported as the top motivations for investment in connected home and building solutions, followed by customer demand (45%), gaining access to new markets (41%) and fear of losing advantage to competitors (34%). Just over a quarter (28%) reported that their investments were motivated by the potential for new business models.

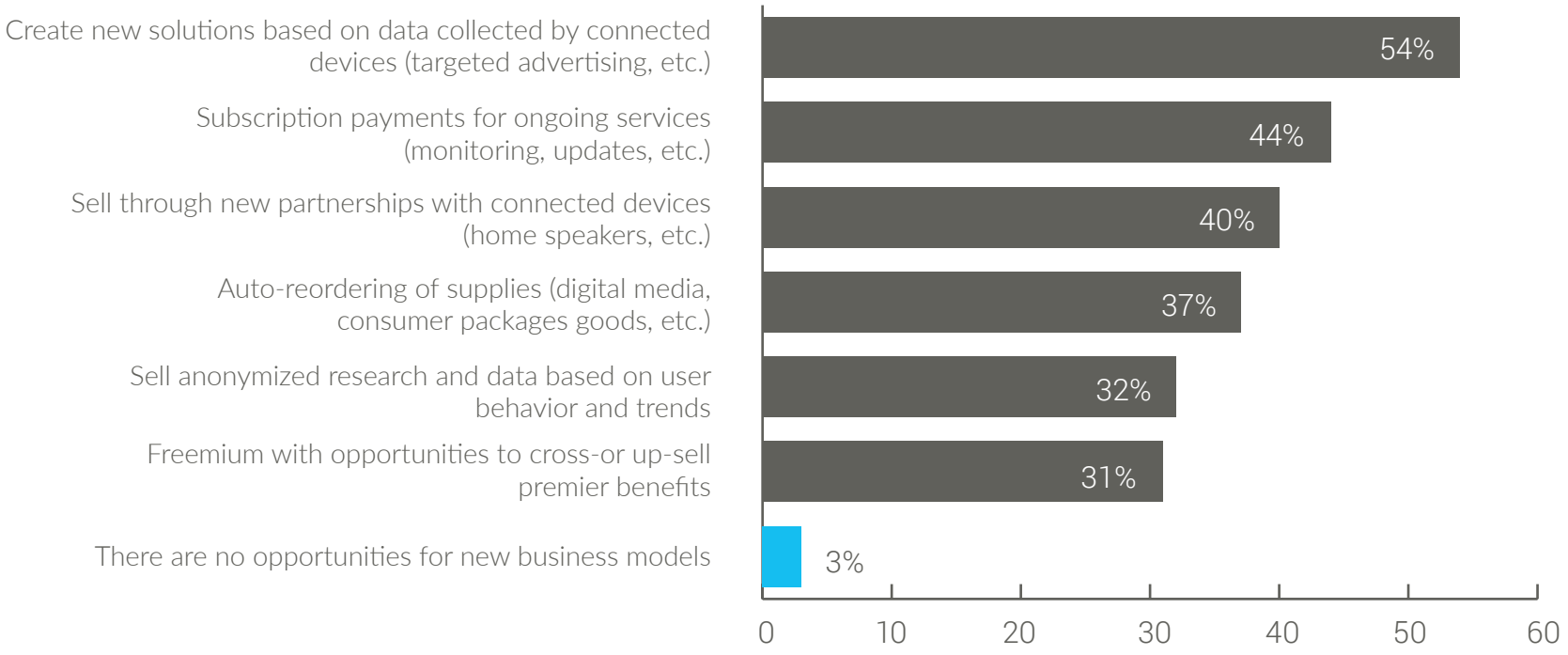
What is motivating your company's investment in connected home and building solutions?



CONNECTED SOLUTIONS CREATE OPPORTUNITIES FOR NEW BUSINESS MODELS

It is particularly interesting that while investments are typically not driven primarily by a desire to enable new business models (only 28%) the clear majority of stakeholders (97%) do see new business models as a genuine opportunity for their connected home and business solutions. The most frequent opportunity is around the potential to monetize the data collected by these devices (54%) which will be explored later in this report.

What opportunities for new business models does your company expect connected home and building solutions to enable?



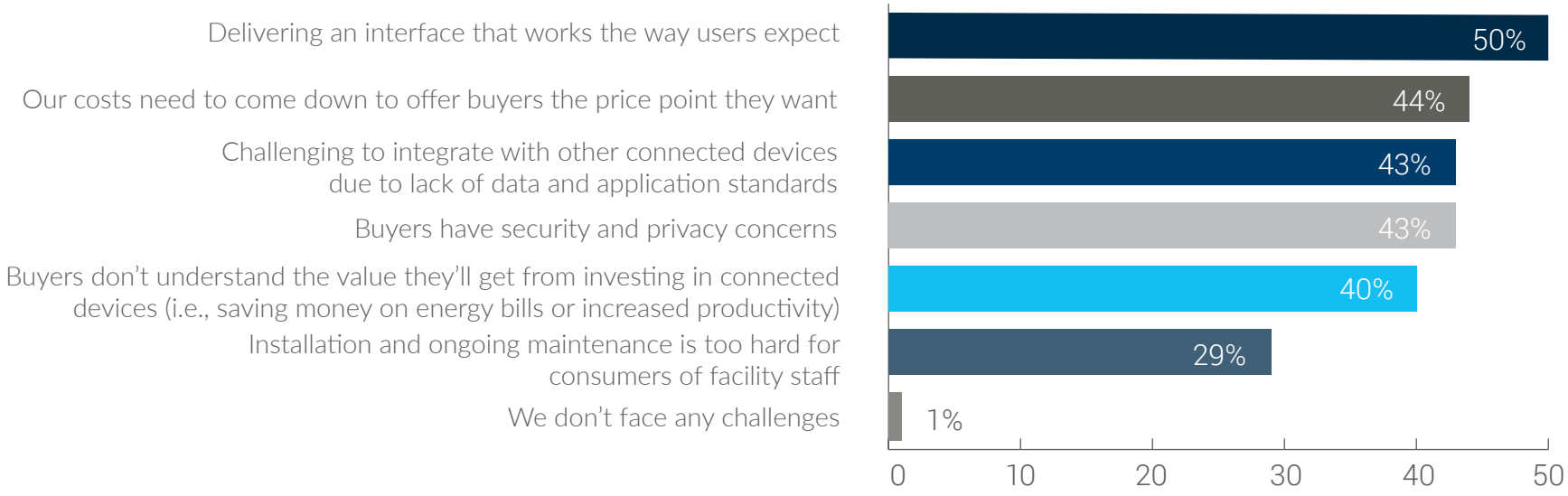
DETAILED FINDINGS: SOLVING EXISTING CHALLENGES WILL BE KEY TO THE SUCCESS OF CONNECTED SOLUTIONS

BUSINESS AND TECHNOLOGY CHALLENGES ARE WIDE-RANGING

The road to a connected world is not an easy one for the organizations that deliver connected home and building solutions. Connected devices have a particularly nasty problem: They need to deal with the technical complexity involved in being connected through a variety of different options such as Wi-Fi, Bluetooth® and Zigbee. At the same time, the standard for user experience is very high and will be compared to flipping a switch to turn on a light or pressing a button to open a garage door. Given these extremes, it is unsurprising that almost everyone (99%) reported that they face challenges or that the top challenge reported is delivering a great user interface (50%).

A wide range of other business and technology issues were reported relating to costs to produce goods resulting in high prices (44%), technical issues connecting data and applications (43%), security and privacy concerns of buyers (43%), lack of understanding of value from connected solutions (40%) and difficulty with installation and maintenance (29%).

Which of the following challenges do you face in developing your connected home and building solutions?

