



European
Commission

Technological developments and roaming

EXECUTIVE SUMMARY

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by:



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Abstract

This study assesses technological and other market developments which could impact competition in wholesale and/or retail roaming markets over the medium term (5-10 years), with a view to understanding whether regulation of data, voice and SMS roaming will continue to be necessary going forwards.

Our analysis suggests that there does not seem to be a case for significant changes to the (retail or wholesale) rules applying to international roaming by individual travellers under the current review (without prejudice to review of maximum wholesale rates). However, the deployment of eSIM and evolution in over-the-top voice and messaging services should be monitored with a view to assessing their impact on competition in retail roaming markets in the medium term. Developments in 5G and IP-based mobile communications in the coming years could also affect the nature, variety and pricing of wholesale roaming products going forwards.

In the more immediate term, it may be helpful to review whether there is a need for more explicit rules or guidelines governing access requests for permanent roaming for the purposes of connectivity for M2M/IoT.

Executive Summary

This study aims to support the Commission in assessing technological and other market developments which could impact competition in wholesale and/or retail roaming markets over the medium term (5-10 years), with a view to understanding whether regulation of data, voice and SMS roaming will continue to be necessary going forwards. A summary of key findings follows.

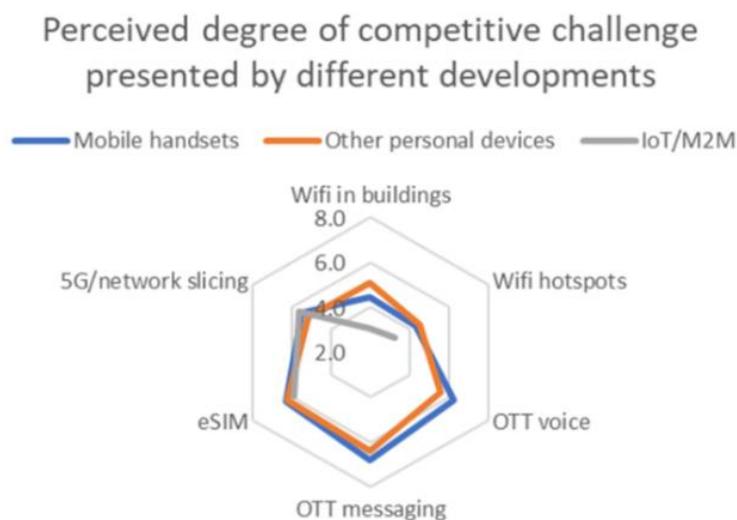
Key technological and market developments

Developments that are likely to be relevant to competition in roaming in the medium term, include developments which enable end-users to *bypass* roaming such as Wi-Fi and OTT services, developments which *facilitate entry* into the roaming segment such as eSIM, and new generation technologies such as 5G, VoLTE and RCS, which affect the nature of roaming products and *require renegotiation* of existing agreements.

Our analysis suggests that there may be different competitive dynamics in markets for mobile handsets and personal devices, compared with the more nascent market for M2M/IoT.

Responses to an online survey conducted for this study, suggest that market participants consider that OTT voice and messaging services are likely to present the greatest competitive threat to traditional roaming offers for mobile voice and SMS, while eSIM and (especially for IoT) 5G and network slicing – are also expected to disrupt roaming markets.

Perceived degree of competitive challenge presented by technological, market and service developments (1=limited challenge, 10=significant challenge)



Source: WIK-Consult based on stakeholder survey, n=31.

The following table provides a summary of the degree to which we expect different developments might impact competition in roaming markets in the medium term, distinguishing their potential impacts on data, voice and SMS markets, and for personal devices compared with IoT/M2M.

Summary of conclusions concerning the implications of technological and market developments on competition in roaming markets in the medium term

Personal devices	Data roaming		Voice roaming		SMS roaming		Dependencies
	Retail	Wholesale	Retail	Wholesale	Retail	Wholesale	
Wi-Fi hotspots	+	+	(+) via OTT		(+) via OTT		
eSIM	+(+)		(+)		(+)		eSIM take-up, wholesale access or roaming
5G/network slicing		+/-					5G deployment and take-up
OTT voice and SMS			++	+	+++	++	Reliable low cost data connection
Capacity trading exchanges		(+)		(+)		(+)	Participation of multiple MNOs per country

+ indicates increase in competition, (+) minor or uncertain increase, - indicates potential competitive challenge

IoT	Data roaming	
	Retail	Wholesale
Wi-Fi hotspots	(+)	(+)
eSIM	+++	
5G/network slicing		++/-

Source: WIK-Consult.

