How Edge Computing is Enabling the Future

www.apc.com/edge

Life Is On | Schneider Electric

Overview

The world of technology is moving faster than ever. From emerging technologies like generative AI to advancements in IT infrastructure, organizations and IT teams specifically face a growing number of threats and increasing sources of data. Executive leadership, board members, and strategic leaders have turned to IT teams to guide their organizations to not only properly store and process data but also to turn increasing volumes of data into valuable insights to strengthen decision making. Increasing data volume has also driven more data processing, putting a greater strain on carbon emissions and organizational sustainability. Many organizations are unprepared, lacking a strategy which addresses both increased data processing and carbon emissions, but organizations and their IT teams can prepare for the future by creating a comprehensive strategy that encompasses and balances increasing data needs and sustainability objectives.

Schneider Electric sought to conduct research to provide further insight into IT Decision Makers' (ITDMs) awareness and familiarity with edge computing technologies and develop a better understanding of how prepared teams, organizations, and industries are to successfully implement edge computing.

Schneider Electric conducted a survey of U.S. ITDMs in 2023 to recognize how teams and organizations are utilizing edge computing, identify existing benefits and challenges teams are facing surrounding edge computing, and uncover what edge computing may look like in the future.

This research finds that ITDMs believe that edge computing can be helpful in driving sustainability and achieving organizational ESG goals. As organizational data increases and IT infrastructure expands in complexity, it will be critical for organizations to identify how they can track and measure energy at the edge.

While many organizations are already utilizing edge computing, there are still pain points and areas of opportunity. According to ITDMs, managing hybrid IT infrastructure (local IT and cloud) is one of the greatest IT challenges their organization is currently facing, followed closely by cybersecurity threats. As a majority of ITDMs indicate their organizations' IT infrastructure is at least 50% cloud-based and many expect their organization's IT infrastructure to become increasingly cloud-based over the next two years, the focus on managing IT hybrid infrastructure will only intensify.

ITDMs expect edge computing to improve several key factors, such as speed, data security, and resiliency. Despite various identified benefits of implementing edge computing, ITDMs report facing challenges in implementing edge computing solutions in their organizations, including integration and a lack of skilled or qualified staff. Providers and organizations will need to address these challenges head on to be successful.

ITDMs believe that edge computing will be beneficial for innovation, with the potential to positively impact emerging technologies and like the Internet of Things (IoT) and machine learning (ML) and artificial intelligence (AI). Beyond emerging technologies, ITDMs have also identified future applications of edge computing that will drive value within their industries. This research explores the current state of edge computing, what necessary steps organizations must take next, and the future of edge computing.

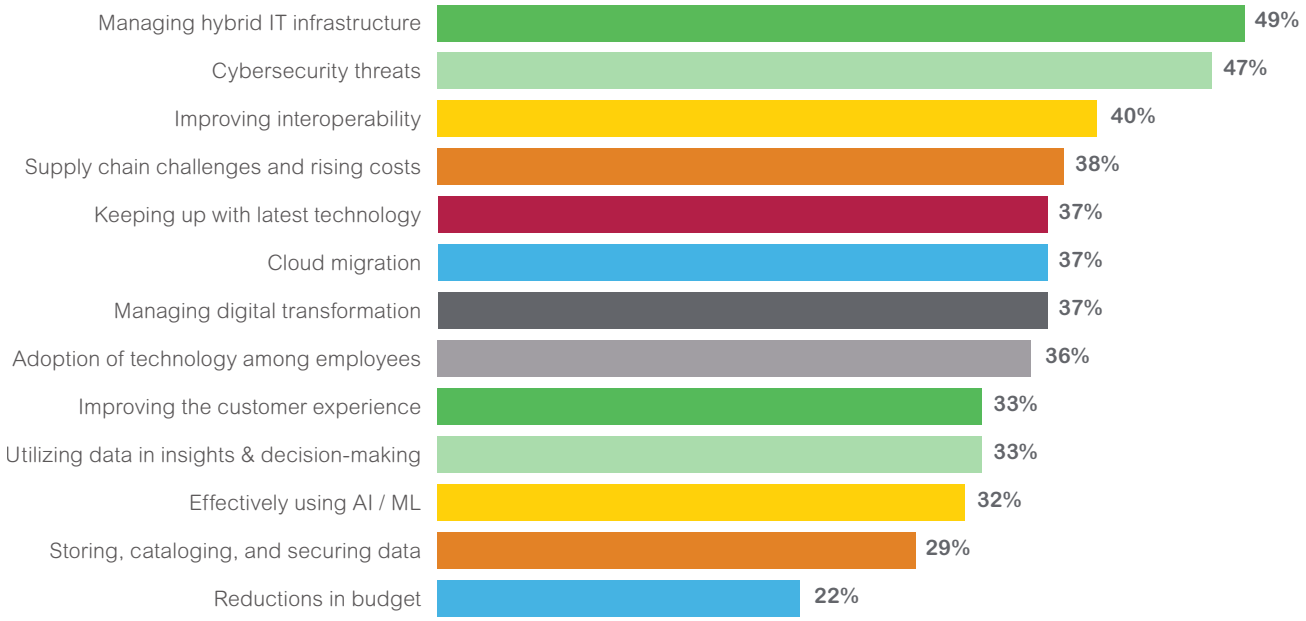
About The Study

The “How Edge Computing is Enabling the Future” report is based on a survey conducted by TEAM LEWIS Research on behalf of Schneider Electric. This research explored IT decision makers’ (ITDMs) familiarity with edge computing, adoption and use of edge computing, benefits and challenges of edge computing, impactful applications across industries, and forward-looking applications of edge computing in the manufacturing, healthcare, and higher education verticals. This research also sought to identify trends across key verticals and demographics. The findings detailed in this report are based on data collected in the study which consisted of 1,150 total responses from ITDMs in the United States in the Manufacturing, Healthcare, or Higher Education industries from May 31, 2023 to June 13, 2023 with a margin of error of +/- 2.8 percentage points.