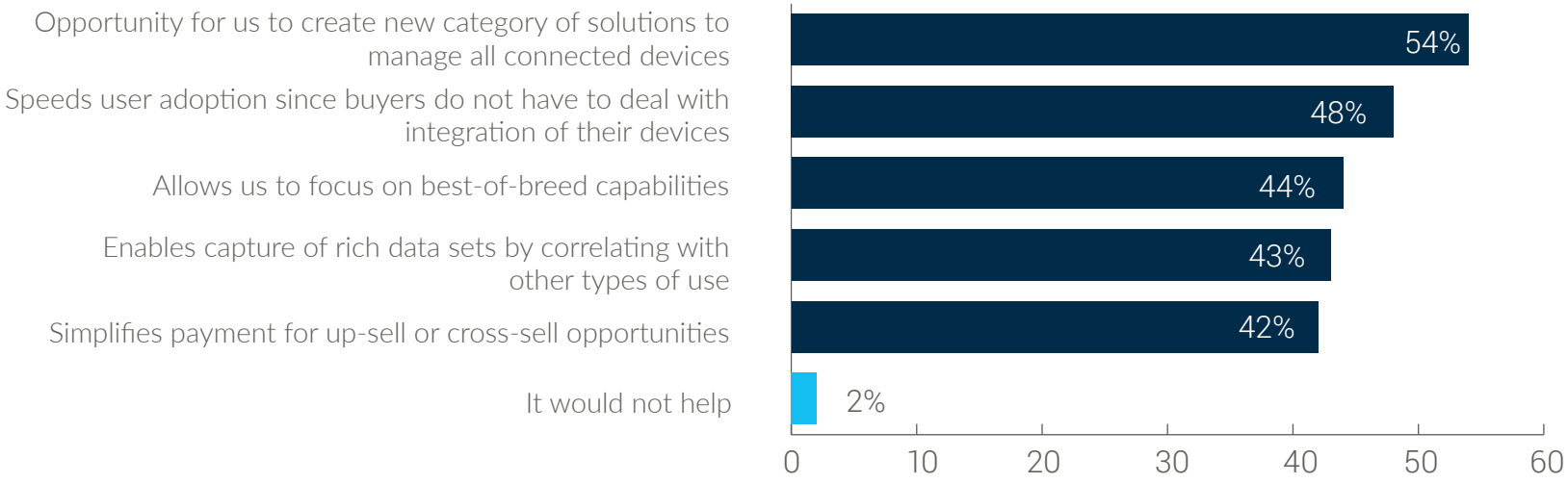


COMMUNICATION STANDARDS WOULD DELIVER SIGNIFICANT BENEFITS

Getting systems to work reliably with each other is always hard, but when every device speaks a different "language" it can be almost impossible. One area that would clearly benefit almost all producers of connected home and building solutions (98%) is clear standards for data and communication among different devices.

The potential benefits of shared standards are wide-ranging. More than half (54%) see an opportunity to create a completely new category of solutions to manage the many connected devices in homes and buildings. Almost half (48%) have confidence that standards would speed user adoption since buyers wouldn't have to personally solve integration issues. Multiple other benefits were reported including allowing the company to focus on their core strengths instead of dealing with connectivity issues (44%), capturing richer data once standardization enables correlation with information collected by other types of connected devices (43%) and simplifying up-sell and cross-sell opportunities (42%).

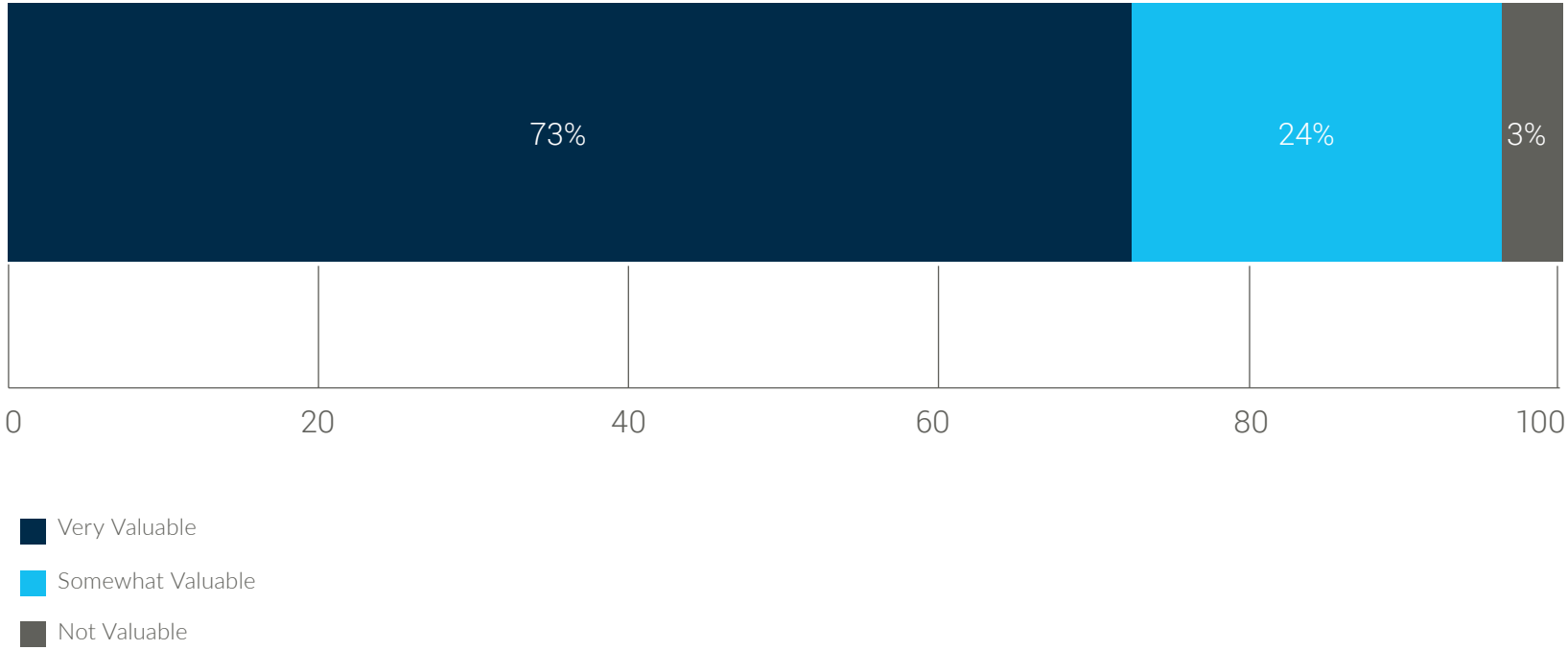
How would your connected home and building solutions benefit if data or communication standards that enabled easy connectivity to other systems and devices were widely adopted?



COMMUNICATION STANDARDS WOULD DELIVER SIGNIFICANT BENEFITS

The impact of adopting standards for data and communication would be significant. Almost everyone (97%) report that these standards with be valuable, and almost 3 in 4 (73%) characterize the impact as "very valuable."

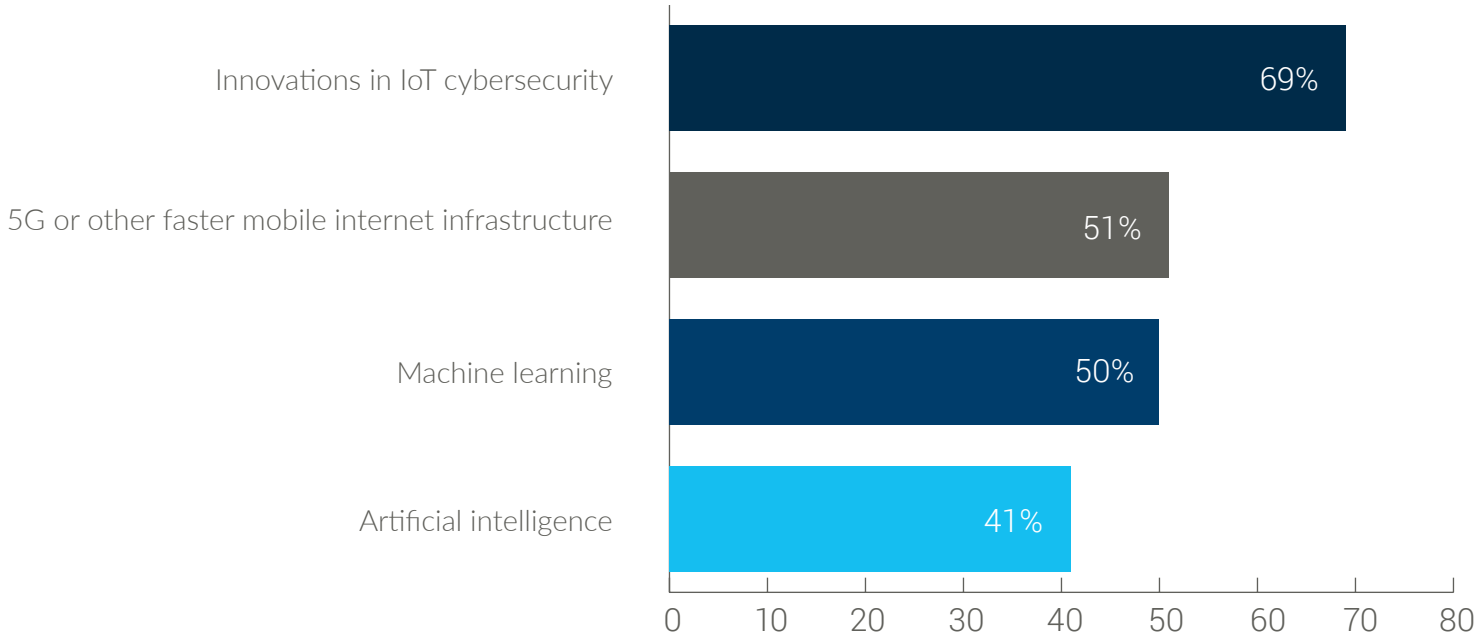
How valuable is it to have data and communication standards to enable easy connectivity to other systems and devices?



