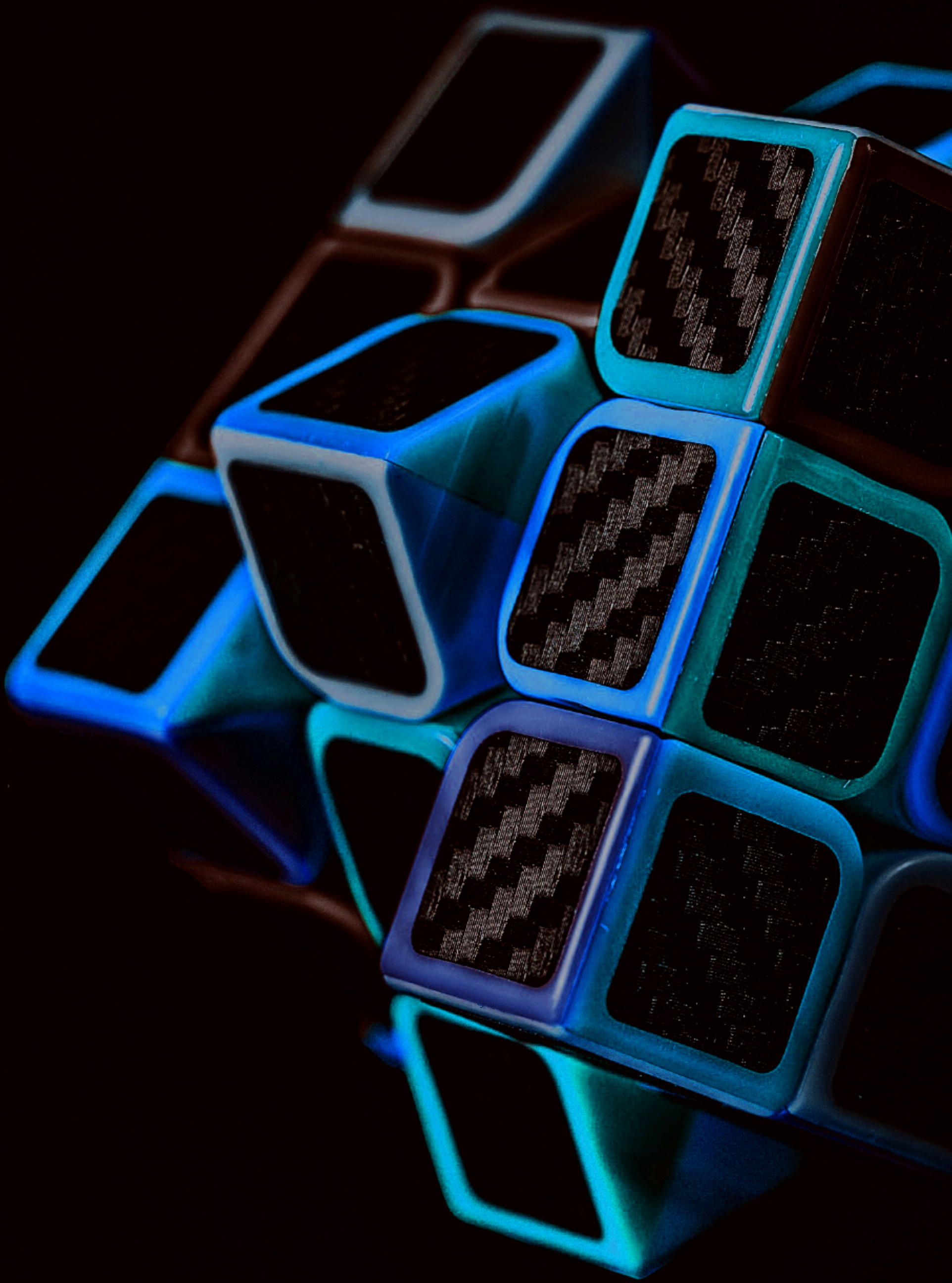
Mobilise

www.mobiliseglobal.com



Consumer eSIM:

A game changer or a gimmick?

eSIM has been growing in strength and started to enter the consumer market. It is a real chance for SME Service Providers to deliver differentiated customer experiences and win the battle for customer loyalty. Yet, as with any emerging technology, there is a lot of ambiguity that surrounds it.

SME Service Providers tend to struggle with the adoption of new technologies. Not only is the process more challenging for them, but they also do not have as many resources as the larger organisations.

In this white paper, we explain the concept of eSIM technology in the consumer market and provide SME Service Providers with an overview of the opportunities and challenges of becoming an Early Adopter.

CONTENTS

INTRODUCTION

In the last couple of years, the consumer eSIM concept has become a telco buzzword - widely discussed, marketed and publicised.
But like with any upcoming technology, there is a lot of ambiguity on the real consumer opportunities and the challenges involved in deploying an eSIM solution. This is especially the case for SME Service Providers (SPs).

As with most new technologies, SME SPs face very different, and often more challenging, access routes compared to larger SPs. In this paper, we will try to navigate the eSIM opportunities in the consumer segment and present how we envisage SME SPs overcoming the main challenges.

eSIM is a generic and loosely used term in the telecoms industry and describes a collection of different technologies and applications.

In this paper, we will focus primarily on the consumer application where subscribers can activate the service on their mobile device without the need for a physical SIM card. But before we embark on our journey, I would like to dissect the basics of the SIM technology and explain how we got to the point where we are now.

WHAT IS AN ESIM?

