April 2022

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China's growing importance in international standardisation organisations

Consequences for Germany and the EU

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Summary[1]

Standards and technical norms are important building blocks of digitalisation that have received little attention until recently. In addition to the guidelines, rules and laws that determine our everyday lives, standards ensure that products pass certain quality thresholds and that they are interoperable, i.e. that they can communicate with each other.

Germany is a very important player in the field of standards and norms. For a long time, representatives from the EU and the US were the most strongly represented players in standardisation negotiations. But in recent years there has been a power shift tilting in favour of Asian countries. China in particular has significantly increased its presence in standardisation organisations. This is part of a far-reaching strategy to become the world market leader in artificial intelligence, a technology for which important decisions are being made in standardisation talks.

As recent examples have shown, new technologies are often not value-neutral, but have ethical and human rights implications. The development of new networks also has geopolitical consequences. Germany as well as the European Union must react to these developments in order to participate in the international competition for standards in the long term and to be able to set its own course. Furthermore, political decision-makers must be enabled to react to proposals that could endanger the compliance with universal human rights and ethical standards.

Impressum

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[1] The Multilateral Dialogue Geneva Konrad-Adenauer-Stiftung und DiploFoundation jointly published a study on China's role in international standardisation organisations. This analysis is largely based on the findings of the previously-mentioned study. The studay was published in December 2021. The link to the full study is available here.

Introduction

Standards are technical descriptions of processes or products that are adopted by consensus and on a voluntary basis in corresponding expert forums. Even if we are not aware of it, standards and norms make our everyday life easier and ensure - among other things - that we can open emails across devices or charge most mobile phones with a standardised USB cable. Since standards are voluntary, their success also depends on their ability to prevail over others on the market.

Until recently, standards received relatively little attention, even though they have a considerable economic impact. In Germany alone, the economic benefits of standards and norms (i.e. licensing rights, savings through interoperability, etc.) amount to up to 17 billion euros annually. [1] In recent years, however, there has been growing attention for the topic of international standardisation and particularly in the field of digital technologies, as new paths are being set for artificial intelligence, the Internet of Things and many other applications. In recent years, controversial Chinese advances in international standardisation organisations have repeatedly made headlines.[2]

Why are standards a political issue (lately)?

Beyond the political dimension of the debate, standardisation procedures are very technical and highly complex. Although standards are voluntary, there is great interest in establishing common guidelines. These commonly adopted rules can, for example, reduce research and production costs, increase the interoperability of devices or guarantee the mutual recognition of technologies and services. In addition, there has been a growing awareness in recent years that the participation in international standardisation cooperation can bring decisive advantages in strategic industries. [2] For example, it can be observed that recently concluded bilateral and multilateral agreements increasingly include clauses for the recognition or preservation of the international standardisation system. Especially in the field of digital technologies, the struggle for technological supremacy is in full swing. The pressure is very high in the area of standard-setting for broadband standards (e.g. 5G and 6G), applications for the Internet of Things (IoT), the automated evaluation of sound and image material (e.g. facial recognition) as well as for artificial intelligence. With these technologies, the (geo-) political dimension of new standards became

more prominent. Many companies and countries expect emerging technologies to open up new market segments and hope to benefit from effects such as the first mover advantage. Indeed, there can be a large number of standards that refer to the same technology and usually the best one prevails in the free competition of the market. However, in view of the growing importance of China's state capitalist economy, the first challenge is: what if an increasing number of standards do not need to prevail in the competition of free market economies but are rather established in a controlled market?

Aside from completion aspects, the increasing digitisation and fusion of daily life with technologies make a closer look at these guidelines all the more important. Nevertheless, the increasing politicisation of standards could lead to significant obstacles and the slowing down of the development of new technologies.