State of IT Infrastructure & Perceptions of Edge Computing

With ever-evolving technology, ITDMs are facing a variety of challenges from managing IT infrastructure, including legacy IT and new operational systems, to making sure their organization is prepared to fend off advanced cyberthreats. According to ITDMs, the greatest IT challenge their organization is currently facing is managing hybrid infrastructure (local and IT cloud), with nearly half (49%) of ITDMs reporting that managing hybrid IT infrastructure is their top challenge, followed closely by cybersecurity threats (47%). Interoperability across systems has also posed a challenge for many organizations, with two in five (40%) stating improving interoperability across legacy IT and new systems is one of their organization's top challenges. Of interest, only twenty two percent of ITDMs say reductions in budget is one of the greatest IT challenges their organization is facing; this finding holds true across organizations with various sizes of IT tool budgets.

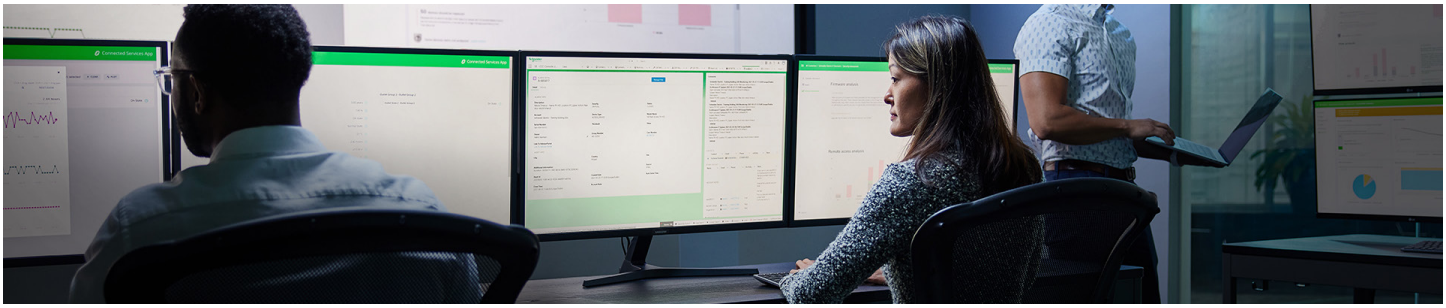
What are the greatest IT challenges your organization is currently facing?



ITDMs at organizations with 1,500 or more employees are more likely than ITDMs at smaller organizations to say adoption of technology among employees (46%) is one of the greatest challenges their organization is currently facing, second only to cybersecurity threats (51%).

In today's environment, organizations rely on cloud infrastructure, especially as organizations increasingly adopt a hybrid IT infrastructure. Nearly half (48%) of ITDMs surveyed report that their IT infrastructure is hybrid (50% cloud, 50% local IT). Over one-third (36%) of ITDMs say their organization's IT infrastructure is mostly cloud (75% cloud, 25% local IT). Only five percent of ITDMs say their organization has a fully cloud IT infrastructure. ITDMs at companies with 1,000-1,499 employees are most likely to say their organization has a hybrid IT infrastructure.

ITDMs expect their organizations to transition more towards the cloud over the next two years. Nearly one in four (22%) ITDMs expect their organization to have a fully cloud IT infrastructure in the next two years, while over half (53%) expect their organizations to adopt a mostly cloud (75% cloud, 25% local IT) IT infrastructure.



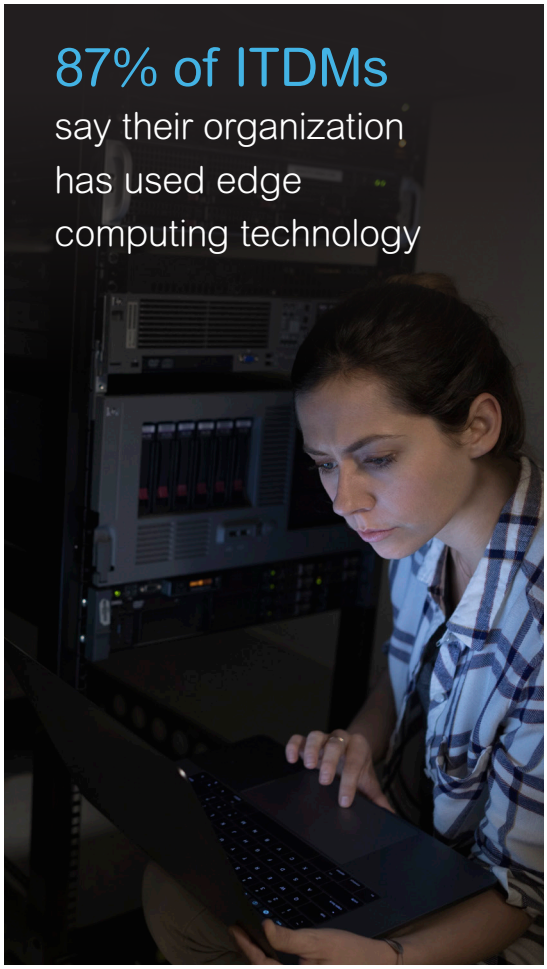
Awareness & Familiarity With Edge Computing

