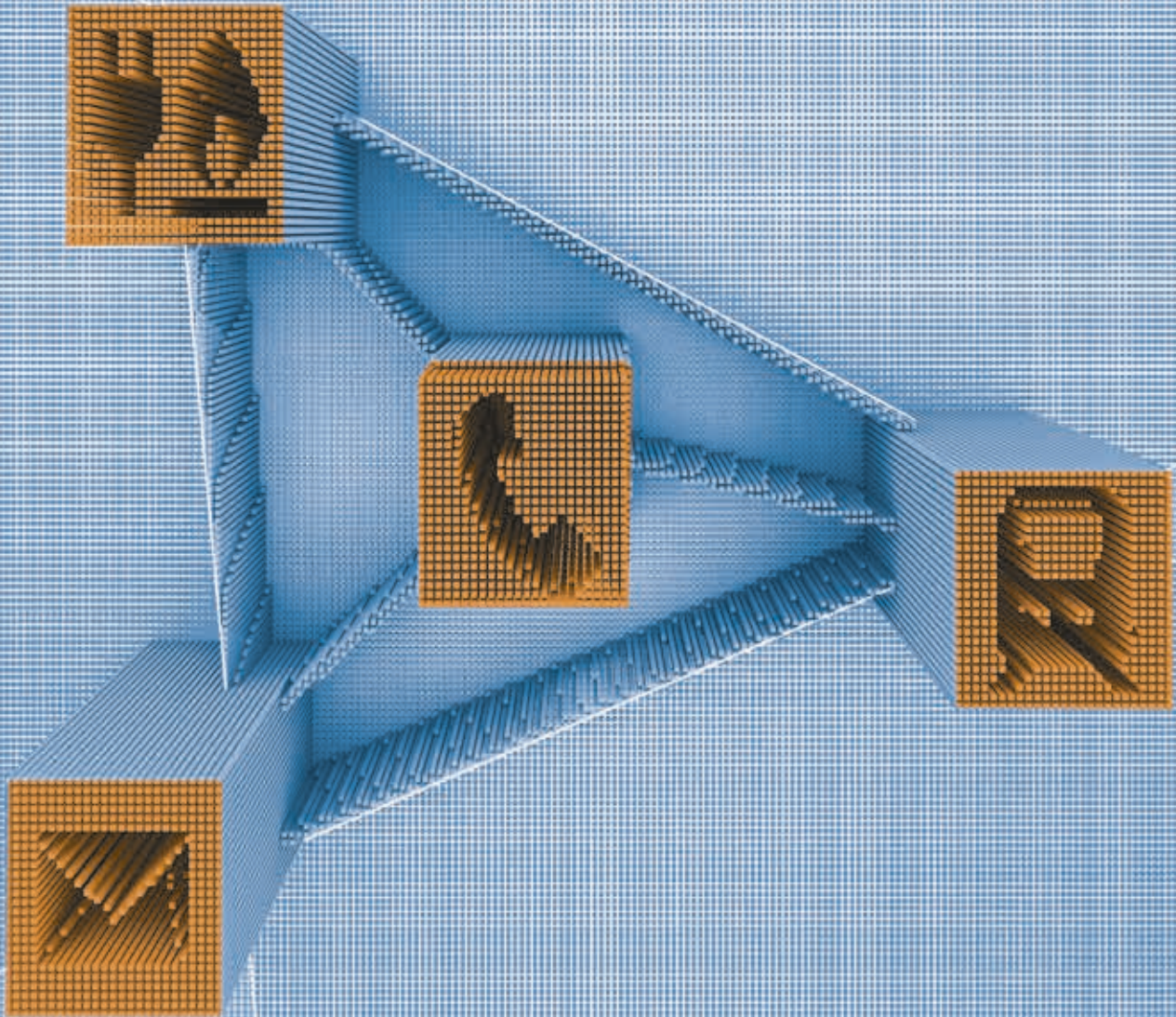




Bundesnetzagentur

Digital transformation in the network sectors

Recent developments and regulatory challenges



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Summary

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**Bundesnetzagentur for Electricity, Gas,
Telecommunications, Post and Railway**

Task Force Digitisation/Interconnectivity and Internet Platforms

Tulpenfeld 4

53113 Bonn

Germany

email: dv-ipf-postfach@bnetza.de

1 Background

Industry, society, the administration and politics are all affected by the **digital transformation**. Products and services, operations and processes, corporate strategies and structures are currently being adapted or redesigned. The various possibilities to acquire, store and analyse data are at the heart of this development. The progress within this area has been the basic requirement for achieving efficiency gains as well as implementing innovative services and products.

