

Wholesale Roaming Strategies & Competitive Landscape White Paper

March 2020



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Introduction

International mobile roaming refers to the ability for a cellular customer to automatically access voice, messaging and/or data services when travelling outside the geographical coverage area of its home network, by connecting to a foreign operators' infrastructure referred to as the 'visited network'.

As per the ITU, international roaming thus provides subscribers with the possibility to use their mobile phone outside their own country, where their home network operator has no coverage. This is enabled via roaming agreements negotiated between MNOs of the home and visited countries. The contractual agreements including technical standards for concluding and implementing international roaming have been standardised by the GSMA.

With regard to this, there exist 2 pricing models:

- Wholesale roaming charges: Negotiated as inter-operator tariffs and charged by the visited network operator to the home network operator for letting the latter's customer use the visited MNO's infrastructure.
- Retail roaming charges: The foreign network operator then charges a retail tariff to the customer, often at a higher margin, to enable its customers to roam freely while travelling.

Retail costs, in essence, include all these charges: wholesale costs, handling and routing costs to the home operator as well as the destination network, data clearing house costs, signalling fees and others.

In many regional cases, roaming regulation exists to maintain competitive offerings as well as to keep retail and wholesale tariffs under check; for example, EU price caps and Roam Like at Home (RLAH) introduction.

This report analyses the wholesale roaming sector, in terms of market trends, drivers, disruption, operator (MNO and MVNO) strategies as well as quantifying roaming usage for voice, SMS and data, alongside wholesale revenues for operators. In addition, the study will also focus on key retail market trends such as the introduction of RLAH and roaming bundles around the world.

Outbound & Inbound Tourism Travel Trends

Travel and tourism continued to be one of the biggest contributors to the global economy. Growth in outbound travel and departures around the world continue to develop, with the focus shifting towards newer markets.

The number of tourist arrivals in 2017, across global destinations, witnessed the highest growth since 2010. In 2018, this reached 1.43 billion before reaching 1.5 billion in 2019; representing a y-o-y growth of 4.9%. Leisure continued to dominate the purpose of travel for the global population, followed by business and religious purposes (especially in the Middle East).

Key Travel & Tourism Market Highlights: 2019



1.5 billion

Number of outbound departures from origin markets in 2019.



4.86% Growth

Y-o-Y growth in outbound travel in 2019.



Spain & France Leads Inbound

Leading destinations in 2019, accounting for 95 million and 88 million respectively.



China Dominates Outbound

Outbound trips from China reached 165 million in 2019, up from 150 million in 2018.



Top 10 Destinations

Spain, France, USA, Italy, China, Mexico, Thailand, UK, Germany and Japan accounted for 40% of total arrivals.

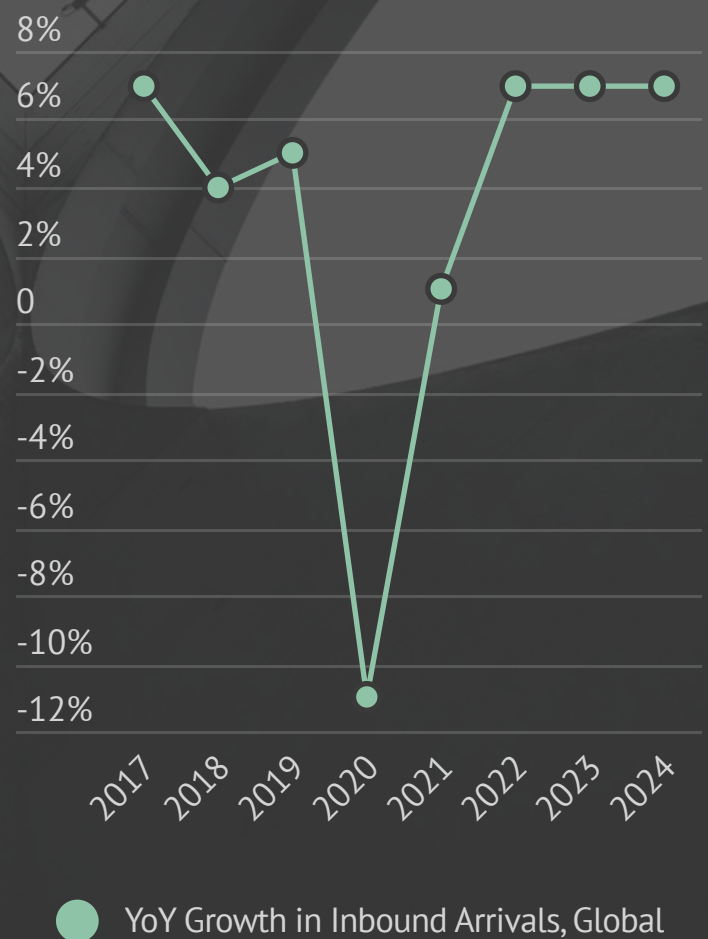
Source: Kaleido Intelligence

COVID-19 Impact: Q1 2020 Update

Kaleido updated its global outbound and inbound tourism data hub, following the outbreak of coronavirus disease (COVID-19) that was first reported in Wuhan, China. Following the spread of the virus worldwide, reaching over 100 countries around the world as of March 2020, the tourism industry is witnessing significant impact in terms of travel. A number of countries have now placed a blanket ban or restricted travel ban on both inbound and outbound traffic.