China's ascent from standard-taker to standard-developer

Broadly speaking, there is a rather simple answer to the frequently asked question of China's ambitions in digital standard-setting: it aims to transform the country from being a consumer of standards into becoming a leading producer of standards. This approach fits into China's broader opening strategy to further integrate the country into the international economic system. Over the course of the past 20 years it relaxed the standardisation system, which, until then, had been used to protect the national economy. One example of this is the Chinese government's goal for 2020 and 2021 to expand active participation in international standardisation organisations. There is indeed a particular focus on the International Standards Organisation (ISO) and the International Electrotechnical Commission (IEC).
Overall, the opening of the Chinese standardisation system offers opportunities for better standards and more possibilities for entering the Chinese market.

A state reform of the standardisation system from 2018 led to the introduction of a hybrid system that allows for the partial recognition of privately-driven standards. The Ministry of Industry and Information Technology (MIIT) even promotes the exchange of Chinese industry associations with international counterparts explicitly. The reform follows an optimisation approach of the 'market-driven, state-led' approach to standardisation. Despite the relaxation, the Chinese state government still acts as a controlling

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[2] i.e. standards for automated facial recognition or a new internet routing protocol – "NewIP"

body which can influence the success and effectiveness of certain standards.

The participation of foreign companies in standardisation negotiations has also been simplified. For this purpose, a law came into force in 2020, which ensures equal participation rights of foreign companies. In practice, however, companies continue to report difficulties and obstacles in trying to participate in standardisation projects, especially in committees considered to be of strategic importance by the government.

The law also leaves nothing to chance when it comes to contributing to standardisation projects. China has a financial incentive system for the participation in international standardisation negotiations.

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Rise according to plan

There can be little doubt about the reasons for China's system optimisation efforts. The manufacturing strategy 'Made in China 2025' and the 5-year plan for national economic and social development published in March 2021 stipulate that the country wants to be 'the leader among the world's manufacturing powers' by 2049 and one of the most innovative nations by 2035. The necessary changes in strategic industries will inevitably involve semiconductors, telecommunications equipment, industrial software and biotechnologies. Another aspect of the strategy includes the strengthened cooperation between military and civilian standardisation organisations. The explicit promotion of dual-use standards, which actively supports the increasing overlap of military and civilian standards, is a cause for concern.

Moreover, the state guidelines raise further questions. The current 5-year plan, for example, foresees the self-reliance in science and technology as a strategic priority for national development. However, this is not a departure from international cooperation according to Chinese Premier Li Kequiang in March 2021. [3]

Particularly noteworthy: There are legal provisions that 'encourage enterprises, social organisations, educational institutions, research institutes, and other organisations to participate in international standardisation activities.' [4] The law also leaves nothing to chance when it comes to contributing to standardisation projects. China has a financial incentive system for the participation in international standardisation negotiations. Companies that lead standard development within international standardisation organisa-

tions receive up to 1 million yuan (USD 155,000) annually from central and regional governments. [5] However, critics note that this system rewards the quantity of standardisation applications rather than their quality. [6]

Exportation of Standards through bi- and multilateral agreements and initiatives

China's efforts to establish itself as a producer of standards are also reflected in bi- and multilateral agreements. Increasingly new agreements include clauses for the recognition of Chinese national standards. This offers the country the possibility to internationalise or export its own standards. By 2019, China had signed a total of 97 agreements with 54 national and regional standardisation organisations and established 12 regional standardisation research centres. [2, p. 29] Furthermore, the new Silk Road ('Belt and Road Initiative') also plays an important role in the issue of standardisation.

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Particularly within the framework of the Digital Silk Road, new markets are to be opened up on the basis of national standards. [6] The government in Beijing for example, has set up an exchange platform for standardisation projects of all countries in the Silk Road Initiative. [2, p. 30] From a European perspective the risks are twofold: on the one hand, exported standards may include standards that have not been able to establish themselves at the international level. On the other hand, the development of Chinese infrastructures and products along the new Silk Road is gradually creating dependencies. In the process, Chinese-national standards could grow into 'de facto' standards if a critical mass of countries follow these specifications. Against this background, Geneva observers also point to China's activities in African countries. If international and Chinese standards cannot be reconciled, the costs of switching to international standards would be extremely high and difficult to implement. These types of dependencies could lead to changes in voting patterns of certain countries in international fora.

