Not a chip off the same block

eSIMs are reshaping connectivity with seamless switching, enhanced security, and IoT integration while navigating challenges in adoption and regulation

BY PRATIMA HARIGUNANI

It is a common thriller movie trope. The antagonist, as usual, turns his phone around, opens the SIM slot, lets the chip fall out, and breaks it with a self-satisfied grin. He then looks at the camera, smug and relieved, grinning how easily he has evaded his pursuers.

Alas, this scene would no longer be feasible in a modern heist plot. The reason? eSIMs.

As digital alternatives to physical SIM cards once embedded in mobile devices, eSIMs offer the same functionality and data as hardware chips, but with a significant difference. They can operate remotely without needing to be inside a device. Thanks to technological advances, connectivity, and remote reprogramming, this capability is a boon for those who loathe dealing with physical chips, especially when travelling or switching between different plans. It is also a relief that one can now easily adjust their plans without the hassle of physically swapping a SIM card.

With eSIMs, users can subscribe to data and Internet packages without physically swapping a SIM card. They can easily adjust plans according to their country or region, avoiding the need to hunt for a good Wi-Fi network abroad and the costly operator roaming fees. Authorities may also find it easier to track a device using an eSIM when it is lost.

The real excitement, however, lies in its potential for IoT applications. eSIMs can be valuable for issuing IoT alerts and assisting enterprises with new use cases. Imagine the possibilities for future cars, smart meters, and wearables expected to embrace this technology as it simplifies operations at scale. Not to mention the reduction in e-waste resulting from the use of eSIMs.

"While eSIMs are inherently more secure due to the lack of a physical card, securing the digital infrastructure managing eSIM profiles is critical."

GAURAV KHANNA
CEO, Matrix Cellular

IN BRIEF

- eSIMs eliminate the need for physical SIMs, offering users seamless subscription switching and improved connectivity, especially during travel.
- The technology's IoT potential is vast, promising simplified operations for connected cars, smart meters, and wearables, reducing e-waste significantly.
- Despite rising interest, limited device support, high costs, and uneven standards are slowing eSIM adoption, particularly in markets like India.
- Security concerns like SIM swapping, malware attacks, and regulatory challenges require enhanced encryption and infrastructure development.
- Producing eSIMs locally in India could bolster security, reduce costs, and align with the nation's self-reliance goals while stimulating economic growth.

So, is that the end of the movie? Not quite.

THE GROWING APPEAL OF ESIMS

Before diving into the challenges, it is essential to acknowledge that interest in eSIMs has risen steadily. Recent industry data (December 2023) indicates that 10-15% of smartphones sold in India support eSIMs, with a potential rise of 20% in the next five years.

This figure is still modest compared to global counterparts, such as 70% eSIM penetration in the US. However, globally, the growth is notable. According to Counterpoint's *E-SIM Devices Market Outlook* (early 2024), global shipments of eSIM-capable devices are expected to exceed nine billion units between 2024 and 2030. Additionally, over 400 operators now support eSIM services globally, enabling an average of over 50 consumer devices. By 2030, iSIM-capable devices could represent a significant portion of the cellular device ecosystem.

The report notes that the industry passed an inflection point with the release of the US-exclusive eSIM-only iPhone in 2022 and is now entering a period of rapid growth. A growing number of OEMs are launching eSIM-capable devices.

There are several other reasons why eSIMs are gaining traction.

eSIM technology enables seamless subscription to Mobile Network Operators (MNOs) of the user's choice and supports multi-profile capabilities, allowing travellers to switch networks without the need for a physical SIM card, says Rahul Tandon, Senior VP, Connectivity Services, IDEMIA Secure Transactions in India. "eSIMs reduce costs by eliminating the need for multiple SIM cards and enhance security through secure, remote provisioning, lowering the risk of SIM card theft or cloning," he adds.

Priyanka Kulkarni, Manager—Telecom, Media and Technology, Aranca, highlights that eSIM adoption

"eSIMs are driving strong adoption with 5G and IoT, offering seamless switching, superior connectivity, and unlocking new enterprise use cases."

PRIYANKA KULKARNI
Manager – Telecom, Media and Technology, Aranca

is gaining momentum due to its integration with 5G technology, which ensures superior call quality and reliability, particularly in urban areas. "It allows users to switch carriers easily, providing access to competitive pricing and helping international travellers avoid high roaming fees by connecting to local networks," Kulkarni says.

Opensignal data reveals that eSIM users are more likely to switch operators. For instance, 3.1% of users in the US and 18.3% in Singapore switched operators in the first quarter of 2023, but this increased to 15.9% and 70.6%, respectively, among users with eSIM-enabled devices. These switchers include permanent transitions and frequent swaps between different operator SIM cards.

Gaurav Khanna, CEO of Matrix Cellular, stresses the convenience that eSIMs offer during international travel. "The adoption of eSIMs in India is revolutionising how we stay connected while travelling internationally. At Matrix Cellular, we offer eSIM solutions that cover over 150 countries, with data plans starting as low as Rs 499. eSIMs provide unparalleled coverage, allowing users to switch carriers easily without needing a physical SIM card, reducing communication costs significantly."