CYBERSECURITY INNOVATIONS WILL HAVE GREATER IMPACT ON ADOPTION OF CONNECTED DEVICES THAN OTHER TECHNOLOGY ADVANCES

Technology continues to advance on many fronts, and many of these have the potential to significantly impact user adoption. Connected home and building solution manufacturers are particularly excited about the potential for innovations in cybersecurity for IoT-enabled devices (69%). Faster mobile Internet infrastructure such as 5G (51%), machine learning (50%) and artificial intelligence (41%) also are expected to accelerate connected home and building solution adoption.

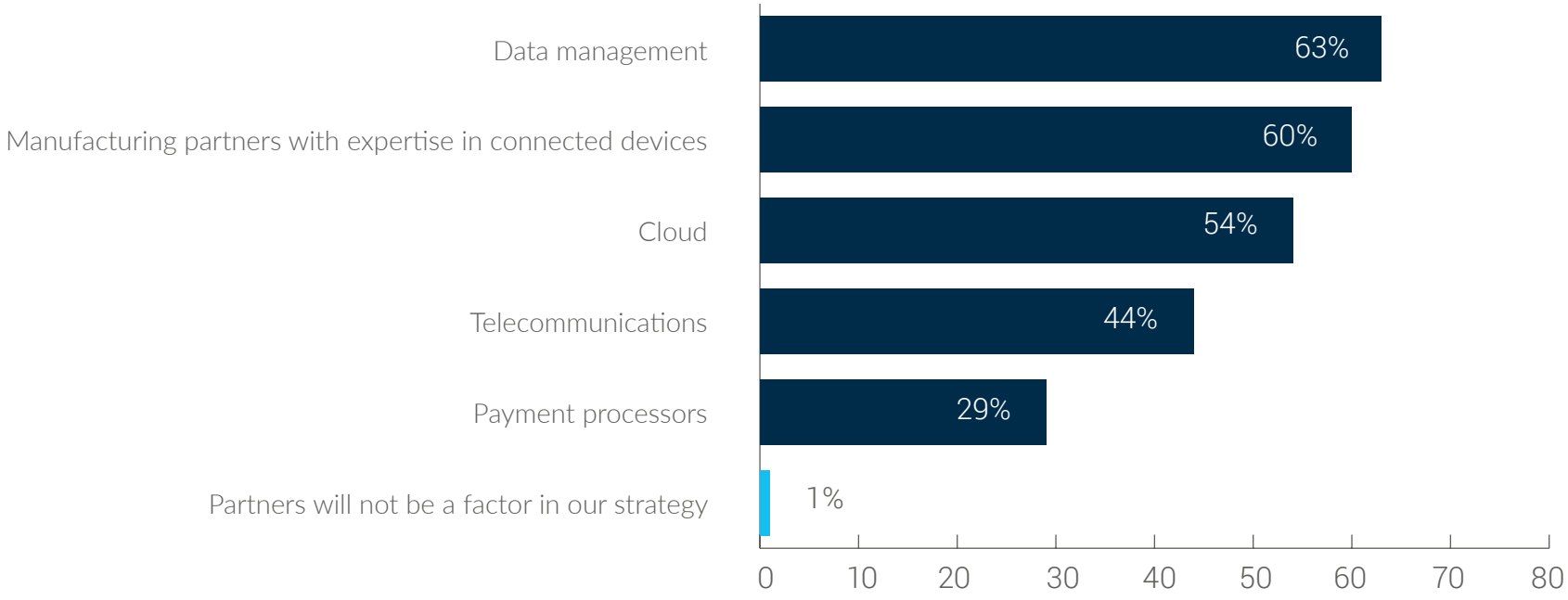
What improvements or emerging technologies are most likely to accelerate the adoption of connected home and building solutions as they become generally available?



PARTNERS ARE KEY TO CONNECTED HOME AND BUILDING SOLUTION STRATEGIES

One of the most effective ways to solve business or technology challenges can be to get expert help. Connected home and building solutions are no different. Almost all (99%) participants identified partners as an important part of their strategy. Manufacturing partners with expertise in connected devices are frequently important to strategies (60%) as are partners with infrastructure-related expertise including data management (63%), cloud (54%) and telecommunications (44%).

What types of technology or business partners are important to your connected home and building solution strategy?



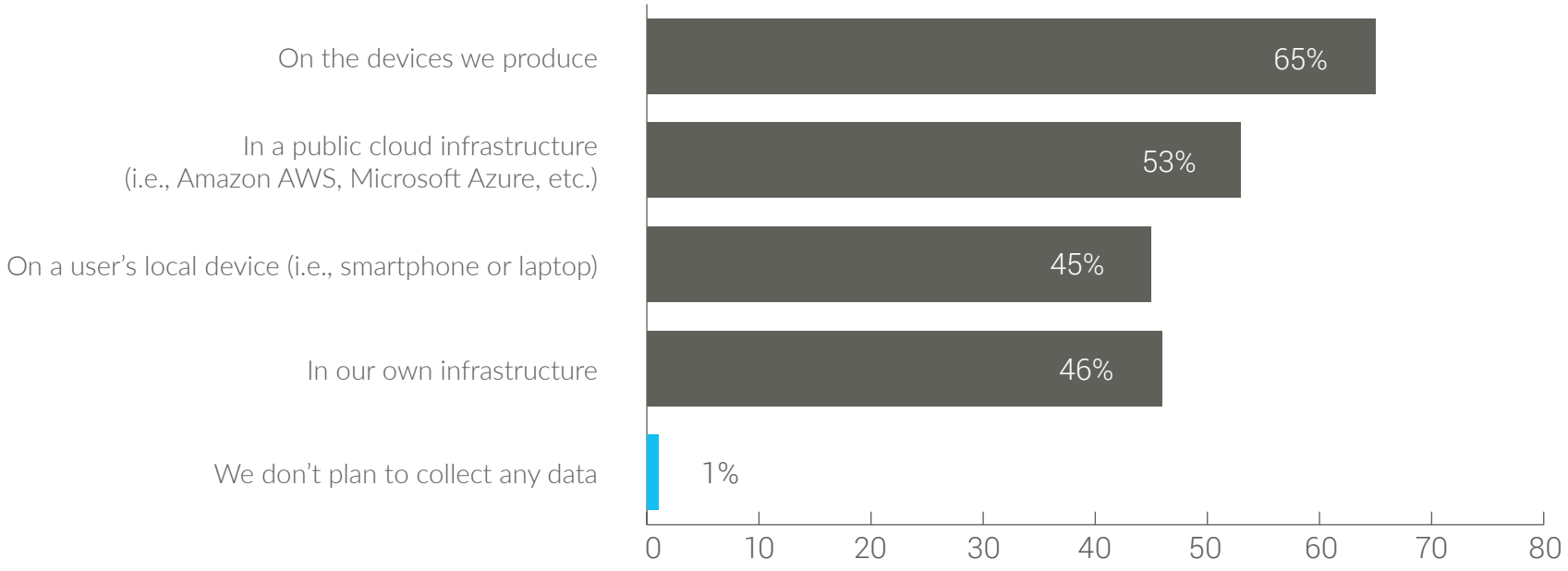
DETAILED FINDINGS: PRIVACY ISSUES ARE FORCING DATA COLLECTION AND USE PLANS TO EVOLVE

DATA COLLECTION UBIQUITOUS WITH CONNECTED SOLUTIONS

Information is key to connected devices. Data is collected to monitor activity, identify when action is needed and deliver reports to users. There is almost complete agreement amongst participants that their connected home and building solutions will collect data (99%).

