ericsson.com/
en/ai-and-automation

Employing AI techniques to enhance returns on 5G network investments

Ericsson AI & Automation

Contents

03 Key findings

04 AI technology adoption

06 Impact of AI adoption within networks

08 AI opportunities for service providers

09 Challenges for successful adoption of AI

10 Successful implementation of AI

11 Recommendations

Methodology

This report is based on a research survey performed during October and November 2018. Telephone interviews were conducted with 165 senior executives from 132 mobile communications service providers globally. The respondents were predominantly Chief Technology Officers (CTOs) and Chief Operating Officers (COOs), but also included Chief Information Officers (CIOs), Chief Marketing Officers (CMOs) and Chief Financial Officers (CFOs) as well as some Line of Business (LOB) managers.

To conduct the survey, Ericsson commissioned Coleman Parkes Research, which specializes in recruiting and interviewing senior-level responders across multiple global markets, vertical sectors and functional areas for a wide range of clients.

> "Machine learning is assisting our engineers to make our mobile networks more proactive and immediately responsive to the needs of our customers."
>
> Head of Radio Products, Tier-1 Operator, Europe

AI will be essential for processing the vast volume of data required to provide enhanced, personalized services to customers

Key findings

AI is creating both benefits and challenges for service providers at the advent of 5G.

At a time of increasing complexity for mobile communications service providers, driven by deployment of 5G and the Internet of Things (IoT), this report examines the crucial role of artificial intelligence (AI) in helping to maximize returns on network investments. It explores the extent to which service providers have adopted AI, and looks at their plans for further deployment. The importance of AI in developing and underpinning customer relationships is also examined. It is our belief that AI will open up exciting opportunities for the mobile communications sector, as it can be utilized to create a more personal approach for customers, while helping to manage the costs of deploying and maintaining networks.

AI is being adopted in networks
AI is being embraced by service providers around the world, according to our research.

More than half of service providers – a total of 53 percent – expect to have adopted AI within their networks by the end of 2020. Some are working to an even shorter timescale, and expect to have adopted AI by the end of this year. A further 19 percent are looking at an adoption timescale of within 3 to 5 years. The main areas in which service providers are already seeing value and return from AI are in building new revenue and enjoying operational cost savings.

AI will be vital to customer service
Enhancing customer experience was identified by 55 percent of service providers as a key area where AI is presently having the greatest impact within core network activities. In addition, 68 percent highlighted enhancing customer service as a business and operational objective over the next 3 years. A further 72 percent agreed strongly that AI will be important in enabling monetization of new network technologies and providing a better service to customers.

