Regulation that enables innovation

To catalyze innovation, government regulatory agencies can encourage investment, streamline regulation, and set standards to promote industry best practices

William D. Eggers, Sam J Walsh, Carsten Joergensen, and Pankaj Kishnani
Introduction

Traditionally, regulators aim to mitigate social, economic, safety, and environmental risks for consumers while ensuring fair markets. As sweeping changes in technology alter the regulatory environment, regulators increasingly aren’t just reacting—they are being proactive, anticipating innovations and even encouraging them. In an era where AI diagnoses symptoms of diseases, climate change poses an existential risk, and technology-based business models can rise and fall within days, regulators are anticipating and preparing for change more than ever.

Regulatory agencies are being called upon to not only protect consumers from the negative effects of technology and economic shifts, but also to help catalyze innovation in areas such as climate sustainability and AI ethics. The twin role creates a strategic tension for regulators: protecting consumers and citizens through regulation while ensuring regulations don’t discourage innovation and growth.

Wind energy projects, for example, struggle to thread this regulatory needle. Many wind farms worldwide are stuck in the permitting process. Only 19% and 21% of planned projects are under construction in Europe and the United States respectively.1 The South Fork Wind project off the coast of Rhode Island, proposed in 2015, started its permitting process under The National Environmental Policy Act (NEPA) more than four years ago and remains undeveloped.2 The Environmental Impact Statement process lasted nearly three years and required a bevy of permits related to fisheries, endangered species, clean water, and clean air.3

Regulatory agencies worldwide are adapting to these tensions. Strategies include clarifying risks to encourage investments, incentivizing innovation, streamlining regulation, and setting standards that promote industry leading practices.

Only 19% and 21% of planned projects are under construction in Europe and the United States respectively.
Walls coming down

- **Innovation vs. consumer safety:** The safety of consumers shouldn't come at the expense of innovation. Regulators are deploying several tools, such as sandboxes and accelerators, to ensure consumer safety while promoting an environment conducive to new technologies and new business models (see infographic, By the numbers: Regulation that enables innovation).

- **Pace vs. effective regulation:** Effective regulation doesn't necessarily require years of drafting regulations. Soft law instruments, such as guidelines and standards, can rapidly adapt to new business models.

- **Regulated entities vs. regulators:** A customer experience lens and risk-based regulations can improve the relationship between businesses and regulators.

- **Higher protection for consumers vs. lower regulatory requirement:** Agencies can cut red tape while maintaining consumer protections. Digital technologies can streamline regulatory processes; and regulators can proactively engage with regulated entities to develop standards and guidelines that protect consumers from risks but at the same time do not put unnecessary burden on regulated entities.
## By the numbers: Regulation that enables innovation

Fintech regulators are adopting innovative regulatory initiatives to create a conducive regulatory environment and improve oversight.

<table>
<thead>
<tr>
<th>Region</th>
<th>Introduced new initiatives or accelerated planned regulatory initiatives</th>
<th>Leveraging suptech</th>
<th>Innovation office</th>
<th>Regulatory sandbox</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and Pacific</td>
<td></td>
<td>58%</td>
<td>56%</td>
<td>52%</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Africa</td>
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<td></td>
<td></td>
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<tr>
<td>Middle East and North Africa</td>
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<td></td>
<td></td>
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<tr>
<td>Latin America and Caribbean</td>
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<tr>
<td>North America</td>
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<tr>
<td>South Asia</td>
<td></td>
<td></td>
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</tbody>
</table>

Financial regulators are also using technology (suptech) to become more data-driven and proactively monitor risks.

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of suptech initiatives in 30+ countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>In development</td>
<td>36</td>
</tr>
<tr>
<td>Experimental</td>
<td>34</td>
</tr>
<tr>
<td>Operational</td>
<td>29</td>
</tr>
</tbody>
</table>

Regulators globally have embraced sandboxes as a regulatory instrument to test innovative business models.