Kaleido's H2 2019 tourism data hub had estimated a 5.3% y-o-y growth, with leading global markets expected to continue growth alongside contribution from emerging markets. Kaleido is expecting a decline of 11% in global outbound and inbound travel trip volume in 2020 (as of Q1 2020). Given the current market conditions, key outbound and inbound countries such as China, Italy, Thailand, Singapore, France and the UK are witnessing a fall in travel numbers. Nearly half of the Chinese population are under some sort of travel restriction, as of February 2020. With this outbreak of corona virus now extending to multiple countries in Asia and the US, Canada, Germany and Australia, Kaleido expects a global decline in travel numbers in 2020.

Possible Decline in Travel Trips in 2020



Source: Kaleido Intelligence

In comparison to previous epidemic outbreaks such as SARS, the current scenario is expected to have a long-lasting impact on the global travel market. Indeed, while some markets are expected to make a quicker recovery in growth, critical countries such as China and Italy will take longer to recover to 2019 levels of inbound and outbound travel volume. Understandably, this means that there will be an impact on active mobile roamers around the world.

VoLTE Roaming & Interoperability

Agreements Grow

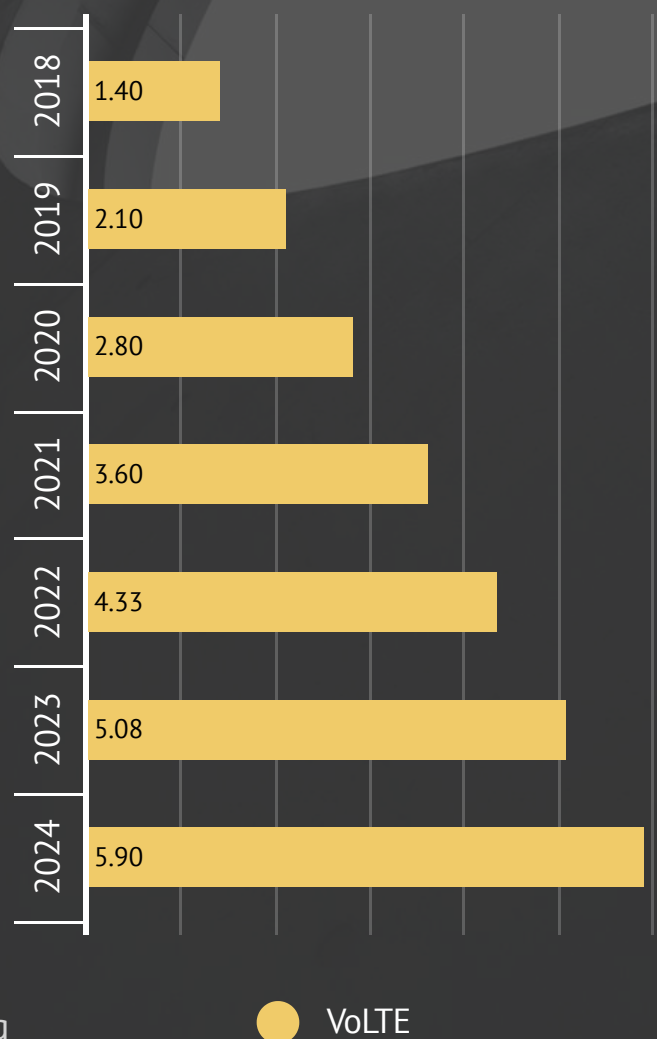
Just over 200 operators had launched VoLTE networks around the world, with 269 operators identified as investing in VoLTE, by the end of 2019. The number of VoLTE connections was estimated to reach 2.1 billion by the end of 2019; this is forecast to reach 5.9 billion by the end of 2024, accounting for more than 85% of combined LTE and 5G subscriptions. With more operators focussing on 5G rollout and with 4G becoming mainstream, VoLTE roaming has become necessary for operators worldwide; this is compounded by a rising number of 2G and 3G network closures.

There still exist technical challenges that are restricting adoption; indeed, a majority of operators interviewed by Kaleido confirmed that not much has changed with regards to VoLTE adoption since 2018.

Meanwhile, the lack of roaming agreements and VoLTE launches continue to hinder progress. This is primarily due to the following key challenges:

- Globally, just around 30 VoLTE roaming agreements are in place, as of December 2019, holding back adoption.
- End to end interoperability, adhering to the GSMA standards and other operational requirements including QoS.
- A significant majority of operators still rely on 2G/3G network fallback for voice connectivity.
- Loss of circuit-switched voice traffic means loss of billed minutes of use as traffic moves to data services. In addition, charging model becomes complicated for operators while moving from a cost per minute to cost per data session.

VoLTE Connections, Global in Billions



Source: Kaleido Intelligence

Despite these challenges, the market is witnessing an accelerated rollout of VoLTE networks alongside an increase in VoLTE roaming partnership announcements. This has been primarily facilitated by the GSMA along with IPX vendors providing an end to end VoLTE roaming services including both S8HR and LBO options.

While it is still early days for 5G around the world, it is quite evident that operators will need to roll out VoLTE networks more aggressively as in a 5G standalone network scenario, only fallback to a VoLTE network is supported and not to any circuit-switched network. Kaleido recommends that leading roaming vendors and service providers urge mobile operators to cooperate to further accelerate VoLTE rollouts globally.

Cellular IoT & Roaming to Gain Global Traction

Unlike the consumer mobile space, the M2M roaming market remains in a state of considerable development. There are several reasons behind this: M2M has started to reach a price point whereby deployments outside of specialised applications make sense for organisations. In turn, this has meant that traction in developing markets has increased.