Indeed, user convenience is a major driver of eSIM adoption. Kulkarni notes that "eSIMs can be configured before arrival in India, removing the need to search for local SIM vendors and enabling seamless connectivity. They appeal to tech-savvy youth, frequent travellers, and users of smartphones and wearables."

The technology is also gaining popularity among dual-SIM users. Opensignal data shows a surge in dual-SIM usage in the US and South Korea, where its penetration nearly doubled and tripled over the past year. Matrix Cellular recently unveiled a Made-in-India eSIM offering, poised to impact the market, which is projected to exceed USD 21.24 billion by 2032.

The environmental benefits of eSIMs also contribute to their appeal. Kulkarni points out that eSIMs reduce plastic waste from traditional SIM cards, supporting India's sustainability goals as it transitions to a digital economy.

And that is just the beginning; the real impact of eSIMs is expected in the enterprise sector.

THE ENTERPRISE MARKET AND IOT ADOPTION

Counterpoint's report indicates that eSIM adoption is not limited to smartphones but extends to connected cars, gateways, routers, and drones, where physical SIMs are challenging to manage.

For enterprises, eSIMs offer significant advantages, particularly in remotely managing and deploying IoT devices across locations, says Kulkarni. "Enterprises benefit from reduced operational costs, enhanced connectivity, and secure authentication protocols, particularly in areas such as industrial asset monitoring, smart metering, vehicle telemetry, and precision agriculture."

Counterpoint Research also notes that IoT and M2M devices equipped with eSIMs will grow faster than consumer device categories due to the cost, space, and remote management benefits. Additionally, new eSIM IoT specifications, SGP.31 by GSMA, have helped streamline the adoption of eSIMs in the IoT sector by addressing previous complexities.

Tandon points out that IDEMIA's Dakota eSIM portfolio provides certified eSIMs for IoT with enhanced security, supporting remote subscription management and incorporating extra security features like IoT SAFE, as recommended by GSMA.

CHALLENGES TO ESIM ADOPTION

Despite their many advantages, several factors slow eSIM adoption, including high costs and supply chain

"The bans on eSIM apps in India do not challenge the technology but highlight issues with provisioning and subscription acquisition mechanics."

RAHUL TANDON
Senior VP, Connectivity Services, IDEMIA Secure Transactions – India

issues. Overhead costs, manufacturing expenses, supply chain disruptions, and mobile number portability costs all play a part.

One significant hurdle is limited device support, contends Khanna. "Not all smartphones and devices are equipped to handle eSIM technology. This restricts adoption primarily to the latest models, leaving many potential users unable to benefit from this innovation."

Kulkarni observes that the lack of uniformity in standards across different eSIM providers and devices, lower consumer awareness, and a lag in the development of associated infrastructure are three key reasons that can impede the growth of this technology in India.

Also, technical issues can sometimes arise during the activation or switching of eSIM profiles, creating frustration for users, Khanna cites. "These technical barriers can be a significant deterrent, particularly for less tech-savvy. At Matrix Cellular, we actively address these challenges by raising awareness, collaborating with carriers, and ensuring that our eSIM solutions are as user-friendly as possible."

"Another notable challenge is the influence of Chinese government policies that discourage using eSIM technology. Chinese smartphone brands like Xiaomi, Vivo, Oppo, OnePlus, and Realme have been slow to adopt this technology because of these regulations. Given that these brands command a sizable share in the Indian market, this trend will likely impede eSIM adoption growth in the country."

Khanna adds that carrier support also plays a crucial role in this equation. "While some telecom providers are fully on board with eSIM technology, others have yet to catch up. This inconsistency in support across carriers limits the seamless experience that eSIMs are supposed to provide."

SECURITY CONCERNS AND REGULATORY ISSUES

Security remains a key concern with eSIMs. Media reports suggest that FACCT, a Russian cybersecurity firm, has warned about SIM swappers exploiting eSIM technology for number pilferage and bypassing security protocols. Since autumn 2023, the firm has detected over a hundred attempts at account breaches.

Kulkarni explains that eSIMs are susceptible to malware attacks that could enable remote device exploitation. Furthermore, eSIMs may be swapped by manipulating MNOs to transfer a user's phone number to a new eSIM. Although regulators are tightening KYC norms for eSIM registration, telecom providers must also enhance security by adopting encryption protocols and multi-factor authentication to protect eSIM profiles.

Khanna agrees, stating that SIM swapping remains a threat. "It is a sophisticated technique that can still pose risks, even with eSIMs. While eSIMs are inherently more secure due to the lack of a physical card, securing the digital infrastructure managing eSIM profiles is critical. Protecting this infrastructure from unauthorised access is crucial."

Opensignal's latest analysis shows how eSIMs are changing how consumers switch operators. According to its report, eSIMs will force operators to adopt new tactics to retain and attract users. eSIMs make it easier for consumers to switch providers without face-to-face interaction or waiting to deliver physical SIM cards. Additionally, eSIM users can store multiple profiles, allowing them to switch between operators more frequently, using the most cost-effective tariff for each situation, such as making calls or managing international roaming.