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and Pacific</td>
<td>19</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
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</tr>
<tr>
<td>Africa</td>
<td>9</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>8</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>7</td>
</tr>
<tr>
<td>North America</td>
<td>6</td>
</tr>
<tr>
<td>South Asia</td>
<td>5</td>
</tr>
</tbody>
</table>

Energy sector sandboxes

<table>
<thead>
<tr>
<th>Energy sector</th>
<th>Implemented</th>
<th>In progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td></td>
<td>Austria</td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td>France</td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td>Norway</td>
</tr>
<tr>
<td>The Netherlands</td>
<td></td>
<td>Sweden</td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td></td>
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<tr>
<td>The United Kingdom</td>
<td></td>
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</tbody>
</table>

Regulatory innovation offices across the globe

<table>
<thead>
<tr>
<th>Innovation offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>Austria</td>
</tr>
<tr>
<td>Bahrain</td>
</tr>
<tr>
<td>Belgium</td>
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<tr>
<td>Canada</td>
</tr>
<tr>
<td>Cyprus</td>
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<tr>
<td>Denmark</td>
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<td>Estonia</td>
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<tr>
<td>Finland</td>
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<tr>
<td>France</td>
</tr>
<tr>
<td>Germany</td>
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</tbody>
</table>

Regulator/central bank–linked accelerators

<table>
<thead>
<tr>
<th>Accelerators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abu Dhabi</td>
</tr>
<tr>
<td>Bahrain</td>
</tr>
<tr>
<td>Dubai</td>
</tr>
<tr>
<td>France</td>
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</table>

Note: Suptech is supervisory technology that helps agencies to support supervision using innovative technologies.

Trend in action
Encouraging investment by clarifying or mitigating risks
Stakeholders rely on regulations to set expectations for risks. Regulatory uncertainty, on the other hand, could foster distrust among consumers, limit investments, and can even endanger markets. The recent implosion of a cryptocurrency exchange left many wondering if tighter regulations could have prevented disaster.

Regulatory tools, such as sandboxes, can provide increased certainty to regulators and regulated entities. Sandboxes are safe testing environments in which innovators can see their inventions play out with certain regulatory leeway and appropriate consumer protections. The use of such tools signals to investors that regulators are inclined to support innovation but will closely watch how the market develops.

A Bank for International Settlements study analyzed how entering the United Kingdom’s fintech regulatory sandbox affects fintech firms’ ability to raise funding. Firms selected for the sandbox witnessed up to a 15% increase in capital raised. The sandbox reduced regulatory uncertainty, helped firms bake in appropriate safeguards, and reduced expenditures on regulatory consulting.

Singapore’s regulatory sandbox that aims to mitigate risks around autonomous vehicles (AV) has been attracting investment to the city-nation. The launch of Singapore’s AV sandbox in 2015 attracted many foreign AV players. In 2017, Singapore introduced traffic rules to regulate AV trials. Key requirements included mandatory liability insurance, installation of a data recorder, a safety driver, and obligation to report malfunctions. Singapore set up a testing center to assess AV capabilities before allowing new tech on the road. Engineers train public transit AV at the same facility. Singapore is counted among the world’s top countries ready for accepting and implementing AVs. The country has gradually opened public roads spanning more than 1,000 km to AVs.

Promoting innovation for regulators and funding innovators
Regulatory agencies must evolve to adapt to innovative new business models. Regulatory innovation requires experimenting with new approaches, such as sandboxes, and a shifting mindset that calls for protecting the public while ensuring sustainable market growth. Adopting regtech technologies that improve oversight and enforcement can promote regulatory innovation. For example, Denmark aims to develop digital-ready legislations that are interoperable and less burdensome for public administrators and businesses. The country requires every new legislation to go through a digital-ready assessment.
Encouraging such innovations is the purpose of the UK Regulators’ Pioneer Fund. The fund invests in regulatory projects which encourage business innovation, investing up to £10 million between 2018 and 2022.\textsuperscript{14} Care Quality Commission, the UK’s regulator of social and health care services, received funding to test its sandbox ideas, engage stakeholders through open discussions, and set innovation principles as a guidebook for future regulatory experiments.\textsuperscript{15}

While the United Kingdom funds regulatory innovations through the Pioneer Fund, Australia funds businesses through challenges and grants to encourage regulatory innovation. One startup, with a grant from the Business Research and Innovation Initiative, developed an AI-powered, sensor monitoring system to monitor the health of exportable livestock.\textsuperscript{16} Another startup developed language processing solutions to analyze disclosures of listed companies in real-time. Another grant-funded innovation will allow regulators to perform more accurate asbestos testing.\textsuperscript{17}

Similarly, governments can also fund innovators, especially early-stage R&D in promising areas that might be too high risk for private investors. Government’s many funding tools include grants, challenges, prizes, loan guarantees, advanced purchase agreements, and in some cases, direct equity. Government financing propelled the research and development (R&D) of COVID-19 vaccines and helped assure businesses that they could invest in vaccine production.\textsuperscript{18}

Similar grant mechanisms have also been used for green energy and climate funding. The Swedish Energy Agency has supported 250 startups with approximately US$100 million in grants. The agency grants up to US$770,000, depending on stages of development, from concept development to viable pilot.\textsuperscript{19}

Government agencies and regulators can also use loans, loan guarantees, and direct equity to boost innovation. The US Department of Energy manages US$35 billion of debt and loan guarantees (see section, How US Department of Energy catalyzes innovation for clean energy).\textsuperscript{20} Morocco and Israel allow startups to choose financing either as a refundable grant or equity investment.\textsuperscript{21}

**Incentivizing businesses to invest in and consumers to adopt innovations**

Incentives shape markets. Regulators can incentivize investment in innovations through a slew of direct and indirect tools.