Meanwhile, several players have emerged on the market to facilitate connectivity, device management and analytics, thus offering value in areas that are traditionally beyond the vast majority of the addressable market.

The emergence of IoT has also had a galvanising effect on the world of M2M.



It has driven recognition of the need for seamless integration of disparate systems, low entry costs for mass-deployments as well as global connectivity for any device. It is predominantly these factors that are raising questions and driving developments in the M2M roaming community today.

Nonetheless, the potential for growth in M2M and IoT has, as yet, not been fully realised. This is first and foremost owing to the fact that deployments are typically complex. In addition, very few markets around the globe have taken a specific stance towards M2M roaming. This means that, in those markets, the baseline regulatory stance for roaming IoT devices remains the same as it is for consumer devices, where regulation and commercial agreements between operators have been developed under the assumption that connected devices will spend the majority of their lifetime within the operator's home network.

While many operators express concern over the impact of permanently roaming devices, very few have any clear visibility as to the number of connections inside their network that are part of the M2M permanent roaming base.

Kaleido anticipates that 170 million M2M connections will be permanently roaming in 2019; this figure will close in on 427 million by the end of 2024. The bulk of inbound connections will be found in Europe & Central Asia as well as East Asia & Pacific: these regions are generally favourable to permanent roaming thus far. Overall, the temporarily roaming installed base will represent roughly 20% of the total roaming M2M connection base over the assessment period.

Kaleido's exhaustive dataset and forecasts on permanent and temporary IoT roaming including traffic and revenues can be accessed from our report on **IoT Roaming Strategies 2020**.

Blockchain Proposition in Roaming



Blockchain is one of the most hyped technologies at the moment and blockchain in roaming is fast emerging as one of the megatrends within this sector.

Kaleido's interview and survey conducted with mobile operators and leading/emerging roaming vendors have confirmed the role that blockchain will play in the near future, especially with regards to efficiency and cost reduction; in addition, as in other telco verticals, it has the potential to reduce losses due to fraud.

In fact, blockchain offers the following advantages to operators:

- Near real-time settlement of charges using smart contracts, reducing any significant clearing house costs, especially in a 5G roaming environment;
- Resolving any disputes or fraudulent transactions more effectively;
- Identity management to reduce roaming fraud;
- Efficient management of overage of voice calls and data.

While a number of operators noted an interest in distributed ledger technologies including blockchain, with a select few confirming trials and talks with vendors, 2019 witnessed some major announcements from the likes of Telefonica, Deutsche Telekom and Vodafone.

However, it is of our view that the impact of blockchain once implemented will be witnessed in IoT Roaming and other use cases enabled by 5G. These new business models will enable more strenuous requirements from a clearing and settlement perspective. This is further exacerbated due to the fact that 5G roaming traffic is expected to grow dramatically alongside the need to manage wide-ranging IoT applications and devices.



While the industry as a whole is optimistic about the impact of blockchain, there are several factors to be considered here:

- It is more than likely that the hybrid approach explained earlier will be the chosen model initially; this means that there is no way any operators will move away completely from a clearing house platform.
- There still exists the biggest barrier in blockchain deployment: proven real-world implications around which technology to use. It is quite evident that there is no consensus amongst operators and some of the industry associations on whether blockchain is indeed the right technology for implementation.
- From our interviews and conversations with industry stakeholders, it is still not clear on how much blockchain solutions will reduce investments for the operators. In fact, one of the operators that we spoke to rejected the idea of having to spend more to trial out a blockchain platform (even on a hybrid-basis) before replacing a clearing house vendor. This is interrelated with the fact that it is too early for operators to understand the real-world implications of such a solution.
- In addition, there is also a possible security risk given these will be private blockchains; unless there are sufficient consensus amongst actors, trust is as easily manipulated as it is now.

While some of these discussions go back 3-5 years, Kaleido recognises that blockchain-based smart contracts, complying to regulatory requirements and interconnect agreements, indeed have a role to play in future roaming agreements, where real-time settlements and new commercial models can be realised.



Roaming Intelligence, Fraud Prevention & Analytics to Drive Revenue Growth

Roaming analytics has become so important over the years, with more operators expected to implement a roaming analytics suite including silent roamer monetisation, targeted campaign management and roaming fraud detection.

Indeed, adoption of such a comprehensive and mature analytics suite has been low during the last decade. Primarily, this was a challenge because of the difficulty in convincing large operators to install or integrate technologies into the network. However, from our recent interviews with leading operator groups, it was quite evident that a host of new analytics-based features with a large focus on predicting, forecasting, and impact analysis was in demand and being considered; it is expected that vendors such as Mobileum will enable newer features capable of predicting inbound and outbound revenues on a global level as well as a market level.

It is worth noting that, as we explain in the next section, a key requirement from operators at this very moment is to implement analytics and campaign management capabilities into their existing platforms; when asked about mobile operators' key roaming requirements from a technical solution perspective, nearly 15% of surveyed operator representatives selected business analytics and campaign management capabilities, followed by 12% selecting network coverage and service reach.

The demand from operators will be based on the following key criteria:

- A customisable platform that can be integrated into existing platforms or systems.
- Flexibility and ease of deployment and management.
- An analytics platform that has enhanced next-generation fraud protection, that goes beyond the traditional rules-based system.
- Investment worthy, that offers better returns, enabling incremental revenue and help retain customers.





With revenue margins for operators decreasing, they will need to look into fraud protection and intelligence platforms for growth. Although there is an increase in the awareness of threats and fraud, networks continue to face a constant evolution of risks, hence the need to embrace such solutions, especially as future fraud and security needs will be different from a 5G and IoT perspective.