Wi-Fi hotspots are expanding across Europe and are likely to remain attractive for reasons of cost, quality and convenience. Wi-Fi technologies are evolving to provide increased download speeds, and companies have emerged which seek to aggregate hotspots from different users or “homespots” to facilitate ease of use for travellers. However, Wi-Fi is unlikely to present a comprehensive substitute for mobile data “roaming” for consumers or mobile IoT because it lacks complete coverage. Moreover, mobile capabilities are evolving alongside Wi-Fi, closing the capability gap, and mobile operators may increasingly use the capabilities to seamlessly integrate Wi-Fi technologies within their mobile offer in a 5G environment, thereby encompassing some of the advantages of this technology that currently encourage users to seek out Wi-Fi as an alternative.

OTT is already replacing mobile calls and SMS for certain purposes, domestically as well as when roaming, and for business applications as well as consumer. Conversely, more attractive roaming offers (based on RLAH) may have tempted end-users to switch to mobile voice rather than bypassing the network. There is likely to be residual demand for mobile communications from users without smartphones and for calls requiring any-to-any connectivity. However, OTT could limit the potential for mobile operators to increase voice and messaging prices, if cost-effective data roaming or alternatives are available.

eSIM is an important development that could facilitate competition and switching in mobile connectivity including roaming. Its effects on competition may differ for different market segments, and depend on the way the standard is implemented and influenced by different interest groups including mobile network operators and device manufacturers. The most significant prospects that eSIM could bring for new entry could be in connectivity for IoT including connected cars (where its use is already established) as well as in the supply of global connectivity to previously connected (but not mobile connected) devices such as tablets and laptops. MVNO/As, verticals and device manufacturers are likely to play an increasing role in providing connectivity in this space. eSIM could also enable customers to select separate specialist roaming providers on their mobile handset, or facilitate their use of local mobile providers (local break-out). However, customer take-up of specialist services might be limited, while local break-out presents other challenges, including trust (for the end-user), identification and security. It is possible that the threat of such competition could limit the ability of MNOs to raise prices, but eSIM in consumer devices is in its infancy and the impact has yet to be seen. The effects of eSIM on competition in consumer roaming in the long term could be significantly improved if GSMA standards were to be revised so as to remove the current limitation of one profile per eSIM.

5G technologies are likely to change the nature of roaming services e.g. by enabling quality and prioritisation as additional parameters as well as potentially affecting the commercial model applied, e.g. basing pricing on bandwidth as opposed to usage. Network slices could also provide options for MNOs and MVNOs to use access agreements as an alternative to traditional roaming as well as enhancing their ability to have more flexibility on service differentiation (latency, security etc), which could prove to be very important for certain vertical use cases. However, as 5G roaming, wholesaling models and vertical use cases have not yet been defined, the impact of 5G on competition in roaming/global connectivity markets is not yet clear. 5G could provide increased potential for new entry and retail competition if MNOs see its capabilities as an opportunity to build a diverse wholesaling model. Equally, if this is not the case, fears have been expressed, that 5G could potentially present a threat to multi-national MVNOs which would need to renegotiate existing arrangements, which are often tied to specific technology generations.

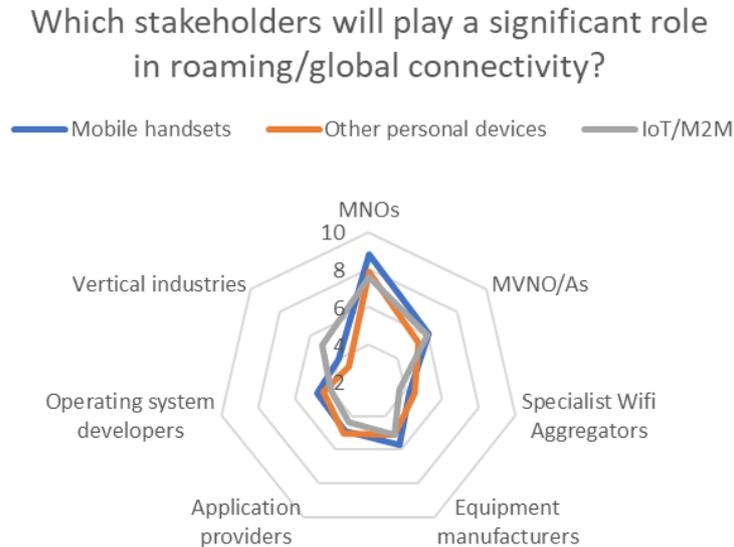
RCS is a standard for rich IP-based communications that is intended to replace existing mobile calling and SMS technologies. It is likely to narrow the gap between the functionality of mobile communications compared with OTT and provide RCS-based communications services which are interoperable between mobile network operators. RCS and VoLTE could change the nature of the services provided and the billing metric. These developments seem unlikely to change the competitive dynamics in mobile roaming markets, but may require new agreements or the renegotiation of existing agreements which could pose challenges to existing or new MNOs or MVNO/As which lack bargaining power with respect to larger MNO groups.