Developments in international standardisation organisations

China's growing interest in international standardisation institutions should not come as a surprise. Until 20 years ago, the country was relatively underrepresented in international organisations. The rapid rise of the country and the opening of its economy therefore translate into greater involvement and representation in international (standardisation) bodies.

For instance, observers report that the presence of Chinese engineers and experts in the working and focus groups has increased significantly. The great interest in international standards is due both to the international orientation of Chinese tech giants and, to a certain extent, to the effectiveness of the incentive system already mentioned. The increased commitment can also be expressed in figures. In terms of leadership positions in the telecommunications standardisation sector (ITU-T) study and focus groups, an almost complete personnel shift took place between 2001 and 2021.

Whereas in the early 2000s the US held 22 chairs and vice-chairs and 60 rapporteurs, it held 5 chairs and vice-chair as well as 16 rapporteur positions in 2021. Conversely, in the early 2000s, only one deputy and three rapporteurs were from China. In 2021, the country held 25 chair and vice-chair and 89 rapporteur positions.
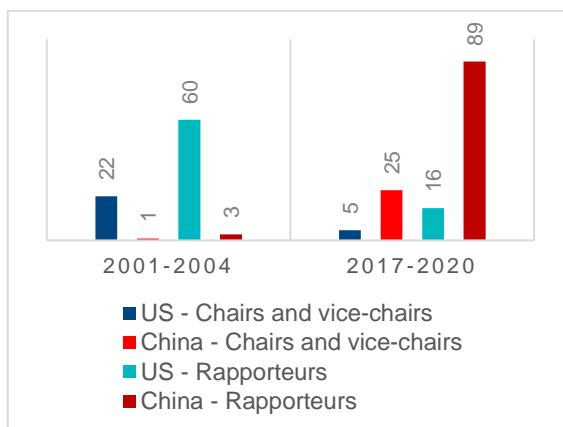

Figure 1: Comparison of ITU-T leadership positions

The situation is similar at the International Organization for Standardization (ISO), where the number of Chinese secretariat positions increased from 6 to 79 between 2000 and 2019. Meanwhile, the number of secretariat positions for Germany and France remained the same. The latest on the US' leadership positions show a decreasing trend. With 16% of the positions, Germany currently holds the second most secretariat positions in digitally relevant ISO working groups, behind the USA with 24%.

The above trend could also be observed at the last World Telecommunications Standardisation Assembly (WTSA-20), which - due to the pandemic - took place in March 2022.[3] With one exception, Chinese candidates secured leadership positions for the available working groups.

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But what do these figures and developments mean for organisations whose standards are largely decided and adopted unanimously?

Consequences of the staffing of key positions

As the German Institute for Standardisation (DIN) made clear in a presentation for the German Parliament in June 2021: strategic fields are occupied by the appointment and leadership of committees, working groups and focus groups. [7] These positions have a steering function, which ultimately also has an effect on the adopted standards. With regard to the national strategy of becoming the world leader in manufacturing, it is evident that Chinese actors are increasingly seeking leadership positions in those committees in which decisions are made for promising emerging technologies such as quantum computing and digital twin.