Indeed, actionable analytics models based on real-time action, margin management, traffic detection, roam like home, enabled by advanced machine learning algorithms are already available from leading vendors such as Mobileum, BICS and TOMIA. Adoption of such services will provide detailed information on roamer behaviour and consumption, enabling predictive analytics to support targeted campaigns and better-quality services.

MNO & MVNO Roaming Challenges & Revenue Opportunities

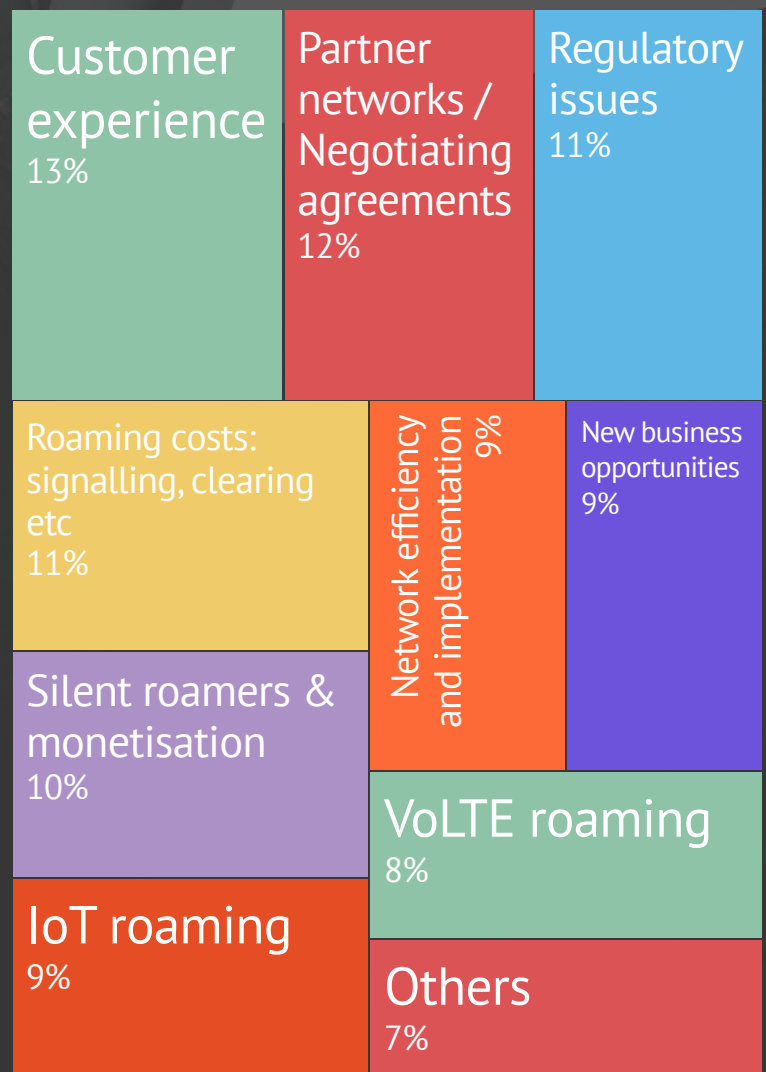
The previous decade was primarily about addressing and reforming retail roaming in terms of bill shocks and pricing regulation, leading to the introduction of roaming bundles, monthly plans and eventually RLAH, and further resulting in immediate growth in roaming traffic. However, international roaming and the economics of wholesale and retail roaming continues to present MNOs and MVNOs with more challenges and consequently, the requirements from operators continue to evolve. Kaleido conducted an exclusive study into the same by interviewing leading operator groups and MVNOs from 7 key regions.

We present the findings from the study conducted in H2 2019 here. Kaleido surveyed representatives in charge of wholesale roaming from 30 leading operator groups and 10 MVNOs during this period.

The respondents were based around the world, with Asia-Pacific and Europe dominating the total number of respondents. The number of operators surveyed represented a majority of the leading MNOs with a multi-regional presence as well as operators with the highest market share in emerging markets.

Our analysis below is specifically focussed on MNO and MVNO feedback around 3 main areas: challenges, technical requirements and future revenue drivers and opportunities.

What is the most important roaming challenges your business face currently? Operator Survey Response



Source: Kaleido Intelligence

Kaleido asked our respondents about the leading challenges that their businesses face currently. Customer experience was noted as the biggest challenge from a roaming perspective, according to the surveyed operators. Indeed, ensuring a premium customer experience from a 4G and 5G perspective similar to domestic levels for both consumer and enterprise sectors will be essential for operators.

As MNOs and MVNOs improve their 4G roaming coverage, they need to focus on accelerating any customer experience improvement programmes. With the adoption of RLAH becoming global, consumers expect a similar level of experience while roaming. Indeed, this ties in with our discussion in the previous section, regarding offering a higher quality of service via implementing real-time intelligence.

The ability to manage customer experience in real-time based on real-world scenarios will not offer a competitive differentiation but also improve customer churn and revenues. This was also backed by our interviews with roaming vendors. Roaming agreements established between operators globally addresses the technical and commercial components required to enable the service [Source: GSMA].

According to the respondents, partnering and negotiating the 'right-fit' roaming agreements around the world still continued to be a significant challenge, comparatively. Sourcing an effective agreement and partnership also include inter-operator agreements including preferred partnerships, roaming tariff negotiation and better IoT wholesale agreements.