As organizations continue to shift their IT architecture towards the cloud, edge computing will become increasingly important to effectively manage, store, process, and utilize the vast amount of data companies are producing and collecting. ITDMs are largely familiar with edge computing, defined by TechTarget as a distributed information technology (IT) architecture in which client data is processed at the periphery of the network, as close to the originating source as possible. Four in five (80%) ITDMs report they are familiar[1] with edge computing, however ITDMs at organizations with tighter IT tools budgets (less than $1 million) (64%) are less likely to report they are familiar[1] with edge computing. ITDMs turn to a variety of sources to stay up to date with trends and developments in edge computing, including industry publications (57%), peers within their industry (53%), events (51%), and colleagues within their organization (50%).

Adoption and Use of Edge Computing

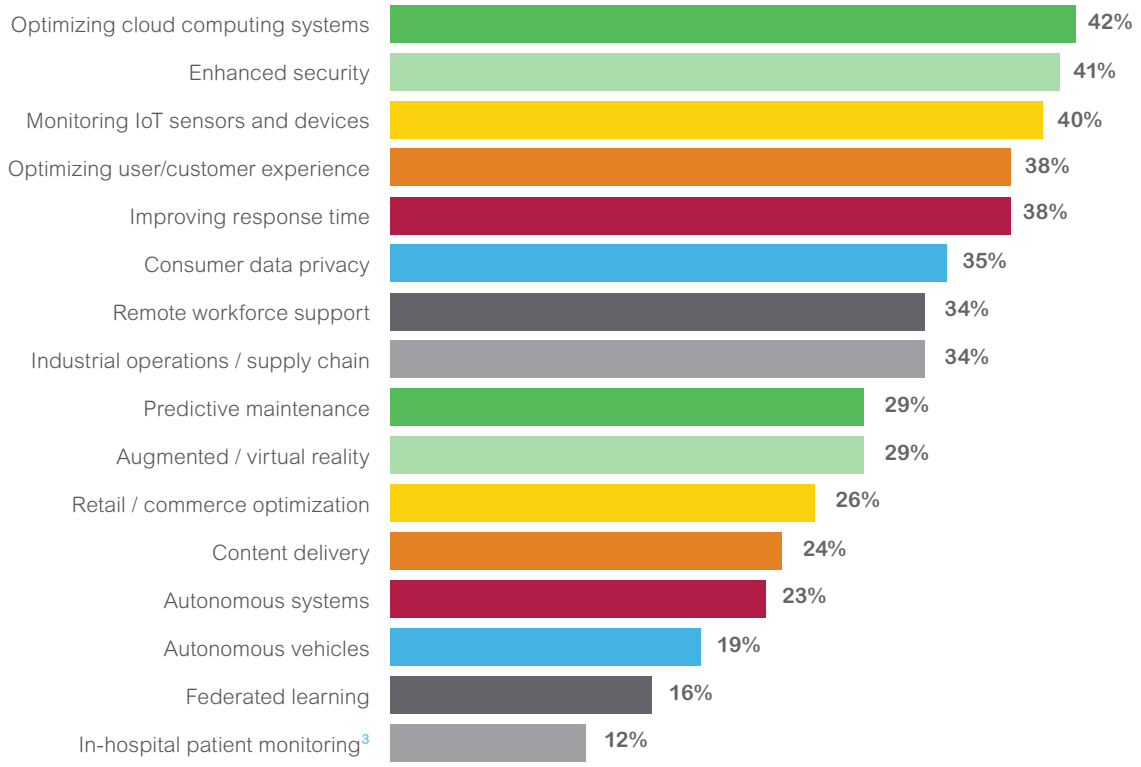
ITDMs are also largely confident in their industry, organization, and team's preparation to leverage edge computing. Approximately three-quarters of ITDMs say their team (76%), industry (75%), and organization (74%) are prepared[2] to leverage edge computing. This confidence in preparation aligns with the number of ITDMs who report their organizations have already leveraged edge computing technology.

ITDMs at organizations with 1,000-1,499 employees (96%) are most likely to say their organization has used edge computing technology, while ITDMs at organizations with small IT tools budgets (less than $1 million) (74%) are least likely to say their organization has used edge computing technology. ITDMs at organizations with small IT tools budgets (less than $1 million) are also least likely to say their organization (59%), industry (61%), and team (64%) is prepared[2] to leverage edge computing. Organizations have implemented edge computing for a variety of reasons. According to ITDMs, the top ways organizations have used edge computing to date include optimizing cloud computing systems, enhanced security, and connecting / monitoring IoT sensors and devices. Many ITDMs also report that their organizations are using ITDMs to streamline the customer or employee experience, including optimizing user / customer experience, improving response time, consumer data privacy, and remote workforce support.