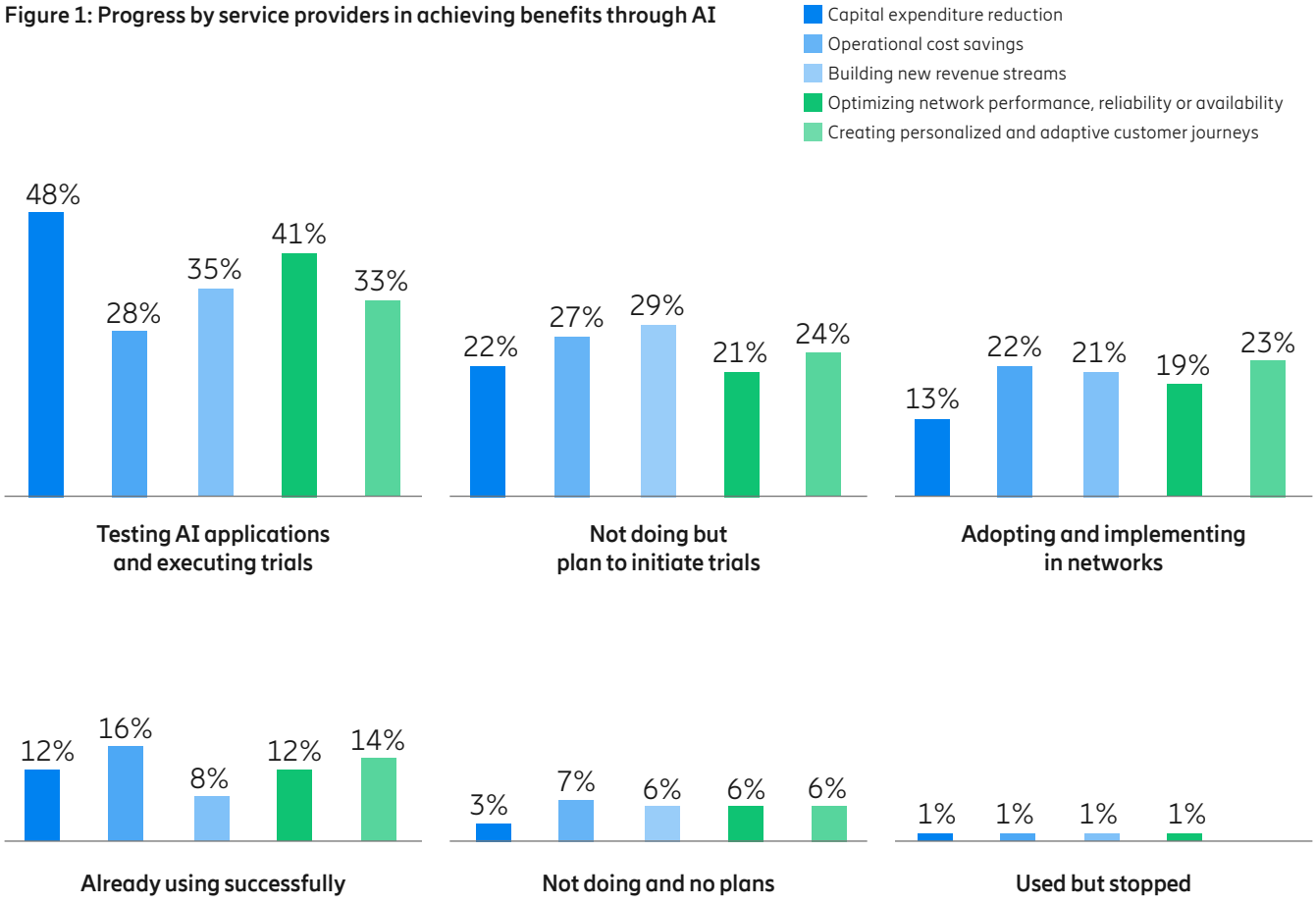
AI will help recoup network investments
At the advent of 5G, service providers are making huge investments in their networks to enable the new use cases that 5G offers. AI will help operators recoup these investments more quickly. Service providers believe the highest potential return from AI adoption will be in network planning (70 percent) whilst 64 percent intend to maximize their returns by focusing their AI adoption efforts on network performance management.

AI is creating network data challenges
Embracing AI in networks is a challenge for service providers. The main concern identified by 71 percent was defining and implementing standardized interfaces. Other difficulties highlighted included data quality (65 percent); excess of data from too many sources (59 percent); problems finding indicators of degradation or compromised assets (59 percent); storage of data in too many systems (56 percent); and lack of single ownership or oversight of the data (55 percent).

AI technology adoption

Many service providers are already concluding successful trials on using AI in their networks.

Figure 1: Progress by service providers in achieving benefits through AI



AI assesses data and quickly delivers analytical outcomes to users. It encompasses Machine Learning (ML), which analyzes raw data and autonomously looks for patterns that can yield further insights.

Already, sectors such as manufacturing, healthcare and banking are capturing the benefits of AI. For service providers, AI offers opportunities that need to be built jointly with infrastructure providers on a case-by-case basis, with a common goal to more effectively manage complexity and optimize network performance.