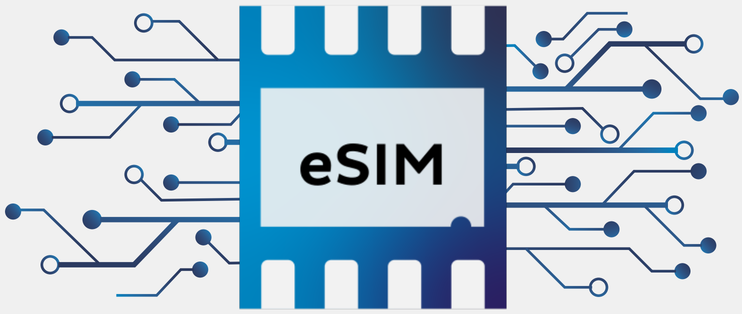
Subscriber Identity Module (SIM) cards were first introduced in 1991 as an authentication method for mobile subscribers to access mobile services. It decoupled the mobile device from the authentication method. It enabled users to change their devices or service providers without affecting one another. To switch service providers, the user needs to swap out the old SIM card with the new one on the same device. Similarly, a user can activate their existing service one a new device by simply taking out the SIM card from the old device and inserting it into the new one.

Mini SIM 1996 | Micro SIM 2003 | Nano SIM 2012 | eSIM 2016

Inside the SIM card sits a programmable IC chip callled UICC that stores the authentication parameters required to connect a mobile user to a network. The authentication parameters include the international mobile subscriber identity (IMSI) and the authentication key (Ki).

In 2010, the standards of embedded SIM and embedded UICC (eSIM & eUICC) were introduced by the GSMA, primarily to serve the Internet of Things (IoT) segment. They allowed service providers to provision - or programme - the service profile remotely without a need for a physical SIM card to be inserted into an IoT device. It offered increased flexibility and streamlined the logistical nightmare of having to insert or swap SIM cards in unmanned or inaccessible connected objects.

Soon after, it became apparent that the same technology could be applied to consumer smartphones. Apple was a strong advocate for that, but the GSMA was initially reluctant due to security concerns.



The consumer application that Apple was pursuing was to allow them – and other device manufacturers – to embed the eUICC chip within mobile devices and enable service providers to programme the subscriber profile remotely, eliminating the need for a physical SIM card to authenticate the service. Apple's motive was to minimise the extremely valuable real estate that a SIM card occupies in their devices. Unbeknown to them was that this technology would revolutionise the digital transformation of mobile services.

The consumer use of eSIM was eventually approved by the GSMA in 2016. It was initially introduced in wearables and then, ironically, the first handheld device released with eSIM technology was Google's Pixel 2. The adoption of eSIM capability has then started to increase, especially among flagship devices.

Currently, most of them are released with eSIM as a standard in addition to the traditional SIM slot for physical SIM cards. Motorola has also surprised us with their revived RAZR model in 2019 that worked exclusively with eSIM. We believe that this design will be embraced more often in the upcoming years. But why is eSIM so revolutionary to the mobile telecom industry?

OPPORTUNITIES

The GSMA has outlined the main benefits of adopting a consumer eSIM strategy by SPs. They include enhanced consumer propositions, streamlined manufacturing and logistics and the ability to launch global offerings in multi-country propositions.

But the list does not end here. Let's explore some of those opportunities and benefits for consumers, SPs and vendors, as well as the ROI.