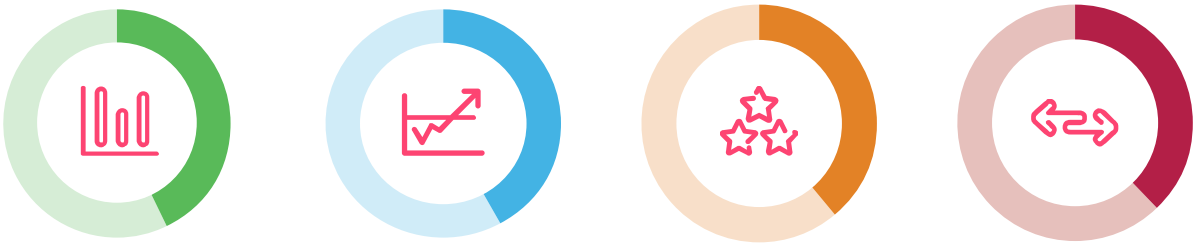
1 Extremely familiar / very familiar
2 Extremely prepared / very prepared

How, if at all, has your organization used edge computing to date?



As shown, organizations have used or implemented edge computing for a variety of use cases. This variety is also reflected in the reasoning behind organizations adopting edge computing. When asked why their organizations adopted edge computing, ITDMs listed increasing data privacy and security (43%), increasing productivity (42%), and increasing reliability (39%). Organizations have also implemented edge computing to increase their organization's ability to respond to change and improve scalability.

Why did your organization adopt edge computing?



43%
Increase data privacy and security

42%
Increase productivity

39%
Increase reliability

38%
Increase our ability to respond to change

3 Answer option only shown to Healthcare ITDMs

ITDMs at the largest organizations (1,500 or more employees) are more likely to say their organization adopted edge computing to improve customer experience (42%) and automate workflows (39%). ITDMs and their organizations have to consider a variety of features when implementing edge computing. When asked what factors their team considered when evaluating the feasibility of implementing edge computing in their organization, respondents listed:

- Security / privacy measures | **57%**
- Technical capabilities | **52%**
- Compatibility with existing systems | **48%**
- Regulatory / compliance requirements | **44%**
- Scalability | **44%**
- Return on investment | **43%**
- Flexibility | **42%**
- Cost | **38%**

ITDMs at the largest companies (1,500 or more employees) were more likely to say their team considered technical capabilities when evaluating the feasibility of implementing edge computing in their organization.

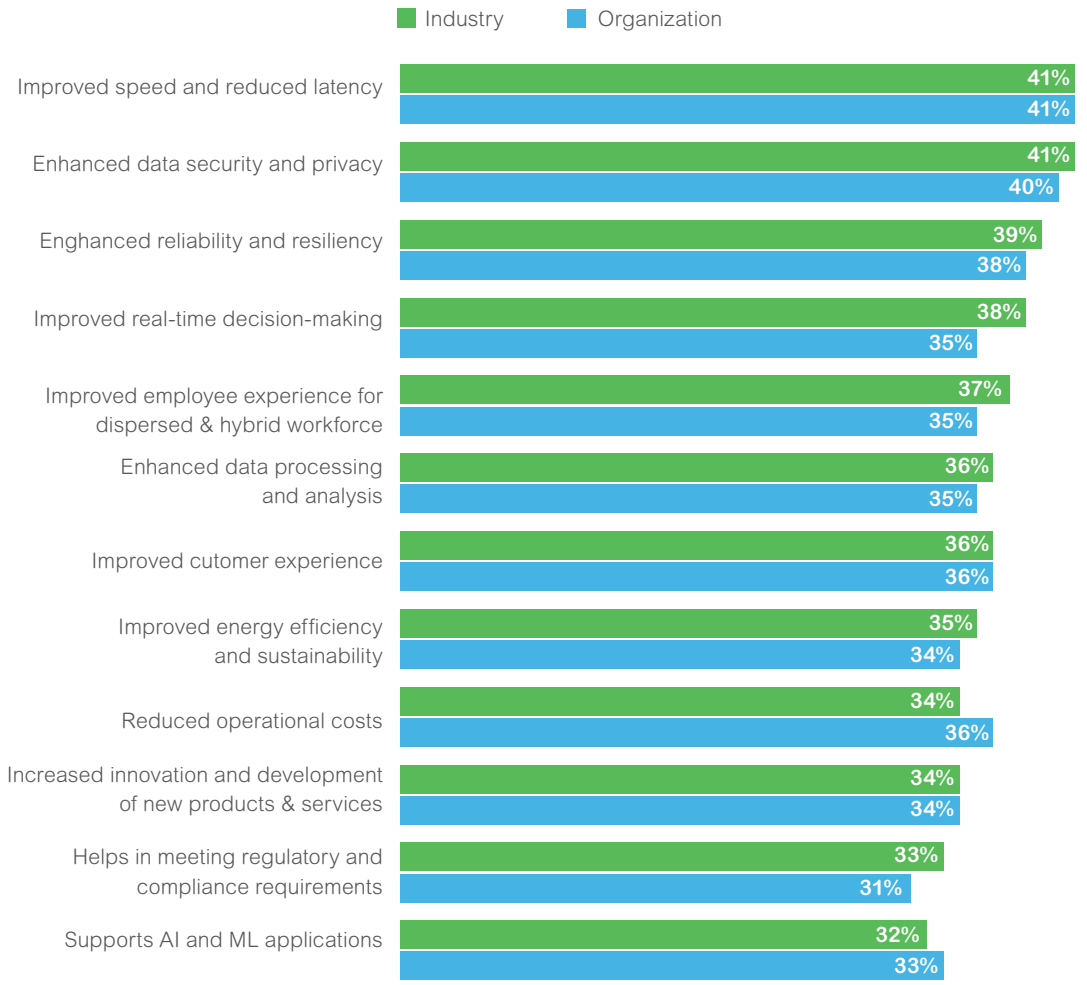
Despite the various use cases and reasons for adopting edge computing, a small minority (10%) of ITDMs report their organization has not used edge computing to date. When asked why their organization has not used edge computing to date, ITDMs named cost (47%) and a lack of skilled or qualified staff (46%) as the top reasons. A lack of clarity and buy-in can also be issues within organizations. Approximately three in ten ITDMs say security concerns (35%) and uncertainty about ROI (29%) are top reasons for their organizations not using edge computing to date, while nearly one in four (24%) ITDMs list lack of stakeholder buy-in as a primary reason.