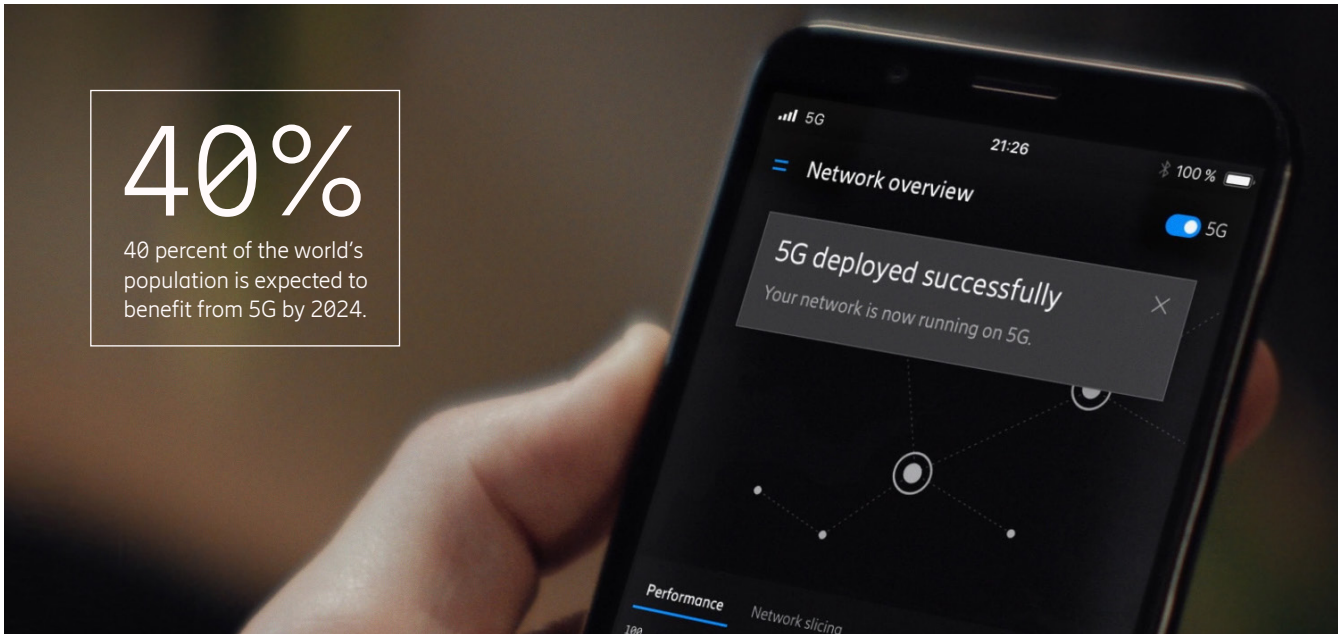
Our research has revealed service providers around the world are presently at various stages on their journey with AI. Only 12 percent feel they have a detailed knowledge of AI's application. However, 49 percent considered themselves to have a fairly detailed knowledge of AI application.

More than half expect AI to be adopted in their networks before the end of 2020 (a total of 53 percent globally) and there is a general expectation (55 percent globally) that the benefits will be evident within 1 to 2 years.

The majority of service providers are at the stage of testing AI, with 48 percent focusing on AI to reduce capital expenditure. A further 41 percent are focusing on using AI for optimizing network performance, and 35 percent for new revenue streams.

> "There has been an increased complexity in the management of a vast number of devices and huge data. AI and ML will help to reduce this complexity."
>
> Machine Learning Scientist, Asia Pacific region

[1] Ericsson Mobility Report (November 2018)



5G is forecast to cover more than 40 percent of the world's population by the end of 2024, according to the Ericsson Mobility Report (November 2018)

Figure 2: Focus of service providers testing AI

The highest current use of AI among service providers worldwide is in service quality management (17 percent) and operational cost savings (16 percent).

The broader context for the interest being shown in AI by service providers is that 5G is expected to cover more than 40 percent of the world's population by 2024,[1] and total mobile data traffic is predicted to have increased by a factor of 5 by this date.

Early adopters of AI among service providers will undoubtedly gain an advantage, as they will be well placed to deal with new challenges that result from the proliferation of additional devices following the introduction of 5G. This is because the advent of 5G will make network topologies relatively complex, with small cells and new antennas making usage patterns more difficult for humans alone to predict, and current radio propagation models becoming more complex to compute as a result of new radio spectrum bands, denser topologies, Massive MIMO and beamforming.

