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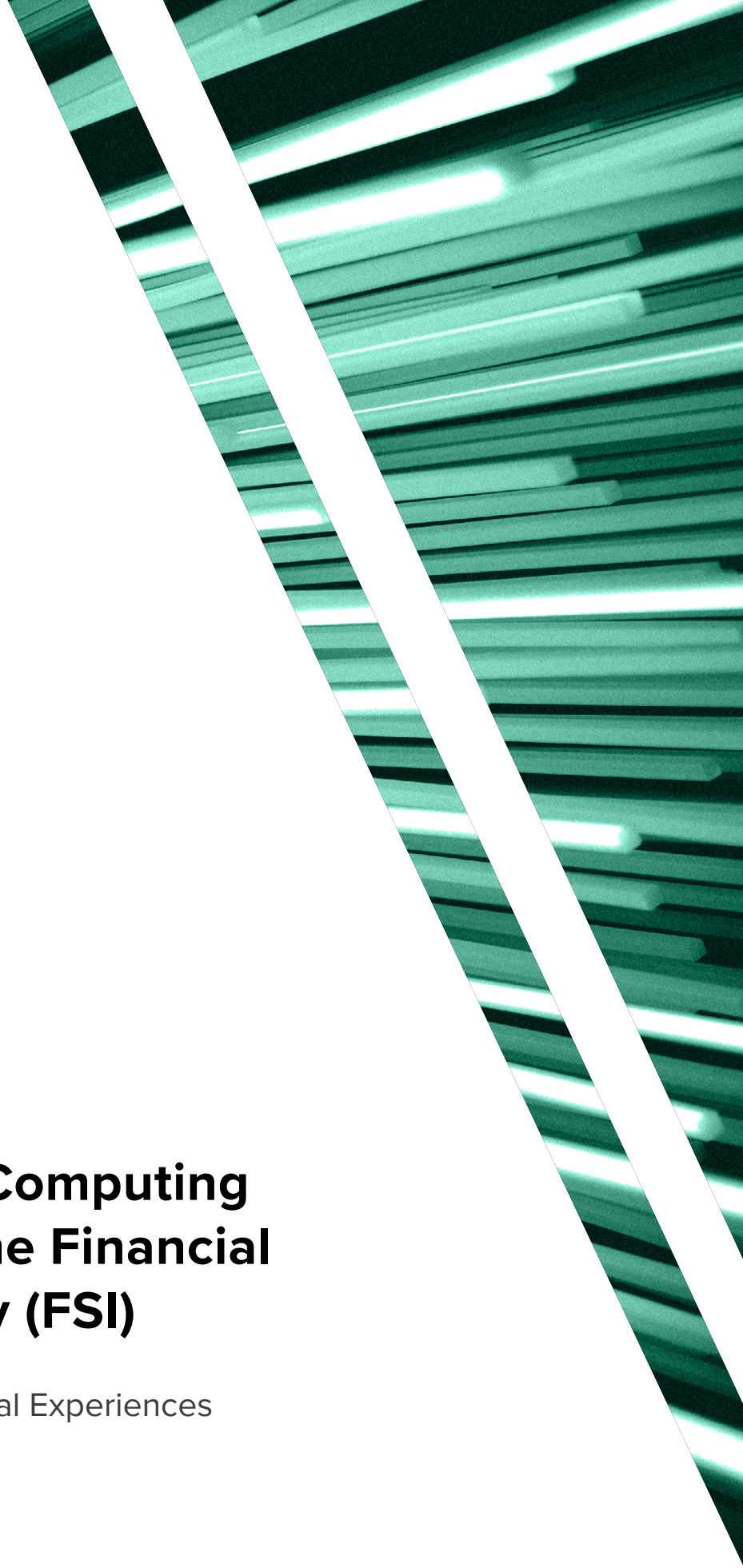


Emerging Edge Computing Momentum In The Financial Services Industry (FSI)