Key challenges your firm faces to improve its international roaming offering? Operator Survey Response



Selected MNO/MVNO Responses

- New business opportunities.
- System capabilities.
- Resources to test and launch roaming services.
- Resources to manage roaming VAS services such as Steering of Roaming.
- New business could cannibalise the roaming traditional revenue.
- Network limitation, we can't offer more aggressive services if the network, coverage not support it.
- Flexibility of systems to create roaming products - Reporting/BI.
- Establishing VoLTE interconnect is the biggest challenge we are facing with partners.
- Flexible IT systems, monetisation.
- Perception that "Roaming is EXPENSIVE".
- Balancing operators, QoS and cost.
- Sublime customer experience all over the world.

Source: Kaleido Intelligence

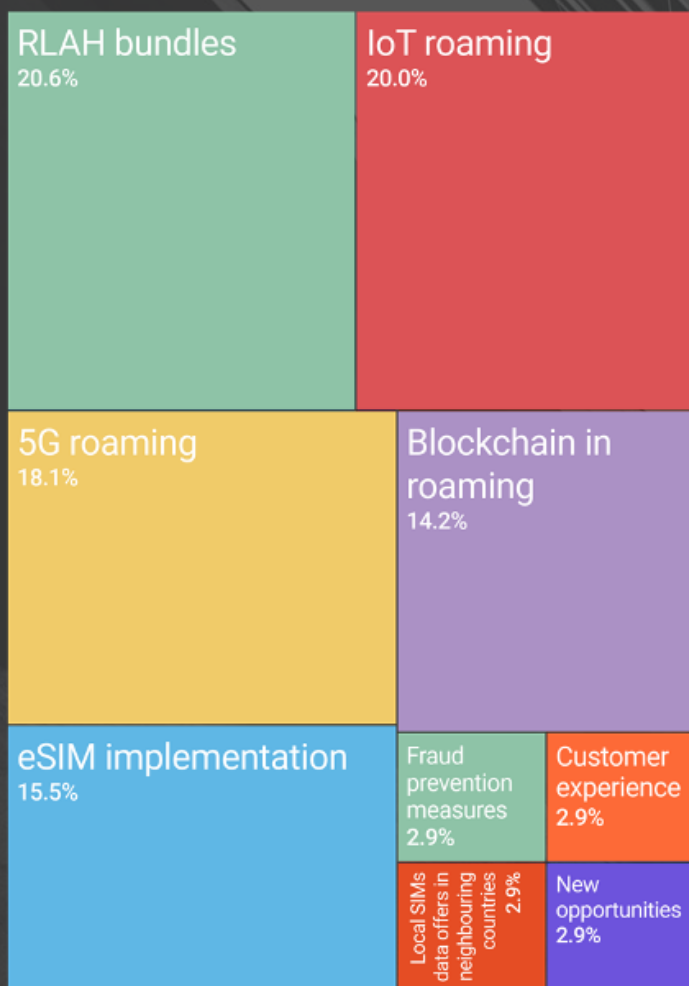
Silent roamer monetisation was found as the third most important challenge. Indeed, as we noted earlier, silent roamers and bill shock were one of the key challenges that the industry as a whole addressed; consequently, silent roamers as a proportion of global roamers were just 60-70% in 2016; this was around 80-90% prior to 2016. Driven by regulation in Europe as well as regional legislation leading to the launch of cheaper roaming bundles and RLAH packages, the proportion of active roamers have risen substantially.

However, silent roamers continue to remain a significant challenge in markets where prepaid penetration is high and retail pricing regulation is non-existent. Operators in these regions are innovating via introducing new tiered roaming bundles and daily passes. It is worth noting that a significant number of operators are still focussed on increasing usage and spend amongst active roamers, without investing in monetising silent roamers; this is expected to change over the coming years, powered by innovative pricing models and investing in analytics suite.

In addition, as noted in chart above, Kaleido asked the respondents to highlight the key challenges they face to improve their international roaming offering. While the list varied according to the operators, there were some repeated challenges such as new business opportunities, flexibility and ease of deployment, as well as managing quality of service and roaming retail offerings.

What is the most important roaming challenges your business face currently? Operator Survey

Response



In addition, Kaleido asked our respondents about the key factors that will drive roaming revenues for the operators over the next 3 years.

Unsurprisingly, the introduction of RLAH was found to be the most important revenue driver, followed by the introduction of IoT and 5G roaming services.

Indeed, as Kaleido observed in previous sections, the introduction of RLAH has driven an increase in roaming usage. However, in some cases, the introduction of RLAH has not managed to offset the decline in revenues due to the fall in retail pricing or due to the fact that there is no additional cost for roaming.

Source: Kaleido Intelligence

Indeed, IoT and 5G roaming services were also found to be an important revenue driver over the next 3 years. With regards to IoT roaming, while the opportunity for MNOs exists, this brings in relatively lower revenue compared to the substantial figures achieved through B2C mobile services.

With 5G being prepped by operators around the world, it is expected to unlock new roaming revenue streams for them. 5G will inevitably bring many new opportunities, service levels and usage levels. However, the challenge here is to identify these services and predict what 5G roaming will look like in 3 years' time; i.e. use cases that will have an impact – anything with connected cars to high speed video services. From a vendor perspective, it is recommended that they offer 5G roaming solutions which adapt all existing signalling, routing, inter-working, clearing, steering, business intelligence, fraud and service assurance solutions, as per new standards.

Market Forecasts: Inbound Roaming Traffic

With the proportion of silent data roamers declining across the world, Kaleido expects inbound average data usage per active roamer to exceed 1 GB per roamer per annum in 2019.