The growth in Norway’s electric vehicles (EV) market has been buttressed by policy incentives. In 2021, nearly 65% of cars sold in Norway were EVs.\textsuperscript{22} By 2025, the country aims to reach 100%.\textsuperscript{23} The government’s car tax system incentivizes this transformation. Low emission cars are exempt from purchasing and vehicle registration tax, import tax, and annual road traffic insurance tax. EVs also enjoy reduced tolls, subsided parking, and access to bus
Endorsing and setting standards to drive growth and convergence

Standards contribute to flexible, agile policymaking. Standards also encourage collaboration, allow technologies to interface with each other, and give consumers accepted baselines of quality. They can be a powerful tool.

The introduction of the Global System for Mobile Communications (GSM) standards represents a major success story in standard setting. The European Telecommunications Standards Institute (ETSI) defined protocols for telecom operators and telecom equipment manufacturers. GSM made technologies interoperable, saved development and production costs, and allowed users to roam freely across Germany.

Likewise, Germany's Energy Agency (Deutsche Energie-Agentur) launched the Start-Up Energy Transition (SET) awards in 2017. The top 15 finalists receive promotional videos and introductions to potential customers, investors, and corporate partners. Since 2020, SET has also added an element called SET Mentoring that allows start-ups to get their business models reviewed by the energy agency.

When engaging with businesses and offering advice, regulatory agencies should guard against “regulatory capture.” Keeping separate teams for regulatory and advisory functions, providing equitable participation platforms, and reforming internal decision-making processes, can help agencies prevent regulatory capture.

Some regulators are going far beyond financial incentives. The German government is funding the KelRide, an on-demand autonomous electric vehicle (AEV) ridesharing project for public transportation. Though the funding is sizeable, the key attraction noted of the project is an ecosystem of stakeholders and an AEV testing environment. The project allows electric AVs to run on a 14 km public road with dynamic re-routing of AVs (as opposed to fixed routes) and a chance to test AVs under real-life adverse weather conditions such as rainfall, snowfall, and fog. If successful, the project is expected to act as a blueprint across Germany.

Likewise, Norway also has in place the “polluter pays” principle, where high-emission vehicles pay more taxes than EV owners. Charging infrastructure has kept pace with EV sales. In 2015, the Norwegian government subsidized a push to construct a charging station every 50 kilometers along main roads, resulting in 21,000 charging stations across Norway in 2022. The country also passed legislation empowering people with the “right to charge,” including those living in apartments and buildings—giving them the right to access charging stations.

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Similarly, the Boiler and Pressure Vessel Code (BVPC), first created in the United States and issued every two years, has been adopted in over 140 countries. The standards improve safety, prevent accidents, and mitigate adverse environmental impacts by avoiding leaks.

As emerging business models mature, we may see agencies setting standards to prevent online harms, protect privacy, and encourage convergence of technologies under metaverse.

Streamlining regulatory processes
Long delays involved in permitting infrastructure projects can be frustrating. This is particularly problematic for green infrastructure given many countries are committed to move towards green energy. In the US, an Office of Management and Budget-led effort to shrink those delays reduced the average time needed for obtaining a permit from 4.5 years to 2.5 years, a 45% reduction that saved billions of dollars.

Australia has also recognized the issue. The 2022-23 Australian budget provides AUD$139.6 million to advance environment law reform. This includes AUD$10 million for a single touch system to remove the patchwork approval process at the federal, state, and local level. The on-time decisions have markedly improved, from 21% in December 2019 to 83% in June 2022.

Moving forward

- Catalyze ecosystem to bring innovation from lab to market: Regulatory agencies should catalyze stakeholders, including researchers, academia, industry, and philanthropies, to build self-sustaining markets.

- Use soft laws to drive convergence: Soft laws such as industry guidelines, codes of conduct, and standards can help regulators drive convergence, enable interoperability between different products, and set quality standards.

- Mitigate risks to increase consumer confidence: Proactively mitigating risks in markets such as AVs and fintech can protect consumers, encouraging consumer confidence.

