Interoperability between messaging services

an overview of potential and challenges

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1 Messaging services and calls for interoperability

Messaging services[1] have become firmly established in Germany thanks to the rapid spread of smartphones and the use of mobile internet. A consumer survey by the Bundesnetzagentur shows that 88% of Germans aged 16 or above[2] regularly communicate using these internet-based services. While they were initially restricted to sending text messages, such services now offer a variety of functions such as calls, video calls, the ability to send voice messages and pictures, group chats, etc.

Messaging services are permanently changing telecommunications usage in Germany, affecting the traditional telecoms markets (in particular fixed network and mobile telephony as well as SMS) and posing increased competition to them. For this reason, the new version of the German **Telecommunications Act** (TKG) of December 2021 **includes** *number-independent interpersonal telecommunications services*[3] in parts of the regulatory regime. The aim of this is to create fair competitive conditions between new services, such as messaging, and traditional telecommunications services like telephony and SMS.

The Bundesnetzagentur's consumer survey shows that the **most popular** messaging services among German users are **WhatsApp** (93%), **Facebook Messenger** (39%) and **Instagram** Direct Messages[4] (25%). All three of these are linked to Meta platforms, Inc. (formerly known as Facebook). Competing services such as Skype (20%), Zoom (18%), Telegram (16%), Microsoft Teams (14%), Snapchat (14%) and Signal (13%) are much less-used. They have increased their share of use since the 2019 survey[5] (see figure 1), but WhatsApp remains by far the most frequently used. More than 78% of users have WhatsApp as their "main service".

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[1] These include in particular messaging, internet telephony and video telephony services, which – unlike traditional telecommunications services such as telephony and short messaging (SMS) – are provided via the open internet, or "over-the-top" (OTT). They are known as OTT communication services because their use is not tied to a particular fixed or mobile connection and they can be used independently. The consumer survey defined these services as "online communication services usually provided via the internet". This definition was taken in order to ask consumers about their use of such services in an easily understandable way. The spectrum of existing services was covered as broadly as possible, regardless of the regulatory classification of any individual service based on its specific properties.

[2] See Bundesnetzagentur (forthcoming): Nutzung von Online-Kommunikationsdiensten in Deutschland.

[3] See Directive (EU) 2018/1972 establishing the European Electronic Communications Code (EECC), transposed into German law as part of the Telecommunications Legislation Modernisation Act (TKMoG), here section 3 para 4 TKG. Email services, for example, also come under this category of services.

[4] Instagram was included in the Bundesnetzagentur survey because it does essentially allow communication among a closed group of users as a combined service (sending of text messages, video calls, etc).

[5] See Bundesnetzagentur (2020): Nutzung von OTT-Kommunikationsdiensten in Deutschland – Bericht 2020. http://www.bundesnetzagentur.de/ott-bericht.
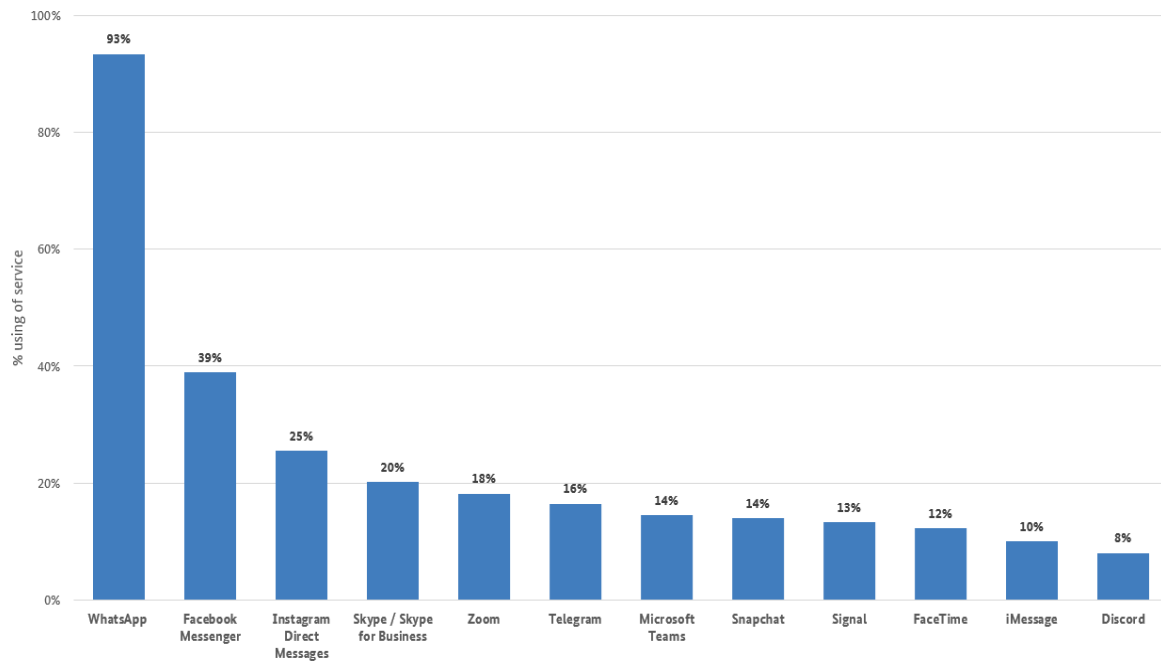
Figure 1: Use of messaging services (%)

Source: Bundesnetzagentur (forthcoming). Base: users of messaging services (multiple answers allowed),
n = 1,906. Messaging services not shown are listed in descending order as follows: Google Messages (7%), Threema (5%),
Cisco WebEx (4%), Google Meet (2%), Google Duo (2%), Viber (1%), WeChat (1%), others (1%)

The **trend towards concentration in the messaging sector** can be attributed to **network effects.** This means that users of a particular messaging service benefit from a greater number of users of the same service, because they can usually only communicate with each other. There is generally no *"any-to-any"* connectivity (anyone can communicate with anyone else, no matter which provider they are using), as there is in the traditional telephone network. The most-used messaging services (see figure 1) therefore only allow communication with users of the same service/provider. That is why, for 93% of users, **network effects are a primary reason for choosing** their main service.[6]

Network effects are self-reinforcing and confer a competitive advantage on the service that is the first to have a critical mass of users.[7] Users who want to change provider have to persuade their contact, or whole groups of contacts, to switch with them.

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[6] See Bundesnetzagentur (forthcoming): Nutzung von Online-Kommunikationsdiensten in Deutschland.

[7] See Katz, M. L., & Shapiro, C. (1985): Network externalities, competition, and compatibility. The American Economic Review, 75, pages 424–440; Markus, M. L. (1987): Toward a "critical mass" theory of interactive media: Universal access, interdependence and diffusion. Communication Research, 14, pages 491–511.