The key to digital transformation is no longer simply the **digital control of machines and operational processes** – this has already been possible for several decades. Today, the main goal is to completely rethink and implement process and value chains with regard to their focus on the customer by a smart interconnectivity concept. Digital transformation facilitates the advanced automation and autonomy of processes; enables the customisation of services and products; and makes business models more fragmented and flexible along the entire value chain. As a result of the digital transformation, markets are facing an increasing **complexity**, a **rapid pace of innovation** and **dynamism** to an extent that has never been known so far. The specific characteristics of the digital transformation are permanently decreasing product life cycles and low market entry barriers and as a consequence of that a multitude of new market players emerge. Further characteristics are the blurring of previous market boundaries, and the increasing importance of **data-based (platform) business models**.

The changes described above not only bring enormous **opportunities** to companies and consumers but also new **challenges**. In this regard, questions arising with respect to data and consumer protection, as well as the dominant role of individual market players are already being discussed in public debate.

Against the background of these diverse and complex developments, the processes of digital transformation in the **network sectors regulated** by the Bundesnetzagentur (Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway) will be systematically presented and analysed. This paper presents the latest developments in the network sectors. In addition it sets out the relevant issues with two main objectives: First of all to deduce the **need for sector-specific regulatory action** and aside of that to point out the **cross-sectoral issues** that are increasingly gaining in importance.

2 Developments in the network sectors

The digital transformation is leading to **structural changes** in regulated network sectors. These changes are considerably influenced by the sector-specific regulatory framework. Analogue to other economic areas it can be seen that **data-based applications**, which offer a range of possibilities for exploiting efficiency potentials within companies, are being developed and implemented in all network sectors. Moreover a multitude of data and platform-based business models, products and services is currently arising (e.g. Over-The-Top (OTT) services, cloud services, hybrid mail, crowd logistics and smart home applications).

- Well-developed, comprehensive telecommunications infrastructures are a basic requirement for the process of digital transformation and interconnectivity. The **telecommunications sector** remains the main enabler for achieving a smart interconnectivity of our economy as well as our society. At the same time this sector is also subject to fundamental changes. The overall spread of the internet has not only led to a convergence of telecommunication networks (one transmission network for all services), but has also created new market players that deliver applications and even communication services exclusively via the open internet. Consequently, these OTT services often find themselves in competition with traditional telecommunication service providers.
- In the **postal sector**, on the one hand certain products and services, such as the standard letter, are gradually being replaced by electronic substitutes. On the other hand the boom in e-commerce, which is predominantly driven by online platforms, is leading to significant growth in those sections of the market that are not subject to licensing; these include the courier, express and parcel markets. In this respect, the growing digital transformation of the value chain in the postal sector offers various opportunities to optimise processes, to leverage potential cost-savings or to develop completely new business models, such as in postal delivery.
- In the **energy sector**, the digital transformation and smart networks are also playing an increasingly important role. For the regulated part of the energy sector, it can be presumed that the emphasis will be placed on enhancing processes and maintaining or rather improving the security of supply. Already today, 1.5 million photovoltaic installations and more than 25,000 volatile electricity-generating wind farms have to be integrated into the electricity grid. This is only possible by using digital control and operating equipment. Beyond that, digital equipment also allows more efficient operations in terms of a greater utilisation of the existing networks. In the competitively organised levels of the value chain, the digital transformation offers enormous potential for energy-related business models, for example in direct marketing, weather and renewable energy output forecasts, energy efficiency or energy storage.
- In the **railway sector** the digital transformation creates numerous opportunities to optimise value-added processes and competitiveness. Intelligent applications could be deployed at the infrastructure, the operational and the consumer levels. For example, multimodal mobility services enable the smart connection of different modes of transport for the passenger. At the same time, predictive maintenance concepts, as well as freight logistics concepts focusing on interconnection between different market players, are gaining in importance. Modern sensor and signal technology is able to increase the reliability and capacity of the existing network.

