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GSR-24 BEST PRACTICE GUIDELINES

Anatel Contribution # 1

Challenges and Opportunities in Adopting Transformative Technologies:

Decision-makers and regulators face a series of challenges and opportunities in adopting transformative technologies for positive impact. First and foremost, there is the need to understand and anticipate the social, economic, and environmental impacts of these technologies. This requires a holistic approach that takes into account not only the immediate benefits but also potential unintended side effects.

One of the main opportunities is the potential of transformative technologies to drive progress towards sustainable development goals, such as reducing inequalities, combating climate change, and promoting social inclusion. However, for this to happen, it is essential for decision-makers and regulators to take a proactive and collaborative approach, involving multiple stakeholders in policy and strategy formulation.

Regulatory Measures and Guiding Principles:

To promote positive and inclusive impact of transformative technologies it is essential for regulatory measures to be based on clear and comprehensive guiding principles. This includes promoting transparency, accountability, fairness, and public participation in the governance of technologies.

Some of the key regulatory measures that can be adopted include:

1. Establishing ethical and safety standards for the development and deployment of transformative technologies.
2. Creating incentives and supportive policies for companies that adopt responsible and sustainable practices.
3. Implementing oversight and monitoring mechanisms to ensure compliance with regulations and accountability by market actors.

Driving Positive Behaviors and Minimizing Risks:

To drive positive behaviors among market participants it is crucial to incentivize responsible innovation and collaboration between businesses, governments, academia, and civil society. This can be achieved through initiatives such as public-private partnerships, training and awareness programs, and fiscal incentives for sustainable practices.

Additionally, to minimize risks and maximize the benefits of transformative technologies, it is important to invest in research and development, impact assessment, and risk management. This includes conducting socio-economic and environmental impact assessments before the deployment of new technologies, as well as implementing risk mitigation measures and contingency plans.

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Anatel Contribution # 2

What are the challenges and opportunities faced by policy makers and regulators in

The digitalization of relationships and business around the world has brought a series of challenges and opportunities for everyone. In regulation, and from the perspective of competition, some characteristics of digital markets emerge as important issues to be resolved: direct and indirect network effects, two-sided and multilateral markets, economies of scale and scope, switching costs, massive use of user data and behavioral biases are some of these challenges. Opportunities will naturally be offered in markets where regulation is balanced. Innovation and the ability to enter all digital markets must be guaranteed.

What are the key regulatory measures and guiding principles to follow to foster positive and inclusive impact of transformative technologies?

The principles of transparency, information, equality, non-discrimination, and free competition are examples that should guide the regulator in monitoring transformative technologies. Among regulatory measures, those that seek to guarantee the application of these principles should be emphasized. In this sense, some can be highlighted such as measures that guarantee access to communication networks and digital markets, transparency, information to users in a simple and quality way, interoperability between products, services and technologies, data portability between digital platforms, training the professionals involved, consumer protection and guaranteeing markets free from unwanted barriers.

How to drive positive behaviors of market players? How to minimize risks while maximizing benefits?

Building a healthy market environment involves constructive regulation, which opens the doors to innovation and guarantees the entry of new players. Therefore, some actions that can be seen as positive to boost these behaviors are: offering innovation and entry incentives (such as tax benefits, access to financing for startups, public-private partnerships (PPPs)); carrying out educational activities such as studies, public consultations, workshops and specific forums, as well as information and professional training fronts; using experimental methods such as pilot tests, regulatory sandboxes and innovation laboratories; adoption of regulatory rules that have the necessary flexibility to keep up with technological advances; encouraging cooperation between the different sectors of the digital economy, both in national and international markets; and, controlling market movements to curb anti-competitive actions.

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Anatel Contribution # 3

Challenges for the digital transition and the role of transformative technologies

The next generation of telecommunications service providers will probably be defined by the current actions to face the advancement of digital platforms with a holistic approach to digital transformation. It is well known that traditional telecommunication operators are facing competition with emerging technology companies, such as Over the Top (OTT) service providers, which offer voice, video, and messaging services over the Internet.

Furthermore, digital transformation has brought with it the demand for a greater amount of radio frequency spectrum. Consumers are constantly demanding improved quality of Internet services and coverage expectations in urban and rural areas. Traditional mobile operators need to invest in network infrastructure to meet these demands, which can be a considerable financial challenge. Additionally, traditional mobile operators are seeking strategic partnerships with technology companies and content providers to offer combined and differentiated services. These partnerships can include video, music, and gaming streaming services, for example, adding value to the packages offered to customers.