Key benefits and opportunities for mobile ecosystem

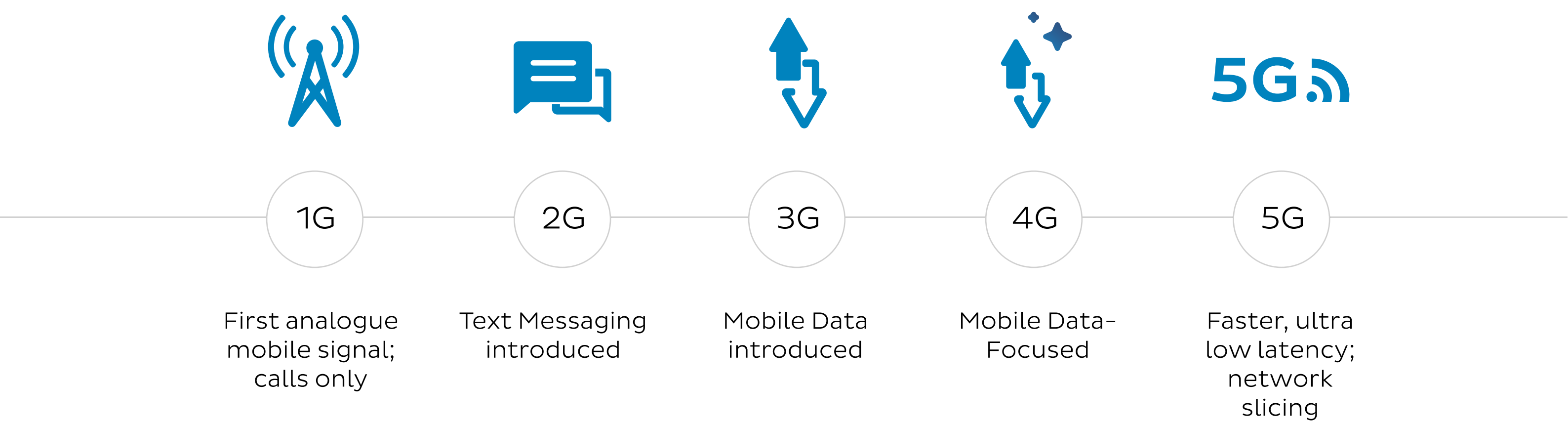
Adapted from: GSMA Intelligence

Operators	Enhanced B2C propositions through multi-device and multi-user subscriptions and device subsidies or financing. This includes enhanced digital interaction through websites, apps and chatbots. Provide cellular connectivity to devices that have certain connectivity requirements such as wide coverage and ultra-reliability. Streamlining of manufacturing and logistics and a possible role in subscription management.
SIM Vendors	Take a subscription management role in the M2M and consumer markets. Provide greater IoT security solutions in a market environment Increasingly exposed to security issues. Streamlining of manufacturing and logistics.
OEMs and IoT Device Manufacturers	Greater global propositions as multi-country connectivity is built in during manufacturing process and delivered locally at a later stage. Greater sales of IoT devices in the M2M market and companion devices in the consumer market through all channels, including telecoms operators. Streamlining of manufacturing and logistics, and freeing up of device space.
Industries	Provide an increasing number of IoT services and applications through a service add-on model delivered locally. Take a leading role in the emerging IoT ecosystem: services and applications will likely take the lion's share of the Iot revenue.

Everything Digital

One could argue that Mobile services have gone "digital" with the launch of their 2G service. Yet, the telecom industry has been consistently falling behind when it comes to the consumer digital user experience.
This is something we'd covered in several articles before like "Why Telecoms Need Better Customer Experience Design", and "Where to Begin and Telecom Digital User Experience – why is it so bad? And how did we get here?"

But over the last decade, the telecom online user experience has improved significantly. Users can now manage their accounts, contact support, pay for and sometimes terminate their services all online. However, SIM cards have been the only non-digital element in the mobile service lifecycle. In a world of on-demand streaming and one-click purchases, having to wait for your SIM card to be delivered or going to a store to collect it, even though you subscribed to a service online, is not the most practical or effective. But with consumer eSIM technology, you can instantaneously activate the service on your device.



According to a survey conducted by the GSMA, a fully digital journey is favoured by the customers, especially due to the following:

Improved Security

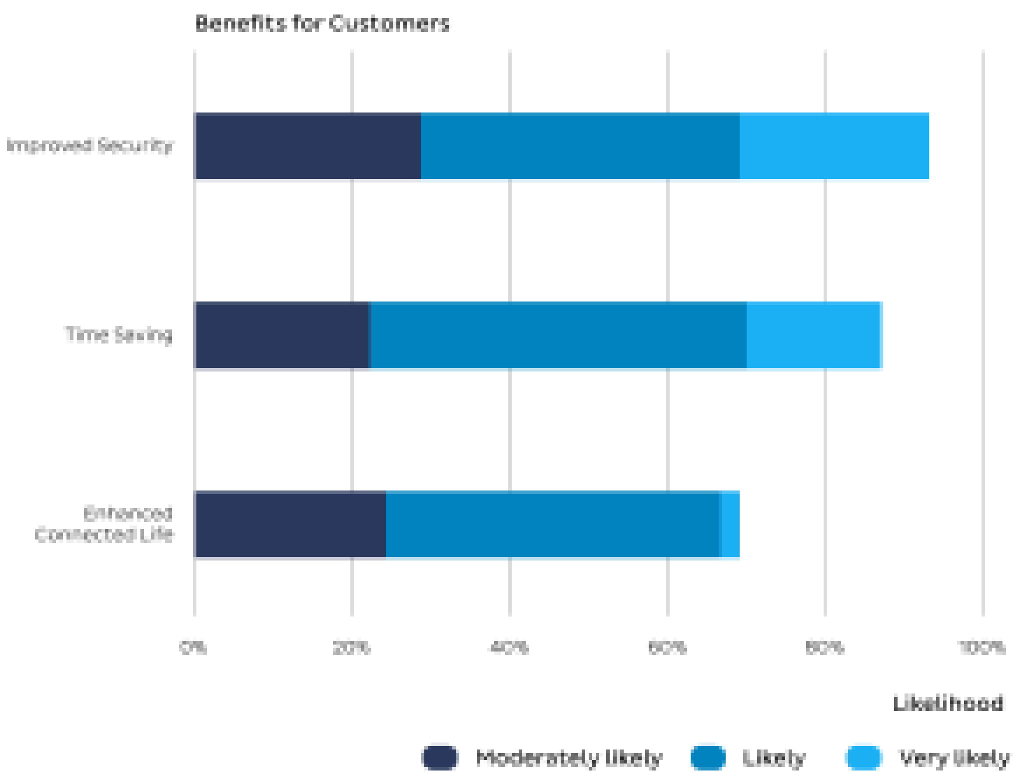
eSIM, in contrast with physical SIM cards, cannot be misplaced, damaged or lost. Additionally, eliminating physical SIM cards gives users better control of their digital identity and service authorisation.

Time Saving

eSIM onboarding is fully digital, therefore quicker and smoother. A user can also easily manage multiple subscriptions (eSIM profiles) from one device instead of swapping (and storing) plastic SIM cards.

Enhanced Connected Life

Users can easily and swiftly switch their service providers and remotely connect and manage all of their smart devices.



Question: How likely will consumers benefit from a proliferation of "physical SIM" (e.g. smart card, embedded) use cases?. *Moderately Likely + Likely + Very Likely as a percentage of total responses.
Scale: Very Unlikely, Unlikely, Moderately likely, Likely, Very Likely.
Adapted from: GSMA Intelligence

Environment

We often assume that the transformation of any tool from physical to software-based is accompanied by reduced waste and a positive effect on the environment. Thus far, we have merely transferred the UICC chip from the SIM card to the handheld device. Has that single move had any impact on the environment?