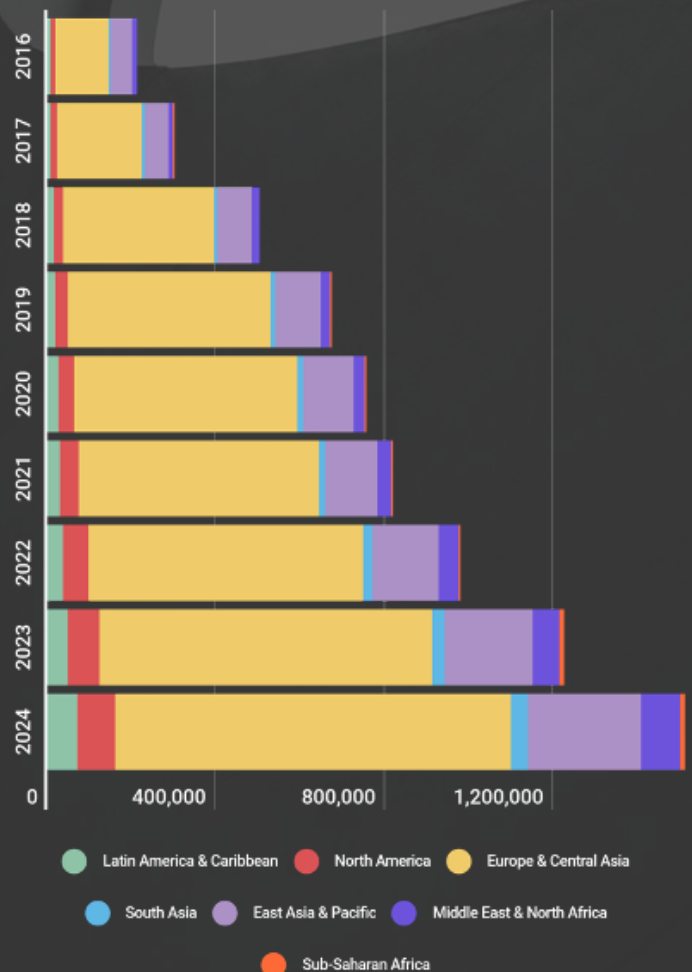
Average data usage in Europe and Asia dominates global markets; Kaleido forecasts this to reach 1.8 GB per annum per active inbound roamer, up from 1.1 GB in 2018. In comparison, inbound travellers to the US and Canada along with East Asia & Pacific will also witness significant increases annually, to reach well over 1.5 GB per annum as these regions get added to RLAH destinations by more operators alongside the fact that inbound travel to these destinations are dominated by intra-regional travel where cheaper roaming bundles and daily passes are available.

Consequently, the total inbound data traffic will reach 1,512 billion MB of data in 2024, equivalent to 1,410 PB of data. This is up from just 212 billion MB (198 PB) of inbound roaming data traffic in 2016.

In 2019, Europe & Central Asia accounted for 71% of global inbound data traffic. This is expected to decline to 62% by 2024; this means that total inbound data roaming traffic will reach 940 million MB of data in 2024.

Similar to the increases in outbound traffic in 2017 and 2018, inbound data traffic also witnessed significant rises representing 57% and 79% y-o-y increases respectively.

Inbound Roaming Data Traffic in Millions of MB, Market Share & Traffic Volume



Source: Kaleido Intelligence

Market Forecasts: Wholesale Roaming Revenues

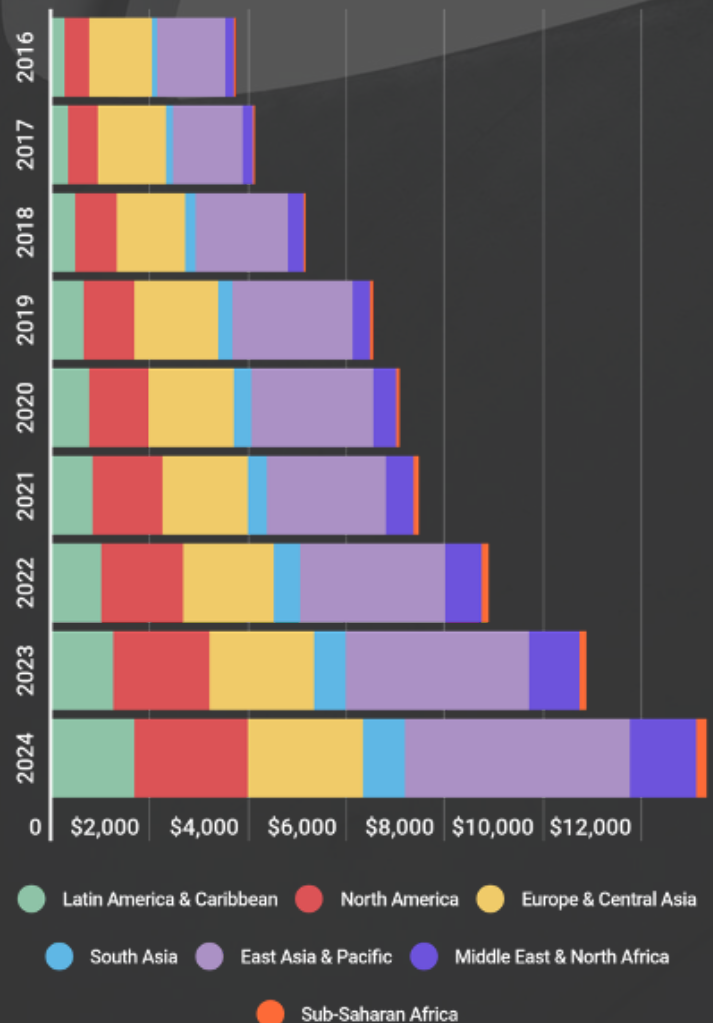
Following the impact of Corona virus on global travel, Kaleido forecasts that the total wholesale roaming revenues will only reach \$13 billion (previously forecast at \$16 billion in 2024), representing a CAGR of 21%. The increase in wholesale revenues is primarily driven by the significant growth in data traffic and usage across all key regions. Voice traffic will still continue to contribute towards this global inbound roaming revenue.

