

Regulating for innovation

Building a regulatory environment that is conducive to innovation



Content

Governments are embracing technology	
The importance of regulations in the context of technology	{E
Challenges that governments face in regulating innovation	12
Case studies on countries ahead of the curve in regulating innovation	14
What has Saudi Arabia done to regulate innovation?	18
Conclusion	20
References	21
Further reading	23
Contacts	24

Introduction

We are facing a period of exponential and disruptive changes, driven by the current chapter of the digital revolution. It is expected that more technology-driven change will occur in the next twenty years, which will cause a profound socioeconomic impact. Emerging technologies are driving innovation and businesses, and with that come new pressures on regulators to protect citizens and market competition without hindering innovation.

Regulations can have various types of effects on innovation, both positive and negative. They can ensure a level of openness and competition in product markets, they can focus the areas of research based on society's needs, and can ensure fair "ground rules" for all economic actors in the innovative process. On the other hand, regulations can create obstacles to the development of new products, discourage research efforts, distort choices of technology adoption, and can raise the cost and uncertainty of innovation. Governments must walk a tightrope between setting the right direction for innovation while encouraging it to flourish.

In this paper, we will explore the topics of emerging technologies, their importance to society, as well as the key role of regulations. We will touch on the various forms of regulations that can be adopted, their



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purpose, and the challenges that accompany setting up effective regulatory frameworks for innovation. To understand these concepts in context, we will go over the strides in innovation regulation undertaken by some of the top innovating countries in the world: the United Kingdom, the United States, and Singapore, as well as by one of the fastest-growing countries in the adoption of innovation: Saudi Arabia.



Governments are embracing innovation

The advent of new technology

The business models of different sectors are being transformed by a new wave of technologies that merge the digital and physical worlds, such as artificial intelligence (AI), big data (the cloud), robotics, biotech/ biosciences, 3D printing, 5G technologies, the Internet of Things (IoT), nano-engineering and nano-manufacturing, and quantum computing.

Many emerging technologies are at different phases of maturity and have various transformational impacts as illustrated in Figure 1.

Benefits of this technology for society

The recent developments in emerging technologies, including AI, robotics, and biotechnology have shown tremendous potential for sustainable development. This new digital era is different due to its extensive scope and the vitality of its impact on human interaction and identity, distribution, production, and consumption systems around the globe.

Al is one example of the potential of new technology to serve society. It could be used to develop new

Figure 1:

Main emerging technologies classified by level of maturity and transformational impact



¹ Emerging technologies challenges and principles of regulation - https://digitalregulation.org/ ² Technology and Innovation Report 2021 - United Nations Conference on Trade and Development

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medicines, speed up the transition to a low-carbon economy, and help people in retirement and old age. The economic gains alone could be enormous since Al could contribute up to US\$15.7 trillion to the global economy by 2030, which is more than the current output of China and India combined.1

Combining AI with 5G technology can lead to further advancement and can be used to monitor and manage farms, factories, and smart cities. The increased productivity of ICT-connected sensors will warn of factory equipment maintenance needs, monitor energy use in buildings, give farmers realtime information on soil conditions, maintain and operate driverless vehicles, optimize energy-grid performance, and diagnose individuals' health remotely. In the national security realm, AI, 5G, and the IoT portend radical changes in missions from logistics and inventory management to surveillance and reconnaissance.

Based on the United Nations Technology and Innovation Report, the countries that are best prepared to handle this coming era are the United States, Switzerland, the United Kingdom, Sweden, Singapore, the Netherlands, and the Republic of Korea.²

The adoption of such emerging technologies by the private sector can be based on various incentives, depending on the need and application:









Maintaining a competitive edge





Accurate decision making



Higher

Capturing future markets

The public sector has also adopted emerging technologies resulting in a positive impact on various fronts:



Economic impact

In addition to enhancing labour productivity, emerging technology adoption will result in increased demand for new skills and capabilities in both the public and the private sectors.

Social impact

Improved systems, processes, tools, and services will enhance citizens' quality of life. The application of human-centered design during solution development is also expected to improve access, reliability, and response leading to improved citizen satisfaction with government entities.

Environmental impact

Emerging technology will help reduce carbon footprints and can be used to target environmental challenges.

Future prosperity

Emerging technologies can become drivers of efficiency and value creation.