Plastic:
In the case of physical SIM cards, the UICC chip is manufactured to be a part of a small plastic piece that we then insert into our phones.
Each SIM card is enclosed in a credit card-sized holder for better usability. The holder, which is approximately 8 times larger than the SIM card itself, is disposed of right after the SIM card of the desired size has been removed (not to mention the packaging).

In 2019, Vodafone announced it would replace the standard credit card-sized SIM holder with a new half-sized format that would reduce the amount of plastic used to produce SIMs by 50%. This initiative alone will reduce Vodafone's plastic waste by more than 340 tonnes per annum. It will save up to 15 tonnes of the CO2e[1] emitted during production and transportation of SIM cards for every tonne of plastic reduced – a reduction of more than 5,000 tonnes of C02e annually.[2]

This gives us an estimated view of how much plastic waste could be avoided if the physical SIM cards would be eliminated altogether.

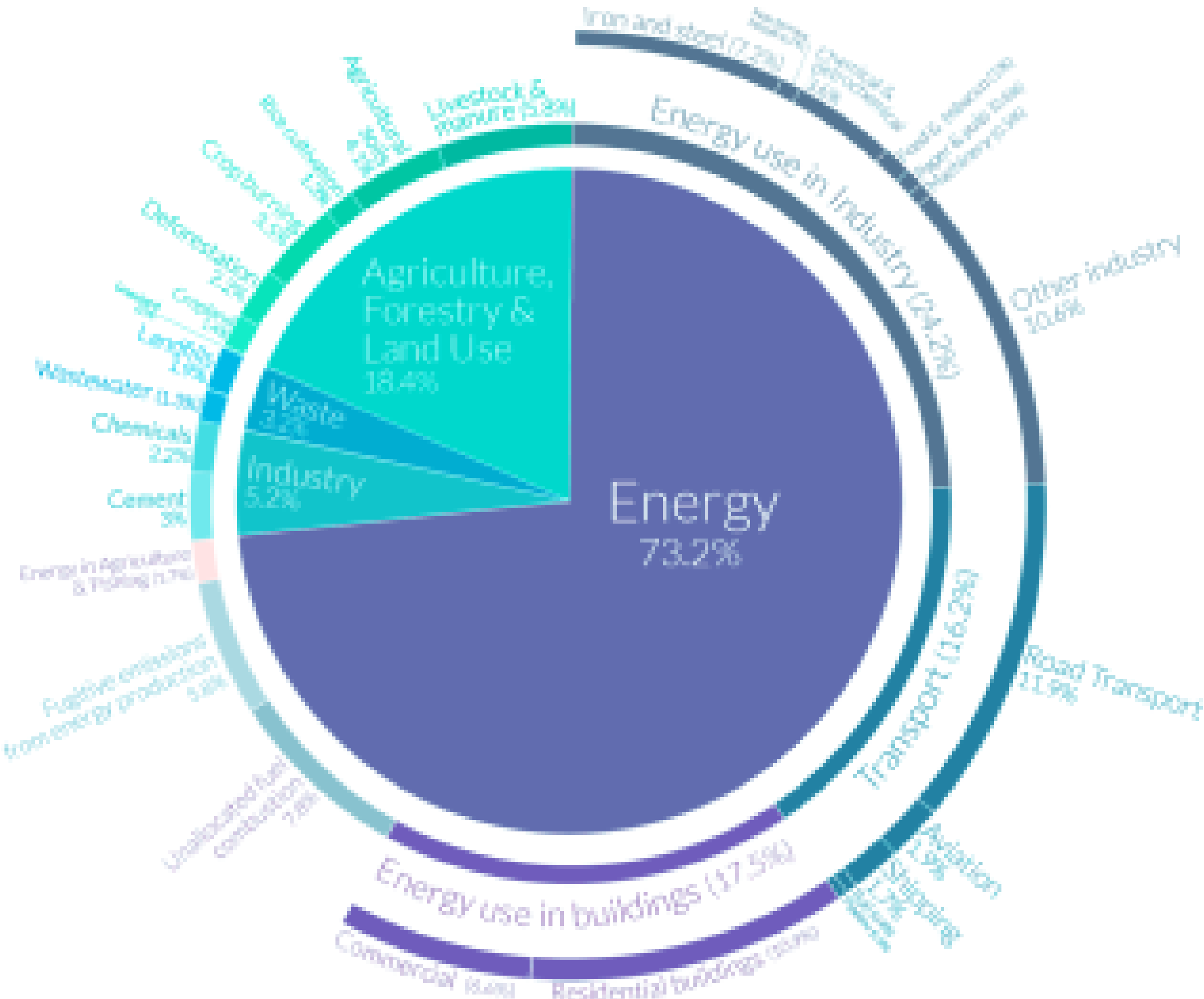
[1]Carbon dioxide equivalent" or "CO2e" is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO2e signifies the amount of CO2 which would have the equivalent global warming impact. Source: ecometrica.com

[2] Source: https://www.telecomtv.com/content/sustainability/vodafone-launches-half-sized-sim-cards-to reduce-plastic-waste-37177/

Carbon Footprint:
In 2012, it was estimated that 2 billion SIM cards are shipped globally per annum, which meant the SIM card industry contributed to about 2,000,000,000*35g CO_2e, or a total of 70,000 tons[3].

Global greenhouse gas emissions by sector

This is shown for the year 2016 - global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.



Source: Climate Watch, the World Resources Institute (2020)

[3] Source: http://www.icma.com/ArticleArchives/CarbonFootprint_SE2-12.pdf

Since then, the Mobile subscribers increased by approximately 50%, which makes us assume that the current SIM card footprint is about 100,000 tones.