However, there is no consensus on where this data will be stored. About two thirds (65%) will store it on the connected device itself, which is the most frequently reported form of data collection. But it is also common for the data to be collected in the cloud (53%), in on-premises infrastructure (46%) or on a local device such as a smartphone or laptop (46%).

How does your company plan to collect data generated by connected home and building solutions?



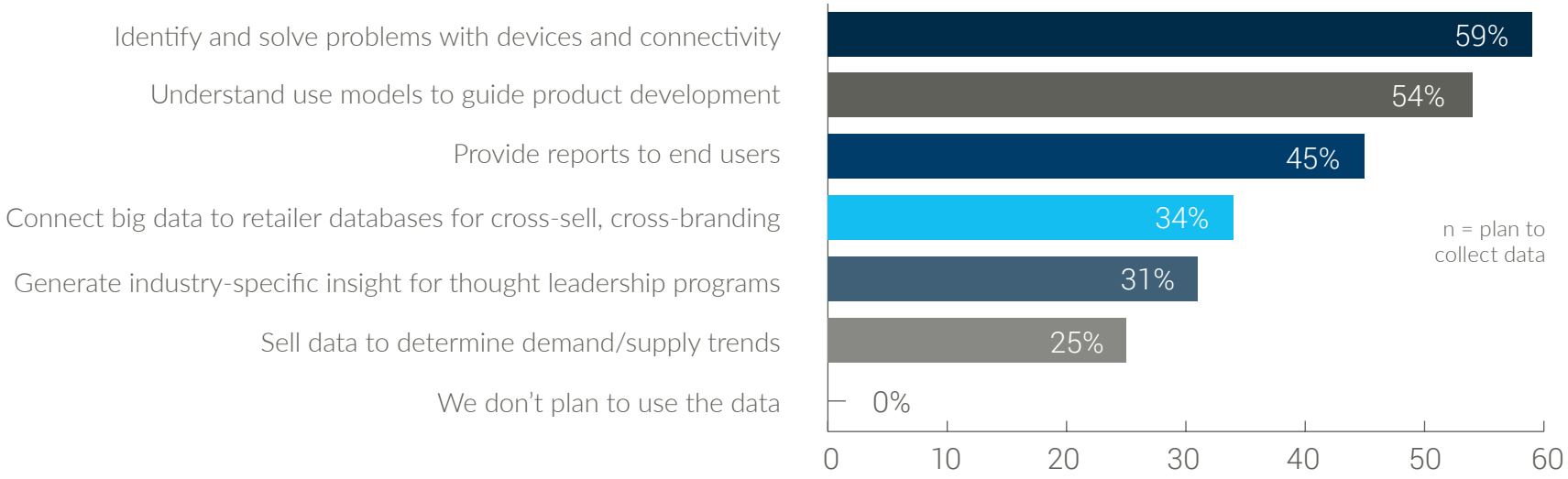
DATA FROM CONNECTED SOLUTIONS WILL BE USED IN A WIDE VARIETY OF WAYS

Data will not just be collected, it will be used extensively. Everyone (100%) who reported that their devices collect data also has a plan to utilize that data.

Data will primarily be used to improve product delivery and user experience. The most frequently reported uses of data are to identify and solve problems with devices and connectivity (59%) and understand models to guide product development (54%). It is also common (45%) to provide reports to users.

Using the data as a source of marketing or direct revenue is another planned use of data collected from connected home and building solutions. About a third (34%) plan to use their data alongside other third-party data sources to create cross-selling or cross-branding opportunities. Another third (31%) see the data as a source of insights for thought leadership and marketing programs. A quarter (25%) plan to sell the data they collect as a direct revenue generator.

How does your company plan to use data generated by connected home and building solutions?

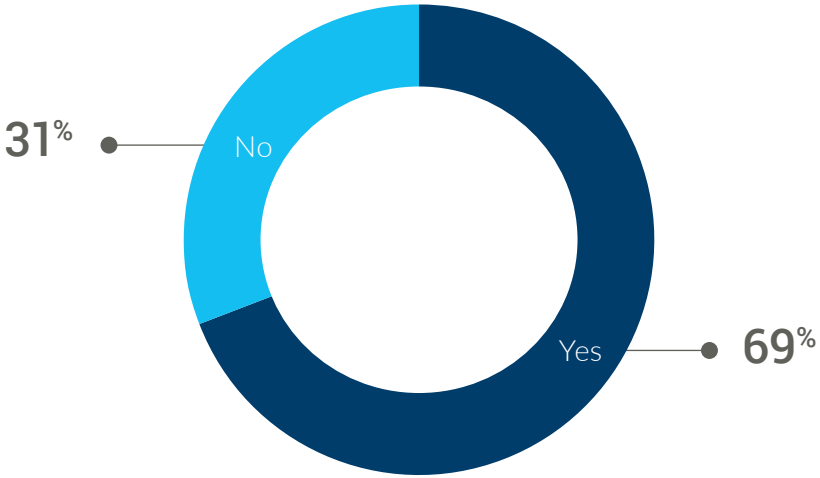


RECENT NEWS ON DATA PRIVACY IS FORCING A BROAD RETHINK OF DATA USE

The plans to collect and use device data are being challenged by public opinion. There has been significant media attention to privacy issues in the past few years. This has intensified in recent months with both the Facebook/Cambridge Analytica data scandal as well as the implementation of GDPR, the European Union's significant new regulations on data privacy which came into effect on May 25, 2018.

News has made a real impact. More than two thirds (69%) report that they have reconsidered their data collection and use methods as a direct result of this recent media focus.

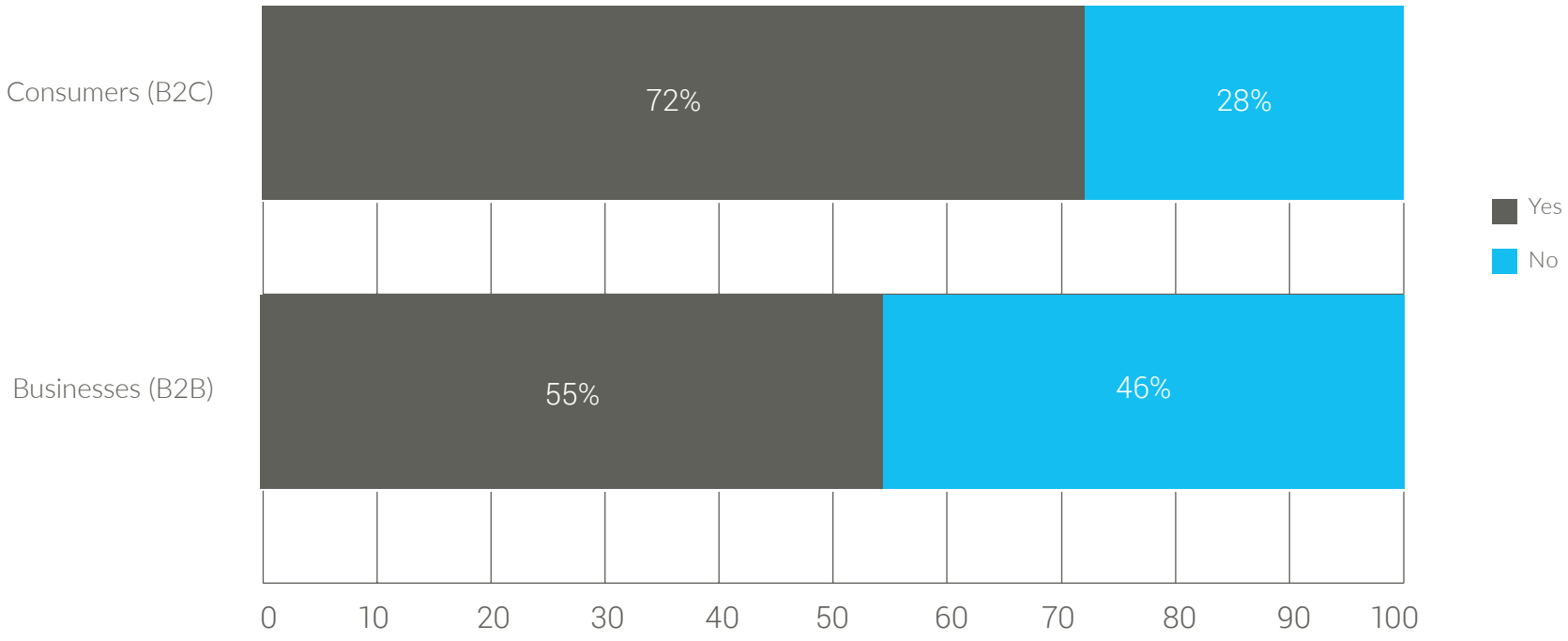
Has the recent media focus on data privacy (i.e., the introduction of GDPR, the Facebook/Cambridge Analytica story) made you rethink your plans to collect and use data generated by connected home and building devices?