Against this background, **the market concentration in the messaging sector** and related issues have been topics of public debate for years. It is often said that there is a **de facto dependence** on dominant messaging providers that enables them to collect and evaluate excessive amounts of **user data**, for example with conditions of use that are not transparent or proportionate.[8]

To **break the market power** of dominant providers and reduce the potential for abuse, there have been repeated calls for them to be forced to open up their largely closed communication networks to providers of competing messaging services.[9] The aim of this would be to establish **interoperability** between different messaging services to enable **their users to communicate** regardless of which provider they use.[10] Supporters of this approach argue that there should be more competition on functions or level of data protection, rather than for the greatest number of users ("*competition in the market instead of competition for the market*").[11]

Following this argument, interoperability obligations should be used as a means of **stimulating competition and avoiding lock-in effects**[12]. The **dependence** of consumers on dominant messaging services should be **reduced** and providers prevented from collecting and evaluating excessive amounts of user data.

At the same time, other players take a critical view of interoperability obligations as a regulatory tool. They believe that other measures are more suited to combating the market power of dominant service providers and are concerned that interoperability obligations could curb innovation by imposing rigid rules. There are also concerns about a harmonisation of standards leading to a lowering of data protection or IT security levels in the market. For example, European Commission Executive Vice-President for A Europe Fit for the Digital Age and Competition, Margrethe Vestager, said:[13]

"Just think about the SMS: it has been around for a long time and it has hardly changed at all. It doesn't have the new functions of messaging apps, like allowing you to set up groups, for example. If we insist that all messaging services have to be compatible, we could end up going back to a sort of SMS."

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[8] See Competition and Markets Authority (2020): Online platforms and digital advertising, market study final report, page 147.

[9] See: Data Ethics Commission of the German federal government (2019): Gutachten der Datenethikkommission der Bundesregierung, page 137; Federation of German Consumer Organisations (VZBV) (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes; Markus Beckedahl (2020): Messengerdienste müssen interoperabel werden – aber nicht um jeden Preis, available at https://netzpolitik.org/2020/bits-messengerdienste-muessen-interoperabel-werden-aber-nicht-um-jeden-preis/.

[10] At the technical level, interoperability is defined as the ability of different digital services to work together and communicate with each other, see OECD (2021): Data portability, interoperability and digital platform competition, OECD Competition Committee Discussion Paper, point 25.

[11] See Handelsblatt, 2 April 2021: Digitalpolitiker fordern EU-Gesetz gegen die WhatsApp-Dominanz, available at https://www.handelsblatt.com/politik/deutschland/big-tech-regulierung-digitalpolitiker-fordern-eu-gesetz-gegen-die-whatsapp-dominanz/27062400.html.

[12] The lock-in effect occurs when customers who already use products or services from a particular company would incur high costs by switching to a different product or service.

[13] See Handelsblatt, 9 March 2021: Rivalität mit China: EU-Kommissionsvizin Vestager will Tech-Allianz mit den USA, available at https://www.handelsblatt.com/politik/international/interview-rivalitaet-mit-china-eu-kommissionsvizin-vestager-will-tech-allianz-mit-den-usa/26989508.html.

The example held up by proponents of an interoperability obligation for messaging services is that of traditional telephony, which has long been interoperable. Users can communicate with each other regardless of which network each of them is using. Interoperability obligations actually made it possible for the telephony markets, which used to be dominated by monopolies, to be opened up to competition.[14] For connectivity reasons, the new TKG also permits interoperability obligations to be imposed on messaging services under certain, very specific, conditions.[15] However, it should be noted here that internet-based messaging services are mostly not based on generally applicable standards, so wide-reaching **technical** aspects would have to be taken into account before the introduction of any such obligations. From an **economic** and **legal** point of view, too, messaging services have specific characteristics that mean that the interoperability approach from the traditional telecoms world is not directly transferable to them.

This discussion paper summarises possible **technical interoperability approaches** in the field of **messaging services** and provides an **overview** of the **effects** of and **challenges** posed by the possible introduction of obligatory interoperability for these services.

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[14] It should be borne in mind in this context that, in the case of traditional telephony, a large-scale standardisation had already been carried out under the auspices of the International Telecommunication Union (ITU).

[15] See section 21(2) of the new TKG of 23 June 2021 (transposing Article 61(2c) of Directive (EU) 2018/1972).

2 Technical interoperability approaches for messaging services

Establishing interoperability would enable users of messaging services to communicate with each other across providers. They could, for example, exchange messages or make calls even if they were using messaging services from different providers.

From a technical perspective, **interoperability** refers to the ability of different services to work together and communicate with each other.[16] There are **various technical interoperability approaches** that could permit communication between different messaging services. These have technical differences and varying degrees of effort required with respect to the necessary technical conditions. These approaches will be described in brief below.
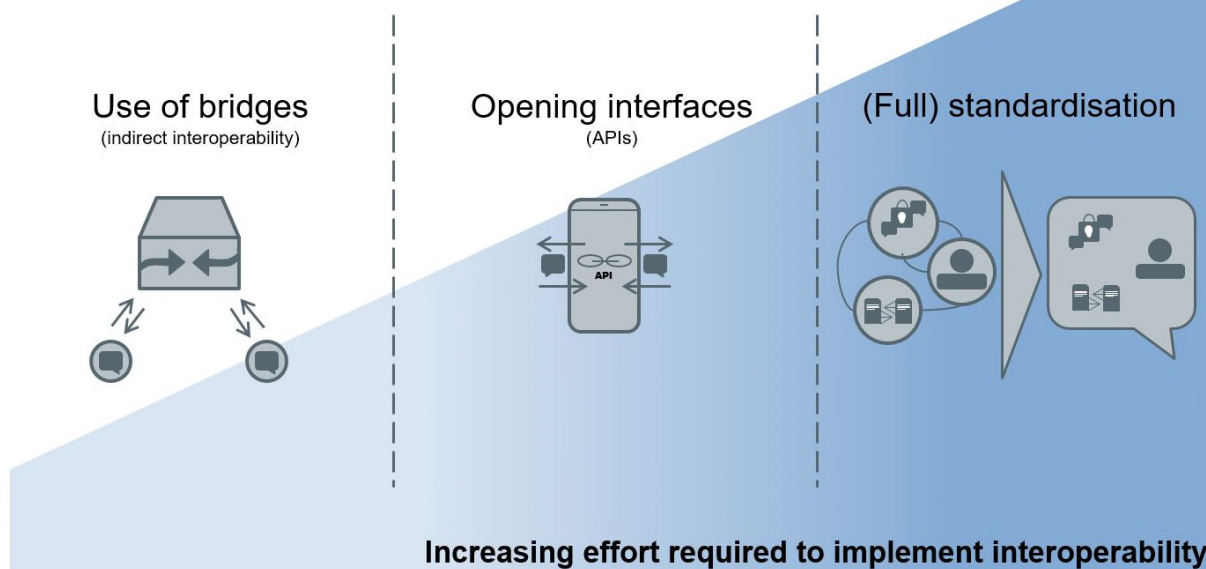

Figure 2: Overview of interoperability approaches

Source: Bundesnetzagentur

One possibility is the use of **"bridges"**.[17] These act as automated software between different messaging services to display messages from one service in another one, for example. They act as a sort of translator between different services so that communication across providers is possible. On the technical level, bridges merely synchronise the message feeds of two different services with each other,[18] but this does allow communication

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[16] This technical definition of interoperability is sometimes known as "(*full) protocol interoperability*", see Crémer, J., Y. de Montjoye, H. Schweitzer (2019): Competition policy for the digital era, page 85; OECD (2021): Data portability, interoperability and digital platform competition, OECD Competition Committee Discussion Paper, point 25.