3 Recommended actions

Sector-specific need for regulatory adaptation

In the digital age, **physical network infrastructures** still provide the basis for the development and provision of innovative products and services in every sector. The enforcement of **regulatory objectives** therefore still remains crucial. This includes the provision of **reliably available high-speed network infrastructures** and **consumer protection**, as well as ensuring **fair competition**. However, the dynamic changes in the network sectors may create a need for regulatory adaptation. It can already be seen today that:

- In the **telecommunications sector** creating the conditions for fair competition between traditional and new telecommunications services is a key aspect. In order to promote the regulatory support for the further market-driven expansion of high-speed telecommunications infrastructure, flexibility in price regulation and the provision of resources remain important.
- In the **postal sector** the digital transformation requires a more intensive market monitoring. In particular, there is a need to observe and analyse the individual market behaviour of new players. As a consequence this creates new challenges in defining the markets. Digital changes that have an effect on costs should be taken more into account in the procedure for determining postal charges. A functioning and viable universal service regime should be adapted to meet the changes in the technical and social framework conditions.
- In the **energy sector** the unbundling requirements are crucial and still remain important in the digital age. The digital transformation calls for a re-thinking of a technology-neutral regulation that rewards efficient solutions. A future task of energy regulation will be to set incentives for cooperation models between network operators. Due to the fact that the digital transformation requires considerable investment in IT infrastructure it is very likely that smaller network operators will not be able to overcome this challenge on their own.
- The digital transformation is opening up new opportunities for the **railway sector** to strengthen its intermodal competitive position. In addition, the digital transformation may encourage intramodal competition. In this respect, however, it is vital that all market players have equal access to the widespread potential of the digital transformation.

Cross-sector challenges

Beyond that, **new common regulatory issues** arise in all regulated network sectors. The main focus lies primarily on the spread of **data-driven business models**. Access to the customer interface, and consequently sovereignty over data, will increasingly become a **significant competitive factor**. Companies must be prevented from having an information advantage as a result of an exclusive access to data from physical network infrastructures. It further has to be discussed how the potential **economic value of data** in network sectors can be made available for exploitation by means of an **appropriate regulatory framework**.

In the network sectors a trend towards the establishment of new **cross-sectoral business models** can be observed. It could well be that, because of the new opportunities provided by the digital transformation and smart networks; there will be a break from traditional market and sector structures, which may lead to a **paradigm shift**. At the core of these business models lies the data-based integration of previously separated

goods and services into a joint and **complex value-adding network**. A key area of expertise for companies in this regard is to manage the efficient distribution of both physical goods and information in comprehensive value-adding networks.

In order to suitably observe and analyse the dynamic developments described, it is recommended **to flexibly adapt market monitoring** and in this context to extend its coverage where appropriate. It is decisive that the Bundesnetzagentur is able to oblige all relevant market players to provide information. This especially applies if the regulatory objectives in the network sectors are affected by the dynamic changes in the market. If necessary, the market monitoring responsibilities should include both the upstream and downstream markets as well as adjacent markets of other sectors.

Directly linked to the new data-driven business models, which are very often cross-sectoral, are issues concerning **data and consumer protection, IT security, interoperability and standardisation**. Consumers can benefit from a wealth of innovative, digital services. At the same time, however, the acquisition, pooling and analysing of personal data provides an increasingly detailed insight into consumer behaviour, habits and preferences. Consequently, the **protection of personal data** is becoming **ever more important** in the digital economy. The particular challenge here is to find a balance between consumers' data sovereignty and the innovative impact of data-based business models. Moreover, **IT security is a key success factor** in the digital transformation. Companies and consumers will only use innovative, digital applications if it can be ensured that they function reliably and free of any interference, and that the data is sufficiently protected against unauthorised access and misuse. Furthermore, the aim is to **promote open standards and interoperability** to enable fair competition for all involved market players.

An **integrated analysis, assessment and supervision** of the areas described assume in-depth, sector-specific knowledge and experience. At the same time it requires an increased cross-sectoral categorisation of the developments. The growing complexity with respect to the digital transformation also demands a **close cooperation** of all responsible authorities. In view of the growing integration of the various digital developments there will be a need for a regulatory framework, which ensures that regulation and competition law as well as consumer and data protection law complement each other.