Another opportunity for traditional operators is to offer high-quality business services. With digital transformation, companies are increasingly dependent on reliable and secure connectivity for their operations. Operators can provide comprehensive communications and connectivity solutions for companies, such as private networks, across different industries, helping them become more efficient and competitive.

In summary, telecommunications operators face significant challenges in the face of digital transformation. However, there are also opportunities to adapt and thrive in this constantly evolving landscape. By investing in infrastructure, exploring strategic partnerships, and offering innovative services, traditional operators can stay relevant and capitalize on the opportunities created by digital transformation. These challenges bring the need to seek better use of the digital transition by telecommunications operators, who must seek to implement efficiency measures, efforts to take advantage of digitalization opportunities, structural changes, and productivity improvements.

In that context, the current landscape of enabling transformative technologies have a great chance of changing and stimulating the renewal of technologies used by telecommunications operators. These technologies include Distributed Ledger Technologies (e.g., blockchain), Metaverse, artificial intelligence, open and interoperable networks, Internet of Things, new satellite and 6G networks. The driving elements and technological advancements involved in the evolution of telecommunications, can be useful in boosting demand and new service and applications.

Taking the case of DLT (e.g., blockchain), despite its revolutionary concept, there is a clear potential for opening new business opportunities, given that telecommunication networks deliver improved security, efficiency, and transparency, for allowing the large-scale implementation of DLTs.

Another interesting example is Web 3.0, a revolution in online interaction and digital business models, based on decentralization, semantics, Artificial Intelligence, and data interconnection. Despite the challenges, there are transformative opportunities of Web 3.0 for society. On the other hand, there is also a need for sensitive regulations that consider decentralization, privacy, security, and innovation, with collaboration between regulators, industry, and civil society. The transition to Web 3.0 imposes technical challenges on telecommunications networks, such as scalability, latency, power consumption, security, privacy, standards, identity management, content distribution, storage, and regulatory issues, emphasizing the importance of innovative and sustainable solutions for a successful transition.

Finally, the imminent challenges for future networks, including the increase in traffic and connected devices demanding scalable traffic engineering solutions. In this context, the need for a flexible 6G architecture, based on cognitive mechanisms, to promote optimized operation and financial viability stands out. Sustainability in various sectors is a key point for the development of 6G technology. As 5G advances, the discussion around 6G emphasizes automation, virtualization, and flexibility, with a focus on holographic experiences and virtual reality. The transition to 6G faces challenges such as security and infrastructure, and at this point, the work highlights Open RAN as a flexible and collaborative solution that can drive the evolution to 6G, enabling supplier choice, innovation, and open standards for an improved experience for users.

Brazilian current initiatives towards the discussion of the digital transformation

Brazilian telecommunications service providers are also carrying out this digital transition, that requires high investment volumes. Furthermore, a scenario of changes in business models can be also noticed in Brazil, with a possible shift in the focus of telecommunications operators, complementing and expanding their connectivity offers.

In face of these new challenges, the National Telecommunications Agency (Anatel) is conducting a series of studies to offer reflections to all stakeholders in the support of its approach to the new regulatory challenges of the digital ecosystem in favor of innovation, competition, and a healthy environment for the provision of universal and meaningful connectivity. In this way, Anatel seeks to promote solid and lasting investments, in addition to guaranteeing significant connectivity that allows the Brazilian population not only access, but a safe, satisfactory, enriching, and productive online experience at affordable prices. These studies can be found at the following webpage <https://www.gov.br/anatel/pt-br/centrais-de-conteudo/publicacoes/estudos-e-pesquisas/estudos-descentralizados>.

Additionally, there is an ongoing regulatory initiative ([Item n. 6 of Anatel's Regulatory Agenda 2023-2024](#)), calling for an assessment of the need for regulation on, among other topics, the risks of imbalance between telecommunications and OTT providers, with the possibility of repercussions on connectivity and the digital ecosystem. The current stage is the Regulatory Impact Assessment (RIA), and it is worth mentioning that its initial outline is under consultation (please refer to [Call for Information n. 26/2023](#)).

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Anatel Contribution # 4

Regulatory Sandboxes and Innovation to encourage an enabling environment for transformative technologies.

The development of digital connectivity demonstrates the accelerated pace of profound technological transformations occurring within the scope of the digital ecosystem, that has caused numerous challenges to Administrations. Additionally, the evolution of the Internet has brought with it not only technological advances, but also the constant need for regulation to protect users' interests, promote innovation and maintain order in an ever-changing digital environment. The transition to this new digital ecosystem, with its emphasis on decentralization, user autonomy and data interconnection, requires a careful regulatory approach.