[17] Sometimes known as *gateways* or *bots*. See Matrix (2021): Bridges, accessible at https://matrix.org/bridges/; Telegram (2021): Bots: An introduction for developers, available at https://core.telegram.org/bots.

[18] There is therefore no interoperability in the technical sense.

between providers for users. Individual market participants have already pursued the development and use of bridges without regulation. However, the use of this kind of indirect method of creating interoperability can breach the conditions of use of the individual messaging services and providers often use technical means to prevent it.[19] Permanent interoperability between different services is thus not guaranteed by this approach.

Another way of ensuring communication across providers is the provision and use of **interfaces**[20]. Interfaces are used to specify which functions of a messaging service are available, which format data are transmitted in and who can communicate using the interfaces. If a provider makes an interface available for a service, providers of other services can use it to exchange data and communicate with each other, although this depends on the scope and design of the interface. A full standardisation of a service or of data formats is not absolutely necessary, because it is also possible to access proprietary interfaces, ie those developed by one provider. However, a requirement to have standardised interfaces would also be a possibility.

Another way of ensuring interoperability between messaging services is **(full) standardisation**[21]. This involves standardising the transmission, the individual functions and necessary interfaces, and the data formats for the exchange of information. Full standardisation leads to the development of a standardised service that can then be made available by different service providers and permit users of the different providers to communicate with each other. This is the type of approach that was taken for traditional communication services like telephony and SMS. These standardised services were developed by international standardising bodies and then implemented by the providers. Email services also have standardised formats and protocols (eg SMTP, IMAP) so they can be offered by different providers and used to communicate regardless of provider. There are also initiatives to develop open standards in the messaging sector, such as Matrix[22] and XMPP[23]. Open communication protocols are intended to enable use across providers, in a similar way as for email.

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[19] See OECD (2021): Data portability, interoperability and digital platform competition, OECD Competition Committee Discussion Paper, point 27.

[20] Often known as APIs (*application programming interface*).

[21] Strictly speaking, full standardisation is not interoperability in the technical sense, because there is one standardised service that is implemented by all providers. The narrow meaning of interoperability refers to *different* services working together.

[22] See Matrix (2021): This is Matrix, available at https://matrix.org/; see also the case study at the end of the chapter.

[23] See XMPP (2021): Extensible Messaging and Presence Protocol, available at https://xmpp.org/.

With regard to the technical implementation of messaging services, there are basically **two different types of architecture**[24]:
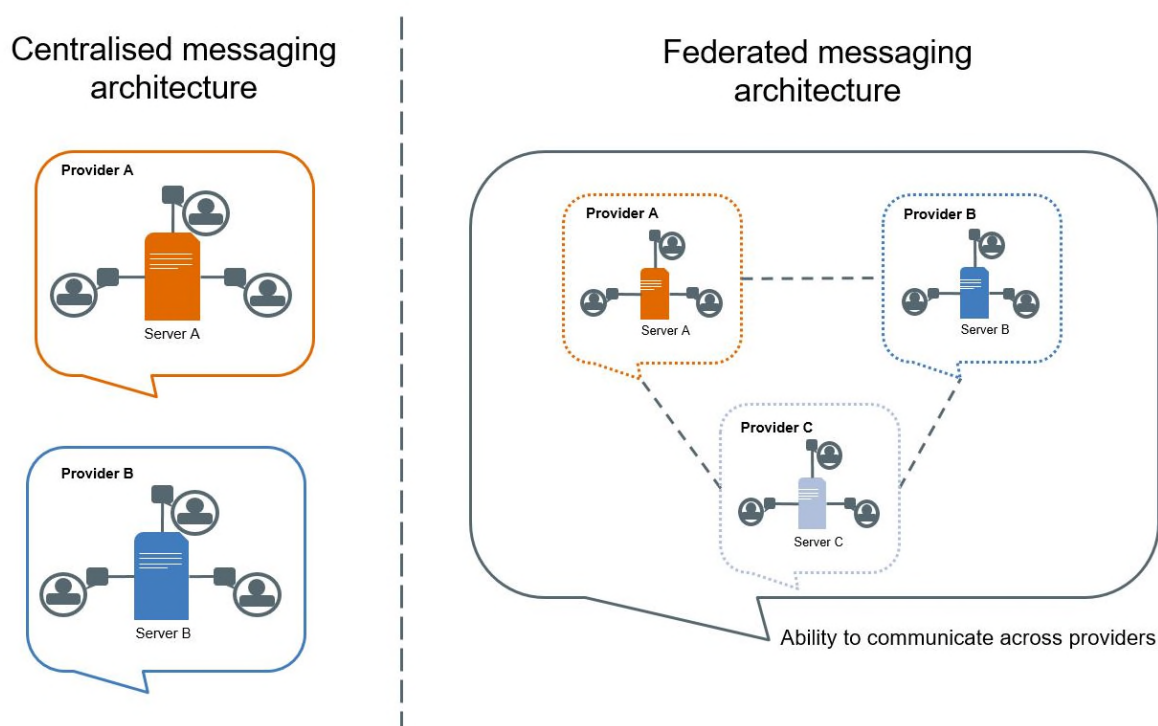

Figure 3: The different messaging architectures

Source: Bundesnetzagentur

With a **centralised messaging architecture**, communication takes place via a central server of the messaging service. The messaging service is made available using this central server and users have to use the client software (app) from the provider. They can use it to log onto the messaging service, confirm their identity to the server and then communicate with other users. The advantage of a centralised messaging service is that the same version of the service is always offered via the central server, enabling all users to use it with updated functions and any security vulnerabilities to be resolved for everyone at the same time using centralised updates. Almost all the messaging services relevant to the German market currently take this approach (WhatsApp, Signal, Telegram, etc). A characteristic feature of this type of architecture is that it does not permit communication with other providers, ie it is not designed for interoperability.

By contrast, in a **federated messaging architecture**, it is not just a central provider that operates a server for the purposes of communication. Instead, different providers can implement the messaging service on their servers and communicate with servers of other providers. Users register with the service provider of their choice. The decentralised server infrastructure aims to provide an open approach for collective networking. If interoperability obligations were introduced for messaging services, the participating providers would

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[24] A further possibility is a direct, decentralised interconnectivity of users (*P2P* approach), but this will not be discussed here since none of the market-relevant services use it.

become part of a federated messaging architecture, eg based on the exchange of data across servers via suitable interfaces.

Example of federated messaging architecture: Matrix

An example of federated messaging architecture is **Matrix**. Matrix is an open communication protocol that permits users to communicate with each other in real time regardless of which messaging service they are using. Its primary uses are internet and video telephony and messaging and it is based on an open, federated messaging architecture.

In the public sector, Matrix is already being used by the German armed forces.[25] There are also plans to use it in the healthcare sector in Germany. In October 2021, gematik GmbH announced that over 150,000 healthcare organisations, including hospitals and doctors' surgeries, are to be able to communicate using TI-Messenger, which uses the Matrix communication protocol and home server.[26] Use is planned to start in the second quarter of 2022.