Although standards are voluntary in nature and decision-making in SDOs is usually consensus-based, in practice, unanimity should not be interpreted as the active agreement of all participants to a certain proposal. It rather reflects the absence of objections. Ideally, this means that objections are no longer raised because they were addressed during the negotiations. But for reasons such as time pressure, different prioritisation, lack of impact assessment, etc.,

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[3] The WTSA meets every four years and is the most important event for the standardisation sector of the ITU (ITU-T). The chairs and vice-chairs of the working groups are appointed there. The assembly also adopts the work programme of the upcoming four years. The proposals and resolutions put forward there sometimes go beyond the standardisation work for the internet and telecommunications (ICT) and increasingly touch upon issues relating to new and emerging technologies.

decisions may well be waved through. From the perspective of political representatives, it is nearly impossible for most countries to follow all developments in these often highly technical discussions, let alone examine all proposals with regards to their quality or the potential diplomatic and social impact. The challenge of this task is further aggravated by the often limited staffing of country delegations in Geneva covering the work of these organisations. Diplomats are often covering several organisations at the same time. This creates situations in which standards are adopted by consensus (i.e. without objections) in the absence of certain interest groups.

However, China seems to be interested in more than just filling key positions. Several documents of the Chinese standardisation authority, the SAC, speak of "improving and/or reforming the standardisation environment". [8] Accordingly, the SAC announced that it would increasingly look into a new administrative model for ISO or actively participate in the reform of the IEC administrative model. [9] The abovementioned reform plans are strongly based on the national model of 'industry-driven and state-led' standardisation. Thus, China is not only aiming at a stronger participation in standardisation organisations but also at actively influencing their future shape and orientation.

> **Relying solely on the appeal of European quality seals could lead to losses at the global level in the long run.**

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Different prioritisation of standardisation organisations

The structural change in some of these organisations is not exclusively due to the consistent implementation of China's strategy. It can also be traced back to the partly decreasing presence of German and European representatives in international committees. Germany continues to provide a constantly high number of experts in leading positions, especially at the International Electrotechnical Commission (IEC) and the International Standards Organisation (ISO). Nevertheless, the example of the International Telecommunication Union (ITU-T) shows that the filling of leadership positions with a steering function, such as chairperson or rapporteur, can be completely reversed.[4] In general, it should be noted that other countries, especially from the Asian region, are taking advantage of the spaces that are opening up to

become more involved in international standardisation organisations.

Observations of personnel developments within the standardisation organisations lead to the conclusion that, from a European perspective, other bodies such as industry consortia, quasi-formal institutions (IETF, 3GPP, etc.) are often preferred. The attraction of these subject-specific consortia and forums is, among other things, that standardisation projects can be adopted more quickly and effectively or that agreement can be reached on specific standardisation projects with a limited number of industry representatives. In the short and medium term, such arrangements are certainly understandable. On the other hand, already limited resources are withdrawn from international fora and replaced by other stakeholders. In the long term, this approach carries some risks: international standardisation organisations such as the Telecommunications Union, ISO and IEC are often mentioned in trade agreements as internationally recognised technical bodies. A closer exchange is therefore also needed between European and international SDOs. Relying solely on the appeal of European quality seals could lead to losses at the global level in the long run. The Agreement on Technical Barriers to Trade (TBT) of the World Trade Organisation (WTO) is such an instrument, in which standards of the ITU, ISO and IEC are recognised. This is significant in that WTO members can assume that they will not introduce unauthorised barriers to trade in services and products if they follow the standards of these three organisations. Even in the event of a dispute, they could thus invoke the internationally recognised legitimacy of these standards. Moreover, it should not be underestimated that the recognition of standards by international SDOs plays a very important role in developing countries and can thus also set important criteria for market access in these countries.

Nonetheless, the withdrawal of industry and academia cannot solely be attributed to the avoidance of protracted negotiations. The (at times) uncertain outcomes of the negotiations as well as the associated costs are also important factors in the withdrawal of certain stakeholders.[5] The participation fees of organisations such as the ITU amount - depending on the type of membership - to almost 32,000€ annually. It must also be taken into account that there are no strict rules in which fora specific projects must be submitted. This bears the risk of "forum shopping", an often-described phenomenon whereby similar or highly overlapping projects are submitted to different

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[4] While in the 2000s, 82 chairs (including rapporteurs) were from the USA compared to 4 from China, in 2021, 21 chairs (including rapporteurs) were from the USA, compared to 114 from China.