Of those ITDMs at organizations that have not used edge computing to date, nearly two-thirds (65%) report their organization plans to use edge computing within the next two years. Nearly one in four (23%) say their organization plans to use edge computing within the next year and two in five say the next one to two years (43%). Only one in ten (11%) state their organization has no plans to use edge computing in the future.

Benefits of Edge Computing

ITDMs see many benefits of edge computing, for both their industry and their organization. The top benefits across both industry and organization include improved speed / reduced latency, enhanced data security / privacy, and enhanced reliability / resiliency.

What benefits of edge computing, if any, do you see for your industry and organization?

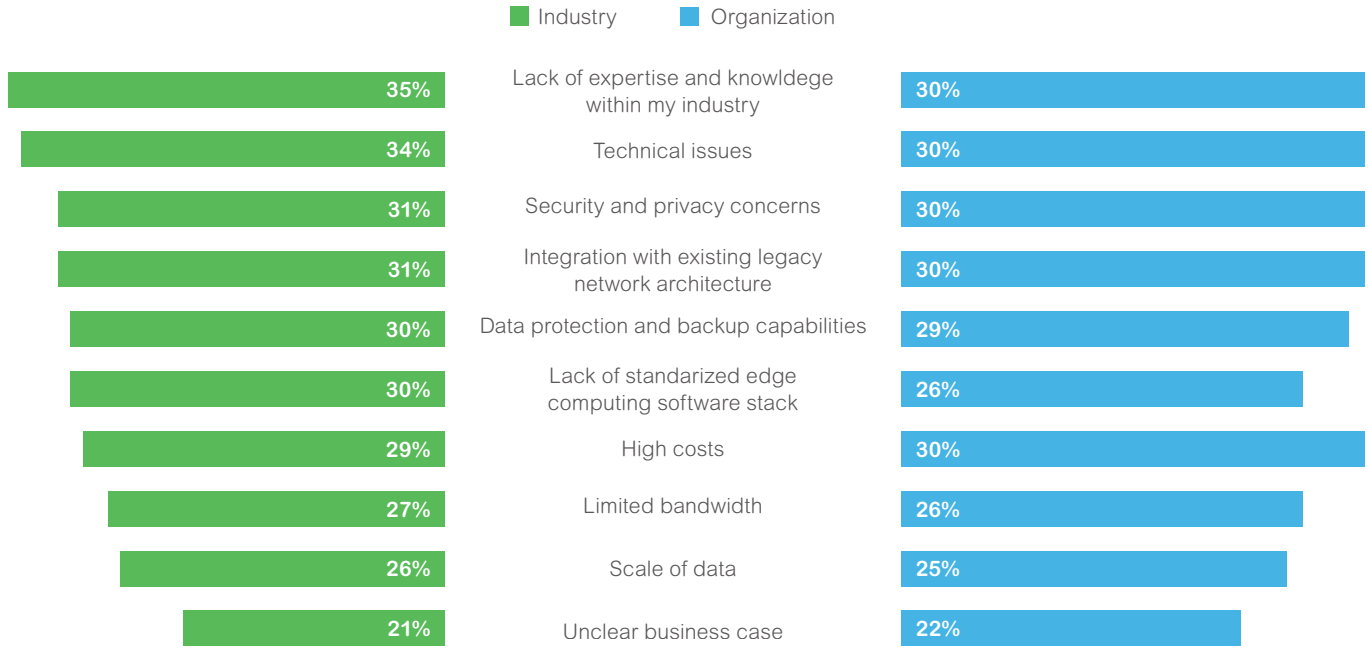


ITDMs at the largest organizations (1,500 or more employees) are more likely to say they see reduced operational costs (42%) as a benefit of edge computing for their industry and improved speed / latency (52%) as a benefit of edge computing for their organization.