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[25] See BWI (2020): Kommunikation in Covid-19-Zeiten, available at: https://www.bwi.de/news-blog/news/artikel/kommunikation-in-covid-19-zeiten-bundeswehr-setzt-instant-messaging-ein.

[26] See Matrix (2021): Germany's national healthcare system adopts Matrix!, available at https://matrix.org/blog/2021/07/21/germanys-national-healthcare-system-adopts-matrix.

3   Effects on competition, data protection and data security

Key question 1: what do users and providers think about the need for interoperability?

At the end of 2019, the Bundesnetzagentur conducted a **representative consumer survey** on the use of messaging services in Germany for the first time.[27] In light of the ongoing debate around interoperability, users were asked about their preferences on the issue, ie whether consumers see an urgent need for interoperability obligations to be implemented.

The survey showed that **consumers did not have a particularly strong desire** for **interoperability regulations to be implemented** in the messaging sector. A main reason for this was that it is generally uncomplicated and often free of charge to use multiple services in parallel (multihoming).[28] There is therefore great potential to increase the ability of users to reach each other without introducing interoperability obligations. As the proportions of people using multihoming show, this possibility is actually put into practice to a large extent (see figure 4). The survey showed that 73% of messaging users have at least two different services, that is to say, almost three quarters of those surveyed practice multihoming. There is a clear correlation between age and multihoming. Among the under-40s, 87% of messaging users make use of at least two different services. This tendency is not so marked among over-40s, with 35% of users in this age group using only one messaging service.
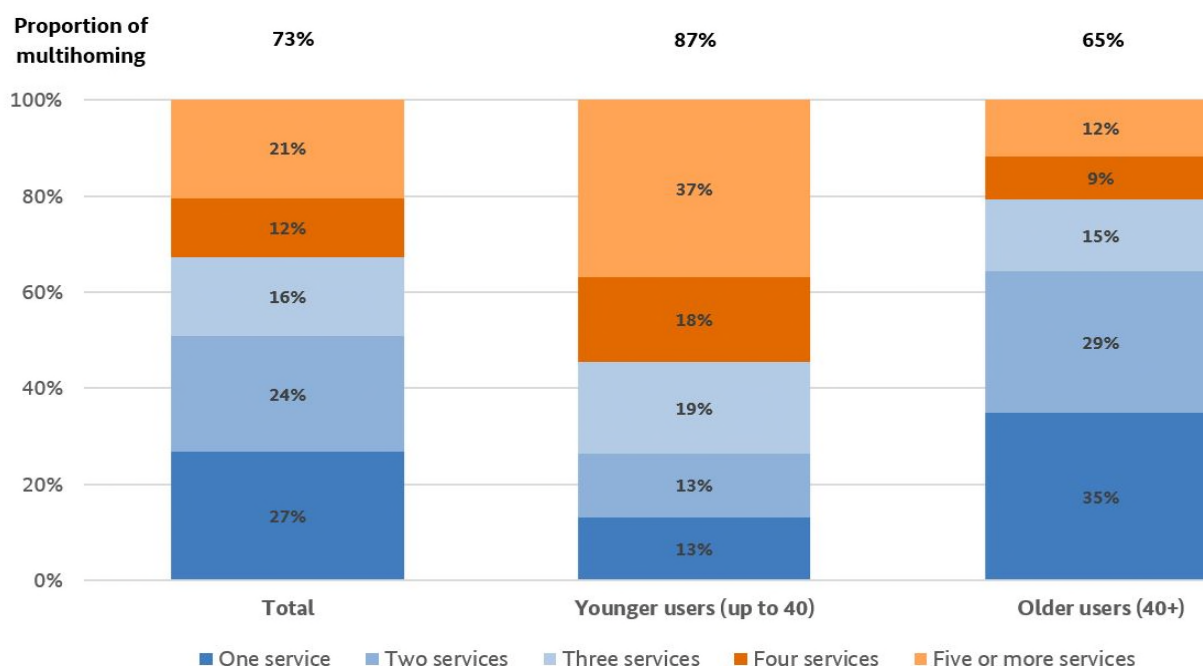

Figure 4: Multihoming with messaging services

Source: Bundesnetzagentur (forthcoming). Base: users of messaging services, n = 1,906, of which n = 659 in the younger age group and n = 1,247 in the older age group

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[27] See Bundesnetzagentur (2020): Nutzung von OTT-Kommunikationsdiensten in Deutschland – Bericht 2020.

[28] Although setting up messaging services for the first time can require some time investment (creating an account, possibly finding contacts, etc); see Competition and Markets Authority (2020): Online platforms and digital advertising: Market study final report, page 136.

A **study** conducted by **VZBV (Federation of German Consumer Organisations)** also showed that from the **point of view of users, there was no clear interest** in interoperability between messaging services.[29] The users surveyed did consider control over their data to be very important, however, with 58% of them stating that they did not want their data to be passed on to another service provider in the event of interoperability. A third of those surveyed could imagine changing their main messaging service if interoperability were implemented. However, it was striking that comparatively few WhatsApp users said that they would stop using the market leader. According to the results of the survey, the introduction of an interoperability obligation would reduce WhatsApp's market share by only 16 percentage points. Going by the competitive standards of traditional markets, WhatsApp would still have a dominant market share of 68%.

A **study by the WIK (Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste)** has shown that consumers **do not see a need for mandatory interoperability** of messaging services.[30] Rather, they deliberately make use of multiple services to communicate with different social groups within their own personal networks separately.

With this in mind, in the **current round of the Bundesnetzagentur consumer survey**[31] on online communication service use, users were asked again about their preferences regarding the introduction of interoperability between messaging services (see figure 5).

[29] See VZBV (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes. Representative survey of 2,203 internet users in Germany.

[30] See WIK (2018): Die Bedeutung von Interoperabilität in der digitalen Welt – Neue Herausforderungen in der interpersonellen Kommunikation, WIK discussion paper no 437, and Arnold et al. (2020): Interoperability of interpersonal communication services – A consumer perspective, Telecommunications Policy 44.