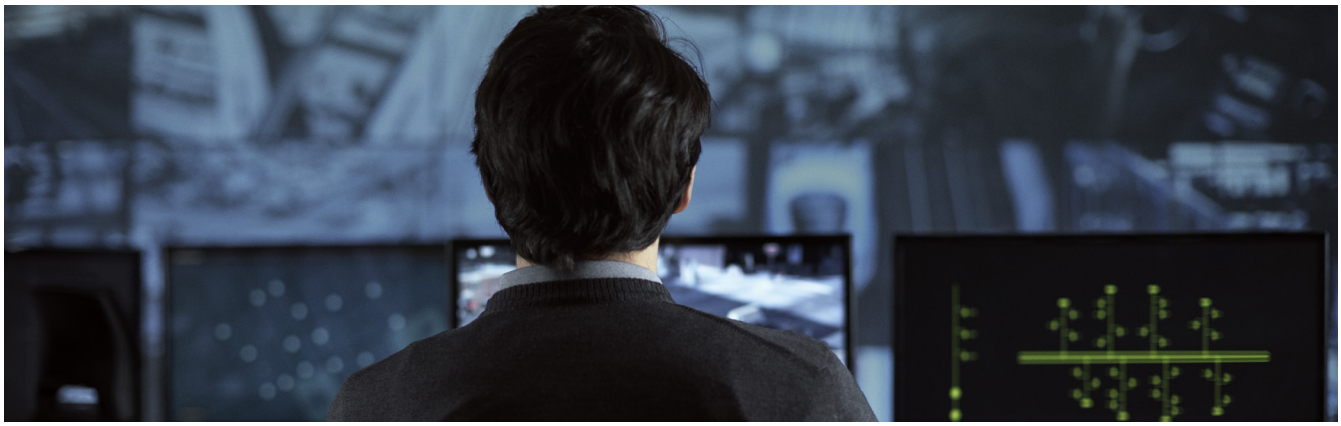
Impact of AI adoption within networks

Service providers around the world are already seeing the impact of AI.

Service providers around the world are observing improved reliability for customers as the area in which AI is currently having the greatest impact upon core network activities. The research conducted for this report has also revealed that AI is presently facilitating improvements ranging from simplifying network evolution to improving performance across existing networks.

> "AI and machine learning will be key to our customer experience-centric operations management."
>
> Chief Technical Officer, Tier-1 Operator, India