- Experiment and innovate: To promote agility, regulatory agencies should experiment with new regulatory approaches to catalyze innovation.
How the US Department of Energy catalyzes innovation for clean energy

The US Department of Energy (DoE) has prioritized incentivizing clean energy technology. DoE appointed its first chief commercialization officer in 2018 to ensure that technologies developed in national labs are commercialized for the American people. The DoE recognizes that funding is not enough to catalyze innovations. It also acts as a partner, regulator, and convenor to encourage businesses to innovate in clean energy.

- **Funder:** DoE funded projects include the small business innovation research (SBIR) program, technology commercialization fund, and the Advanced Research Projects Agency-Energy (ARPA-E). DoE’s funding is not limited to early-stage R&D. They have issued over US$35 billion of loans and loan guarantees for 30+ large-scale energy projects.

- **Partner:** The Lab Partnering Service (LPS) is a collection of online services that connect businesses to information on leading specialists, successful innovations, and patents across the DoE and national labs. DoE’s American-Made challenge even offers startups vouchers to access DoE’s 17 national labs.

- **Convenor:** The LPS also connects investors and innovators. The National Renewable Energy Laboratory’s (NREL) Innovation Incubator program, funded by private philanthropies, assigns a researcher to each startup. The researcher guides them through the capabilities of the lab and its network of researchers, investors, and industry partners.

- **Regulator:** DoE sets energy efficiency standards—another catalyst for innovation. The DoE authorized an industry council to create uniform standards for low-emissivity windows. Some states mandated the standards, which substantially increased demand for such windows. The construction industry benefited, not to mention power grids and consumers.
Reforms in regulatory mechanisms to ease the way for citizen-centered innovation

In 2016, the Canadian Transportation Agency (CTA)—a quasi-judicial tribunal and independent regulator—launched a regulatory modernization initiative that involved a comprehensive review of all regulations made and administered by the organization. The initiative’s goals were:

• Ensuring that industry’s obligations are clear, predictable, and relevant to a range of existing and emerging business practices

• Seeing that the demands associated with compliance are only as high as necessary to achieve the regulations’ purposes

• Facilitating the efficient and effective identification and correction of instances of noncompliance

This ambitious project was completed in three years. It resulted in the elimination of some requirements and simplification of others to reduce compliance burdens and allow transportation companies to operate with greater agility. For example, the need for the CTA to approve code-share agreements between airlines was removed and the advance notice airlines need to provide for certain leasing arrangements was shortened from 45 to 15 days.

The initiative also produced a common set of air passenger rights for the first time in Canada. Given the high level of interest sparked by this component of the initiative, the CTA used a creative mix of methods to allow stakeholders and the broader public to have their say: traditional written submissions, online questionnaires, randomized surveys of travelers in airports, bilateral discussions with industry and consumer group representatives, and virtual and public sessions across the country.

While the Air Passenger Protection Regulations were criticized by some airlines for going too far and some consumer advocates for not going far enough, they spurred adoption of a range of innovative techniques by industry to keep passengers informed in real time when flights were delayed, to track luggage, to process compensation claims, and the like.

Alongside new rules for consumer protection, the CTA enacted groundbreaking Accessible Transportation for Persons with Disabilities Regulations aimed at eliminating barriers for travelers with disabilities. Based on feedback from disability rights groups and the broader industry, these regulations were made relatively prescriptive to avoid debate about complex technical specifications—but critically, they were accompanied by a legislative provision allowing the CTA to exempt a company from a particular...
requirement if the company has a different way of achieving equivalent or better results.

That provision was designed to facilitate innovation by allowing transportation providers to develop and implement new technologies and approaches for ensuring accessible travel without running afoul of the rules. This strategy for reconciling detailed requirements with scope for innovation may be worth considering in other regulatory contexts.

The CTA was under no obligation to undertake such fundamental and sweeping regulatory reform. But it recognized that the status quo, while not intolerable, was far from optimal; so, it decided to be a catalyst for change—a choice more and more regulators are making as business models and public expectations rapidly evolve.


3. Ibid.


5. Carla Mozée, “Everyone is wondering if better regulation could have prevented FTX’s collapse. The answer is both yes and no,” Business Insider, November 20, 2022.


7. Ibid.


18. Abigail Ng, “Singapore has big driverless ambitions and the pandemic is unlikely to stop them.”


23. Ibid.


26. Ibid.


28. Sustainable Bus, “Autonomous vehicles in Munich area, the KelRide project enters new phase (with EasyMile and Via Transportation involved),” September 15, 2022.


37. Ibid.


41. Ibid.


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