Indeed, the average wholesale roaming charges in Europe is significantly lower than other international markets; on that basis Kaleido estimates total inbound wholesale revenues to reach \$2.3 billion in 2024, up from \$1.7 billion in 2019, a slower average annual growth rate of 7% compared to the global average of 15%.

In addition, a significant proportion of traffic in Europe is on-net, further lowering the average wholesale rate. In comparison, wholesale charges derived for Asia-Pacific was significantly higher, representing nearly 4 times that of Europe and Central Asia in 2019. This is forecast to remain the same; however, should average wholesale costs in Asia-Pacific decline at a much faster rate, Kaleido will update the wholesale roaming revenue forecasts.

Unsurprisingly, data roaming will account for the lion's share of global revenues, representing 87% in 2024, up significantly from 72% in 2016.

Wholesale Roaming Revenues, Market Share & Forecasts for Global Regions



Source: Kaleido Intelligence

Leading Roaming Vendors & Competitive Analysis

Introduction & Scoring Methodology

Kaleido's approach towards competitive analysis enables all roaming vendors to showcase their strengths on an equal playing field and enable MNOs to choose a vendor based on their strengths and innovation as opposed to existing popularity. Therefore, our approach focussed on categorising vendors, examining their strengths and weaknesses, identifying the company's unique market positioning, problem-solving capabilities, innovation leadership and finally, how the vendor is positioned to meet MNO/MVNO needs and requirements.

We conducted the following process to achieve this:

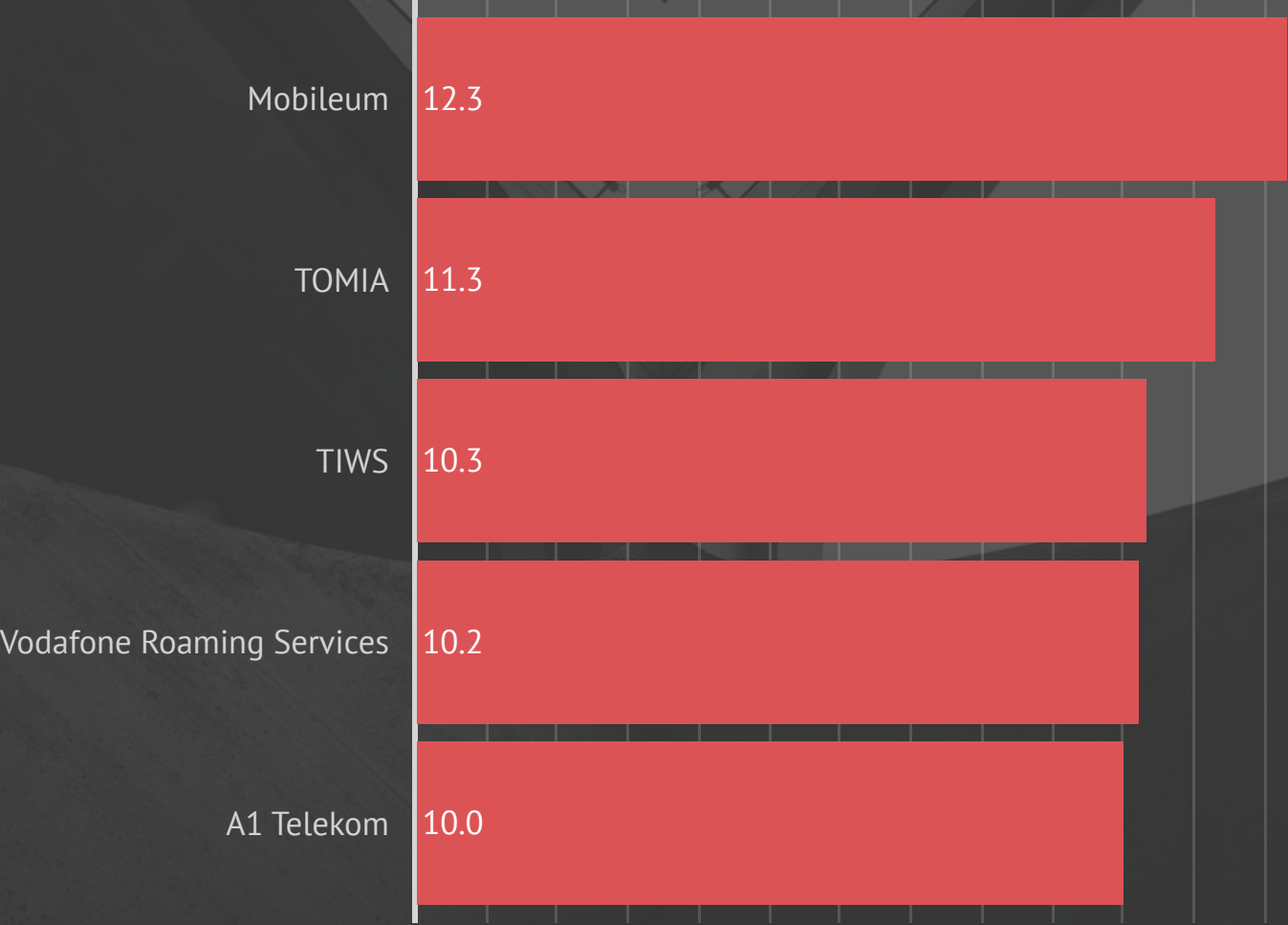
- We conducted in-depth interviews with all major roaming vendors and operator groups. Through these interviews, we established how the companies are positioned in terms of customers and deployments, service offerings, market presence, key strengths and weaknesses.
- Vendors were also invited to take part in answering a questionnaire alongside telephone interviews to request and compile information about service provider offerings and capabilities.
- This enabled all vendors to showcase their strengths and be appropriately assessed by the expert team at Kaleido. Kaleido's impartial approach alongside feedback from vendors enabled us to provide accurate scores.
- Further to vendor interviews, Kaleido conducted interviews with MNOs and MVNOs from across the globe, to determine both MNO and MVNO needs and requirements. This enabled us to match up vendor strengths with real needs as perceived by MNOs, especially from a technical perspective.