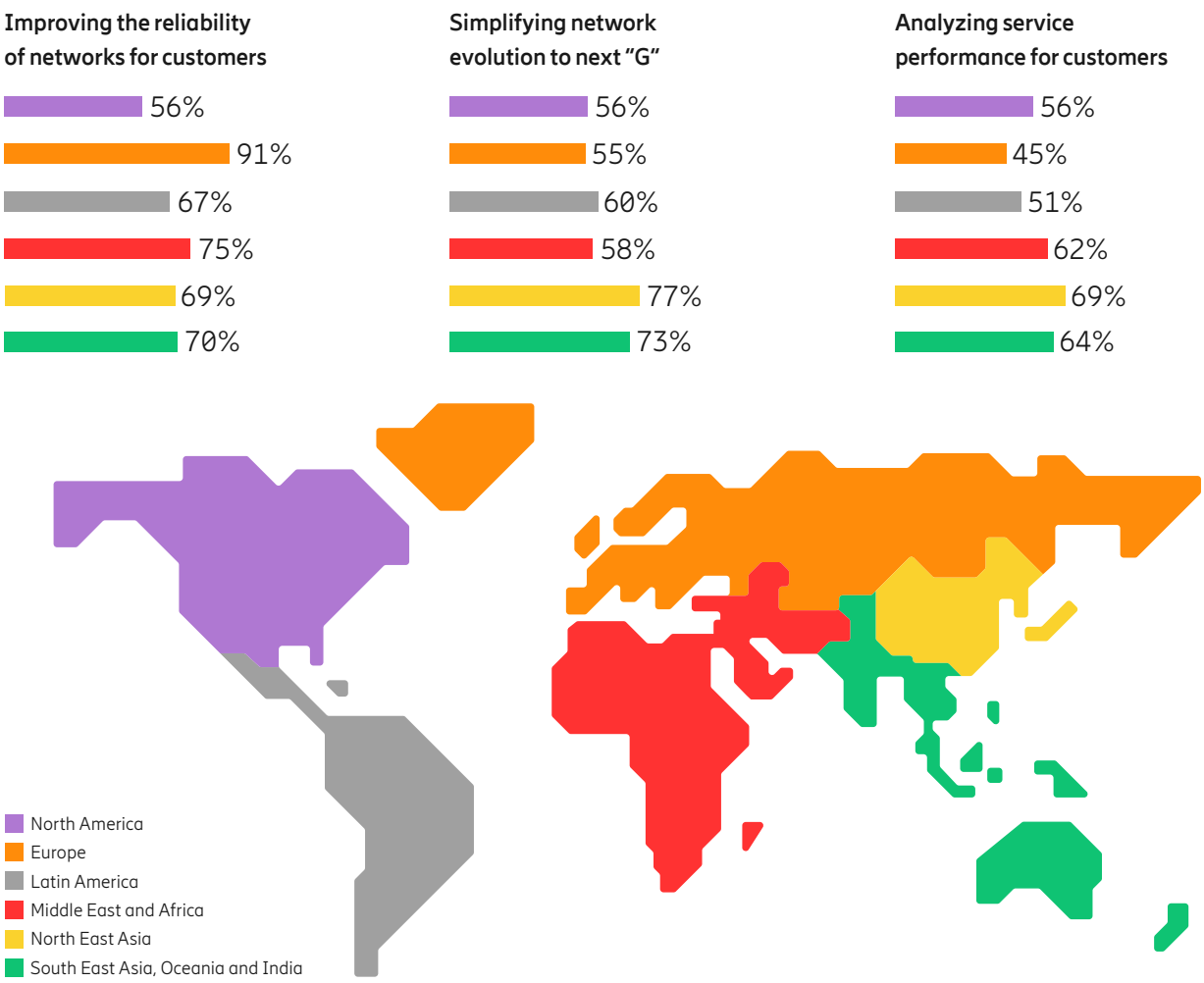
Figure 3: Biggest impact of AI currently within core network activities (worldwide)



The impact of AI is already visible in core network activities

The impact of AI upon core network activities varies between regions.