Edge Powers New FSI Digital Experiences

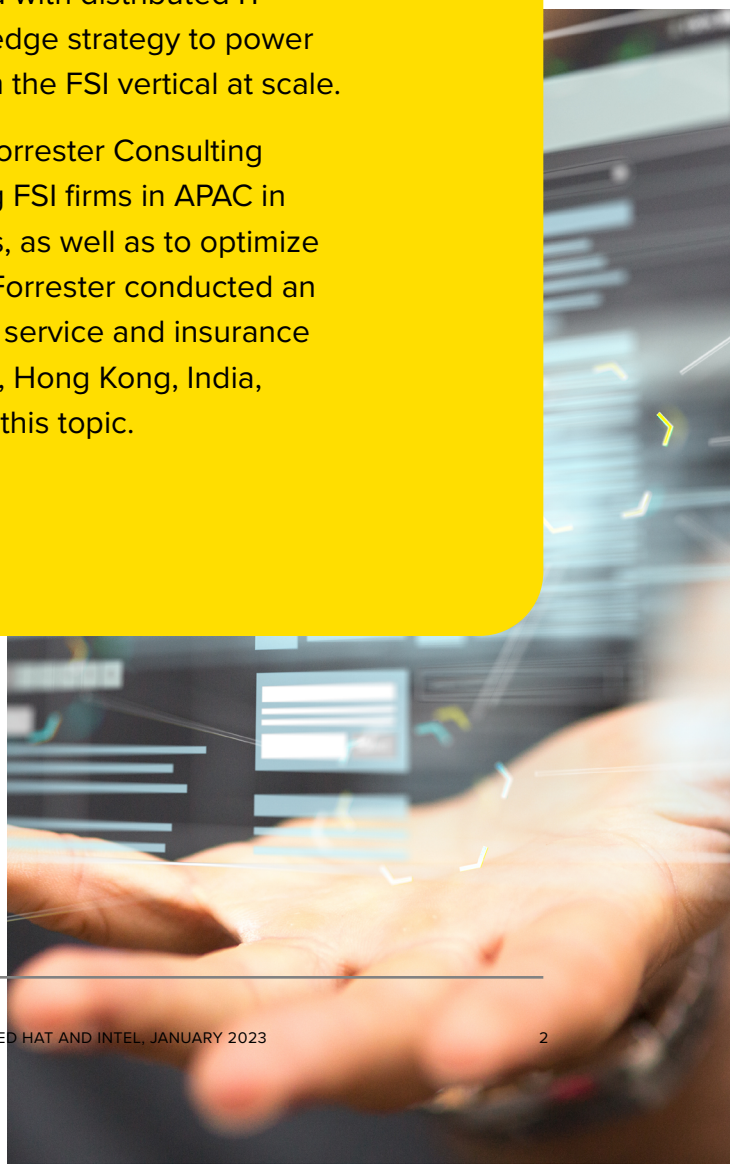
A FORRESTER CONSULTING THOUGHT LEADERSHIP PAPER SPOTLIGHT COMMISSIONED BY RED HAT AND INTEL, JANUARY 2023

Executive Summary

Rising digital consumption and demand for personalized experiences require real-time insight and contextual awareness. FSI firms in APAC should leverage edge intelligence to anticipate customer needs and personalize their experiences. Local data is leveraged to build AI-powered experiences that are enabled by: 1) a fragmented array of devices, and 2) an explosion of connected assets enabled by the Internet of Things (IoT) which generate data that are not easily transported to or processed in public cloud data centers. These drive demand for edge intelligence — digital experiences are at the frontline of these transformation initiatives, and edge is poised to be at the center of it all.[1]

Edge solutions in various environments will fuel innovation and drive FSI firms' future technology fitness with adaptive, dynamic, and resilient business strategies and operations. As FSI firms extend their application deployment initiatives across use cases and environments, their infrastructure strategy must evolve to enable these edge scenarios. Faced with distributed IT deployments, FSI leaders must establish a holistic edge strategy to power next-generation experiences that digitally transform the FSI vertical at scale.

In August 2022, Red Hat and Intel commissioned Forrester Consulting to assess the adaptation of edge computing among FSI firms in APAC in their product, business, and engagement strategies, as well as to optimize deployment of edge use cases in the FSI industry. Forrester conducted an online survey with 230 decision-makers in financial service and insurance enterprises based in Australia, New Zealand, China, Hong Kong, India, Japan, South Korea, and Southeast Asia to explore this topic.



Key Findings

Decision-makers recognize that leveraging edge is vital to the delivery of customer value for sustained business growth. FSI firms in APAC face mounting pressure to build their future technology fitness by driving customer experience (CX) through the delivery of smarter and faster digital experiences to customers everywhere. FSI decision-makers recognize that enabling solutions on edge environments and devices is imperative to create customer and business value through value-added services and products.

FSI leaders are investing in edge to develop novel use cases that generate customer-focused outcomes. Forrester defines edge computing as infrastructure and software that is physically separate from but connected to enterprise core IT assets by shared fiber or wireless networks.[2] To meet customer demands, FSI firms envision accelerating developing edge strategies: 81% of surveyed decision-makers expect to have their firms' live products in market within the next two years.

Deploying software where it runs best will be essential to redefining data agility for real-time insights. For FSI firms to best capture edge opportunities, it is important for stakeholders to evaluate their firm's evolving edge computing requirements. It is also crucial to optimize edge deployment with architecture that addresses evolving core-to-edge-to-cloud workload application and use case affinity requirements.

FSI Firms Are Creating Next-Generation Experiences At The Edge

Come 2023, global economic uncertainty and changing market dynamics will influence key paradigm shifts, one of which lies in addressing evolving demands for edge devices and IoT-enabled assets, as well as ensuring security of the fragmented array of networks, connected assets, and edge environments.[3] Edge computing is bringing computing functions closer to where FSI firms need to generate data and execute actions on that data. According to Forrester Analytics data, redefining data agility to provide real-time insights for greater customer value through next-generation digital experiences, products, and services is a core benefit of edge computing.[4]

Forrester defines four types of edge computing environments that serve different stakeholder needs and enable a range of use cases: the enterprise edge, the operations edge, the engagement edge, and the provider edge.[5] Finding the right opportunity begins with understanding the capabilities of different edge environments and identifying the combination of edge environments that best serve the unique needs of each FSI firm.