[5] The failure to adopt a resolution to promote private sector engagement within the ITU-T at WTSA-20 in March 2022 sent a discouraging signal to businesses.

institutions in order to have the best possible chance of successful adoption. This further strains the already scarce human and financial resources. The increasing exodus of industry and academia

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from international standardisation bodies ultimately leads to the concentration of a few players who (have to) fill the vacuum that arises from that situation. The resulting lack of diversity thus has a negative effect on the diversity of ideas. In conjunction with the unanimity principle, this means that it is easier for individual actors to position themselves as the dominant force.

Case studies

Many, if not the vast majority, of the adopted standards are of a purely technical nature. However, two Chinese initiatives in recent years show that standardisation organisations are increasingly confronted with initiatives that have strong ethical dimensions:

Case study 1: Facial recognition in video surveillance

In 2019, China Telecom submitted a standardisation proposal "requirements for the application of facial recognition in video surveillance" to the ITU-T Working Group 16. This group is responsible for multimedia coding, systems and applications. The submitted proposal covered both commercial and public use of a facial recognition protocol. The proposal contained standards for the automated evaluation of physical attributes as well as the matching of dynamic face recognition with other sources (e.g. photos taken with a mobile phone, photos from scanned databases, etc.). The standard proposal sought to standardise the application of facial recognition in video surveillance as well as determine the requirements, conditions and security safeguards for the technology. This standard aimed could for example have laid out the basis for the search for suspects in public spaces or the management of certain areas, such as hotel lobbies, railway stations, etc.

The initiative was met with criticism, especially from ~~the European side,~~ European countries, given that the proposed standard had a very broad scope of ap-

plication. The human rights implications were the primary concern, as the processing of personal attributes such as skin colour, gender, age, etc. in combination with automated tracking mechanisms increased the risk of discriminatory practices. Furthermore, it was not clear from the proposal how the collected biometric data would be used by third party users. The proposal was also criticised for exceeding the limits of a technical standard. The adoption of the proposal would instead be tantamount to a political recommendation. Critics of the proposal stressed that the conditions and safeguards for the use of facial recognition are issues to be determined through legislative processes. EU member states in particular pointed out that the introduction of a technical standard was premature, as discussions on the impact of this and similar technologies were still in full swing. As a result of timely intervention by mainly European countries, the project was stopped in spring 2021 and has been on hold since then.

Case study 2: 5G Standardisation

The new mobile technology 5G differs from its predecessors, among other things, by dramatic improvements in data transmission and the reduction of latency times. In particular, these advances boost industry and production sectors, which is why a downright race for 5G infrastructure and, building on it, for 5G standards has broken out. On the one hand, it was and still is a matter of securing first-mover advantages. On the other hand, other important areas of application are linked to the advantages of the communications standard, especially to increase productivity and to realise the so-called "factory of the future". However, the growing connectivity of technologies (e.g. Internet of Things, Smart Cities) also poses risks to national security and large sectors of the economy. Due to concerns over possible embedded eavesdropping and killswitch capabilities of the devices, Huawei and ZTE products have been excluded from public infrastructures in many places.

It is noteworthy to highlight that the competition for 5G standards is largely limited to three competitors: Ericsson, Nokia and Huawei. Important preparatory work for the new mobile standards was carried out in the context of negotiations within the 3rd Generation Partnership Project (3GPP), a quasi-formal standardisation organisation. Within this organisation, China has the most individual members with 19.2%, followed by the US with 12.4% and Germany with 8.4% of the individual members. The membership figures are also reflected in the distribution of leadership positions. The share of Chinese-held positions has grown from 17% to 36% between 2012 and 2021. By comparison, the share of US-led working

and focus groups increased from 12% in 2012 to 21% in 2021. Statistical analyses [2, p. 41] also show that Huawei is the most active member in terms of submitted and approved standardisation contributions for 5G, followed by Ericsson, Nokia and Qualcomm. The Chinese company is also leading in terms of safety-related standards submissions. Additionally, Huawei is at the forefront of standard-essential patents for 5G, which will allow the company to secure long-term revenue streams. [2, p. 51] These developments are emblematic of the fact that China is following up its ambitions with action, as mentioned above.