In the grand scheme of things, this can be considered a negligible contribution compared to the global 50 billion tonnes produced every year.

However, in the current climate of becoming more environmentally conscious and responsible, this amount becomes significant and could be eliminated almost entirely with the adoption of one simple piece of technology that, as mentioned earlier, is becoming ever more present across all types of devices.

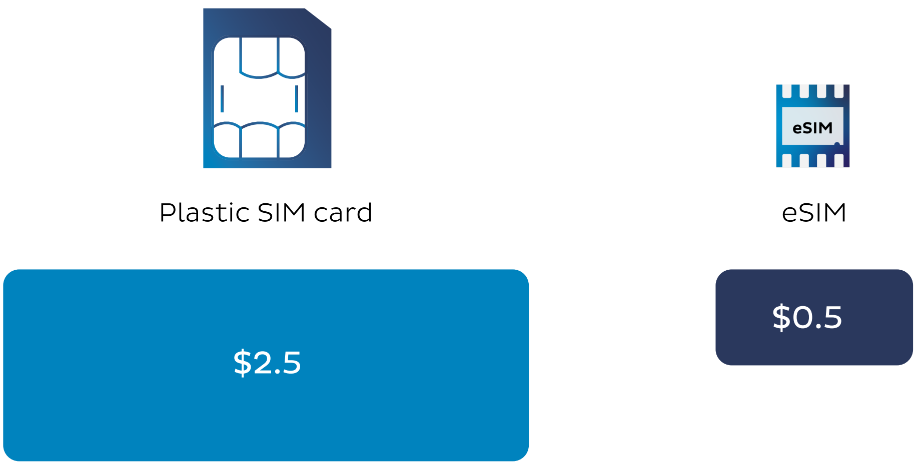
Cost Saving

SIM cards, packaging and marketing sleeves represent a significant fixed cost on Mobile Service Providers, which can escalate with the increasing churn rates caused by higher competitiveness in the market.

The average wholesale cost of a SIM card is 1 US dollar, in addition to another dollar for packaging and 50 cents for delivery, adding up to a total of 2.5 USD per new subscriber and a SIM swap.

The corresponding cost for an eSIM ranges between 20 and 50 cents and is projected to fall further over the coming years, with many industry experts believing that eSIMs will be commoditised altogether. However, based on today's eSIM pricing, Service Providers could reduce their SIM cost by a whopping 80%.

To put this into perspective, an SP with a 1 million customer base and approximately 50% gross additions per annum could save 1 million US dollars of cost per annum if they switched to 100% eSIM provisioning.



Futureproofing

There are two main factors that are controlling the adoption of eSIM in the consumer market are:

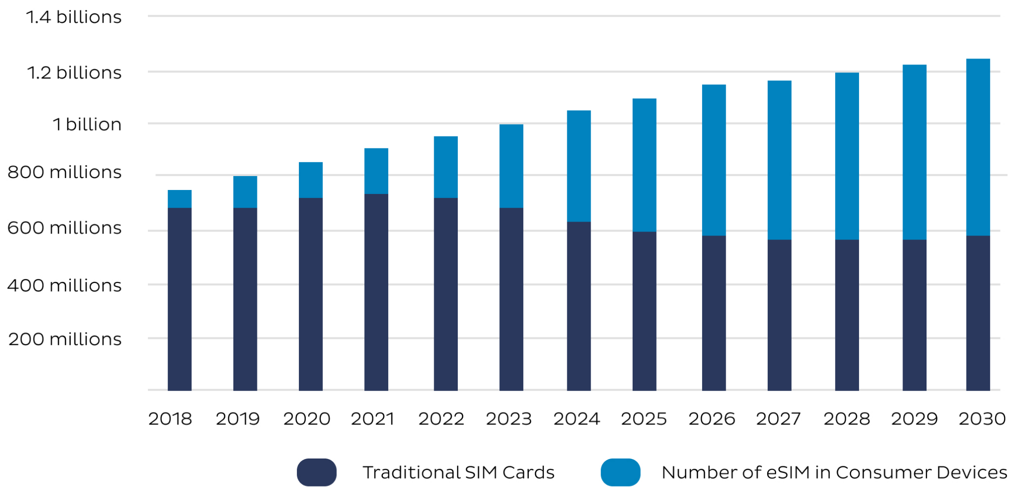
- Handset capability and
- Service Providers readiness.

As of 2021, all flagship devices are shipped with eSIM capability as a standard, in addition to the physical SIM slot. And it is projected that most smartphones will follow suit in due course.

According to the GSMA research "The future of eSIM in smartphones",

- the number of operators offering eSIM services for smartphones surpassed 100 in 2019 and continues to grow
- nearly 60% of operators that do not offer an eSIM service plan to do so during 2020-2021
- 20% of operators expect to offer more than 10 different eSIM smartphones by the end of 2020, which means they expect other OEMs to introduce eSIM in their smartphones this year.

The road is paved for both device manufactures and SPs to roll out eSIM on a global scale in the coming years.
It is estimated that by 2030 half of all consumer devices will be eSIM capable, and a third of all mobile subscriptions will be activated via eSIM.