FSI decision-makers recognize that leveraging edge computing solutions is vital to delivering customer value for sustained business growth. APAC FSI firms are strategically focused on driving CX (70%) and business growth (74%) by providing new forms of value to customers through new products (70%) and value-added services (68%) (see Figure 1). More than 4 in 5 FSI decision-makers (86%) acknowledged that enabling edge solutions is imperative to create customer and business value. Edge computing solutions are also recognized for their contribution to the capacity of FSI firms to generate new forms of value to their customers through value-added services (85%) and new product propositions (84%) (see Figure 2).

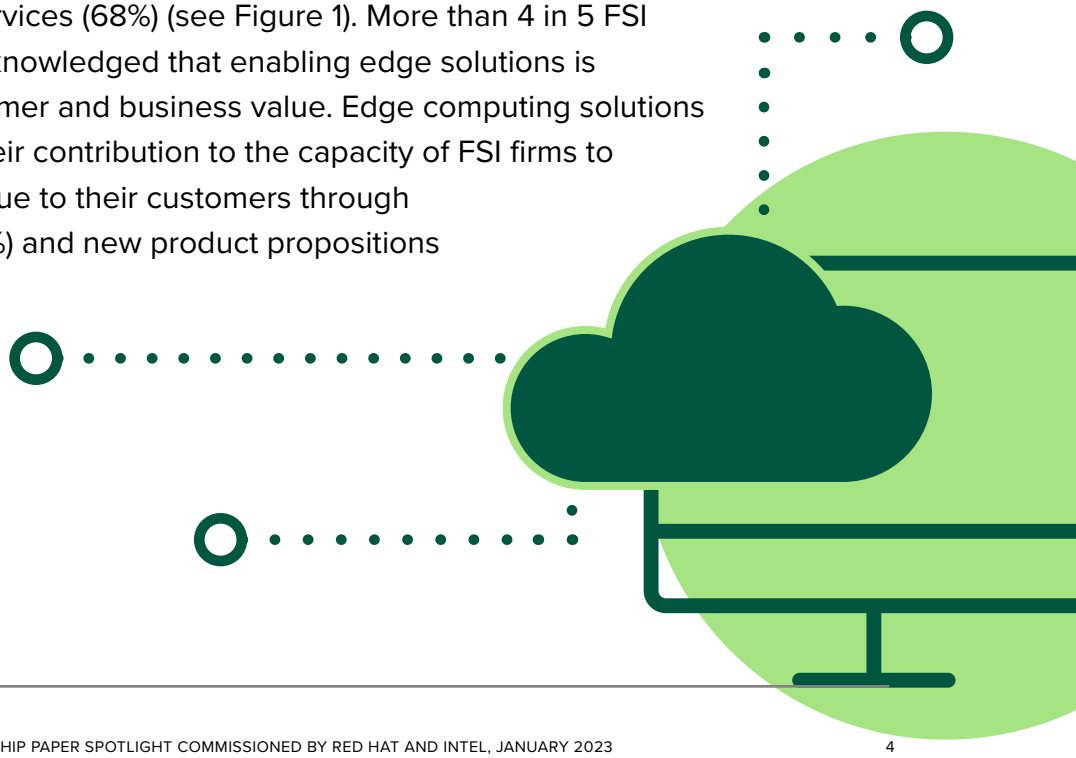
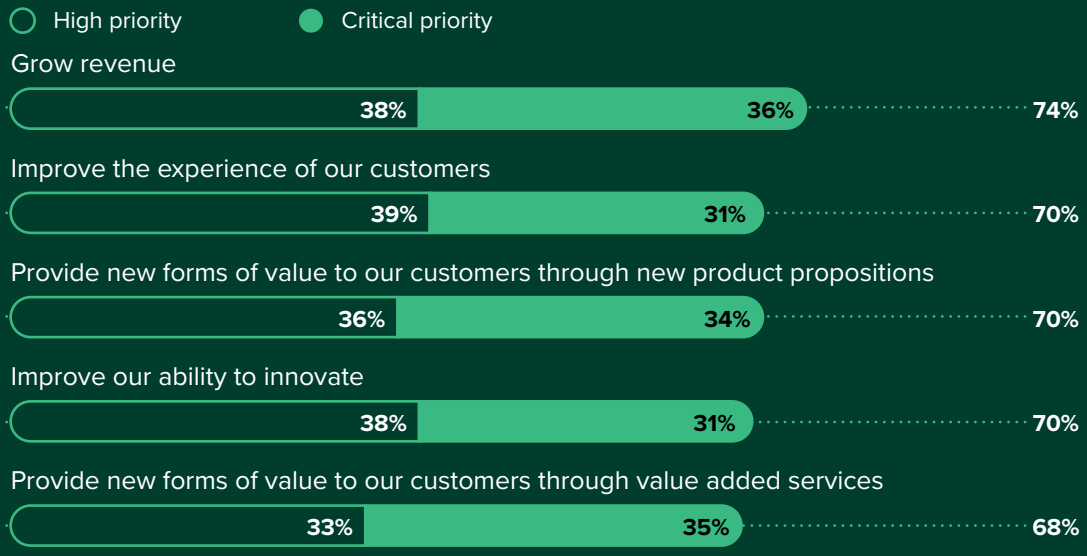