RECENT NEWS ON DATA PRIVACY IS FORCING A BROAD RETHINK OF DATA USE

Unsurprisingly, companies that sell to consumers are much more likely to have their plans impacted by privacy-related issues (72%) than companies that sell primarily to businesses (55%).

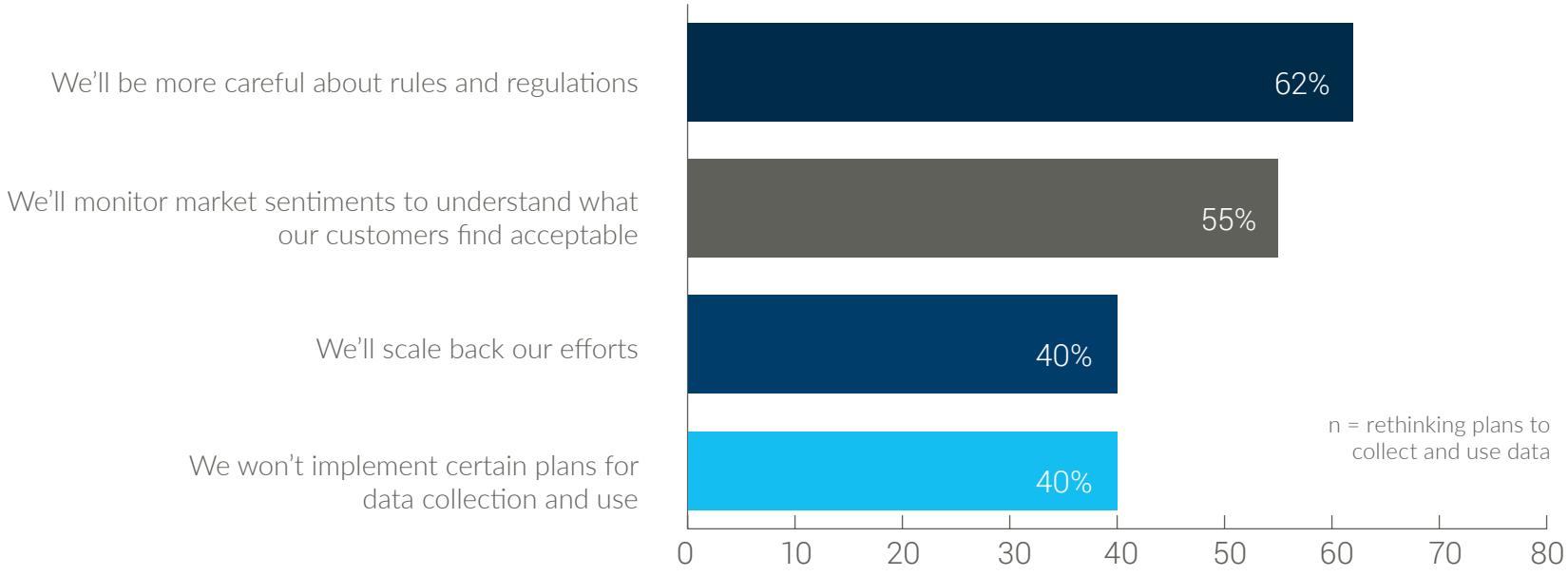
Has the recent media focus on data privacy (i.e., the introduction of GDPR, the Facebook/Cambridge Analytica story) made you rethink your plans to collect and use data generated by connected home and building devices?
By type of customer



RECENT NEWS ON DATA PRIVACY IS FORCING A BROAD RETHINK OF DATA USE

The outcomes of these concerns about data privacy have been varied. Among companies that have rethought their data collection and use plans, many will merely be a bit more careful about following the rules and regulations (62%) or monitoring their customers' expectations to understand what is acceptable (55%). But many are taking more drastic steps. They are either scaling back their efforts (40%) or in some cases completely abandoning certain parts of their plan (40%).

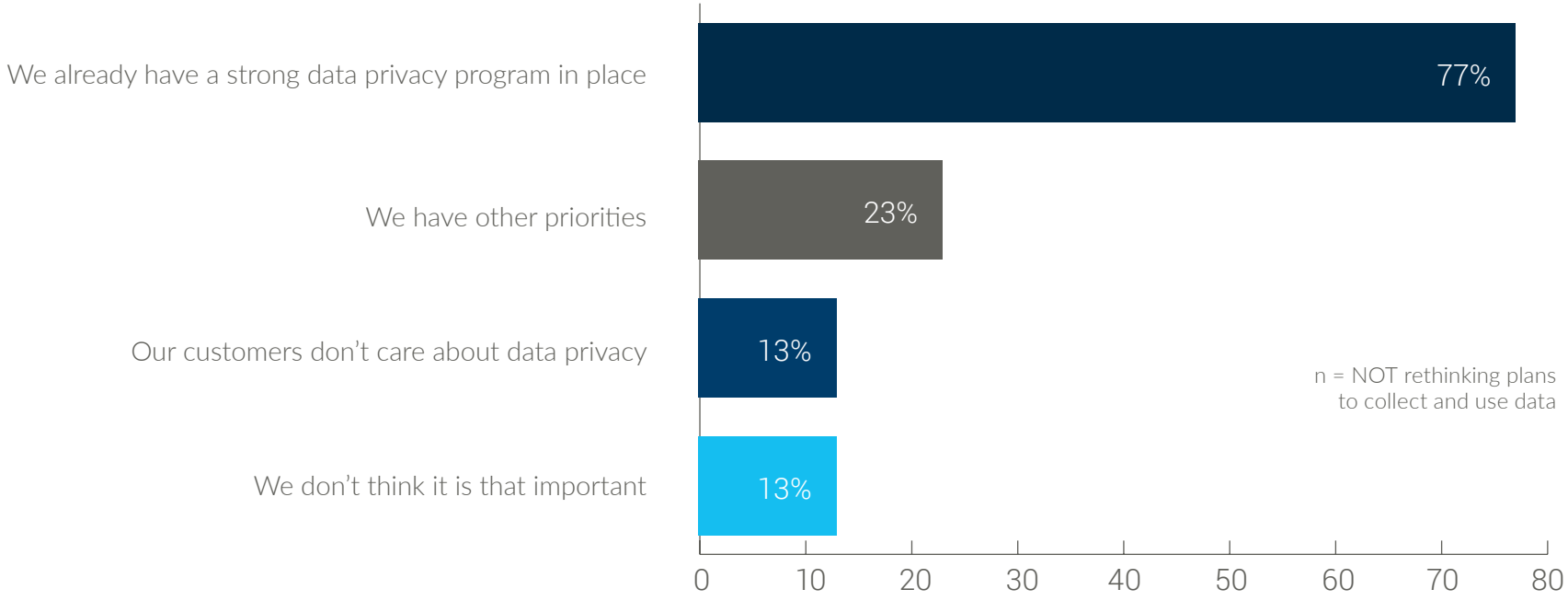
How do you expect to change your plans to collect and use data generated by connected home and building devices based on recent media focus on data privacy?



RECENT NEWS ON DATA PRIVACY IS FORCING A BROAD RETHINK OF DATA USE

We were also interested in understanding why some companies have not changed their plans for data collection and use, especially given how high profile this issue is. The good news is that this group does care about their customer's data and privacy. Most of them (77%) haven't changed plans based on privacy news because they already have a very strong data privacy program in place. Only a few of this group reported that data privacy simply wasn't a priority (23%), that their customers didn't care (13%) or that they didn't think privacy was important (13%).

Why hasn't the recent media attention on data privacy changed your plans to collect and use data generated by connected home and building devices?