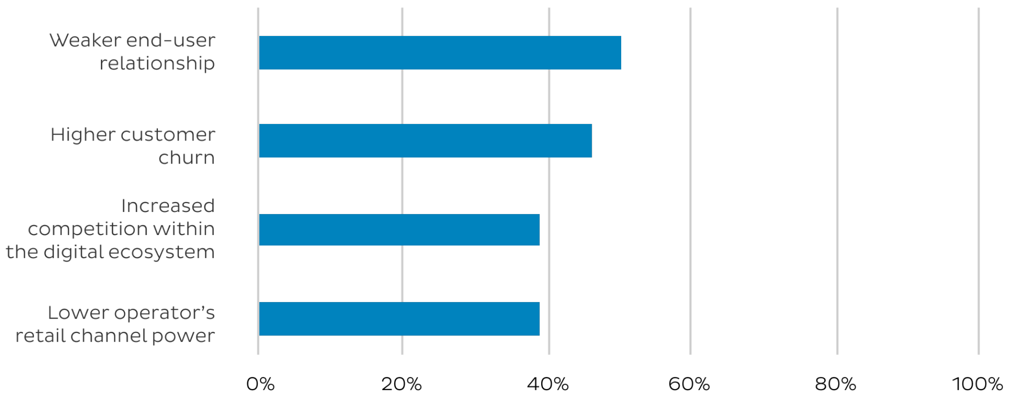


Total number of eSIM and traditional SIM in the consumer segment (2018-2030) in EU28
Adapted from: WIK-Consult

CHALLENGES

Unfortunately, all benefits stemming from the eSIM technology come with a heavily regulated and standardised process. It represents a barrier to most SME SPs to adopt this technology, especially for those who aspire to be ahead of the curve and become early adopters.

Main operator challenges (High risk*)



Question: What are the main telecoms operator concerns/risks associated with the future/evolution of the "physical SIM" (e.g. smart card, embedded)?
*High risk as percentage of total. Scale: Low risk, Moderate Risk, High Risk
Adapted from: GSMA Intelligence

GSMA Certification

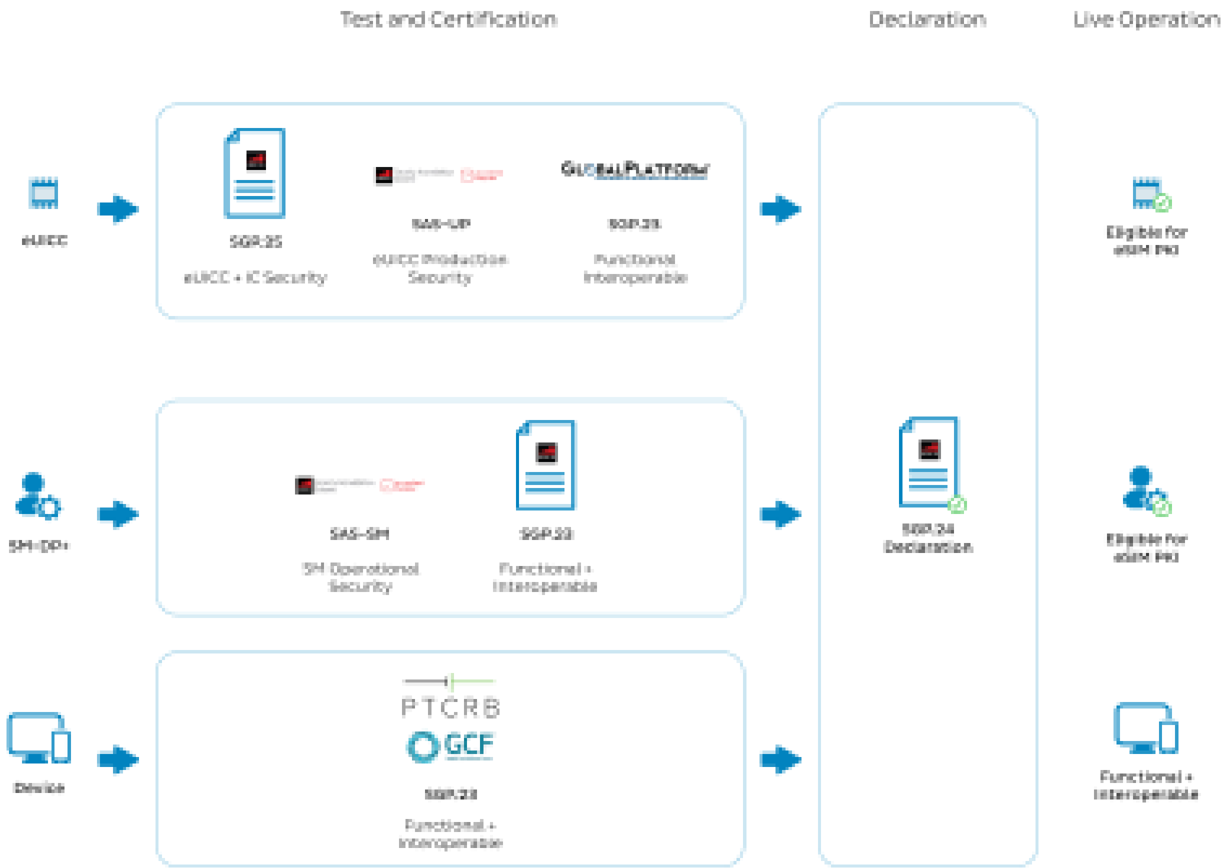
Any operator that aspires to enable eSIM capability within their network needs to, as per the GSMA standards, acquire a network element called Subscriber Management System (SM-DP+) to manage and activate eSIM profiles to the user device over the air. Furthermore, the operator needs to acquire a certificate from the GSMA as per SGP.24 Compliance.

Process, which primarily ensures that the Subscriber Management Systems are compliant with the functional requirements, platform security and site security. The process can last up to a year in normal circumstances but has been even more laborious recently with the on-going pandemic restrictions and challenges since the process requires an onsite audit.