Key aspects need to be considered in defining regulatory models that can be adopted for the implementation of such technologies. Therefore, it is necessary to analyze alternative regulatory approaches and tools that prove to be more dynamic, flexible, and capable of guaranteeing security to citizens, consumers and service users, but, at the same time, also capable of boosting innovation, through the clear and equitable definition of the rules of the game, in order to reduce uncertainties, avoid distortions in the market and bring stability and confidence to companies so they can develop their full innovative potential.

Among the proposals for new regulatory instruments capable of facing the challenging scenario of technological disruption, the Regulatory Sandbox became popular after being adopted by several countries¹ and recommended by international organizations, such as the OECD, as it was considered a useful mechanism for regulators to monitor, within a context of great and rapid transformation, the development of new technologies. In summary, Regulation should not stifle innovation, but rather create a safe and supportive business environment, and some actions useful in guaranteeing this enabling environment, such as the Regulatory Sandbox², but also other initiatives that can be combined, for example, public-private collaboration³.

More specifically, an experimental regulatory environment (Regulatory Sandbox) is an instrument for promoting innovation based on a regulatory incentive whose inductive pillar is temporary normative-regulatory exemption, which provides companies with a space conducive to testing and experimenting with innovations in real conditions, through implementation of a more flexible and less restrictive regulatory environment, in return for compliance with the regulator's supervisory parameters and constant monitoring and inspection. The main idea is to allow the testing of innovative projects in a simpler and more interactive regulatory environment, with constant dialogue with the regulator, breaking the regulatory gap and quickly addressing the challenges posed by disruptive solutions, without

¹ The regulatory sandbox, a new initiative in Brazil, is used successfully in the United States and the European Union. Initially, the application of this regulatory model was reserved for fintechs and other companies and solutions in the financial market. The United Kingdom was a pioneer in its adoption, with the launch, in 2015, of a project led by the FCA (Financial Conduct Authority) which aroused the interest of regulators around the world. Currently, there are more than 50 jurisdictions actively exploring or implementing the instrument, including in Brazil, as discussed below. Research released in 2020 by the World Bank showed that at least 57 countries adopt the practice of regulatory sandbox (COUTINHO FILHO, 2018.).

² Regulatory Sandbox: Mechanisms such as regulatory sandboxes can allow companies to experiment with new technologies and business models in controlled environments.

³ Public-Private Collaboration: Partnerships between governments, the private sector and civil society can help create more informed and equitable regulations.

preventing and hindering the development of new business models and new products and services.

By adopting the strategy of positioning the regulator alongside the regulated, based on a relationship of trust and mutual support, collaboratively monitor what is being developed in the market and, only later, verify the need and convenience of regulate the new phenomenon, the sandbox clearly adheres to the principles of the theory of responsive regulation, which advocates exactly that the regulator understands the functioning of the regulated sector and the intrinsic motivations of the subjects subject to regulation so that they are able to respond responsively to the demands and needs of regulating new products, services or technologies developed.

With temporary authorization, a new entrant becomes subject to the regulatory framework edited by the regulatory body, which may apply to program participants certain regulatory relief⁴ to be able to test their products, services or business models directly in the market, in order to ensure innovation capacity, accelerate learning processes and encourage competitiveness and greater diversity of business models, obviously respecting minimum security standards, and mitigating risks faced by entrepreneurs, and consequently facilitates the attractiveness of investments for innovative projects, by eliminating the risk of those finding themselves involved in discussions about the irregular or illegal exercise of regulated activity.

More information can be found in the Pro-innovation regulatory model study⁵ carried out by Anatel in association with the University of Brasilia (UnB).

1. Regulatory Sandboxes in the Telecom Sector in Brazil

At Anatel, the telecommunication regulator in Brazil, the Regulatory Sandbox is being structured in [Regulatory Initiative n. 2](#) of its Regulatory Agenda 2023-2024, currently, in the final stage of the regulatory process. However, the Agency's Board of Directors already has the competence to establish conditions that differ from general standards, to meet special cases where there is a clear recognition of the need for flexible and adaptive approaches in the face of singular and exceptional situations that may arise in the telecommunications sector. Evidence of that is the approval in the first quarter of 2024 by the Board of Directors two regulatory sandboxes, on:

- Use of RF Repeaters and Signal Boosters for mobile services by city halls to expand the coverage of that service in particular areas where the systems do not have sufficient signal level coverage for full use; and
- Provision of Direct-to-Device (D2D) capabilities, with the aim of allowing the authorization of temporary use of radio frequencies, in bands allocated for terrestrial mobile services, in order to carry out tests on satellite systems that use direct-to-device applications, for a period longer than that established in current regulations.