[31] See Bundesnetzagentur (forthcoming): Nutzung von Online-Kommunikationsdiensten in Deutschland.
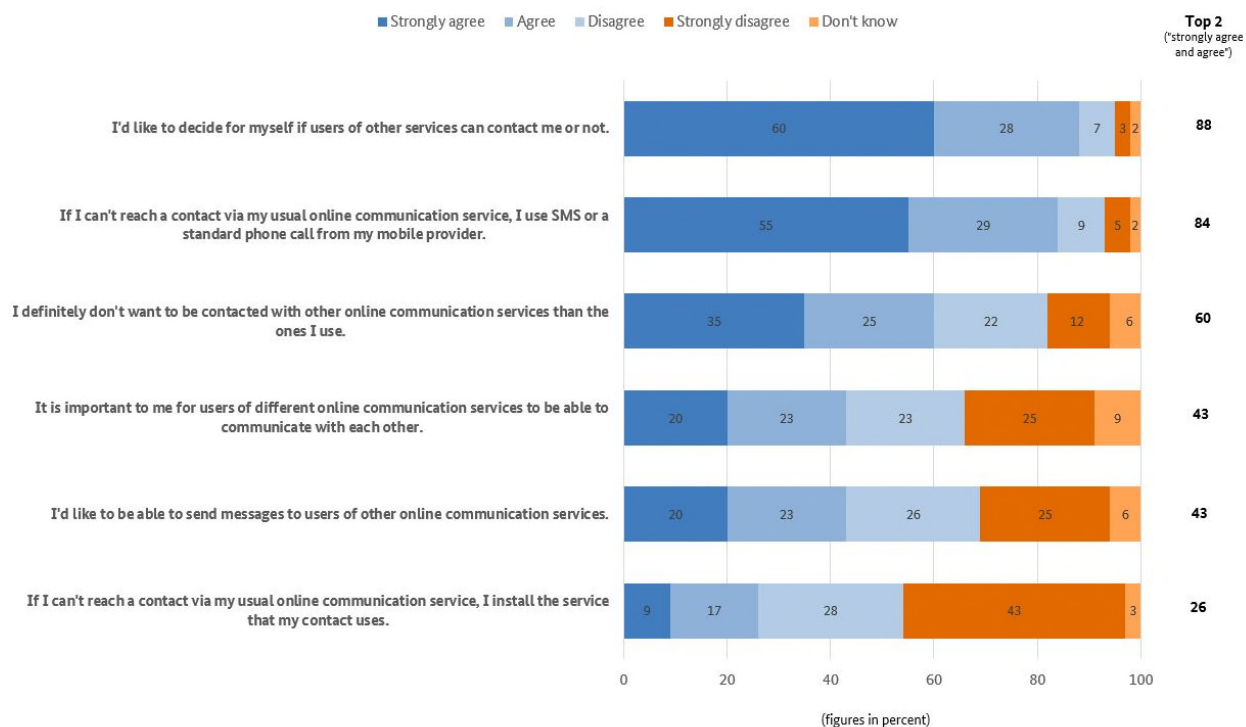
Figure 5: Views on interoperability

Source: Bundesnetzagentur (forthcoming). Base: users of messaging services, n = 1,906

The new survey confirmed that users of messaging services in Germany **do not have a clear preference for or against the creation of possibilities for communicating across services**. Of the messaging users surveyed, 43% agreed or strongly agreed that it is important for users of different services to be able to communicate with each other, while 48% disagreed or disagreed strongly with this statement. At the same time, 51% did not think being able to send messages to users of other messaging services is necessary.

There was a clear preference about being contacted by users of other services: 60% definitely do not want this. In this context, it should be noted that use of WhatsApp is already very high (93%), so with it and other Meta services, there exists de facto an almost complete connectivity in the market. The great majority of messaging service users can already reach each other via WhatsApp, at least at the fallback level.[32]

In addition, almost all those surveyed (88%) want to decide for themselves whether users of other messaging services are allowed to reach them. A total of 26% stated that they would essentially be prepared to install another messaging service to contact a specific user. If a contact is not reachable via the messaging service(s) that the user has, the traditional, interoperable telecommunications services are used as further fallback options, according to 84% of users surveyed.

Finally, to turn to the views of the **messaging service providers** themselves: there has not so far been any initiative from the market to create comprehensive interoperability such as that of the traditional telecoms

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[32] This enables communication even if a particular contact is not reachable directly using a particular messaging service.

world, or any such initiatives have not been successful. Only Meta (previously Facebook) has been planning to make its own services interoperable among themselves for some time,[33] ie it wants to permit communication between WhatsApp, Facebook Messenger, Instagram and other apps.[34]

There are no known calls for interoperability from smaller competitors, which may initially seem strange, because introducing interoperability is intended to help reduce the market power of dominant providers. However, providers such as Signal and Threema take a critical view of interoperability and cast doubt on whether it is a suitable means of combating market dominance.[35] At the same time, it should also be noted that these providers have already chosen a centralised messaging architecture for their services. As explained in section 2, there are **initiatives to develop open standards**, such as Matrix[36] and XMPP[37], using a federated and interoperable approach for messaging services. Open communication protocols are intended to enable a federated and interoperable messaging architecture, similar to the one used by email. However, such open, standardised approaches have not become broadly established so far.

In a **sector inquiry on consumer rights,** the **Bundeskartellamt** surveyed providers of messaging services on the issue of interoperability.[38] It specifically asked companies for their opinion on whether interoperability obligations would make it easier to switch to messaging services with a greater focus on data protection and thereby improve data protection quality. The companies surveyed did not outright reject interoperability, with half of them being open to voluntary interoperability projects, but less than half stated that they would participate in them.

However, the majority of respondents expected an interoperability obligation to have negative effects, particularly on innovation, data security and data protection, although some of them did think these problems could be overcome. These providers thought that data protection and security difficulties could be resolved at the technical level. The majority of companies surveyed did not expect mandatory interoperability to lead to a higher level of data protection.

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[33] See New York Times (2019): Zuckerberg Plans to Integrate WhatsApp, Instagram and Facebook Messenger, available at https://www.ny-times.com/2019/01/25/technology/facebook-instagram-whatsapp-messenger.html.

[34] See Mosseri (2020): Say hello to Messenger: Introducing New Messaging Features for Instagram, available at https://about.fb.com/-news/2020/09/new-messaging-features-for-instagram/.

[35] See Fanta, Rudl (2019): EU-Staaten könnten Messenger zur Öffnung zwingen, available at https://netzpolitik.org/2019/nie-mehr-whatsapp-eu-staaten-koennten-messenger-zur-oeffnung-zwingen/ and Piétron (2019): Digitale Souveränität durch Interoperabilität, WISO Direkt, 24/2019. *"Messaging services with a focus on data protection, such as Threema, have also expressed criticism as they are concerned that interoperability would bring down their high data protection standards. Threema pointed out that it would only be able to guarantee data minimisation and encryption within its own network and not for data flows to other platforms. Yet data protection has to be focused on "the weakest link in the chain", from which all content in the decentralised network can be accessed. Moreover, it would no longer be possible to guarantee anonymity if other messaging services had to identify individual Threema users, for example in order to send messages to them."*

[36] See Matrix (2021): This is Matrix, available at https://matrix.org/.

[37] See XMPP (2021): Extensible Messaging and Presence Protocol (XMPP), available at https://xmpp.org/.

[38] See Bundeskartellamt (2021): Sektoruntersuchung Messenger- und Video-Dienste, interim report "Branchenüberblick und Stimmungs-bild Interoperabilität".

Few providers were in favour of a general legal obligation for interoperability for all messaging services. Of the 44 companies that took part in the survey, only three operators of free messenger clients supported this kind of obligation. Less than a fifth of respondents could imagine a legal obligation that would apply only to the biggest providers. Services most frequently mentioned that should be subject to such an obligation were (in alphabetical order) Facebook Messenger, Signal, Telegram, Threema, WhatsApp and Zoom.[39]

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[39] See Bundeskartellamt (2021): Sektoruntersuchung Messenger- und Video-Dienste, interim report "Branchenüberblick und Stimmungs-bild Interoperabilität", page 27.