Better government

Overall public service delivery can improve by utilizing emerging technologies, creating more citizen-centricity.





Not all countries are currently developing or scaling emerging technologies, but all countries need to prepare for them. New technologies will demand much greater digitalization, connectivity, and, last but not least, regulation.

Regulations to provide technological access

Country-wide access to electricity and to ICT can bridge gender, generational, and digital divides. Through inclusive national digital strategies, regulators and governmental bodies can leverage ICT infrastructure and improve internet access, either through fixed or mobile broadband. Since reaching remote areas and vulnerable groups may not be viable for the private sector, governments, working together with ICT regulators, need to consider incentives and subsidies for internet access and devices for people to connect to the network. Although the cost of these devices consistently falls over time, it is still a significant barrier for some society segments.

Regulations to mitigate risks

Regulators are in a unique position since they are at the forefront of interactions with consumers, businesses, and the government. They directly



The growing number of data regulations³



Note: Data protection regulations include different types of regulation relating to data transfers and local storage requirements. Numbers are affected by the way in which regulations are structured, as this varies by country; some countries may have a single regulation covering a wide range of measures; others will have several different regulations covering, for example, restrictions on data flows for different types of data, and local storage requirements

³ Casalini, F. and J. López González (2019), "Trade and Cross-Border Data Flows", OECD Trade Policy Papers, No. 220, OECD Publishing, Paris, https://dx.doi. org/10.1787/b2023a47-en

oversee the market where essential services are delivered to citizens. However, traditional regulatory structures are complex, fragmented, risk-averse, and adjust slowly to shifting social circumstances, with various public agencies having overlapping authority. Most regulators, especially in the least developed countries, are not fully engaged in enhancing the regulatory framework for emerging technologies.

In the context of fast transformation led by emerging technologies, which disrupt traditional business models and create new ways for consumers to interact with the providers of services, regulators play a vital role. They can take the lead in promoting international debates on how such technologies affect citizens' rights, privacy, data ownership, and online security. Their concerns need to be reflected in normative frameworks and regulatory regimes on data collection, use and access, and data privacy while also balancing individual and collective rights, and allowing private sector innovation.

Considering data privacy is fueled by the exponential rise of emerging technologies, governments' concern about ensuring secure and trustworthy data exchange has resulted in the proliferation of data regulation worldwide (Figure 2).

The multiplication of data regulations and revisions in the last decades reveals a trend towards adopting an adaptive regulation approach rather than the classic "regulate and forget" approach. The rapid development of the emerging technology market calls for a more responsive and participative approach to co-design policies and standards, both at the local and global levels. Multi-stakeholder collaboration and a cross-sectoral discussion are required to address the complex challenges of data and emerging technology regulation and ensure the free flow of data across borders.

New technologies require regulators to reconsider the tools and frameworks used to oversee the market, ensure fair competition, and protect consumers. While services and applications based on these technologies may be subject to regulation, such as data protection, cybersecurity, and consumer protection, the supporting technologies probably should not. To navigate the challenges posed by emerging technologies, the UN's International Telecommunication Union (ITU) proposes a set of principles to guide the future of regulation of these innovative technologies.4



Innovative and adaptive regulations: the modern regulatory models should be innovative and adaptive. They should rely on trial and error and have shorter feedback loops. Regulators can seek feedback using a number of "soft-law" innovative instruments such as policy labs, regulatory sandboxes, crowdsourcing, codes of conduct, best-practice guidance, and self-regulation.

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Outcome-focused regulations: they are a set of rules that prescribe achieving specific, desirable, and measurable results, unlike traditional prescriptive and input-based regulatory models. Outcome-focused regulations should stipulate positive outcomes that regulators want to encourage, offering the private sector greater flexibility in choosing its way of complying with the law.



Evidence-based regulations: a modern approach to regulating that is data-driven and risk-based. It is dynamic and based on real-time data flows between the private sector and regulators. The data could then be compared with regulations to decide whether a firm is in compliance. Firms in compliance would be listed as safe, and if not, the data systems could produce a set of action items to meet the standard.



Collaborative regulation: an ecosystem approach, where multiple regulators from different nations collaborate. It encourages innovation while protecting consumers from potential fraud or safety concerns. Private, standard-setting bodies and self-regulatory organizations also play key roles in facilitating collaboration between innovators and regulators.