⁴ The regulatory relief envisioned for the sandbox consists, at first glance, of exempting program participants from complying with certain rules. In principle, precarious authorization may exempt the sandbox participant from complying with all regulations issued by the regulator for market participants, conditioned on compliance with the conditions and obligations contained in said authorization. Still, regulators may require sandbox participants to comply with some specific regulations.

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https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?HWH32bONvibUcMC3mewfUplX7e-9fyZZC4iEjl2QHwXAoLCOrVZwNzRf5vR3YcCMWZN4eCgQDLmVzIOFPcg7Rlz0T7CRF7MrVVmiCb1soTWG6OVL-rIRsNEEFVz-6y-w

More information about these and other sandbox projects can be obtained on the Anatel website, at <https://www.gov.br/anatel/pt-br/regulado/agenda-regulatoria/sandbox-regulatorio>.

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Anatel Contribution # 5

• What are the challenges and opportunities faced by policy makers and regulators in embracing transformative technologies for greater impact?

Decision makers, who have been structuring their work to achieve true meaningful connectivity based on overcoming connectivity and usage gaps, need to face the fact that the adoption of transformative technologies can generate opportunities, new challenges, relevant social impacts, and new citizen demands.

Although technologies like Artificial Intelligence can significantly contribute to objectives, acting as teaching assistants for digital skills, they can also reduce job opportunities for the population in a job market where the division of roles between humans, machines, and algorithms is already being discussed.

In this sense, we need to rapidly evolve the concept of meaningful connectivity and how we measure it to cover not only digital skilling but also to address digital reskilling for part of the population due to technological disruption.

Also, there is an evident risk of imbalanced power dynamics in the use of these technologies, where capabilities become concentrated in the hands of a few actors, and the economic and social benefits may not be as evenly distributed as they could be.

Transformative Technologies often outpace the development of regulations, leading to regulatory gaps and uncertainties.

• What are the key regulatory measures and guiding principles to follow to foster positive and inclusive impact of transformative technologies?

Policy and Regulations should not prevent innovation and should support responsible development and deployment of transformative technologies.

Decision Makers can help protect consumers from harm and ensure that transformative technologies benefit society. This includes measures to safeguard human rights, democratic values, privacy, prevent discrimination, and address potential negative externalities.

Policy and Regulations can support the use of these technologies to achieve social good while mitigating potential risks such as climate change, healthcare disparities, and economic inequality.

Regulators should promote digital skills among the population to ensure optimal utilization of transformative technologies, thereby ensuring adequate social development for all. The mechanisms for achieving this should be diverse and result from direct public investment, public policies, regulation, and partnerships with the private sector.

- **How to drive positive behaviours of market players? How to minimize risks while maximizing benefits?**

The concept of “meaningful connectivity” is central. Pillars such as infrastructure, suitable devices, affordable prices, digital skills, online security, and trust should be shared by everyone across different levels of demand. Regulatory actions should prioritize facilitating “meaningful” access to available services and technologies for the entire society, including transformative technologies.

For market agents, transparency, ethical responsibility, and commitment to ESG (Environmental, Social, and Governance) principles are essential values that can become competitive advantages in a society increasingly demanding and concerned about the sustainability of its future.

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Anatel Contribution # 6

• **What are the challenges and opportunities faced by policy makers and regulators in embracing transformative technologies for greater impact?**

Transformative technologies are those with the potential to cause significant changes across various aspects of society, the economy, and daily life. Often, these technologies represent significant advances in terms of innovation and have the power to fundamentally reshape how we live, work, and interact. For decision-makers and regulatory bodies, there are a series of challenges in adopting measures that can maximize the impact of transformative technologies, as listed below:

Risks and uncertainties: The adoption of transformative technologies often involves unknown risks and uncertainties about their long-term impact. Regulators and decision-makers need to address these uncertainties while working to promote innovations.

Regulatory barriers: Inadequate or overly restrictive regulations can pose significant obstacles to the adoption of transformative technologies. Therefore, regulators should be mindful of the need to update regulations and avoid barriers that hinder the implementation of technological changes.

Ethical and privacy concerns: Technologies such as artificial intelligence, big data, and biotechnology raise ethical and privacy concerns. Decision-makers and regulators need to balance innovation with the protection of individual rights and the mitigation of potential harms.

Digital inequality: The adoption of transformative technologies can exacerbate digital inequality, leaving some marginalized groups isolated from the rest of society. Regulators need to ensure that technologies are accessible and equitable for all segments of society.