Figure 1

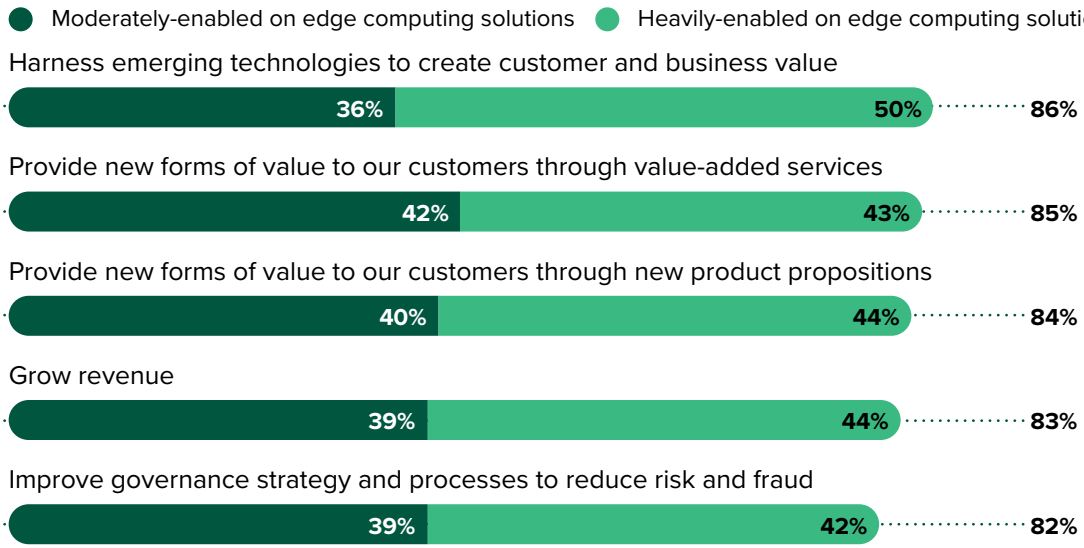
Top Five Business Priorities For Organizations In The Next 12 Months



Base: 230 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

Figure 2

Top Five Business Priorities Enabled On Edge Computing Solutions



Base: Variable, dependent on number of respondents who selected 'high priority' or 'critical priority' for each business priority out of a total of 230 respondents
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

FSI firms expect to continue developing their edge strategies and bring products to market over the next two years. Many APAC FSI firms are in the early stages of their edge journey. Twenty percent of APAC FSI firms currently have an edge computing strategy, and 63% of decision-makers will explore business viability and developing a strategy over the next year. Over 80% of firms have plans to introduce live products to the market within two years.

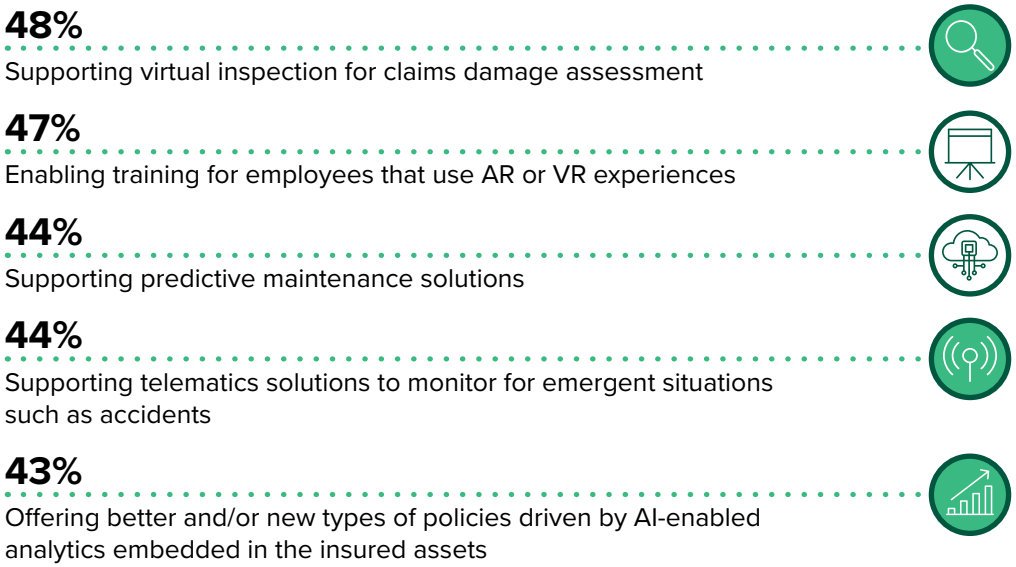
FSI firms are evolving their edge strategies to enhance customer value, which is reflected in studying edge use cases focused on addressing customer-focused outcomes. Insurance firms are focusing on exploring edge use cases including processing video imagery (48%), smart devices to enhance customer value through fraud reduction (47%), and enhanced reliability (46%) (see Figure 3).