Key question 2: how does interoperability affect competition between messaging services?

Interoperability obligations are basically remedial measures and, as such, a means to an end, not an end in themselves. It must therefore first be analysed whether the market has failed in the messaging sector, and if so howthis would justify interoperability obligations. The main factor raised in this context is a lack of competition caused by network effects that lead to a high level of concentration among a few messaging services (see section 1).

Interoperability obligations are intended to **mitigate network effects** and help to strengthen competition between individual services.[40] Rather than competition for the greatest number of users ("*winner-take-all*" effect), there could be more competition for quality, for example in user friendliness, innovative functions or data protection and data security. Interoperability could increase consumer choice in services overall (reduction of lock-in effects).[41]

A precise estimation of the **effects** of interoperability obligations on actual competition in the messaging sector is **complex** and depends on various factors. Generally, interoperability can help to avoid foreclosure tendencies in markets by facilitating market access for potential competitors.[42] It can promote competition between service providers such as that which arose, for example, in the course of the liberalisation of the telecommunications markets, when interoperability requirements broke up former state telecoms monopolies. This enabled competitors to offer their own voice telephony services that also permitted communication with customers of the former monopolists.

In contrast to those traditional telecommunications services, however, in practice users of messaging services use multiple services in parallel (**multihoming**). The great majority of all users in Germany already do this (see key question 1). The obstacles to having multiple services are low, as they are often offered free of charge and the only requirement is to download the relevant app before use. Popular operating systems like Android and iOS make multihoming easier by integrating different messaging services in their phone contact lists or in a notification centre.[43] In addition, traditional communication services such as voice calls and text messaging can be used as fallback options if a particular contact is not reachable using a particular messaging service. As a result, users have only a weak preference for interoperable messaging services, which may mean that interoperability is of minor importance as a distinguishing characteristic in the competition between messaging services.

Furthermore, there are **technical differences** between the different **messaging services** and their functions. The services allow such functions as calls, video calls, voice and text messages and sending files and images, largely based on proprietary, non-standardised network protocols and coding methods.

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[40] See Crémer, J., Y. de Montjoye, H. Schweitzer (2019): Competition policy for the digital era, page 59.

[41] See VZBV (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes, page 16.

[42] See Crémer, J., Y. de Montjoye, H. Schweitzer (2019): Competition policy for the digital era, page 37; Competition and Markets Authority (2020): Online platforms and digital advertising: Market study final report, page 140.

[43] This refers to the collection and display of all incoming notifications from different app on mobile devices.

The implementation of interoperability obligations may therefore be technically demanding, depending on their specific design (see section 2). As the level of intervention increases, it is often only possible to implement **dynamic adjustments and innovations** (such as expanding the range of functions, changing encryption and communications protocols, or coding methods to improve the service quality) in a federated system with multiple service providers to a limited extent or with a delay, because all market participants have to be informed of such changes in advance.[44] Otherwise, providers or users that have not yet installed the latest version of the service will not be able to communicate with users of other providers until they do so.

Traditional communication services such as email and SMS are examples of standardised services in which it has so far not been possible in practice to expand the range of functions to a significant extent or to implement secure end-to-end encryption across the board. That is why users turned instead to completely new means of communication, in particular messaging services, which do nowadays often offer end-to-end encryption.

It can therefore be seen that an increasing depth of technical implementation of interoperability (eg due to increased standardisation) may restrict options for expanding the scope of functions and innovation.[45] To reduce the possible **clash between competition aspects** (encouraging alternative service providers) and **openness to innovation**, a **differentiated interoperability approach**[46] could come into consideration.

· **Asymmetric interoperability:** in this case, any interoperability measures would only be directed at dominant messaging service providers and they would be the only ones required to open interfaces to their services. Alternative providers would have the choice of using these interfaces. It would not be necessary to fully standardise the service because the existing, proprietary standards of the dominant provider could be accessed.

· **Focus on core functions:** rather than making all functions of messaging services interoperable, any obligations could initially focus on long-established core functions such as text-based messaging between users.

However, with this kind of **differentiated interoperability approach**, it is hard to predict the extent to which alternative providers and users would actually make use of the new communication possibilities. For example, if certain additional functions were not available from an alternative provider, users would still have a strong incentive to use the service of the dominant provider (as well).

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[44] See Moxie Marlinspike (2016): Reflections: The ecosystem is moving, available at https://signal.org/blog/the-ecosystem-is-moving/.

[45] Crémer, J., Y. de Montjoye, H. Schweitzer (2019): Competition policy for the digital era, page 59; Bundeskartellamt (2021): Sektoruntersuchung Messenger- und Video-Dienste, interim report Branchenüberblick und Stimmungsbild Interoperabilität, page 45.

[46] See: Data Ethics Commission of the federal government (2019): Gutachten der Datenethikkommission der Bundesregierung, page 137; Competition and Markets Authority (2020): Online platforms and digital advertising: Market study final report, Appendix W: assessment of pro-competition interventions in social media, point 74; VZBV (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes, page 30.

In general, it should be remembered that users may display **inertia** when faced with a possible change.[47] They may, for example, be reluctant to have to get used to a new user interface of an alternative messaging service, meaning that even if there is interoperability between services, a large number of users may stick with the dominant provider alone (see key question 1). This may make it more difficult for competing offers to become established on a large scale.[48]

On the other hand, smaller service providers could also deliberately decide not to introduce an interoperable design since they would then have no way of distinguishing themselves from dominant providers. A **product differentiation**, with regard to data protection or encryption methods used, for example, would no longer be possible.
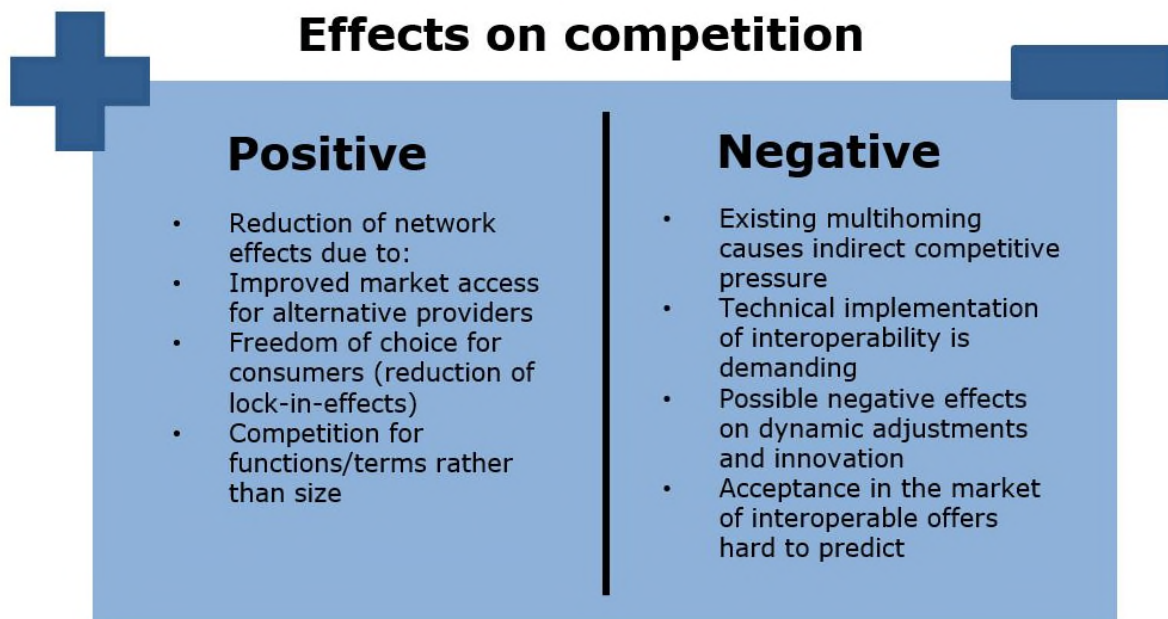
Effects on competition