At the same time, new models for **wholesale capacity trading** for roaming are being explored. Proponents of such models claim that these platforms could boost competition in roaming wholesale markets, by anonymising trading (which is currently conducted through face-to-face bilateral negotiations) and by breaking the link between outbound and inbound traffic, which penalises operators and MVNOs which have little to offer in exchange for roaming access. Digitised trading may also be needed to handle the increased diversity of data roaming requirements that may arise with 5G. However, a key challenge with such models is that they rely on participation by multiple operators in each country, and there is a lack of incentive for larger mobile groups to participate.

Main actors in cross-border connectivity

Traditional mobile network operators are considered likely to continue to play the most significant role in the provision of international roaming connectivity in the medium term. However, new IoT/M2M services and business models alongside entry enablers such as eSIM are expected to increase the scope for new players or types of players to gain a foothold in markets for cross-border data connectivity. The main beneficiaries seem likely to be mobile virtual network operators and aggregators. Device manufacturers and verticals are also likely to play an increasingly important role as they look to bundle connectivity or provide interfaces or options for connectivity into their offers to consumers.

**Which stakeholders will play a significant role in roaming/global connectivity?
(1=limited role, 10=significant role)**



Source: WIK-Consult based on stakeholder survey, n=33.

Implications for regulation

There does not seem to be a case for significant changes to the regulatory rules applying to international roaming under the current review (without prejudice to review of maximum wholesale rates). There are nonetheless a number of issues which our analysis suggests could benefit from more immediate attention.

One issue that was raised by MVNO/As interviewed for this study is that differing rules in different countries or different approaches by operators to permanent roaming could affect the potential to deploy IoT services across the single market.¹

It could thus be helpful to review whether there is a need for more explicit rules or guidelines governing access requests for permanent roaming for the purposes of connectivity for M2M/IoT. In order to avoid unintended use of permanent roaming for personal communications² as well as addressing concerns of IoT connectivity providers,³ it might also

¹ One case that was highlighted to illustrate challenges in obtaining roaming in the context of IoT was the dispute between Transatel and Telefonica Deutschland that was referred to the German regulator BNetzA. <https://www.transatel.com/in-the-press/transatel-wins-german-regulatory-decision-on-access-to-telefonica-data-roaming/>

² The potential use of eSIM to enable multiple contracts for mobile “roaming” connectivity with different identifiers could in theory make it harder to identify users which are in practice permanently roaming.

³ Interviewees noted that there could be a lack of clarity about whether a roaming application was “M2M” or involved personal interaction, especially in cases – such as connected cars – where different applications may be provided by the same global connectivity provider under the same contract for different purposes in parallel (e.g. telemetry and in-car entertainment).

be helpful to provide guidance on how M2M should be distinguished from personal communications, and assess what action could reasonably and proportionately be taken by MNOs to enforce conditions they may apply for the use of permanent roaming.⁴

Finally, our research highlights the important role that standards can play in fostering innovation and competition in global connectivity markets. There could thus be a role for the EU to observe and if necessary support the development of standards that could allow QoS-guaranteed roaming for M2M applications requiring it, as well as closely following the implementation of standards adopted for eSIM to ensure that they evolve in such a way as to facilitate selecting and switching between multiple profiles.

Looking into subsequent reviews, although there is likely to be continued reliance on managed communications services for some customers and for some types of communication,⁵ it is possible that OTT might provide a sufficient constraint on pricing to enable the withdrawal of retail roaming obligations (RLAH) on voice and SMS offers in the medium term.