Regulators working with key stakeholders from the private sector, the non-profit sector, and academia can ensure that they co-create an environment where emerging technologies are built with consumer safety, privacy, and security in mind and where digital products and services are as inclusive and affordable as they are innovative.

⁴ ITU - Emerging technologies challenges and principles of regulation - https://digitalregulation.org/3004297-2/.

It is also important to take full advantage of these emerging technologies. Government entities and regulators will need to keep adjusting their legislation and regulation to the changing context and applications of emerging technologies.

Figure 3:

Legal Framework's Adaptability to Digital Business Models - G20 countries⁵



The analysis of the Legal Framework's Adaptability to Digital Business Models among G20 countries reveals that some leading economies, such as Italy and Argentina, have not kept up with the pace of innovation and emerging technology development (Figure 3). Failing to do so will negatively affect countries' competitiveness in the short and long run.

It could take time, but accelerating the reform of institutions and the combined efforts of civil society groups can lead to changes in regulations and laws. This eventually will trigger changes in user and consumer behavior, aligning innovation and emerging technologies with societal goals.



Challenges that governments face in regulating innovation

Governments and regulators walk a tightrope between regulating effectively and maintaining a business environment conducive to innovation and growth. Market competitiveness is vital and regulatory frameworks should be in alignment with national innovation strategies, while catering to the various needs of emerging technologies. For example, companies trying to get into the IoT market expect to have interoperability and common standards, while those entering the AI space must rely on privacy, security, and data ownership. This creates a challenge in drafting regulations to facilitate interoperability because they could reduce the security of data transactions.



Keeping pace with change: Digital technologies tend to develop faster than the regulations governing them, and there is a continuous need to stay up-to-date with technological progress and its effects.



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technologies:

to be addressed.

⁶ OECD - The Governance of Regulators | Shaping the Future of Regulators - The Impact of Emerging Technologies on Economic Regulators - https://doi.org/10.1787/db481aa3-en.

Emerging technologies have enabled the development of new products, services, and business models that were hardly conceivable just a few years ago and their pace and scope continue to have an astonishing impact on markets and societies. Governments have the task of promoting innovation and maximizing its benefits for the economy and society, as well as mitigating risks that arise. The OECD identifies the following interrelated challenges that governments and regulators could face.6

Designing "fit-for-purpose" regulatory frameworks:

To respond to the encroachment of digital platforms on various sectors, and to changes to the traditional delineations between consumers and

Tackling regulatory enforcement challenges:

Traditional enforcement methods might not be effective in the context of emerging technologies and new ones must be developed.

Addressing the transversal and transboundary dimensions of these

Since digitalization gives businesses global reach and has a consequential effect on jurisdictional boundaries, collaborations on the global front need

Case studies on countries ahead of the curve in regulating innovation



Digital regulation

In addition to providing a supportive ecosystem to grow innovation in the UK, the government aims to set the direction for the outcomes they strive for through digital regulation. The guiding objectives while setting up these policies are: promoting competition and innovation, keeping the UK safe and secure online, and promoting a flourishing democratic society. One of the challenges the new regulations address is competition. While competition is crucial to the digital economy, the market dominance of a few key tech companies is leading to fewer opportunities for smaller firms, which leads to lower innovation, higher prices, and less choice and control for consumers. In response, the government is establishing a Digital Markets Unit (DMU), currently under consultation in the parliament, as the UK's first tech-focused regulatory agency, which will have the power to:

Establish rules to allow people to switch between phone operating systems.

Ensure smaller technology companies are ready for any surprise Big Tech algorithm changes.

Allow for publishers and content providers to get greater power to receive payments from large tech firms.

Potentially force firms to share data.

Make senior managers pay civil penalties if they fail to respond to requests for information.

Other than market competition, the UK government also aims to protect users and consumers. A proposed Online Safety Bill establishes a regulatory framework to tackle harmful content online. It will codify the duty of care of online companies to keep their users safe while defending the freedom of expression and the free press. Now that the UK is no longer a part of the European Union (EU), the government controls its own data protection laws and regulations. After three years of implementing the General Data Protection Regulation (GDPR), they are capable of maintaining the same standards while also looking for innovation to spur further development in the field of data protection.

The UK is seeking to chart its own path away from the EU while also maintaining high standards in tackling its own digital regulation framework. Almost all of the laws proposed exist and have been enacted or enforced by the European Union and its member states. One example is the landmark Digital Services Act, which addresses tech giants' failure to combat illegal content on their platforms. Noncompliance could cost companies as much as 6 percent of global annual sales when the rules go into effect, in 2023 or 2024 depending on their size.