Figure 3

Top Five Insurance Use Cases Currently Implemented Vs. Currently Being Explored

Customer-focused outcomes

Top five insurance use cases that FSI firms have 'currently implemented'



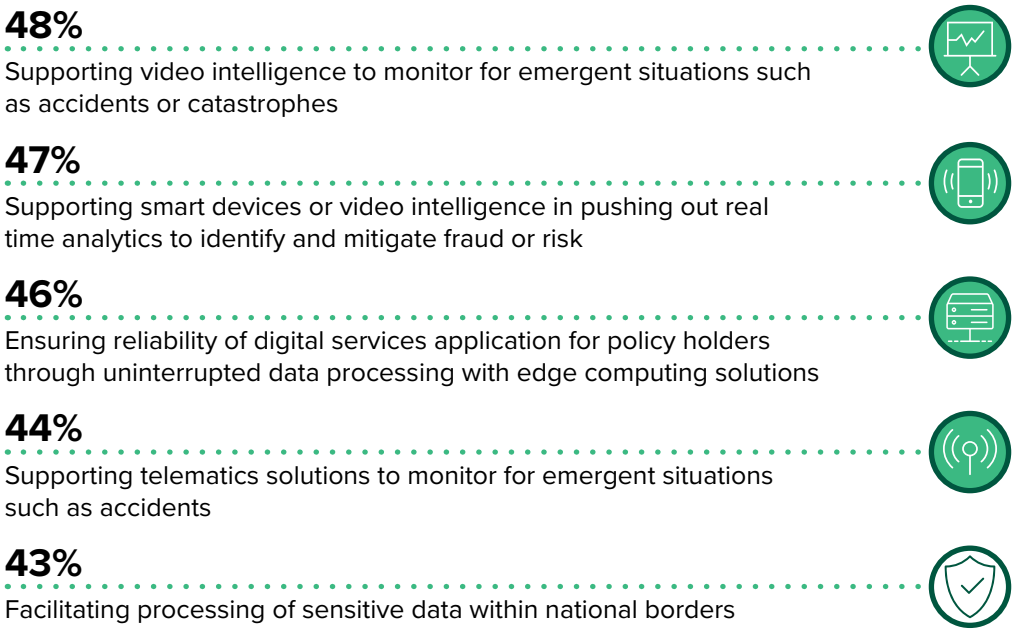
Base: 210 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

Figure 3 (Continued)

Top Five Insurance Use Cases Currently Implemented Vs. Currently Being Explored

Customer-focused outcomes

Top five insurance use cases that FSI firms are 'currently exploring'



Base: 210 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

These initiatives are mirrored in banking use cases to enable smarter, faster digital experiences for customers with video intelligence that detects potential fraud (45%) and real-time authentication (44%) (see Figure 4).

A combination of environments is needed to address each FSI firm's unique needs and crystallize their edge vision. Each edge approach addresses distinct needs, and 71% of FSI firms are considering to implement more than one edge environment. For example, the enterprise edge (62%) features an enterprise data store at the core that allows users to extend their application services to remote locations. Decision-makers also stated their interest in the operations edge (58%) with local networks of smart things, local compute, and remotely-deployed gateways in commercial and

industrial spaces at the end user side. The engagement edge approach (57%) — compute clusters that are globally distributed to help firms deploy high-performance systems-of-engagement apps to customers wherever they are — similarly arouses interest amongst FSI leaders.

Figure 4

Top Five Banking Use Cases That Are Currently Implemented Vs. Currently Being Explored

Customer-focused outcomes

Top five banking use cases that FSI firms have 'currently implemented'

52%
Reducing data sovereignty issues related to data transfers across borders

49%
Enabling training for employees that use AR or VR experiences

49%
Supporting deployment of IoT capabilities as part of customer service at physical locations

48%
Supporting AI-enabled analytics in data processing to detect fraudulent patterns for fraud mitigation

48%
Reducing latency by processing data locally to reduce bottlenecks, allowing quicker data distribution

Base: 160 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

Figure 4 (Continued)

Top Five Banking Use Cases That Are Currently Implemented Vs. Currently Being Explored

Customer-focused outcomes

Top five banking use cases that FSI firms are 'currently exploring'