DETAILED FINDINGS: DISTINCT CULTURAL SPLIT EXISTS ON BEST WAY TO INTEGRATE DEVICES

NO AGREEMENT ON BEST APPROACH TO INTEGRATION

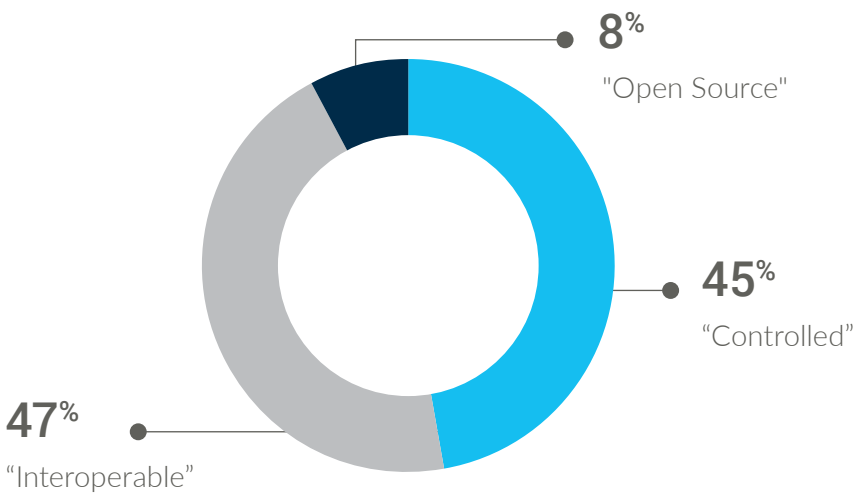
In any technology ecosystem, there is a trade-off between exercising strict control over the devices that can connect and having a set of industry standards so any devices following those standards can operate together. Tighter controls over integration enable enforcement of a consistent customer experience while allowing for more interoperability allows for a wider range of devices and vendors in the same ecosystem. Each approach has benefits, and often it boils down to the cultural preference of the solution provider.

The world of connected home and building solutions has not escaped this integration culture clash. We asked participants which of the following represented their culture of integration and offered the following options:

- **"Controlled" —** Deliver all needed functionality within our own managed ecosystem so we have full control of the customer experience
- **"Interoperable" —** Follow generally accepted industry standards that enable interoperability within a broad ecosystem that adopts them
- **"Open Source" —** Be open and enable our customers to do anything they want

The result was a fairly split between the "Controlled" approach (45%) and the "Interoperable" approach (47%). Only 8% described their culture of integration as being similar to open source.

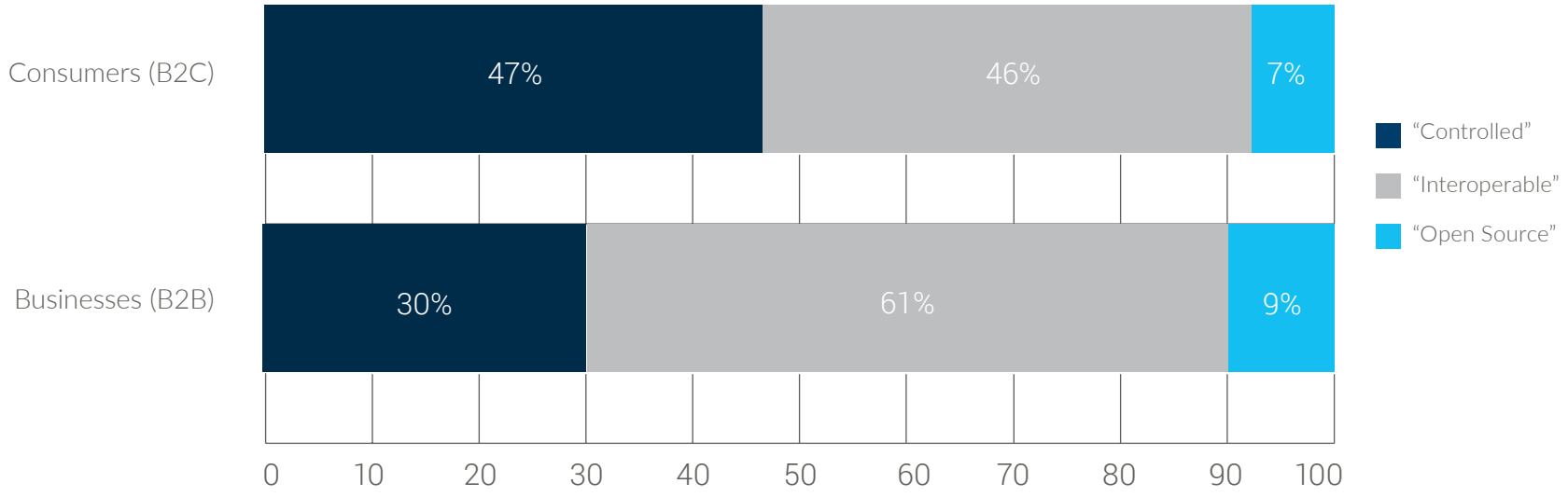
Which of the following best describes your company's culture of enabling your customers to integrate and connect your devices with other home and building solutions?



NO AGREEMENT ON BEST APPROACH TO INTEGRATION

Companies that sell primarily to businesses are typically less worried about user experience and more concerned about functionality. It is not surprising that they are more likely to report that they have embraced an "interoperable" culture that is open to a broader ecosystem of connected devices (61%).

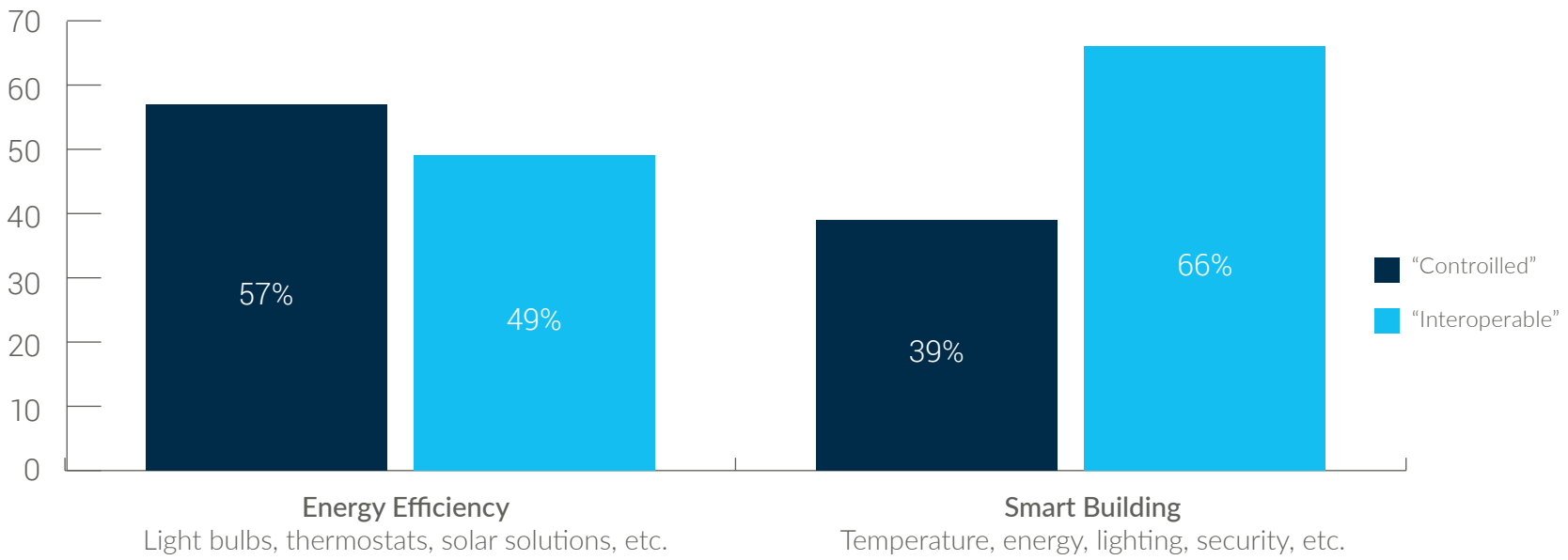
Which of the following best describes your company's culture of enabling your customers to integrate and connect your devices with other home and building solutions? *By type of customer*



CULTURE OF INTEGRATION HAS FAR-REACHING IMPACT

There are several interesting correlations between the culture of integration that a company has adopted for their connected home and building solutions and the category of solutions that they believe has the biggest market opportunities. Those that have a tightly managed "Controlled" culture of integration see more opportunity in specific standalone solutions such as light bulbs and thermostats. Companies that have adopted a broader "Interoperable" culture of integration see more opportunities in the category of connected buildings which brings together a variety of point solutions.