However, due to the reliance of OTT on data connections, continued retail RLAH obligations for roaming data may be needed, unless there is evidence that competition from alternative roaming provision via eSIM (or the strong development – contrary to expectations - of local break-out) can effectively constrain retail data roaming prices. Such evidence might take the form of significant take-up of alternative roaming services or LBO by EU customers for travel outside the EU, leading to significant reductions in data roaming offers for such customers. It will not in any event be possible to gauge the effectiveness of alternative roaming offers until there is higher take-up of eSIM enabled smartphones.

At the wholesale level, it seems likely that data roaming regulation will continue to be required in the medium term to support both roaming for personal communications and provide a back-stop to support roaming for the growing IoT/M2M communications market. It is also possible that bottlenecks might emerge in the future with regard to wholesale provision of roaming services that provide assured QoS e.g. for M2M services, which may require intervention.

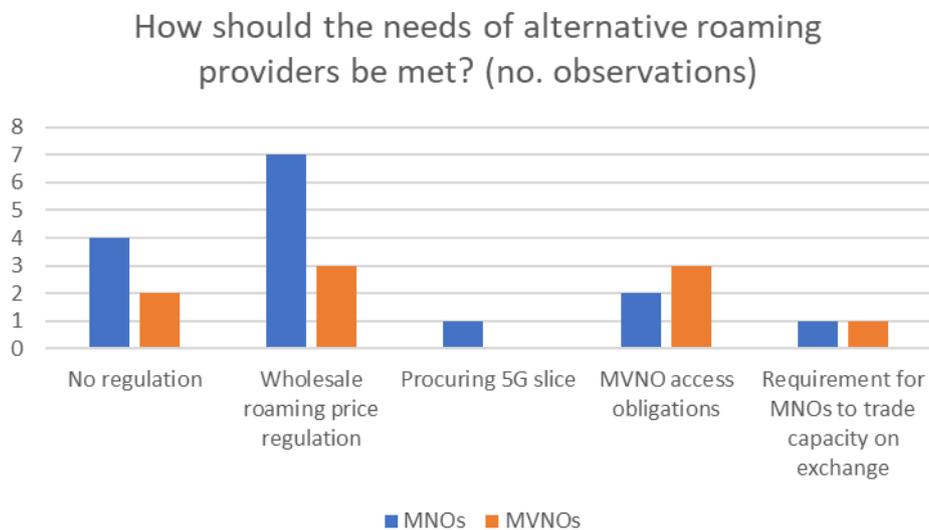
If competition challenges persist in wholesale data roaming (in its basic form and/or with QoS guarantees), there is a further question as to which kind of obligation would be most appropriate to address them. Respondents to the online survey conducted for this study suggested that wholesale price obligations would be the most appropriate solution – although MVNO providers also cited MVNO access obligations as of equal importance.

⁴ Any such guidance may however fall beyond the scope of the Roaming Regulation and may thus need to be addressed separately

⁵ For instance not all customers will subscribe to an OTT service, and not all customers will subscribe to the same OTT service. Especially for group calls, it is likely that number-based services (either using managed services or using alternatives such as SkypeOut that rely in part on managed services) will continue to be used for participants who are not subscribed to the same OTT service, or who lack smartphones or who (momentarily) lack access to mobile broadband.

There were fewer calls for obligations to be applied on access to 5G network slices or requirements for MNOs to make access available via a capacity trading exchange. This may be because these options are less relevant, or could be due to the fact that they are less well developed, and therefore their significance less well understood. As there may be further insights into these developments in the coming years as 5G is deployed and commercial capacity trading platforms are launched, it may be helpful to analyse whether there is a need for any measures to be taken in these areas in a subsequent review of the roaming regulations.

How should the needs of alternative roaming providers be met – responses from MNOs and MVNOs



Source: WIK-Consult based on stakeholder survey, n=26.

It is less clear what intervention, if any, will be needed at the wholesale level concerning voice and SMS. If, on the basis of competition from OTT, retail markets are found to be prospectively competitive in the presence of data roaming regulation, this could warrant the deregulation of wholesale markets as well as the removal of RLAH (retail) obligations under a future review of the roaming regulations. However, it is possible that some challenges could persist for non-attached mobile operators and MVNO/As, including with the migration to IP-based services by means of VoLTE and/or RCS, and with the associated development of new wholesale offers. A future review of the roaming regulations might consider how to deal with this issue, in light of the experience in the negotiation of wholesale roaming agreements for IP-based voice and messaging.

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