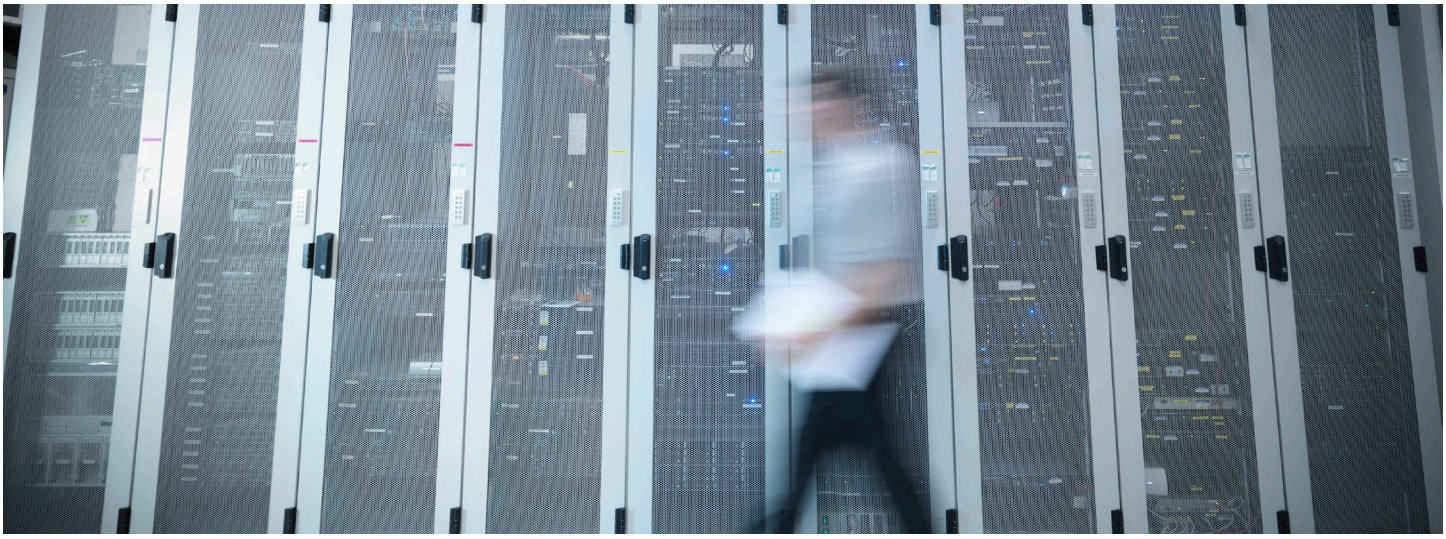
Drawbacks and Challenges of Edge Computing

ITDMs foresee some drawbacks or challenges of edge computing for both their organization and industry. ITDMs predict the top negative impacts their industry or organization will experience due to edge computing to be a lack of expertise or knowledge, technical issues, and security / privacy concerns.

What negative impacts, if any, do you think your industry and organization will experience due to edge computing?



Organizations who have already implemented or used edge computing technology have faced several challenges. ITDMs say the biggest challenges their organization faces in implementing an edge computing solution are difficulty in integrating with other emerging technologies, lack of skilled / qualified staff, and limited edge computing standards and best practices.



What are the biggest challenges your organization faces in implementing an edge computing solution?

Difficulty in integrating with other emerging technologies

Lack of skilled and qualified staff

Limited edge computing standards and best practice

Maintaining edge reliability in remote or harsh environments

Challenges in designing adaptable edge solutions

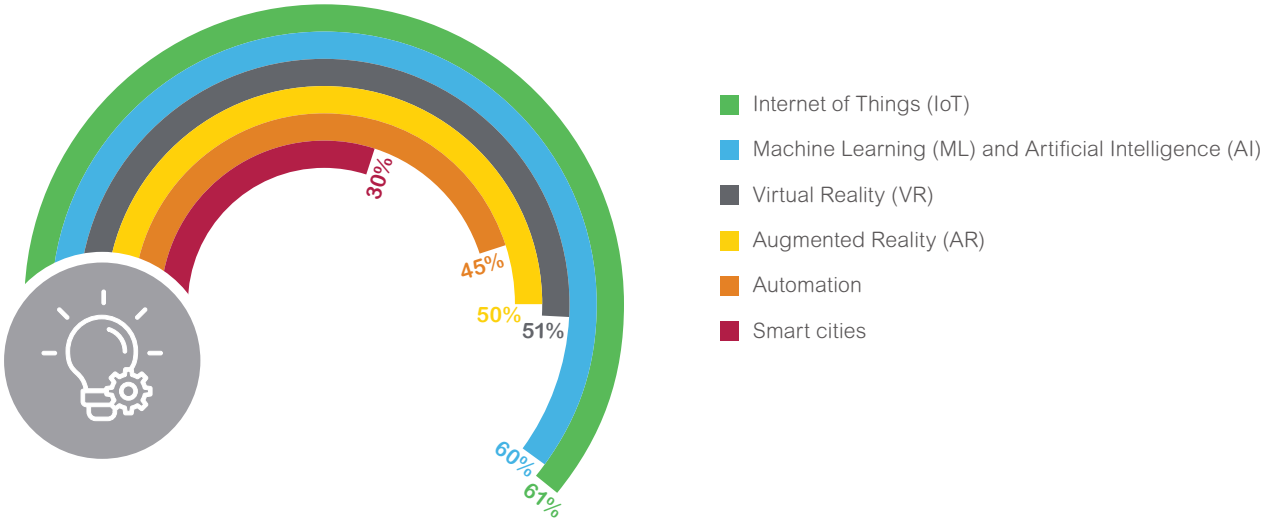
Managing large amounts of edge data

ITDMs at the largest organizations (1,500 or more employees) are more likely to say regulatory and compliance issues (34%) are one of the biggest challenges their organization faces in implementing an edge computing solution.

The Future of Edge Computing

As seen in this research study, many ITDMs say their organizations are already using and implementing edge computing. As adoption continues to grow across organizations and verticals, ITDMs foresee edge computing positively impacting several innovations and industries. ITDMs foresee innovations like the Internet of Things (IoT) and machine learning (ML) and artificial intelligence (AI) benefiting the most from edge computing.

In your opinion, what innovations do you believe will benefit the most from edge computing?