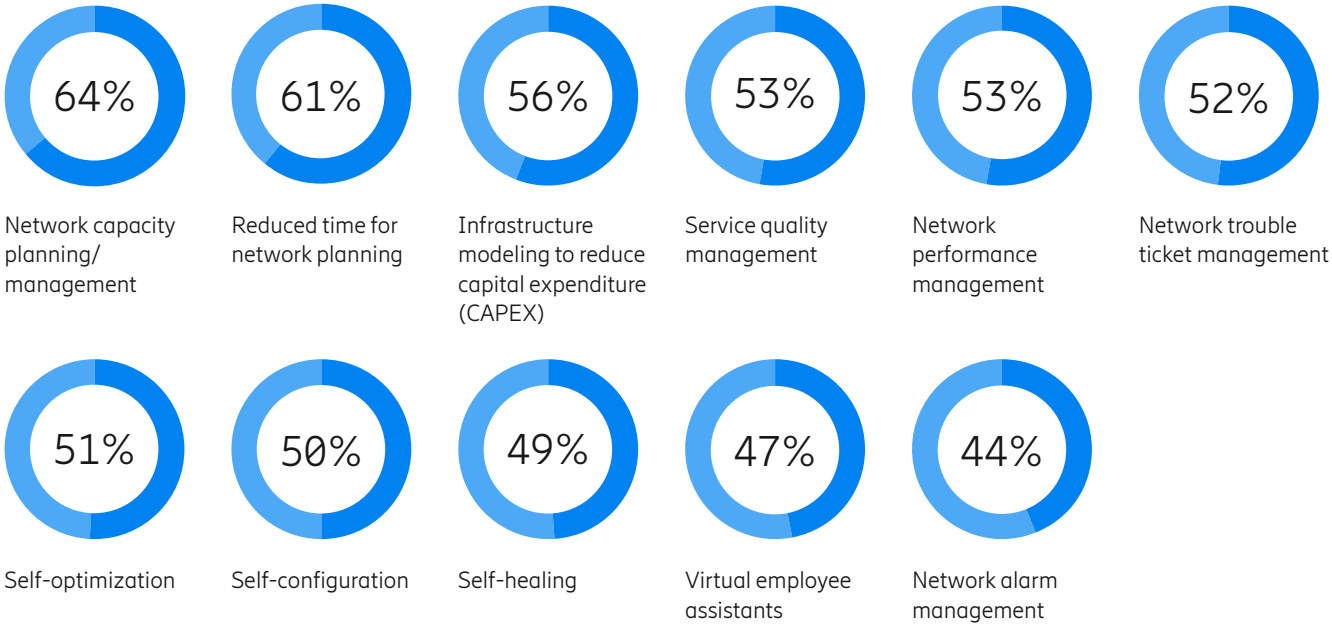
Figure 4: Biggest impact of AI currently within core network activities (regional)



AI opportunities for service providers

The improvements to efficiency that can be brought about by AI are of particular interest to service providers.

Figure 5: Areas where service providers will be focusing upon adopting AI in their networks



Continuous improvements to efficiency are essential to any business sector, and the mobile communications sector is no exception.

The arrival of 5G will be characterized by improved speed, consistency, reliability and capacity. Features such as advanced load management will enable service providers to effectively manage the network traffic, ensuring network performance has minimal to no impact with additional devices coming over the networks. Service providers will be able to achieve successful management of network performance by developing cognitive and predictive AI algorithms.

The rapid expansion of advanced IoT devices will need real-time latency, and successful adoption of AI will facilitate faster, more responsive, available-on-demand networks.

However, the benefits of AI extend beyond cost-management and network-management efficiencies. Enhancing user experiences is expected to be one of the many notable benefits of AI-managed services on the networks.

In our research, network capacity planning/management emerged as the top area where operators see opportunities in terms of implementing and adopting new AI use cases. This was followed by reduction of time in network planning.

The results of our research highlight the strong appetite among service providers for building AI reasoning-based systems that can enable the self-healing, self-optimizing and self-configuring networks of tomorrow.

Figure 5, above, shows the areas where service providers indicated how they are focusing their AI adoption efforts. It shows how increased reliance on smart automation enabled by AI will be an investment for service providers, with return on investment (ROI) visible in significantly reduced operating costs.

> "The business model the communication sector has to come up with will be value-based. For voice, they were charging per minute. For data, it was per MB. What they always missed in their business models was customer value."
>
> Assistant Professor, Middle East and Africa region

Challenges for successful adoption of AI

Accessing network data, and using it to solve business challenges, are hurdles facing many service providers.

In order to maximize the potential of AI, there needs to be effective collection, structuring and analysis of data to ensure clear and actionable insights for network development and improvement.

This is an area of concern among service providers and infrastructure vendors across the globe, with 71 percent expressing concern about defining and implementing standardized interfaces.

As part of our research, we asked respondents to provide their views on whether their company was collecting data effectively.