However, the fundamental scepticism towards the Chinese telecommunications giant is not solely due to its increasing market power. It is rather due to the unclear relationship between Huawei and the Chinese government, which is why the company's dominance is also viewed from a geopolitical and security perspective.

Conclusion

Standardisation is a highly technical and complex subject area that has a decisive impact on the innovative capacity of states and societies.

China's growing role in international standardisation organisations is not problematic per se, because the diversification of the group of stakeholders and the joint development of standards contribute to the adoption of high-quality standards that can be applied worldwide.

Nevertheless, some of the above-mentioned strategy papers of the government in Beijing are cause for concern (e.g. reform proposals for international standardisation organisations towards a 'state-led, industry-driven' model). Strategies to push back Chinese actors hardly seem promising, especially since their actions are not violating any rules of the expert bodies. For this reason, European countries, with their strong export orientation, must be interested both in maintaining the integrity of the global standardisation system and in promoting international competition. In this respect, the opening up of new markets on the basis of Chinese-national standards, for example, should be used from a European perspective as an impulse to become more involved in the international negotiation of global standards. Likewise, efforts must be made to quickly close the standardisation gap, i.e. to enable developing countries to help shape international standards. The different levels of development in this area can lead to

dependencies or the abandonment of the international standardisation system by the countries concerned.

In order not to hamper innovation through excessive politicisation of processes, responses to current trends need to be extremely prudent and inclusive. It is important to improve the understanding of the respective goals and priorities of the different interest groups. The strategic orientation of any measures must guarantee the long-term competitiveness of German and European technologies and ensure that our ethical and human rights standards are upheld. The focus should also be on improving the dialogue between different actors (ministries, industry, research, civil society) but also on better coordination of like-minded actors at international level. There is already a certain degree of exchange between representatives of the EU states. In view of the large number of initiatives and the limited resources, this coordination within the EU framework alone is not sufficient.

Recommendations

1) Enhanced engagement of German and European actors

- **Strengthen the national participation in international standardisation negotiations:** Increase German and European presence in standardisation organisations by providing financial resources (especially for staff secondment). Strengthen cooperation with permanent representations abroad.
- **Improve the coordination of support offers for the participation of SME:** Better bundle information on available support programmes for SMEs in the field of standardisation with the involvement of the industry associations.
- **Create incentive systems:** Improve capacity building of civil society and academia in the field of international standardisation negotiations through competitions, promotion of specific research branches, etc.
- **Strengthening of information services:** Expand available (and easily understandable) information services for capacity building of those interested in standardisation. Increase outreach through educational measures in schools, initiatives, scholarships, etc.

2) Improvement of dialogue

- **Create dialogue platforms:** Promote closer alignment between business, technical community, civil society, academia and government

stakeholders by providing regular networking formats.

- **Deepen the cooperation between SDOs:** Reduce mandate overlaps, duplication and forum shopping between standardisation organisations through capacity building measures between institutions.

3) Raising awareness about ethical and geopolitical dimensions

- **Raise awareness about the importance of international standard setting:** Highlight the strategic importance of internationally negotiated standards for new markets and maintaining globally interoperable technologies.
- **Raise awareness about the non-technical aspects of standards:** Connect actors in international human rights processes and standardisation organisations (e.g. joint working forums, workshops, etc.) to improve mutual understanding. Raise awareness for the human rights-related impacts of standardisation projects, also in the political and public debate.