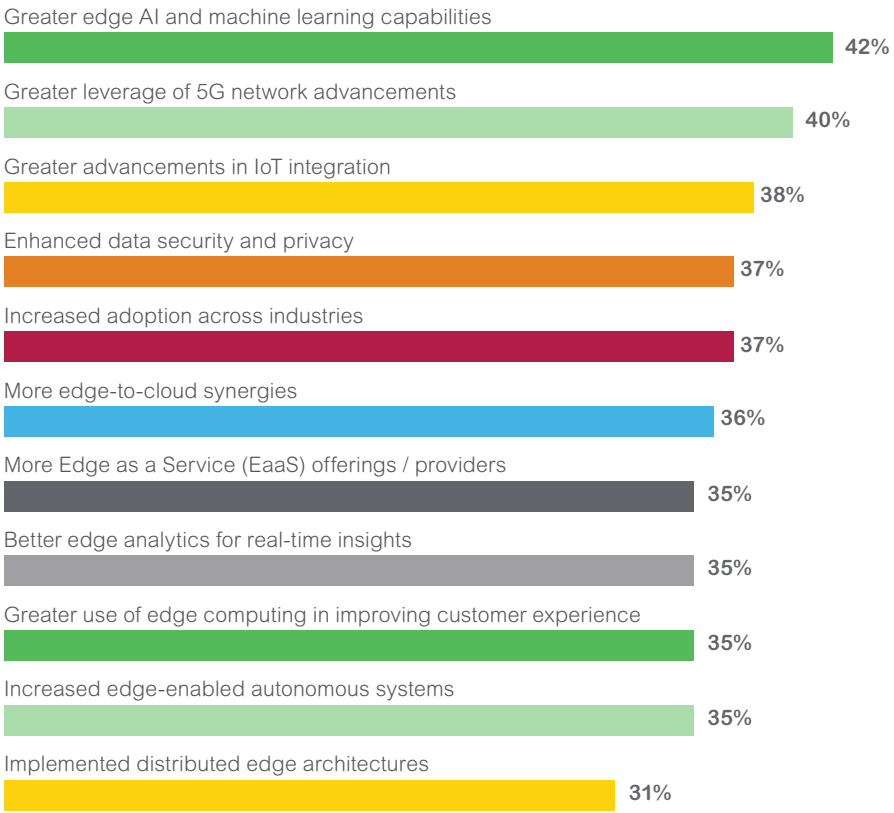
There are also several industries and key verticals that ITDMs expect to see greater benefits from edge computing. Over half of ITDMs say the manufacturing / supply chain (53%) and healthcare & life sciences (51%) industries will benefit the most from edge computing. Approximately two in five ITDMs believe financial services (42%), e-commerce / retail (41%), and education (38%) will benefit the most from edge computing.

ITDMs also expect their industries to see a variety of future applications of edge computing, including real-time data processing and analysis and increased security and privacy, among others. When asked what future use cases or applications of edge computing they see in their industry, ITDMs reported:

- Real-time data processing and analysis | **55%**
- Increased security and privacy | **54%**
- Edge-enabled IoT applications | **49%**
- Improved latency-sensitive applications | **48%**
- Localized data storage and processing | **44%**
- Reduced reliance on cloud computing | **40%**

While organizations adapt to implement edge computing effectively, edge computing will also continue to evolve over the next several years. ITDMs anticipate edge computing evolving in several ways, including better integration with other emerging technologies, increasing adoption, and the creation of synergies, among others.

How do you see edge computing evolving in the next 5 years?



Edge Computing and Sustainability

While edge computing is expected to impact emerging technologies and evolve into greater applications and use cases, edge computing can also be integral to helping organizations achieve their goals and enabling a more sustainable future. Many organizations are focused on a variety of sustainability objectives, in addition to goals surrounding privacy, diversity, and inclusion.

What are your organization's ESG (Environmental, Social, and Governance) goals?

1. **47%** — **Protect data privacy** & implement strong cybersecurity measures
2. **45%** — **Enhance** supply chain sustainability
3. **44%** — Develop **sustainable** products and services
4. **43%** — Promote **diversity** and inclusion
5. **42%** — **Reduce emissions** and improve energy efficiency
6. **41%** — Ensure ethical and **fair labor** practices
7. **41%** — Use **renewable energy** sources
8. **38%** — Implement circular economy principles to **reduce waste**

ITDMs are optimistic about how their organization's edge computing strategy can help influence and support their organization's ESG goals. From strengthening data privacy to utilizing renewable energy sources and responsible sourcing practices, ITDMs anticipate edge computing to integrate into their organization's ESG goals. When asked how their organization's edge computing strategy supports their organization's ESG goals, respondents listed:

- Enhance data privacy and security measures | **48%**
- Sustainable products and services using edge computing | **45%**
- Renewable energy sources for edge computing infrastructure | **45%**
- Responsible sourcing practices for edge computing hardware materials | **45%**
- Circular economy principles and cloud computing | **42%**
- Energy-efficient edge computing | **42%**
- Edge analytics for optimized operations | **42%**