Additionally, it is possible to identify opportunities associated with transformative technologies:

Efficiency improvement: Transformative technologies have the potential to significantly improve efficiency in various sectors, especially in the telecommunications sector, which greatly benefits from this type of technological innovation. Regulators can seize these opportunities to promote innovation and economic growth.

Regulatory innovation: The adoption of transformative technologies also offers opportunities to innovate in regulatory approaches. For example, regulatory sandboxes and adaptive regulations can facilitate experimentation and adaptation to rapid changes in the technological landscape.

Sustainable development: Transformative technologies have the potential to drive sustainable development by helping to address environmental and social challenges. Regulators can leverage these technologies to promote more sustainable practices in the telecommunications sector.

Consumer empowerment: Technologies such as the Internet of Things and blockchain can empower consumers by offering greater transparency and control over their data and

commercial interactions. Regulators can work to strengthen these aspects by promoting consumer trust and participation.

By addressing these challenges and seizing these opportunities, decision-makers and regulators can ensure that the adoption of transformative technologies leads to a significant positive impact on society.

• What are the key regulatory measures and guiding principles to follow to foster positive and inclusive impact of transformative technologies?

To promote the positive and inclusive impact of transformative technologies, regulators can adopt measures such as ensuring transparency and accountability of companies regarding data and algorithms, as well as promoting equity and accessibility of technologies. This can be achieved through innovative regulatory approaches that allow for experimentation, stakeholder engagement in policy-making, and investment in digital education.

Additionally, it is essential to establish mechanisms for impact assessment and continuous monitoring to ensure that technologies are developed and regulated in a way that benefits society as a whole, while mitigating potential risks and inequalities.

• How to drive positive behaviours of market players? How to minimize risks while maximizing benefits?

To drive positive market behaviors regarding transformative technologies, it is essential to adopt a multifaceted approach involving incentives, regulation, and awareness. Therefore, it becomes relevant to promote transparency and accountability of companies, ensuring they clearly communicate their practices regarding data collection, usage, sharing, and algorithms employed. This can be achieved through regulations mandating detailed reports on these practices and imposing penalties for violations. Additionally, some incentives could be adopted, such as certification seals and recognition campaigns of companies adopting data protection and equity policies.

To minimize risks and maximize benefits of transformative technologies, it is crucial to invest in digital education and training for all stakeholders, from end-users to developers and regulators. This can enhance understanding of the potential risks and benefits of technologies, empowering market participants to make informed decisions and adopt responsible practices. Furthermore, establishing effective supervision and monitoring mechanisms is important to swiftly identify and mitigate any emerging issues, ensuring user safety and protection. These combined measures can help create an environment conducive to positive behaviors and maximize the benefits of transformative technologies while minimizing potential risks.

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Anatel Contribution # 7

Challenges and Opportunities in Adopting Transformative Technologies:

We face the need to balance security and regulatory compliance in a rapidly evolving technological scenario, using advanced technologies to improve communication effectiveness, especially in emergency situations.

Practical example: Implementation of the CELLBROADCAST - EMERGENCY ALERT system to optimize communication with society in general in emergency and crisis situations. (<https://www.gov.br/anatel/pt-br/dados/utilidade-publica/notificacao-de-alertas>)

Guiding Principles and Regulatory Measures to Promote Positive Impact:

We promote transparency and accountability in the development and implementation of new technologies, adapting our regulatory framework to be flexible to technological changes, while maintaining consumer protection and market integrity.

Practical example: Cybersecurity Working Group (GT-CIBER) and enforcement actions to correct technical deviations through Ordinary Orders establishing compliance rules for the regulated sector. Or even in specific cases, climb the regulatory pyramid and implement enforcement actions to combat any validated technical deviation: Implementation of Double Factor Authentication Technology for Number Portability (<https://www.gov.br/anatel/pt-br/subjects/noticias/portabilidade-de-numero-de-telefone-movel-passa-a-exigir-confirmacao-por-sms>) and Implementation of STIR SHAKEN (<https://teletime.com.br/11/03/2024/call-authentication-to-combat-telemarketing-starts-day-27/>) .

Promoting Positive Behaviors and Risk Management:

We implement education and awareness programs for regulators and the general public, focusing on the benefits and risks of transformative technologies, especially in cybersecurity.

Practical example: “Cybersafe October” Campaign. (<https://www.gov.br/anatel/pt-br/assuntos/noticias/anatel-promove-campanha-outubro-ciberseguro>).

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