Manufacturing

The US has lagged behind Europe in regulating big tech, but it has created an environment conducive to innovation and entrepreneurship. In 2014, the government launched Manufacturing USA, a publicprivate partnership that brings together industry, academia, and government partners to collaborate and nurture manufacturing innovation. The initiative is made up of 16 specialized institutes (robotics, biofabrication, cybersecurity, and others), which bring together business competitors, academic institutions, and other stakeholders to test applications of new technology, create new products, reduce cost and risk, and enable the manufacturing workforce with the skills of the future. The institutes have worked with over 2,300 member organizations, 63 percent of which are manufacturing firms, and 72 percent of these are small manufacturers. They have collaborated on over 700 major technology and workforce R&D projects and engaged over 90,000 people in advanced manufacturing training.

Intellectual Property

The US also has robust Intellectual Property (IP) protections, enshrined in the Constitution, which protect innovators. IP protections allow

entrepreneurs to be confident in securing their ideas since the process of innovation is risky, expensive, and difficult. It provides them with the knowledge that they will be able to share in the returns of their successful innovations. From patents and trade secret protections to copyrights, trademarks, and service marks, the US leads the world in providing IP protections—and a secure environment to enforce them.

Healthcare

Government policies have played a major role in developing the venture capital market from the beginning and they continue to drive investments toward innovation in various sectors. For example, regulations have driven investments in healthcare services through the introduction of the HITECH Act (2009), which promotes the adoption and meaningful use of health information technology. With continuing advancement in AI and data-driven customer health insights, more investments are continuing to pour into this sector. Through this type of regulation, the government aims to enforce the rules protecting patient privacy while promoting the adoption of new technology.



Singapore

Singapore encourages innovation by ensuring a level of controlled risk through various regulatory sandboxes that allow solutions to be tested before execution.

Fintech

The Fintech Regulatory Sandbox framework enables financial institutions and fintech players to experiment with innovative financial products or services in a live environment but within a well-defined space and duration. The Monetary Authority of Singapore provides regulatory support by relaxing some of its legal requirements for the duration of the sandbox while also including the needed safeguards to protect the safety and soundness of the financial system. Once an entity exits the sandbox, it must comply with all legal and regulatory requirements.

Data compliance

The Data Regulatory Sandbox is governed by the Infocomm Media Development Authority (IMDA) and aims to promote responsible use of data, support business data innovation, and build consumer trust. There are three stages to the sandbox: engagement, providing guidance, and prototyping. For the latter, IMDA partners with major players in the industry, such as Meta. Since 2018, IMDA has collaborated with Meta, then Facebook, on policy prototyping through Facebook Startup Station Singapore (subsequently renamed Facebook Accelerator Singapore) to support start-ups working on the innovative use of data. These efforts help guide the focus on building consumer trust in the use of data and keep the progress of government initiatives relevant to emerging technologies. This year IMDA and Meta have expressed to be focusing on Data Transparency and Consent in the Metaverse with findings to be shared later in 2023.

Privacy enhancing technologies

In July 2022, on the ten-year anniversary of the data protection law in Singapore, the IMDA and the Personal Data Protection Commission (PDPC) announced the launch of a Privacy Enhancing Technologies (PET) Sandbox to support businesses who wish to pilot PET projects that address common business challenges. PET is crucial to Singapore's



regulatory environment, which protects consumer interests and personal data while supporting economic growth through the sharing of insights.

Singapore has chosen to launch this sandbox in response to businesses asking for guidance on deploying PET solutions. Since PETs can unlock great value from private or proprietary data that businesses may not be willing to disclose, their adoption in real-world applications can be tricky. The sandbox can provide a safe environment to pilot PET projects to help businesses identify the appropriate technology to address their needs.

Building a regulatory environment that is conducive to innovation **17**





What has Saudi Arabia done to regulate innovation?

The Kingdom has embraced innovation through its Vision 2030 and has demonstrated its advances through handling of the Covid-19 pandemic. Beyond the recent response, Saudi Arabia has been moving fast to create an environment conducive to business and innovation through efforts to diversify the economy while strengthening the local workforce and entrepreneurship.