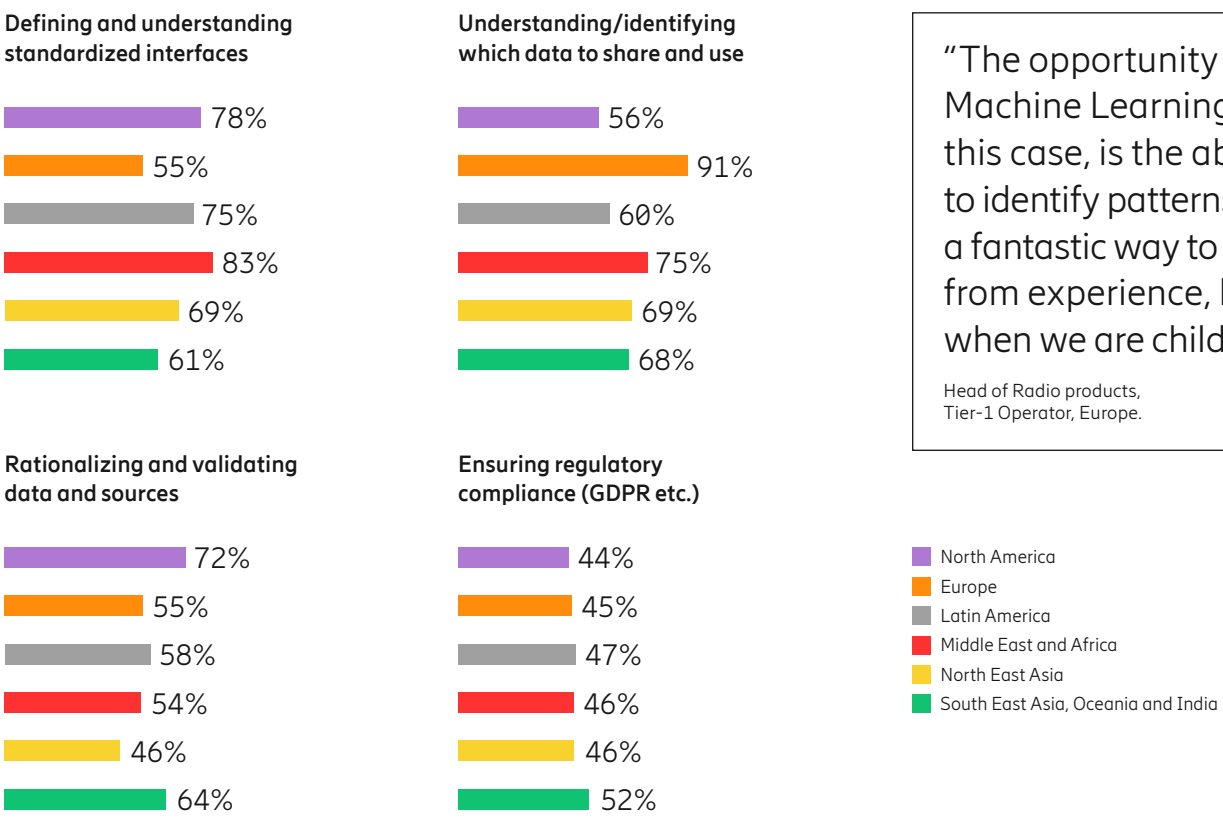
It became apparent that data quality was an issue. This was cited by 65 percent of respondents globally, and 89 percent in North America.

Other concerns expressed globally included an excess of data from too many sources (59 percent); problems finding indicators of degradation or compromised assets (59 percent); storage of data in too many systems (56 percent); and lack of single ownership or oversight of the data (55 percent).

At the heart of these concerns is the fact that traditional approaches to data analytics have been based upon centralized and generic analysis tools. These are unsuitable for addressing the increasing complexity and vast volumes of data in 5G networks. The barriers highlighted in our research (data quality, multiplicity of sources and systems) are indicative of the limitations of the traditional approach to data analytics.

AI-enabled networks employ advanced data analytics that make systems smart, adaptive, self-aware, proactive and prescriptive. These can play a key role in reducing associated operating costs and in addressing many of the barriers that service providers have indicated are preventing insights from data being acted upon.

Figure 6: Challenges identified by service providers in sharing data to enable real AI benefits



> "The opportunity for Machine Learning, in this case, is the ability to identify patterns. It's a fantastic way to learn from experience, like when we are children."
>
> Head of Radio products, Tier-1 Operator, Europe.