4) Improved coordination among like-minded

- **Coordinate closely with like-minded states:** Strengthen information exchange and cooperation beyond the EU with other like-minded countries (e.g. joint positioning, exchange to identify common priorities, etc.).
- **Coordinate with like-minded actors against normative projects that violate human rights:** Coordinate with like-minded stakeholders to prevent standardisation requests that violate human rights or are unethical (e.g. joint positioning, exchange of information to avoid forum shopping). If possible, submit acceptable counterproposals to solve the same (technical) problem.
- **Optimise processes:** Consistently enforce mechanisms for the exclusion of non-relevant or rejected standardisation proposals.

5) Strengthened dialogue with representatives of underrepresented groups

- **Close standardisation gap:** Support SDOs to reduce the standardisation gap by providing dedicated support to developing/emerging countries (both within and outside the technical fora).
- **Diversify the membership:** Actively recruit less represented stakeholders in standardisation bodies (e.g. from developing countries, youth representatives, etc.). Offer special support for the participation of SMEs, civil society and academia by reducing entry barriers (e.g. lowering membership fees, facilitating access to information).

Bibliography

[1] DIN Deutsches Institut für Normung e.V., „Der gesamtwirtschaftliche Nutzen der Normung - Eine Aktualisierung der DIN-Studie aus dem Jahr 2000," 2011. [Online]. Available: https://www.din.de/resource/blob/79542/946e70a818ebdaacce9705652a052b25/gesamtwirtschaftlicher-nutzen-der-normung-data.pdf. [Zugriff am 06 April 2022].

[2] S. Teleanu, „Multilateraler Dialog Genf - Standardisierungsstudie - Die Geopolitik Digitaler Standards," 14 Dezember 2021. [Online]. Available: https://www.kas.de/de/web/multilateraler-dialog-genf/einzeltitel/-/content/standardisierungsstudie-die-geopolitik-digitaler-standards. [Zugriff am 06 April 2022].

[3] SCMP Reporters, „South China Morning Post," 11 März 2021. [Online]. Available: https://www.scmp.com/news/china/politics/article/3124740/two-sessions-2021-live-updates.

[4] 12. Volkskongress, „Standardization Law Of The People's Republic Of China," 4 November 2017. [Online]. Available: https://www.cfstc.org/en/2932583/2968817/index.html.

[5] V. Pop, S. Hua und D. Michaels, „From Lightbulbs to 5G, China BattlesWall Street Journal (Wall Street Journal)," 08 Februar 2021. [Online]. Available: https://www.wsj.com/articles/from-lightbulbs-to-5g-china-battles-west-for-control-of-vital-technology-standards-11612722698.

[6] J. Voo und R. Cremers, „China's Role in Digital Standards for Emerging Technologies - Impacts on the Netherlands and Europe," Mai 2021. [Online]. Available: https://leidenasiacentre.nl/wp-content/uploads/2021/05/Chinas-Role-in-Digital-Standards-for-Emerging-Technologies-1.pdf.

[7] S. Gabler, „Internationale Normung und Standardisierung im Bereich neuer Technologien als Teil des geopolitischen Wettbewerbs," 07 Juni 2021. [Online]. Available: https://www.bundestag.de/resource/blob/846438/5165a1089417d56629aef3d539844d12/Praesentation-Sibylle-Gabler-data.pdf.

[8] Standardisation Administration of China (SAC), „Notice of Standardisation Administration of China on Releasing "Main Points of National Standardisation Work in 2020"," 20 März 2020. [Online]. Available: https://www.sesec.eu/app/uploads/2020/04/Main-Points-of-National-Standardisation-Work-in-2020.pdf.

[9] SESEC IV Project, „Selected Translation - Key Points of National Standardisation in 2021," April 2021. [Online]. Available: https://sesec.eu/wp-content/uploads/2021/04/Annex-2-Key-Points-of-National-Standardisation-in-2021.pdf.