Positive

- Reduction of network effects due to:
- Improved market access for alternative providers
- Freedom of choice for consumers (reduction of lock-in-effects)
- Competition for functions/terms rather than size

Negative

- Existing multihoming causes indirect competitive pressure
- Technical implementation of interoperability is demanding
- Possible negative effects on dynamic adjustments and innovation
- Acceptance in the market of interoperable offers hard to predict

Figure 6: Effects of interoperability on competition between messaging services

Source: Bundesnetzagentur

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[47] See Bundeskartellamt (2021): Sektoruntersuchung Messenger- und Video-Dienste, interim report "Branchenüberblick und Stimmungsbild Interoperabilität", page 48.

[48] See VZBV (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes, page 23.

Key question 3: are data protection and data security compatible with interoperability?

Creating interoperability among messaging services could also directly **affect** the level of **data protection** and **data security of individual services**, because communication data would have to be exchanged among several providers and processed by them.

- With regard to **data protection**, there must be a legal assessment of the conditions under which personal data are collected, processed and otherwise used. As well as the content of the communication, this also applies to metadata, ie data on communication processes such as the addresses of senders or recipients and the frequency and length of the communication.[49]

- **Data security** focuses on the general protection of data from manipulation, loss or unauthorised access by third parties. Of particular relevance here is messaging services' ability to encrypt the content of communications.

If messaging services were to be made interoperable, the individual providers would technically become **part of a federated network**, in which they would exchange data among themselves (section 2). In this kind of decentralised network structure, all the participants involved in communication would essentially have access to the relevant communication data, because **the mutual exchange of data** is a prerequisite for **interoperability**. Users would be directly affected, as they would not only have to "trust" their own messaging provider in its data processing but, indirectly, all other providers involved as well. The way that interoperable services function is thus quite different from that of centralised services, including from the user perspective.

Ensuring the highest possible **data protection and security standards in interoperable systems** is, therefore, a **complex issue**. In the event that providers with different data protection standards (regarding, for example, the collection, storage and use of metadata) were to allow communication across providers, the level of data protection in the market as a whole could be reduced, as summarised below. Certainly, users would still be able to choose a provider with a focus on data protection, such as one that largely did not save metadata. Yet in a federated system it could not be guaranteed that other participants involved in the communication would do the same, also doing without the storage and processing of metadata. Ultimately, such a system would remove the possible processing of data by third parties from the direct control of users' own providers and users themselves.

By the very nature of a federated network as opposed to a centralised messaging service, when different providers communicate there are data that can be collected at different points. Critics point to the risk of interoperability requirements giving dominant providers, in particular, access to data that they would not otherwise have, which could allow them to strengthen their dominant position even further.[50] In addition, when it is possible for communication across providers to take place, there may be a **conflict** with the goals of the data protection principle of **data minimisation** if not all providers in an interoperable communication network uphold the same standards.

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[49] For an in-depth discussion of metadata, see the Federal Office for Information Security (BSI) (2021): Moderne Messenger – heute verschlüsselt, morgen interoperabel? page 12.

[50] See Piétron, D. (2019): Digital Souveränität durch Interoperabilität: Zur Möglichkeit dezentraler sozialer Netzwerke in der Plattformökonomie, in Wiso Direkt 24/2019, Friedrich-Ebert-Stiftung; Landesanstalt für Medien NRW (2021): Datenportabilität und Interoperabilität – Die eine Welt der Daten und Dienste? tbd – der Debattenmonitor der Landesanstalt für Medien NRW, edition 1, page 9.

Before an interoperability obligation were introduced for messaging services, it would have to be clarified at a global level which **standard user identification features** were to apply between providers, as these currently vary from provider to provider. In some cases telephone numbers are used, in others email addresses or self-generated user IDs. It would have to be ensured that unauthorised parties had no access to such (personal) data. However, if such known identification features like phone numbers and email addresses were not used for data protection reasons,[51] it could be difficult to automatically find contacts. Moreover, determining standard identification features centrally could conflict with users' desire for anonymity (deliberate decision not to be contactable via certain services, use of pseudonyms, etc).

If interoperability were to be implemented not using standards but by providing interfaces, as explained in section 2, there would have to be agreements among all providers to ensure that the interfaces were supported and implemented by all sides. Responsibility for **access control** to the **interfaces provided** would also have to be decided on in advance to avoid misuse (spam, unauthorised collection of personal data, etc).[52]

Encryption methods would need to be standardised and complied with by all parties as well.[53] It should be noted that a consensus on a minimum standard could mean reducing the level of security for users. In general, implementing encryption is demanding and may be too slow for dynamic adjustments, especially in a federated system (eg in the event of vulnerabilities that need to be resolved quickly).[54] From a technical perspective, it also needs to be clarified how and by whom **user identification and authentication** can be guaranteed ie whether communication is actually taking place with the desired contact.

The issues in data protection and data security described could be resolved using **standardisation** and **regulation**. For example, the idea of the *Messaging Layer Security (MLS) protocol*, which is currently under development, is to enable secure, end-to-end encryption for the necessary exchange of data between different messaging services.[55] Comprehensive standardisation could also theoretically make services follow the principles of *privacy by design and default*[56] ie minimising data where possible and refraining from storing metadata, as certain providers with a focus on data protection are already doing.[57] This could lead to a much higher level of data protection among dominant providers than is currently the case, assuming that all providers followed the relevant rules or that such rules could be consistently enforced.

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[51] See Federal Commissioner for Data Protection and Freedom of Information (2021): Leitfragen zur Beurteilung von Messenger-Angeboten,available at https://www.bfdi.bund.de/DE/Fachthemen/Inhalte/Telefon-Internet/Datenschutzpraxis/Beurteilung_Angebote_Messenger.html.

[52] See Riley, C. (2020): Unpacking interoperability in competition, Journal of Cyber Policy, Vol. 5:1, page 99.

[53] For more details see BSI (2021): Moderne Messenger – heute verschlüsselt, morgen interoperabel?.

[54] See also the assessment of the messaging service providers surveyed by the Bundeskartellamt: Bundeskartellamt (2021): Sektoruntersuchung Messenger- und Video-Dienste, interim report "Branchenüberblick und Stimmungsbild Interoperabilität", page 64.

[55] See BSI (2021): Moderne Messenger – heute verschlüsselt, morgen interoperabel? page 9; for interoperability between different messaging services, the interoperable design of further functions must additionally be determined to permit interoperable communication.