The complexity of the process resulted in a very limited list of certified Subscriber Management System providers globally. Most of those providers are incumbent MNOs and software giants that are – for now – looking to keep the capability limited to their use. Then there are the IoT focused providers, who are less interested in the consumer segment.

And finally, we have a handful of providers that offer the eSIM capability under a Network-as-a-Service model to consumer service providers.

This caused a huge gap between supply and demand, making it harder for small to medium mobile providers to enable the eSIM capability.



Adapted from: GSMA, https://www.gsma.com/esim/compliance/

Regulated Process with App Marketplaces

The GSMA wants to ensure that eSIM provisioning via mobile applications can only be offered by the apps released by the service provider themselves. To achieve this, the GSMA, working together with the app marketplaces, has regulated the process for app developers to have the capability to provision the eSIM via a mobile app.

The way mobile app marketplaces (Google Play and App Store) enforced this process is by allowing mobile applications to provision an eSIM via device APIs called LPA (standardised by the GSMA) only if they can prove that they are in agreement with the Subscriber Management System provider.

The way this is implemented differs between the two system operators, but the resulted process is complicated, lengthy and offers little support or guidance to the developers. It is what you would expect from a collaboration between an overly standardised organisation (the GSMA) and two too-big-to-care software organisation (Apple and Google).

Complicated Digital-Network Integration

For Mobile Service Providers to truly capitalise on the eSIM capability and deliver a seamless digital user experience, they need a digitally focused Business Support System (BSS) that can offer real-time provisioning, eSIM management, payment processing and service activation. Those are tasks that SPs have been accustomed to carry out in minutes, if not days, and now they need to squeeze them into a second.

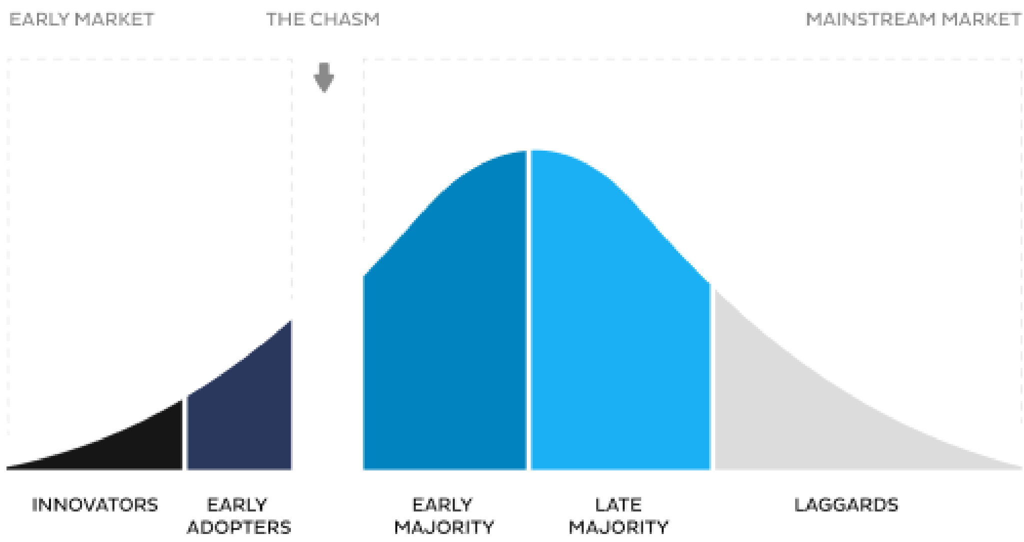
One might think this shouldn't be a problem for SPs that process thousands of concurrent data and voice sessions every second. But in reality, the systems were never designed to process and manage service provisioning in real-time because the need was never there. And to turn this around would require, in most cases, a costly digital transformation exercise which can be prohibitive to most SME SPs that are already struggling with shrinking margins and increasing competition.

SOLUTION

Larger SPs have the resources, technology, relationships and negotiating power to navigate through and eventually overcome the consumer eSIM challenges. They only need a clear vision and determination to invest their time and resources accordingly. SME SPs could, however, be dwarfed by those challenges, from digital transformation budgets to sourcing the eSIM technology from the eSIM network providers, not to mention getting support from the mobile app marketplaces.

By inspecting the challenges facing SME SPs discussed in the previous section, we can predict that most of them will eventually ease-off and/or disperse entirely. But by the time it happens, SMEs will fall under the Late Majority stage in the eSIM technology adoption lifecycle, missing out on the opportunity and the eSIM market share.

But is there a shortcut for SME SPs to jump ahead from being Late Majority and become Early Majority, or even Early Adopters?



Here at Mobilise, we have taken the challenge to encapsulate all the capabilities and expertise in our HERO platform that would enable SPs to launch a successful consumer eSIM offering. We have achieved this by:

Platform

Building a digital platform designed to offer a seamless and intuitive digital user experience. Our digital platform is powered by a flexible and agile orchestration layer that manages the new and complex eSIM business rules.
These include new eSIM workflows, telco network integrations, eSIM security requirements as well as stock managernent.