48%
Supporting high frequency algorithms in trading through low latency provided by edge computing

45%
Supporting video intelligence in detecting potential criminal or fraudulent activities

44%
Supporting real-time authentication

43%
Eliminating the need for co-location to reduce rental incurred

42%
Supporting AI-enabled analytics in data processing to detect fraudulent patterns for fraud mitigation

Base: 160 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

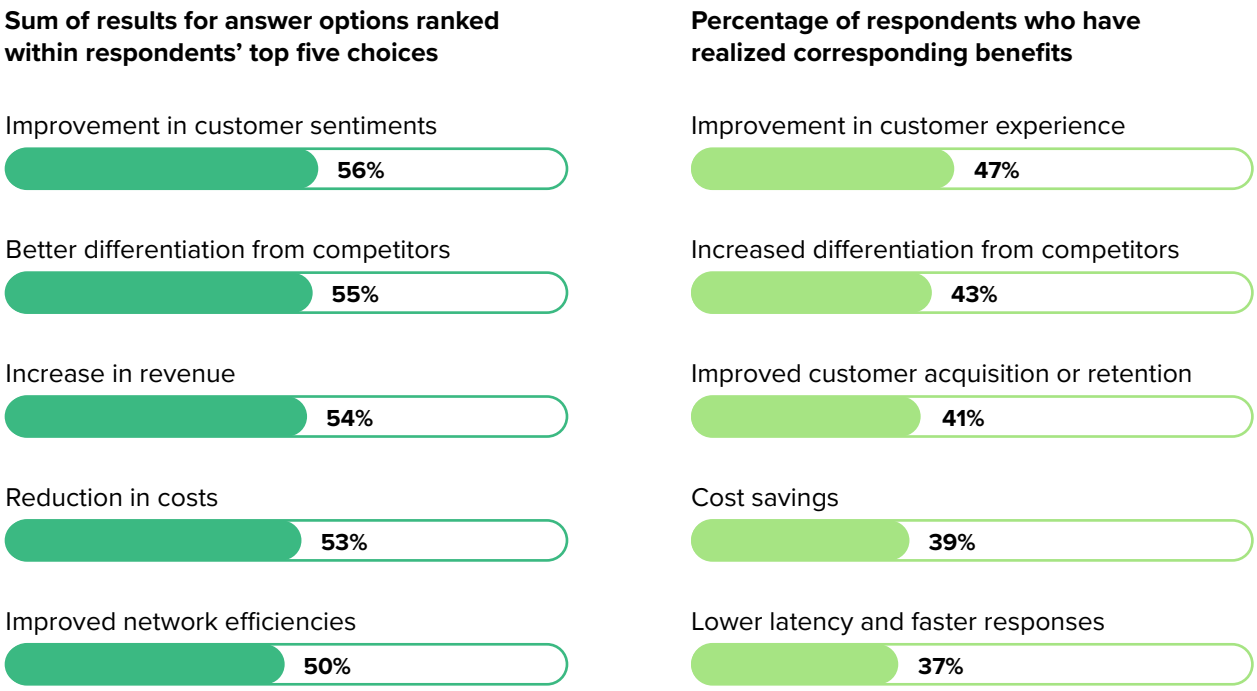
The Lack Of A Mature Strategy And Infrastructure Constraints Pose Challenges To Capturing Edge Opportunities

There is strong interest amongst APAC FSI firms in exploring the business viability of edge, and to eventually transform initiatives into live value propositions for customers. However, many of them have not adopted a strategic mindset and approach towards these edge-related initiatives.

Consequently, many firms have not fully achieved their key intended outcomes. Fifty-five percent of them had indicated that they hoped to achieve differentiation from competitors via edge initiatives, but only 43% of respondents indicated this as a benefit they have already realized (see Figure 5).

Figure 5

Top Five Intended Key Outcomes Vs. Top Five Corresponding Realized Benefits



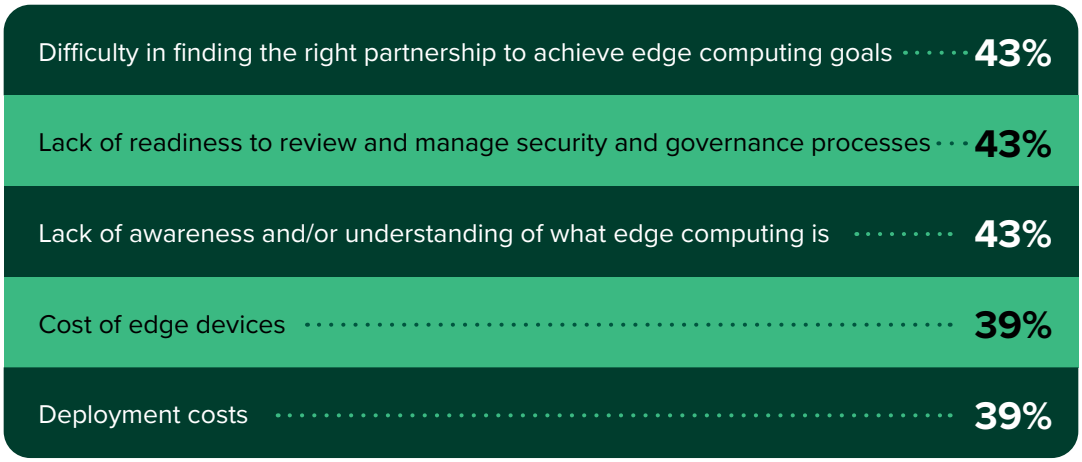
Base: 230 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