Regulatory frameworks

These efforts include setting up regulatory frameworks to direct the country's digital transformation as well as to create an ecosystem that attracts foreign investment. One initiative is the new Personal Data Protection Law, issued in September 2021 and which came into effect in April 2023, which aims to protect individuals' personal data privacy and regulate organizations' collection, processing, disclosure, or retention of personal data.

The new law draws on GDPR but differs in a key aspect: the restrictions on transferring data across borders. Companies that have not had to worry about data transfers to subsidiaries, holding companies, or third parties outside the kingdom will need to make sure that they comply with the new law. While this system values security, it poses a significant obstacle to the introduction of innovative and emerging technologies, including AI, machine learning, and advanced medical solutions by international companies.

In a push to regulate the cybersecurity space, the National Cybersecurity Authority (NCA) of Saudi Arabia has called on all entities that provide cybersecurity solutions, services, or products to register through its website. Registration was optional at first but became mandatory by 1 August 2022 for any entities providing cybersecurity solutions, services, or products in the Kingdom. The stated benefits of this registration requirement are to:

Regulate the cybersecurity sector.

Create a suitable ecosystem to attract local and international investments.



Support small and medium enterprises.

Encourage innovation in cybersecurity.

⁷ Cabinet Resolution No. 678, dated 29/11/1443H (corresponding to 28th June 2022) and ratified by Royal Decree No. (M/132), dated 01/12/1443H (corresponding to 30th June 2022)

The Kingdom is aiming to become a leading country in the application and development of IoT technologies and services. With this goal in mind, the Communications, Space & Technology Commission (CST), previously named the Communications & Information Technology Commission (CITC), published an updated IoT regulatory framework for public consultation with several edits to the existing version that was published in 2020. The amended framework includes the adoption of further international standards and encourages both the use of IPv6 and interoperability between IoT devices and platforms. The new framework also includes potential reporting and registration requirements on IoT market players for the CST wishes to retain oversight over this space.

The CST has also published a public consultation on the regulation of net neutrality to protect consumers, competition, and reliable services. Net neutrality is essential to ensure a free and open internet that encourages innovation and promotes transparency. This would create the first regulatory basis for net neutrality in Saudi Arabia.

Entrepreneurship support

While Saudi Arabia has been working on establishing regulatory frameworks to support its digital economy, it has also been promoting regulation to encourage entrepreneurship and new businesses. The Saudi Central Bank (SAMA) issued a regulatory sandbox framework for fintech companies in 2019, and the CST launched a regulatory sandbox initiative for emerging technologies in May 2022. The CST aims to increase investments, foster innovation, and encourage the introduction of emerging technologies into the Saudi market. Companies in the sandbox will benefit from regulatory waivers, guidance, and support from CST's partner network. The sandbox targets companies that propose innovative business models, rely on emerging technologies, demonstrate a clear benefit to end users, and plan to launch and scale their business in Saudi Arabia.

In another step to facilitate business and investment, the Kingdom has published a New Companies' Law.⁷ It will allow, among other things, the formation of a new type of company called a Simplified Joint Stock Company, which helps support the needs of entrepreneurs and venture capitalists. This law will help increase business sustainability, encourage investments in small and micro companies, simplify procedures and regulatory requirements, increase market diversity by introducing new company types, protect shareholders, and reduce potential disputes.

Conclusion

The pace of digital transformation and innovation is always faster than the regulations to direct it. Keeping up with a changing environment and avoiding obstacles to innovation due to outdated regulations is an ongoing global challenge. Some countries are more prepared than others to deal with emerging technologies, but there is room for progress even for the most accomplished. Countries at different stages of development can have disparate goals when regulating innovation. Some are hoping to achieve widespread adoption of technology while others aim to rein in large tech companies, but all will need to design adaptive regulatory frameworks to keep up with change. The rapid development of the emerging technology market calls for a more responsive and participative approach to co-design policies and standards, both at the local and global levels. Multi-stakeholder collaboration is required to address the complex challenges of data and emerging technology regulation to ensure the free flow of data across borders, protect consumers, and safeguard fair competition.

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Further reading

This publication comes as part of series of two on innovation and regulation. Download the other publication through link below.

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Innovating governments

Driving innovation to deliver better public services



Innovating governments

Building a regulatory environment that is conducive to innovation.



Building a regulatory environment that is conducive to innovation **23**



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