Successful implementation of AI

Comprehensive experience in building and managing mobile network products is vital to successful implementation of AI.

Service providers are keen to embed AI more readily into their networks, according to our research. This sentiment is shared among 77 percent globally, and is particularly strong in South East Asia, Oceania and India (91 percent) and North America (83 percent).

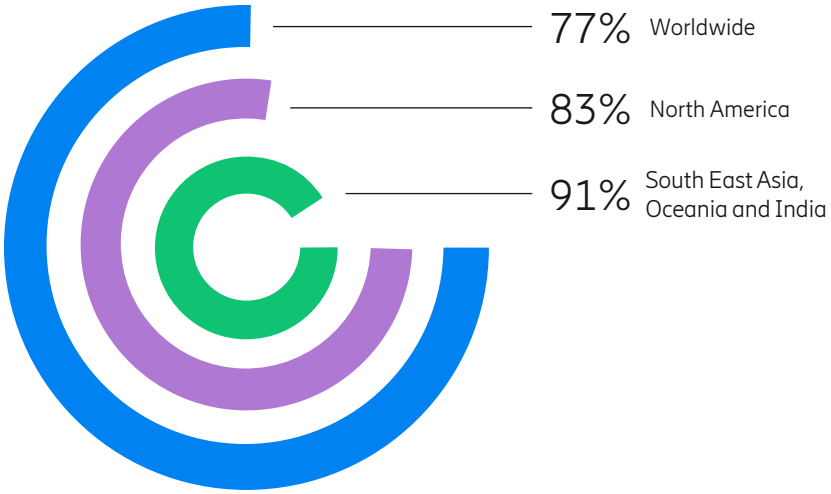
There is broad agreement among service providers that delivery of new services to customers can be accelerated by adoption of AI technology across networks. Worldwide, this view is held by 76 percent of service providers, with 85 percent of respondents in North East Asia expressing this view.

There is also widespread belief that AI will enable service providers to scale network operations and evolve into digital service providers, while managing the associated cost. This view is endorsed by 73 percent globally and there is almost universal support in North America at 94 percent.

In order to achieve this integration and acceleration, AI technology needs to be defined and implemented using standardized interfaces. Therefore, successful AI implementation is considered to be dependent largely on telecom expertise (63 percent worldwide) and easy-to-adopt functionality that enables staged AI functionality to be easily implemented (70 percent), as well as configurable AI functionality (62 percent).

AI will undoubtedly play a crucial role as network complexity increases and service providers face the demands of handling multiple technologies such as 4G, 5G and IoT, as well as growth in the number of devices. This is because AI will enable service providers across the globe to manage increasing network deployment and network operation costs.

Figure 7: Service providers wanting to embed AI into their networks



Therefore, early adopters of the AI-enabled networks would seem likely to benefit the most in terms of their ROI. Ericsson is working in collaboration with service providers at the heart of new developments, with a focus upon using AI to reduce costs and increase network performance. With more than 600 AI patents approved for filing, Ericsson has played a pioneering role in transforming the engineered network into a continuous learning network.

> "We are keen to lead the way in the region when it comes to artificial intelligence, as it paves the road for implementation of new technologies across all our markets."
>
> CEO, Tier-1 Operator, Middle East

Recommendations

AI will bring myriad opportunities to mobile communications

AI will bring significant benefits to mobile communications, notably cost and network management efficiencies, and improvements to customer experience. However, in order to make the most of the opportunities, service providers will need to take a proactive approach which includes:

– building standardized interfaces to access relevant and actionable data
– exploring ways of using AI to optimize customer experience
– running early trials with new customer segments to identify AI opportunities
– examining use of AI and automation for network operations, including planning and optimization
– ensuring early adoption of new solutions for AI and automation to facilitate introduction of new use cases

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

www.ericsson.com

Ericsson
SE-164 80 Stockholm, Sweden
Telephone +46 10 719 0000
www.ericsson.com

The content of this document is subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document

BNEW-19:007926 Uen
© Ericsson AB 2019