APAC FSI firms face fundamental business and technology challenges as they operationalize their edge initiatives. These challenges would hamper success in today's context as the concept of 'workload affinity' grows in prominence.[6] The proliferation of IoT, 5G, and business-optimized networking fabrics has led to businesses extending deployment of applications, services and use cases at edge environments.[7] However, firms need to first solve the following challenges they face most, to achieve the flexibility and agility required to enable workload affinity:

Firms are still struggling with business fundamentals. To navigate new developments in edge and identify how edge scenarios apply to business objectives, organizations must be resourceful in knowledge, internal collaboration, and most importantly, ready to deal with security complications that edge deployments can bring. Some of the top business challenges faced by APAC FSI firms include difficulty in finding the right partnership internally to achieve edge computing goals (43%), a lack of readiness to review and manage security and governance processes (43%), and a lack of awareness and/or understanding of what edge computing is (43%). In addition, more than one-third of APAC firms (38%) cited that getting executive buy-in is very challenging (see Figure 6).

Figure 6

Top Five Business Challenges Experienced In Edge Deployment And Ongoing Management



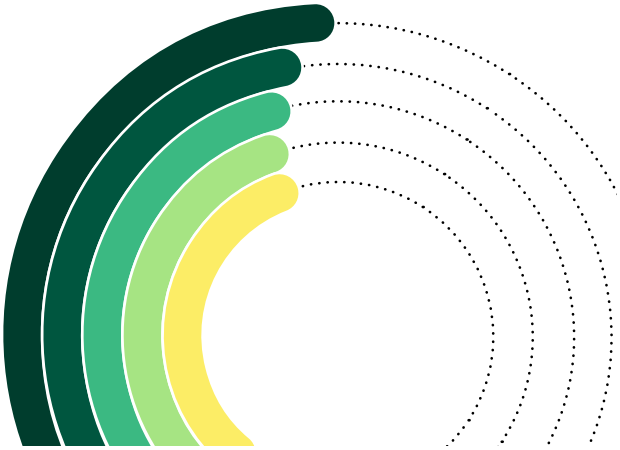
Base: 230 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

Resourcing in the context of remote deployments. Two out of the top three technical challenges faced by APAC firms were related to a lack of resources and expertise to ensure proper management and maintenance of edge sites. This includes the lack of technical expertise to ensure interoperability between hardware and software within highly complex solutions at edge sites (41%), and the lack of resources to manage physical security of edge sites (38%). This is further exacerbated by how edge deployments are almost always remotely located — 39% of APAC firms indicated that it is very challenging to address the complexity of managing edge devices remotely (see Figure 7).

Legacy infrastructure hinders innovation. Edge deployment highlights the need to review current application architecture and data to orchestrate a new way of distribution that maximizes performance. This often constitutes the need to address problems such as vendor lock-in and the compatibility of application infrastructure on new edge sites. Yet, more than one-third (37%) of APAC firms indicated that legacy technologies are a bottleneck to operationalizing their edge initiatives.

Figure 7

Top Five Technology Challenges Experienced In Edge Deployment And Ongoing Management



- **41%:** Lack of technical expertise to ensure interoperability between hardware and software within highly complex solutions at edge sites
- **39%:** Complexity of remotely managing edge devices
- **38%:** Lack of resources to manage physical security of edge sites
- **37%:** Lack of know-how to size edge computing infrastructure appropriately for maximum cost efficiency
- **37%:** Lack of strategy to ensure consistency in site management across edge sites for easy troubleshooting

Base: 230 C-level executives and directors, and senior managers with responsibilities for edge computing strategy in their respective banking or finance institution
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat and Intel, October 2022

Key Recommendations

Real-time analytics, insights, and immersive digital experiences are shaping future opportunities among FSI firms. APAC FSI firms are deploying a variety of potential edge use cases from emergent monitoring to fraud detection in four edge environments, often to distribute software that can support the creation of digital-first experiences for customers.

However, many APAC firms have yet to execute edge initiatives against a well-thought-out strategy that guides them through the complexities of edge deployments. To achieve their priorities in delivering frontal digital experiences for customers, APAC firms need to foster a deeper understanding of edge environments, facilitate effective internal collaboration, and ensure selected edge solution providers can help operationalize edge initiatives and fill in relevant technical gaps.