However, given their availability and potential for online scams and financial fraud, there are growing concerns about their malicious use. eSIMs also challenge regulators as they tighten KYC processes for mobile

> eSIMs cut costs by removing the need for physical SIM cards and boosting security with remote provisioning, reducing risks of theft and SIM cloning.

SIM cards. At the same time, law enforcement agencies are already struggling with poor on-the-ground KYC implementation when tracking criminals.

Regulatory challenges are also evolving as eSIM adoption grows. For instance, the Department of Telecommunications issued directives against platforms selling international SIM cards without clearances. Google reportedly delisted eSIM apps like Airalo and Holafly due to similar regulatory issues.

Nonetheless, eSIMs are not devoid of security advantages. Kulkarni emphasises that by being embedded in devices, eSIMs reduce the risks of theft and fraud, particularly those associated with SIM swapping and cloning.

Khanna highlights that eSIMs improve fraud prevention by eliminating the risk of physical theft or unauthorised SIM swapping, a common tactic for fraudsters.

Tandon adds that eSIMs, thanks to their secure hardware and software architectures, provide enhanced security for converged use cases beyond seamless connectivity management.

Experts point out that most concerns can be addressed by an obvious solution: making eSIMs locally.

A DOMESTIC OPPORTUNITY FOR INDIA

If economies of scale and manufacturing costs are factors to reckon with, making these SIMs in India would be a good starting point to address some incipient challenges. Indigenisation may also be more well-timed here than one can think of.

Kulkarni avers, "Yes, it can help reduce dependence on foreign technology and mitigate risks posed by the vulnerabilities embedded therein. By controlling the production process, India can achieve a dual objective of improving security standards and boosting the local economy by creating jobs and encouraging innovation within the country. Further, local development can help reduce costs and minimise the risk of supply chain disruptions."

Khanna adds that indigenisation aligns with India's broader goal of self-reliance, enhancing national security by reducing dependence on external players. "By focusing on local production, we can create tailored solutions that meet the specific needs of the Indian market while simultaneously bolstering security," he notes.

Tandon points out that locally produced eSIMs would also allow quicker responses to evolving security threats and regulatory requirements. This would strengthen the technology's resilience in India and enable the development of solutions that address specific domestic challenges.

However, Kulkarni cautions that building this technology locally will require substantial investments in R&D and infrastructure. Competing with established global players will also play a critical role in the success of India's homegrown eSIM industry.

Khanna also underlines the issue of infrastructure development, "To support the widespread adoption of eSIM technology, substantial investment is required to build the necessary infrastructure. This includes everything from upgrading network capabilities to ensuring that eSIM management platforms are secure and efficient."

Although most MNOs in India have already upgraded their infrastructure to support eSIM adoption, its growth and adoption are hindered by challenges such as the limited availability of compatible devices and a lack of consumer awareness, Tandon sums up. "The regulatory framework is also being addressed to make it more conducive for adoption."

It looks like eSIMs will have to endure some plot twists before they find a suitable slot. Everyone will be happy when that happens, especially consumers with itchy feet and the new breed of enterprise users, except for that guy in the movie. This time, he must find something else to crush with his shoe, like a prisoner leg iron. But then, what if it is juiced up with an eSIM, too?

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SMEs scale new heights with cloud

Cloud technology empowers Indian SMEs in BFSI with scalability, innovation, and security, enabling them to compete with larger firms and drive growth

BY VISHAL BHAT

Technology has revolutionised various sectors, particularly the Banking, Financial Services, and Insurance (BFSI) industry. SMEs in India increasingly realise the power of digital tools, especially cloud technology, to enhance their operational capabilities. The SME Digital Insights Study, conducted by CyberMedia Research, reveals that almost 50% of Indian SMEs plan to adopt cloud solutions in FY2024, indicating a shift towards digital-first strategies.

As SMEs embrace cloud computing, they gain access to infrastructure that allows them a unique opportunity to compete with larger enterprises on a level playing field. This digital shift, driven by cloud technology, is reshaping the competitive landscape of the BFSI sector. The study highlights that 58% of SMEs consider themselves digitally mature, positioning them to lead the next wave of digital transformation.

By adopting cloud-based solutions, these businesses are not only boosting their growth potential but are also enhancing their ability to meet the evolving needs of their customers and the market.

EMPOWERING SMES WITH CLOUD TECHNOLOGY

Cloud computing offers SMEs the technological infrastructure to overcome traditional barriers, such as high operational costs and limited access to advanced technologies. By utilising cloud platforms, which are scalable, cost-efficient, and secure, SMEs in the BFSI sector can modernise their operations and foster innovation. Adopting cloud technology ensures that these businesses remain agile, allowing them to respond to market demands swiftly and efficiently.

While cloud adoption presents immense opportunities for scalability, efficiency, and access to cutting-edge