Kaleido Score (Vendor Overall Score)

Once the vendor had been scored across the different categories and criteria as explained above, Kaleido derived an overall score for each vendor, specific to the product segment (IPX, Steering of Roaming, Sponsored Roaming & Hubs, VAS - Analytics & Fraud, Roaming Data & Financial Clearing). The overall score was obtained based on criteria and category weightings. This resulting overall score was then used to position and rank vendors in order. Please contact Kaleido Intelligence for more information on the research process, criteria, scoring and weightings.

KALEIDO SCORE: Leading Roaming Vendors in Steering of Roaming, Top 5

The below charts highlights the overall Kaleido score for vendors in mobile steering of roaming product category.



● Steering of Roaming



	Steering of Roaming
MAX KALEIDO SCORE	14

Mobileum, TOMIA and TIWS scored highly across all product leadership as well as innovation criteria, giving them a top 3 position within Steering of Roaming.



KALEIDO SCORE: Leading Roaming Vendors in Analytics, Fraud & VAS, Top 5

The below charts highlights the overall Kaleido score for vendors in mobile roaming analytics, fraud and value-added services product category.



● Analytics, Fraud & Other Roaming VAS



Analytics, Fraud & VAS

MAX KALEIDO SCORE

13

Mobileum is the leading vendor delivering wholesale analytics-based projects. BICS & TOMIA also scored highly for their roaming intelligence and analytics service offerings to grow roaming revenues.



Kaleido Score & Roaming Vendor Analysis:

Mobileum

Summary

Founded as Roamware, Mobileum's foundation is based on its strong analytics and big data expertise in revenue impacting solutions focused around the areas of roaming, fraud & security and customer engagement. Mobileum is a leading vendor capable of delivering wholesale analytics-based projects – roaming agreements, contracts, analytics, forecasting and others.

Mobileum's solutions are capable of helping their customers to increase profitability by reducing operational costs and wholesale charges across both wholesale and retail needs; 90% of all its agreements are profitable. Within retail, Mobileum offers a suite of revenue accelerator solutions including customer analytics, policy management, digital engagement and campaign management.

Underlying all of this is the analytics platform and actions platform from Mobileum, Active Intelligence. Using machine learning and AI, the platform is able to deliver real-time traffic analytics and customer analytics as well as apply business logic to inform traffic management decisions, assess risk, and protect the network; few vendors can give this level of insight.

In addition, the platform can predict and forecast travel as well to ensure that the operator is well placed to pre-empt and ensure a high-quality service.

The platform has evolved over the last few years, in terms of predictability, breaking down granular information to help MNOs make profitable decisions.

Kaleido Score

While operators in the past never really integrated roaming analytics and intelligence platforms; possibly because they received insights from clearing houses; this viewpoint has changed over the last 2 years with tier 1 operators embracing the power of analytics. Operators rely on Mobileum's integrated analytics platforms to improve steering efficiency or profitability; the company has a proven leadership in providing roaming analytics alongside steering and other value-added services.

Kaleido's analysis scored Mobileum highly for its analytics and roaming value-added services including its real-time fraud prevention and management.

In steering, Mobileum scored highly across all product leadership scoring criteria, giving them a leadership position within Steering of Roaming, in terms of product capabilities and positioning.

- **Steering of Roaming: 12.3/14**
- **Analytics & VAS: 10.3/13**

It is our view that if operators are reliant on long term revenue generation via roaming services or if they wish to subsidise roaming, then it is critical that they have deeper insights on customers and critical roaming features; this makes Mobileum an ideal partner.

With a large focus on predictability and forecasting and impact analysis, Mobileum expects its platform to predict and forecast roaming revenues later this year onwards on a global level as well as a market level.

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[Kaleido Intelligence](#) is a specialist consulting and market research firm with a proven track record delivering telecom research at the highest level.

Our Mobile Roaming research service covers the following industry leading publications:

- Wholesale Mobile Roaming Strategies & Forecasts
- Retail Mobile Roaming Trends & Forecasts
- Mobile Roaming Data Hub
- IoT Roaming Strategies & Forecasts
- 5G Roaming Future & Forecasts
- IPX Data Roaming Outlook & Forecasts
- International Travel & Tourism Trends
- International Travel & Tourism Forecasts
- Blockchain in Roaming: A Strategic Outlook

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