[56] See Article 25 of Regulation (EU) 2016/679.

[57] See VZBV (2021): Interoperabilität bei Messengerdiensten, Diskussionspapier des Verbraucherzentrale Bundesverbandes, page 27.

However, comprehensive standardisation or regulatory requirements could also cause unique selling points of individual providers (in the collection and processing of data or the development of innovative functions, for example) to be lost. In addition, a possible impact on dynamic adjustments and innovation would have to be taken into consideration, depending on the type and scope of the standardisation. Improvements in encryption methods, for example, might only be able to be implemented with a delay.

4 Legal framework

For the legal implementation of interoperability obligations, section 21(2) of the new **Telecommunications Act (TKG)**[58] grants the Bundesnetzagentur the power to require providers of number-independent interpersonal telecommunications services (including messaging services) to make their services interoperable **in the event that end-to-end connectivity between end-users is endangered**[59]. Germany has here transposed into national law binding provisions of the European Electronic Communications Code (EECC), **which puts very high constraints on the imposition of interoperability obligations.** It is assumed that end-to-end connectivity is currently ensured by end-users using number-based interpersonal telecommunications services – that is to say, traditional telecoms services.[60] However, future technological developments and user behaviour could lead to insufficient interoperability between interpersonal telecommunications services. The European legislation assumes that significant barriers to market entry and obstacles to further onward innovation could emerge and appreciably threaten effective end-to-end connectivity between end-users.[61]

Against this background, a complex regulatory framework for the imposition of interoperability obligations on providers of number-independent interpersonal telecommunications services has been set out in law. Its decisive prerequisite is an appreciable threat to end-to-end connectivity between end-users throughout the European Union or in at least three Member States. **Procedurally, the powers of the national regulatory authorities are dependent on a decision of the European Commission as to the necessity of regulatory intervention by the NRAs.** That means that only following a decision by the European Commission does the national regulatory authority have the authority to assess whether, and to what extent, it is necessary and justified to impose interoperability obligations on the providers of number-independent interpersonal communications services. What is more, interoperability obligations can only be imposed on **providers of number-independent telecommunications services that have a significant level of coverage and user uptake.**

The legal requirements for the imposition of interoperability obligations for providers of number-independent interpersonal telecommunications services may be summarised as follows:

- end-to-end connectivity between end-users is endangered due to a lack of interoperability between interpersonal telecommunications services,

- the obligations are necessary to ensure end-to-end connectivity between end-users,

- the number-independent interpersonal telecommunications services have a significant level of coverage and user uptake,

- the European Commission, after consulting BEREC, has found an appreciable threat to end-to-end connectivity between end-users throughout the Union or in at least three Member States and has adopted implementing measures as referred to in point (ii) of the second subparagraph of section 61(2) EECC.

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[58] Transposition of Article 61(2) first subparagraph point (c) of Directive (EU) 2018/1972.

[59] Where end-to-end connectivity between end-users is endangered due to a lack of interoperability between interpersonal telecommunications services.

[60] See Directive (EU) 2018/1972 – recital 149.

[61] See Directive (EU) 2018/1972 – recital 149.

The imposition of interoperability obligations for providers of number-independent interpersonal telecommunications services will therefore depend on whether future technological developments or increased use of such services lead to insufficient interoperability between interpersonal communication services to the extent that end-to-end connectivity between end-users is generally threatened.

General competition law, in the form of the German Act against Restraints of Competition (**GWB**), also contains provisions on interoperability. As set out in section 19a GWB, the Bundeskartellamt can use a two-stage process to prohibit anti-competitive practices by undertakings of paramount significance for competition across markets. This includes the ability to ban undertakings from making the interoperability of products or services more difficult and in this way impeding competition (section 19a(2) para 5 GWB). In view of the special provisions in the TKG regarding the imposition of interoperability obligations on providers of number-independent interpersonal telecommunications services, the question arises as to what extent there is the possibility for the general provisions of the GWB to be applied.

Finally, it is also intended for the **Digital Markets Act (DMA)**, which is currently being negotiated at the European level, to include interoperability provisions. The aim of the proposed Regulation is to introduce EU-wide, harmonised rules to create fairer and more open digital markets for all. Under Article 6f DMA, gatekeepers (large, systemic online platforms) will be required to allow business users and providers of ancillary services access to and interoperability with the same operating system, hardware or software features that are available or used in the provision by the gatekeeper of any [own] ancillary services. Interoperability is thus currently only envisaged for ancillary services of platforms (such as payment services) and not for core platform services (as such major messaging services).

5 Implementation and challenges

In addition to the complex legal requirements for any imposition of interoperability obligations for messaging services under the TKG described in the previous section, there are also the challenges already mentioned that interoperability measures would face in practice. In summary, the **major challenges** or **potential conflicting goals** are:

- from **a competition perspective**, interoperability measures could theoretically drive up competition for services and help to establish alternative providers. However, since they would also require consensus on the functioning of messaging services (standardisation of functions, opening of interfaces), possible negative effects on innovation (eg dynamic adjustments) would have to be taken into account.[62]

- in **data protection** and **data security**, there may be a conflict between the openness of a federated communication network with as many providers as possible and the guarantee of maximum protection of (personal) data, because interoperability inherently involves the exchange and processing of data by many parties.

Before any interoperability obligations are imposed, it must first be assessed whether **the market in the messaging sector has failed** and whether such obligations are in principle suitable remedies. In other words, the type of problem that exists must be clearly proven. As far as interoperability as a possible solution is concerned, it has been shown that the competition and data protection issues in the messaging sector are complex. Before any specific measures are decided, therefore, the potentially conflicting goals and the legal requirements have to be given appropriate consideration to achieve an overall benefit.

Such conflicts might be mitigated by **a differentiated approach to interoperability measures**, such as only focussing on core functions or asymmetric obligations directed only at dominant providers. In any case, it is essential for **regulators to be closely involved**[63] in the whole process, particularly as regards the **determination** and **monitoring** of the following points:

- the decision on the **addressees** of any interoperability obligations and the **functions** that have to be **interoperable**,

- the technical definition of relevant **interfaces** and **standards** to be used (eg communications protocols),

- **data protection** and **data security** rules (handling of communication data, user identification, rules on encryption methods, etc),

- **access control** rules to prevent misuse, and

- any additional **rules on dynamic adjustments** (technical updates, any new functions, dealing with IT security incidents, etc) and, where necessary, on **dispute resolution** between individual providers.

Overall, it is clear that establishing interoperability between different messaging services to enable communication between different providers is **far more complex** than interoperability between **traditional telecom-**

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[62] See Competition and Markets Authority (2020): Online platforms and digital advertising, market study final report, page 370.

[63] See Crémer, J., Y. de Montjoye, H. Schweitzer (2019): Competition policy for the digital era, page 126.

munications services such as telephony and SMS, which have already been fully standardised, and may therefore be expected to involve a great deal more regulatory effort. What is more, messaging services are internet-based services and, as such, offered worldwide, so any measures to introduce interoperability must ideally be **coordinated internationally.**

List of figures

Publisher's details