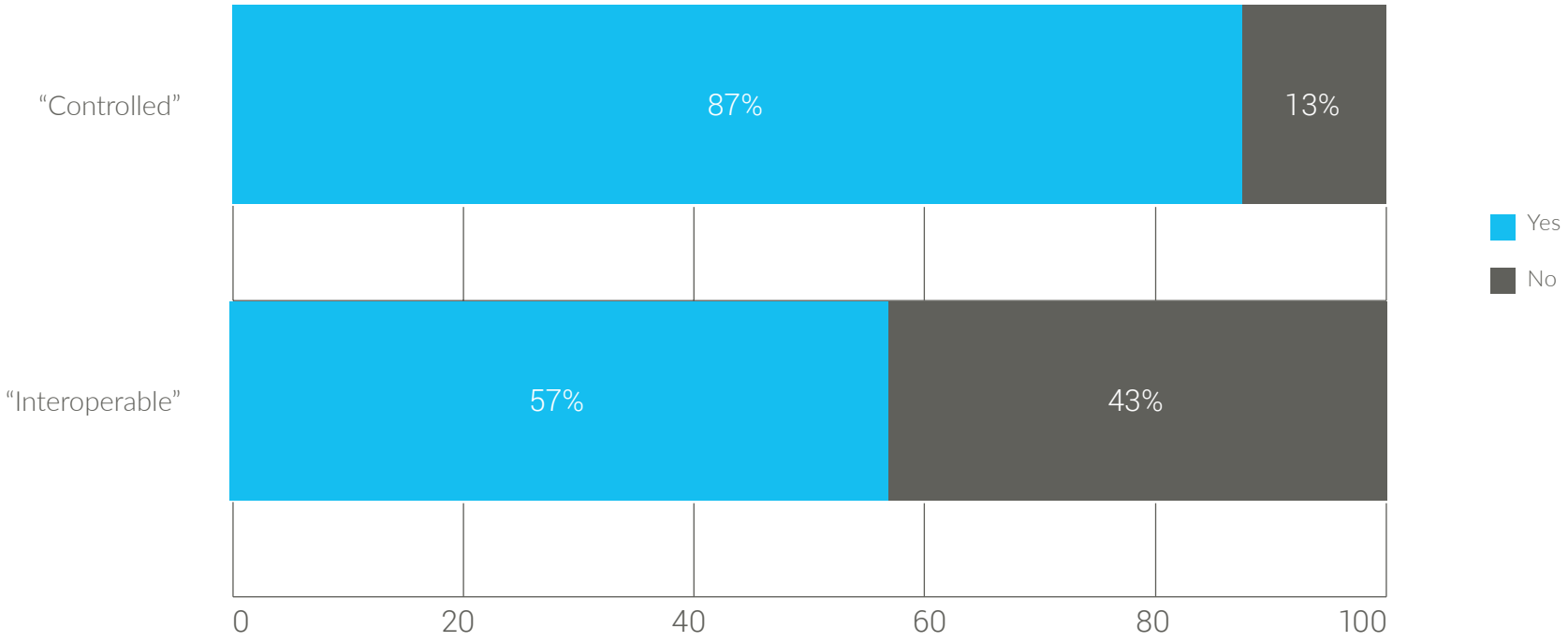
What is the biggest market opportunity for connected home and building solutions? *By type of integration culture*



CULTURE OF INTEGRATION HAS FAR-REACHING IMPACT

There is also a strong connection between integration culture and concern about data privacy. “Controlled” integrators who want oversight are significantly more likely (87%) to have taken recent data privacy issues seriously. Far fewer (57%) of the companies with an “Interoperable” integration culture have done the same.

Has the recent media focus on data privacy made you rethink your plans to collect and use data generated by connected home and building devices? *By type of integration culture*



SURVEY METHODOLOGY AND PARTICIPANT DEMOGRAPHICS

An online survey was sent to manufacturing decision makers. All participants were responsible for decisions related to the production of IoT (Internet of Things) connected devices for home and buildings in one of the following categories:

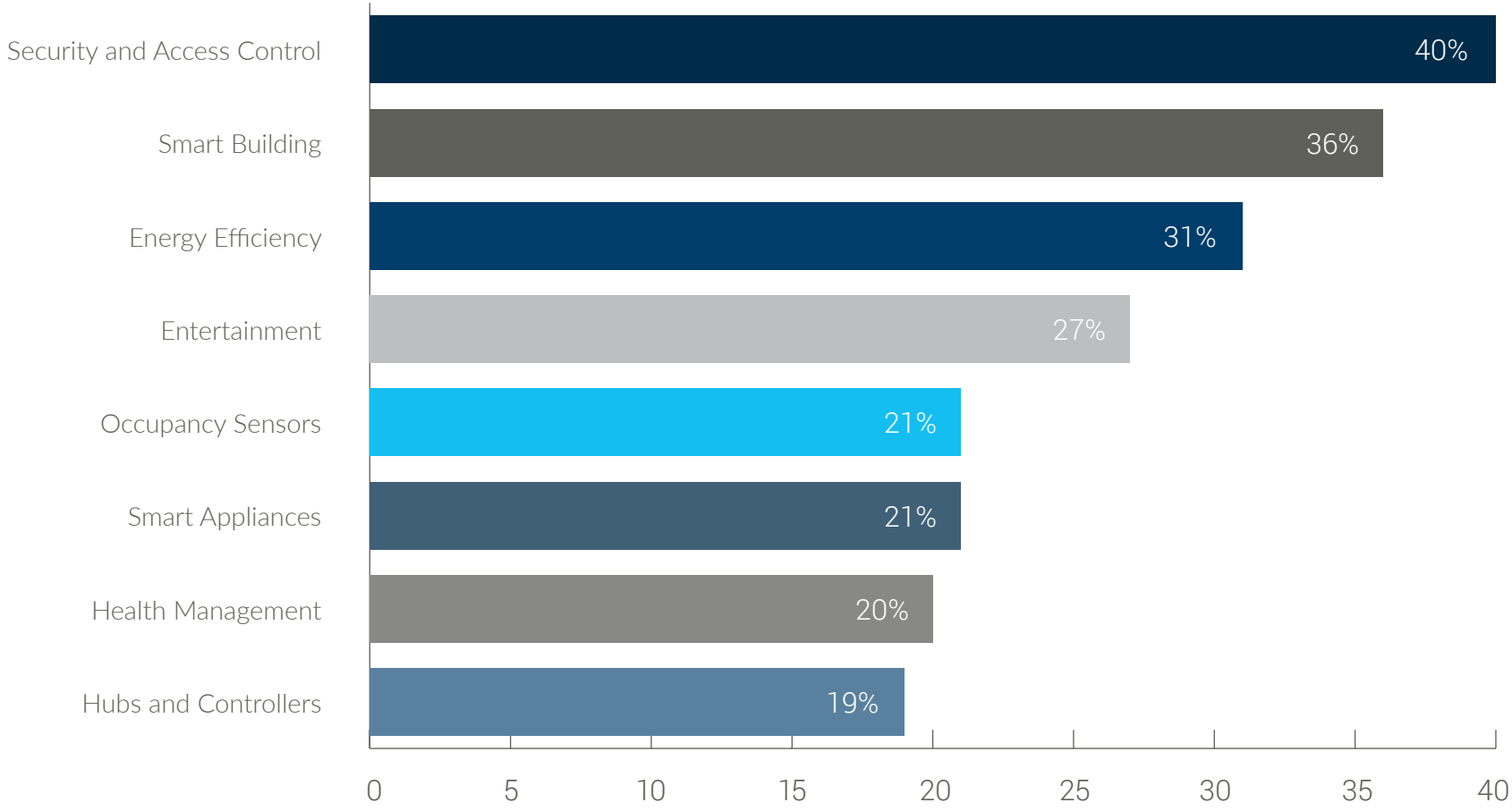
- **Security and Access Control**
  Locks, security cameras, building access, etc.
- **Energy Efficiency**
  Light bulbs, thermostats, solar solutions, etc.
- **Smart Building**
  Temperature, energy, lighting, security, etc.
- **Smart Appliances**
  Refrigerators, sprinklers, vacuums, etc.
- **Entertainment**
  Speakers, gaming, video, etc.
- **Occupancy Sensors**
  Presence, temperature, etc.
- **Health Management**
  Fitness trackers, blood pressure monitors, sleep monitoring, etc.
- **Hubs and Controllers**
  Voice assistants, routers, etc.