Knowledge

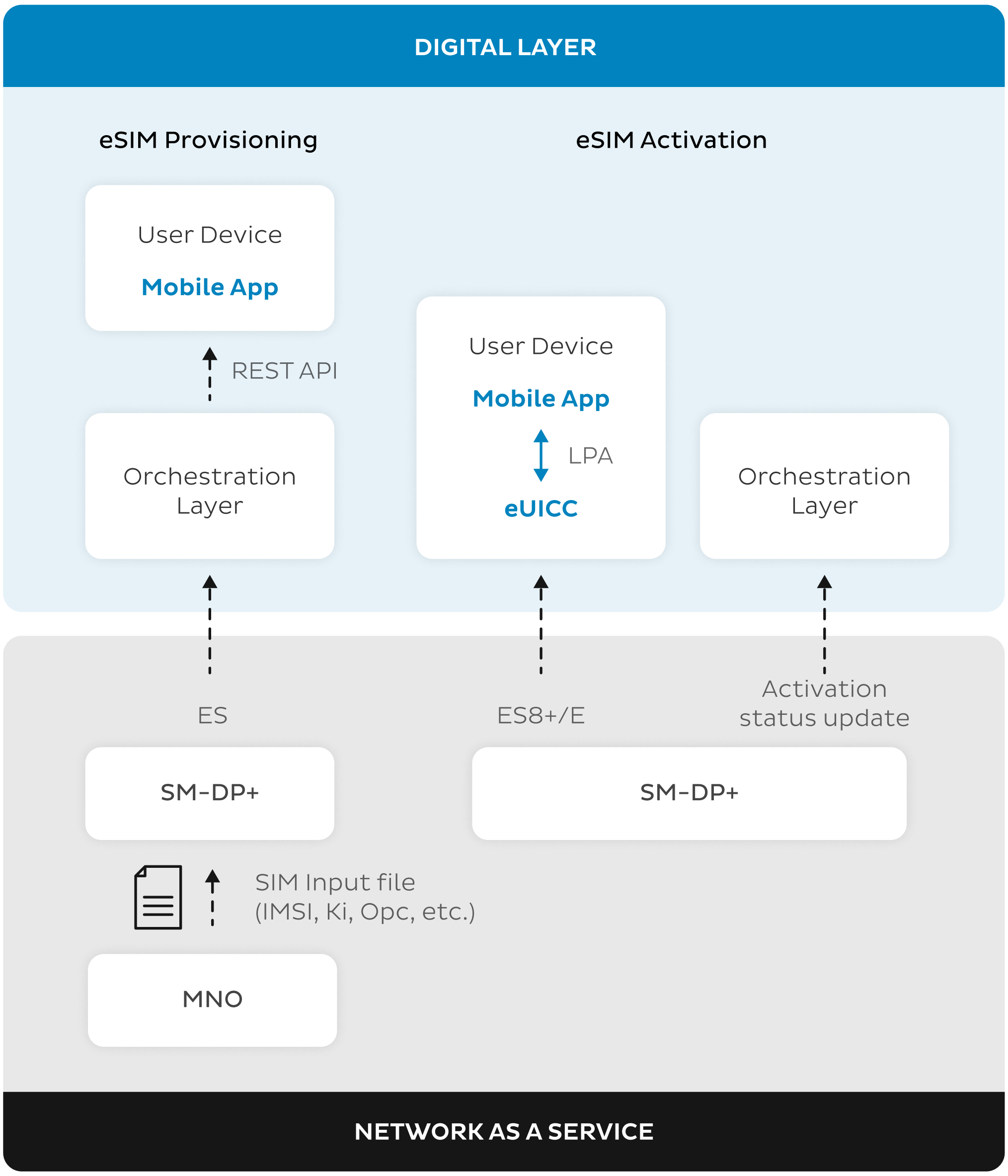
Acquiring necessary knowledge to build a framework to engage with the mobile app marketplaces and facilitate and accelerate mobile application integration and approval processes.

Network Partnership

Partnering up with a GSMA-accredited eSIM network provider and together offering a fully integrated consumer eSIM as a service solution.

We call it: “eSIM as a Service”

eSIM as a Service Structure



IN CONCLUSION

The window of opportunity for eSIM has definitely opened up, it is real and the best time to act on it is now. But it is not without challenges and obstacles, especially for the small and medium service providers. The shortfall is primarily in knowledge, technology accessibility and cumbersome processes.

Eventually, the knowledge will be acquired, the technology will become more accessible, and the processes will be optimised. However, by that time, the competitive advantage for SME SPs will have been lost. Therefore, those who want to stay ahead of the curve need to lead the way through the current barriers and obstacles.

Mobilise is a leading provider of SaaS solutions to the telecommunications industry. We are a dynamic and experienced company focused on delivering highly engaging digital-first service propositions and excellent customer experiences. With a strong track record, deep industry knowledge and a team of specialists, we support our clients in building and executing transformational strategies.

www.mobiliseglobal.com

ABOUT MOBILISE

ABOUT THE AUTHOR

AMR HOUSSEIN | Managing Director

Amr is a senior telecommunications professional with strong international/multi-cultural experience supported by an effective combination of technical proficiency and strategic planning. He has 15 years' experience covering the design, development and delivery of advanced telecommunication services in the mobile industry, with a focus on the MVNO and OTT services segments, with a track record for setting up several successful Mobile solutions globally.

As Managing Director of Mobilise Technology, Amr provides oversight and guidance to Mobilise's digital strategy, facilitates client on boarding, managing business requirements, project scope, financials and service delivery to ultimately ensure that the merits of the business case are realized, bridging the gap between business and technology.

Specialities include: digital architecture and strategy, eSIM, telco BSS/OSS (strategy, design, transition, operate and Improve), MVNO strategy, vendor negotiations, telecom products development and delivery, mobile network architecture (MNO/MVNO/MVNE), project and programme management.

Mobilise

+44 20 3910 0331

mobiliseglobal.com

info@mobiliseglobal.com

2nd Floor, 371 Kennington
Lane, London, SE11 5QY