As FSI firms progressively operate on the 'workload affinity' model, there is no one-size-fits-all approach or template for edge computing strategies. The key is to have an overarching plan that details a clear roadmap for execution and management of initiatives that best fits their use cases in a tactical way that connects both business and IT in their combined mission.

To power to the edge intelligently, firms should:

Assess company-specific use cases.

Firms should map out use cases and edge scenarios that will be most valuable and relevant based on corporate strategic priorities, geographic deployment, and future initiatives. It is also important to identify the outcomes of edge initiatives that can be measured against strategic priorities. This creates a healthy mechanism for evaluating ROI and business cases for future edge use cases and initiatives.

Align stakeholders on the same mission.

Firms should foster a communicative framework that allows executive stakeholders from across the organization to participate in identifying edge

use case requirements and business scenarios. This approach reduces operational silos in implementation, and ensures plans are feasible across organizational processes. For example, if IT teams face technical resourcing and management issues, business teams can thus work on budget allocation matters to support the overcoming of resourcing issues.

Design with workload affinity in mind.

As firms explore more real-time use cases and new technologies (e.g., IoT solutions), they will find that deployment will extend beyond the public cloud to the edge, to support low-latency and data intensive operations. The concept of running the right workloads in the right locations (e.g., cloud, data center, and edge), has never been more important. It is critical to establish a comprehensive roadmap to address evolving core-to-edge-to-cloud workload affinity requirements. This includes establishing a comprehensive edge strategy that is contextualized within firms' existing infrastructure, enabling firms to meet current needs, and ensuring they are agile and modular enough to flex for the demands of tomorrow.

Leverage partner competencies.

As part of their strategic deployment, firms should evaluate requirements for edge solutions and third-party partners to address gaps in capabilities, security requirements and expertise, while enabling automation, consistency, and interoperability across use cases and workloads. More than half of APAC firms (52%) valued the capability of leveraging open source for innovation when selecting an edge computing implementation partner. As the vendor landscape evolves, firms can choose from a diverse set of offerings, including those based on open-source technologies, that will help them extend their cloud-native workloads, application, and development strategies to relevant edge environments in pursuit of their broader business goals.[8]

Appendix A: Methodology

In this study, Forrester conducted an online survey of 230 FSI decision-makers in enterprises based in Australia, New Zealand, China, Hong Kong, India, Japan, South Korea, and Southeast Asia to assess adaptation of edge computing among FSI firms in their product, business, and engagement strategies, as well as to optimize deployment of edge use cases in the FSI industry. Survey participants included directors and those in higher positions, with responsibilities and influence over their organizations' edge computing strategy. The study began in August 2022 and was completed in October 2022.

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Appendix B: Demographics

REGION	
India	**16%**
China	**15%**
Australia	**13%**
Hong Kong	**13%**
Japan	**13%**
South Korea	**13%**
Malaysia	**4%**
Singapore	**4%**
Indonesia	**3%**
New Zealand	**3%**
Thailand	**3%**

POSITION	
C-level executive	**20%**
Senior vice president or vice president	**57%**
Director	**23%**

FUNCTION	
Business leader	**51%**
IT leader	**49%**

ANNUAL REVENUE	
$500 million to $999 million	**33%**
$1 billion to $5 billion	**41%**
More than $5 billion	**26%**

COMPANY SIZE	
1,000 to 4,999 employees	**44%**
5,000 to 19,999 employees	**38%**
20,000 or more employees	**18%**

INDUSTRY	
Corporate banking	**23%**
Investment banking	**20%**
Retail banking	**18%**
Life insurance	**17%**
Non-life insurance	**13%**
Wealth management	**9%**

Appendix B: Demographics (Continued)

INFLUENCE OVER COMPANY'S EDGE COMPUTING STRATEGY	
Final decision-maker for organization's edge computing strategy	**55%**
Part of a team making decisions for organization's edge computing strategy	**33%**
Influence decisions related to organization's edge computing strategy	**11%**

Appendix C: Endnotes

[1] Source: "Prepare For Emerging Edge Intelligence Momentum," Forrester Research, Inc., October 7, 2022.
[2] Source: "The Four Edges Of Edge Computing," Forrester Research, Inc., May 6, 2021.
[3] Source: "Predictions 2023: Edge, IoT, And Networking," Forrester Research, Inc., November 3, 2022.
[4] Source: "Predictions 2021: Edge Computing," Forrester Research, Inc., October 27, 2020
[5] Source: "The Four Edges Of Edge Computing," Forrester Research, Inc., May 6, 2021.
[6] Forrester defines the concept of 'workload affinity' when firms deploy software where it runs best. Source: "Workload Affinity Becomes The Strategy For Edge Computing," Forrester Research, Inc., September 29, 2022.
[7] Source: "Workload Affinity Expands Edge Computing Opportunities In 2022," Forrester Research, Inc., October 7, 2022.
[8] Ibid.

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