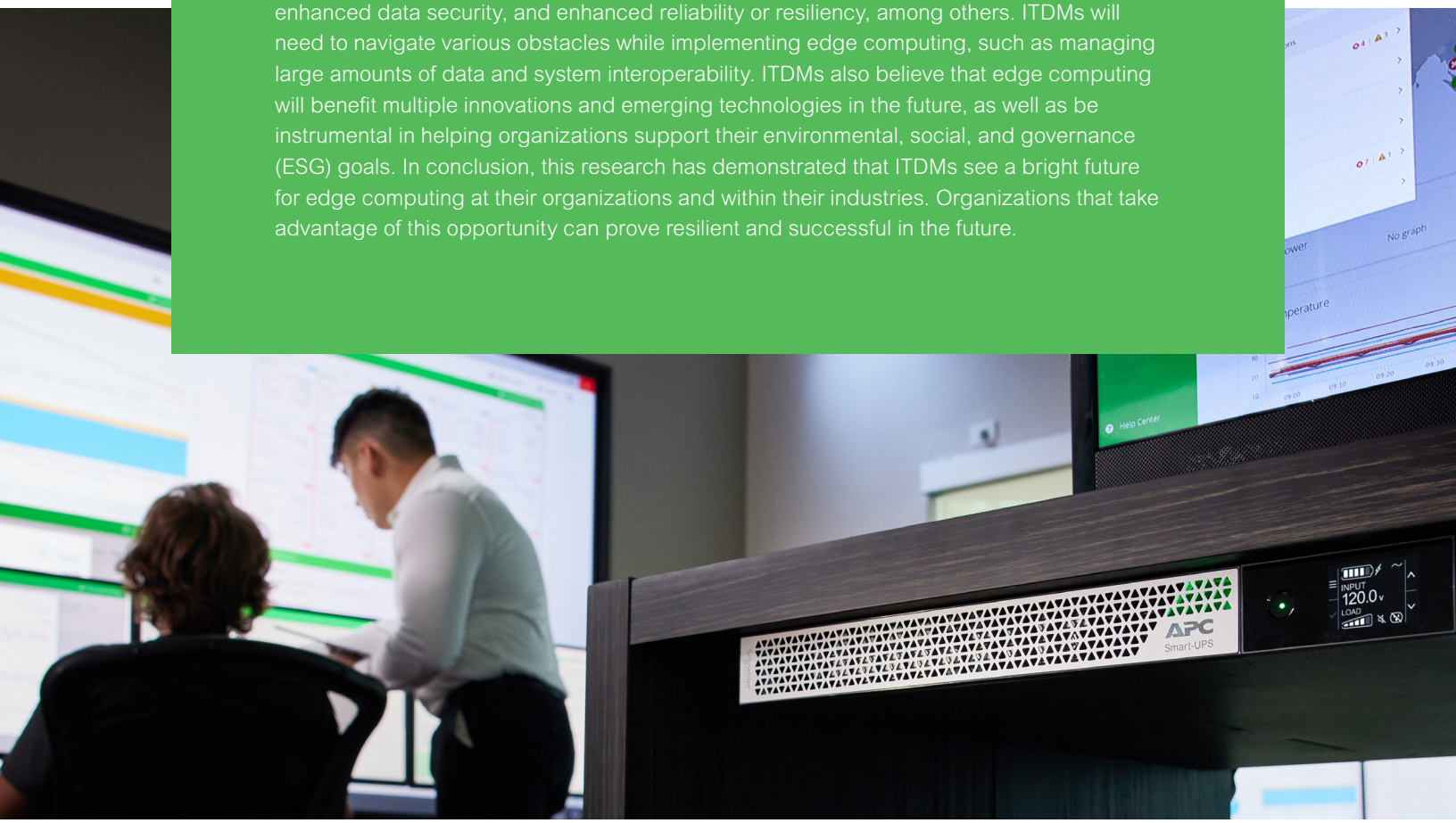
To successfully use edge computing strategy to support organizational ESG goals, organizations are faced with the hurdle of identifying these energy sources for edge computing and creating a comprehensive framework to measure and track this data. Although no small task, nearly all ITDMs indicate that having a source of truth for this data is important to their organization.

4 Extremely important/very important

In line with the clear verdict that organizations need to know where the energy at the edge is coming from, ITDMs indicate that their organizations use a variety of strategies and tools to measure and track this energy. The top ways organizations are measuring and tracking sustainability at the edge include automated data collection and analytics tools (45%), supply chain sustainability tracking for edge computing materials (44%), and sensors and monitoring tools in edge computing hardware (40%). Organizations need to ensure that they have strong tools and strategies in place to successfully measure and track where energy at the edge is coming from.

Conclusion

As shown in this research, adoption of edge computing is growing quickly across companies of all sizes and IT budgets. As organizations increasingly utilize the cloud and adapt to a hybrid IT infrastructure, organizations are simultaneously facing a variety of complex IT challenges. From improving interoperability across legacy IT and new systems to managing adoption of technology among employees to protecting their organizations from cybersecurity threats, ITDMs have greater roles and responsibilities than ever. Despite the challenges ITDMs and their organizations are facing, ITDMs believe edge computing can offer their organizations a variety of benefits, including improved speed and reduced latency, enhanced data security, and enhanced reliability or resiliency, among others. ITDMs will need to navigate various obstacles while implementing edge computing, such as managing large amounts of data and system interoperability. ITDMs also believe that edge computing will benefit multiple innovations and emerging technologies in the future, as well as be instrumental in helping organizations support their environmental, social, and governance (ESG) goals. In conclusion, this research has demonstrated that ITDMs see a bright future for edge computing at their organizations and within their industries. Organizations that take advantage of this opportunity can prove resilient and successful in the future.



Boston One Campus
800 Federal Street
Andover, MA. 01810 USA
Phone: + 1 976 794 060
www.se.com

Life Is On Schneider Electric

• 998-22857413_LMA-US