Participants worked at companies with 1,000 employees or more, and held a variety of direct decision-making roles including business leadership, engineering, operations, supply chain and procurement. Questions were asked on a range of topics related to the adoption, opportunities and challenges in delivering connected home and building solutions.

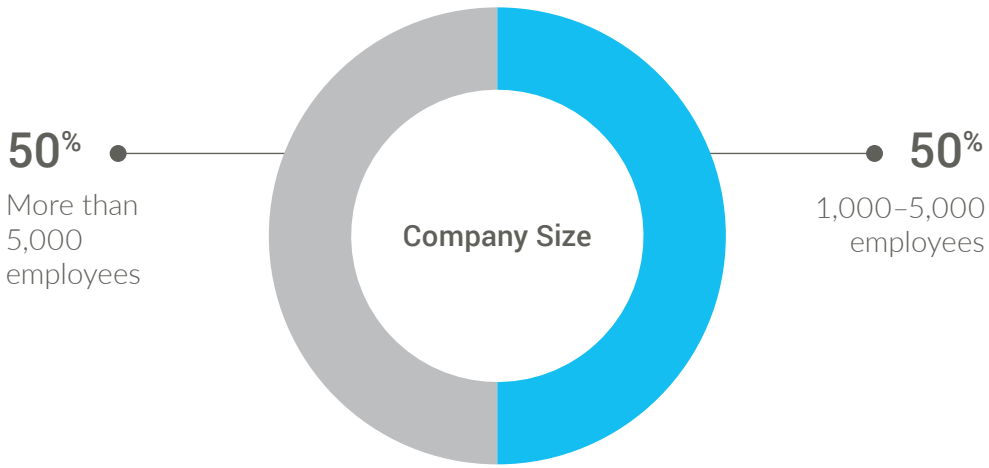
A total 201 qualified individuals from around the globe completed the survey. Participants included a mix of roles, job responsibilities, types of devices manufactured and company sizes.

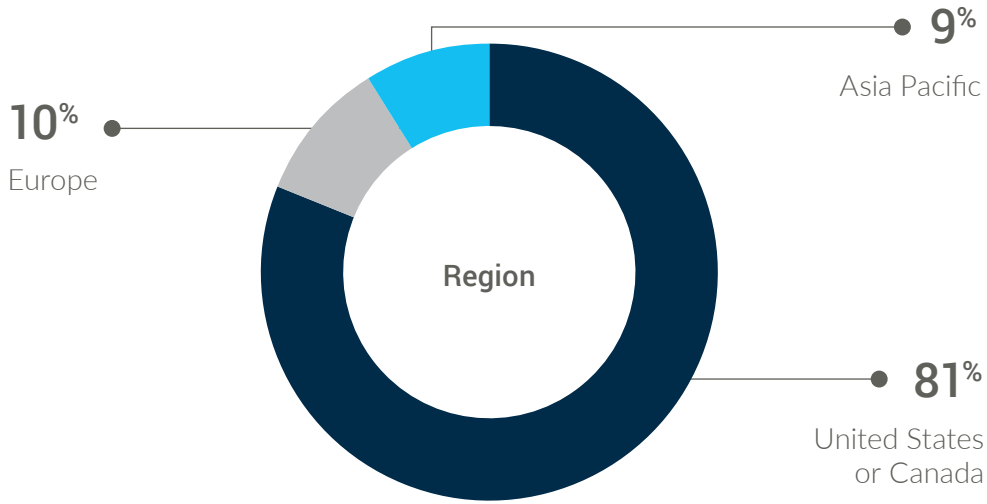
SURVEY METHODOLOGY AND PARTICIPANT DEMOGRAPHICS

Types of Home and Building Solutions



SURVEY METHODOLOGY AND PARTICIPANT DEMOGRAPHICS





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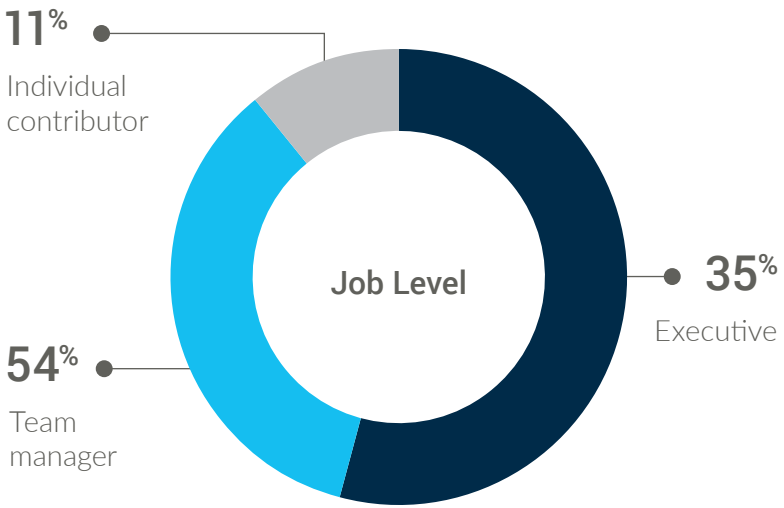

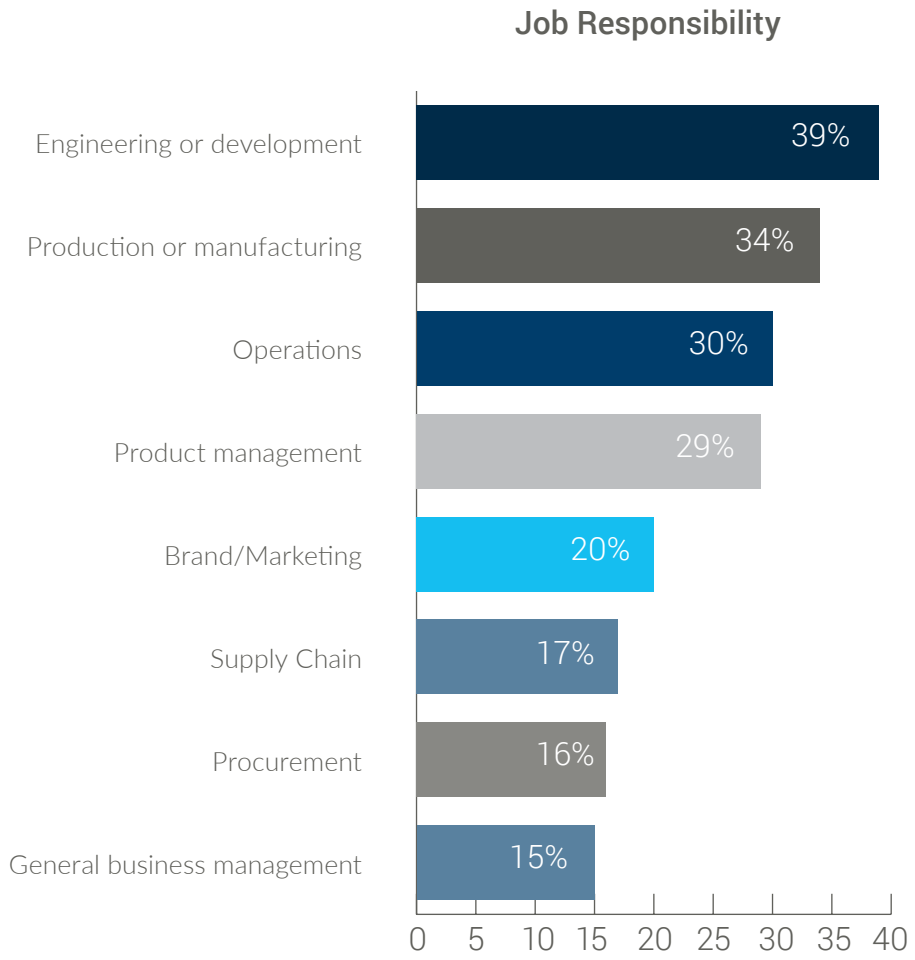

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