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ARTICLE

Rethinking Regulation for Dynamic Digital Ecosystems

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1. Introduction

Examining regulatory responses to technological advancements reveals a recurring pattern. Technological innovation often paves the way for widespread commercialization and adoption. Yet, in some instances, the large-scale implementation of a technology unveils unforeseen drawbacks that cannot be predicted or thoroughly tested in controlled lab environments. As time progresses, the negative effects of these technologies become apparent, prompting scientists to investigate their causes. As a result, political and regulatory measures are introduced to mitigate risks, through the imposition of proscriptive and prescriptive rules enforced through the looming threat of penalties.

To illustrate this pattern, consider the case of seat belts in the UK. The arrival of motorcars on British roads during the 1890s was undoubtedly a remarkable technological advancement. However, as evidence accumulated regarding collisions and safety, it became clear that regulatory intervention in road safety was necessary. The growing number of road users competing for space and mounting public pressure from safety advocates highlighting high rates of death and injury reinforced the need for action. Although car manufacturers were mandated to equip new vehicles with front seat belts as early as 1965, it took nearly a century, until 1983, for seat belt usage to become mandatory in the UK.

While regulatory theory and strategies have evolved considerably since then, it remains important to revisit conventional debatesaround the purpose and form of regulation when facing novel issues related to regulating digital ecosystems. How effectively do existing regulatory approaches serve their purpose in the context of digital ecosystems? How can we develop regulation for digital ecosystems that

maintains incentives for innovation, ensures a fair distribution of related economic benefits, and mitigates risks arising from technological change? This short article aims to address these questions by first exploring the reasons behind the need for regulatory intervention and the multiple goals they aim to balance. Subsequently, it delves into the specific challenges associated with regulating digital ecosystems, particularly when relying on traditional regulatory strategies. Finally, it concludes by discussing key features of regulatory strategies that can effectively regulate digital ecosystems, circumventing the identified challenges.

2. Why Regulate? A Paradigm Shift Towards Dynamic Innovation

As digital ecosystems continue to grow and evolve, legitimate concerns arise regarding their impact on individuals, society, and market dynamics. From a rights-based perspective, regulation aims to protect user's personal data and mitigate potential harms to other individual rights. Additionally, broader distributional concerns come into play from a regulatory theory standpoint. With technological advancements, the unequal distribution of benefits becomes more apparent. It is essential to consider who benefits and who bears the costs of innovations. This consideration goes beyond a simple analysis of costs and benefits; it involves examining how the costs and benefits are distributed among different groups based on factors such as class, gender, or poverty.

Crucially, regulatory intervention can help to maintain markets competitive, promote innovation, and protect consumers from long-term harm. This involves ensuring contestable markets and reducing barriers to entry. Given the interconnected nature of digital ecosystems, another reason for regulating them relates to the risks of market discrimination. Certain players in the digital industry can act as *de facto* regulators by controlling market access and setting terms of use. Such outcomes may reflect imbalances in bargaining power relevant to unfair trading practices laws, or excessive market power positions likely to fall within the scope of antitrust laws.

However, traditional regulatory frameworks may not always adequately address the evolving concerns and strike the necessary balance among the diverse interests inherent in digital ecosystems. To foster dynamic innovation, as highlighted in the recent DCI Conference, a different approach to regulation in required. In line with Foss and Klein's argument for rethinking hierarchy, a revaluation of regulation becomes imperative. Just as hierarchy provides a structured environment for human intelligence and creativity to thrive, regulation can serve as an organizational framework that facilitates innovation. In this context, regulation has the potential to act as a coordinator of innovation, shaping interactions between firms, the state, and individuals.

While economists play a pivotal role in designing new analytical models to understand and support dynamic innovation, the task extends beyond their expertise alone. Lawyers, regulators, and policymakers must also venture beyond their comfort zones to challenge established regulatory models and shift the focus away from creating new laws and regulations that conform to outdated moulds. Achieving a balance between fostering innovation and effective regulation requires a willingness to explore new approaches beyond traditional regulatory paradigms.

3. Challenges in Regulating Digital Ecosystems

Addressing these challenges is certainly not a trivial task. Digital ecosystems have unique characteristics that require careful consideration when developing tailored regulatory frameworks. One of the key challenges lies in the rapid pace of technological change. As illustrated by the seat belt analogy, there is often a significant disparity in timing between technological innovation and regulatory response, creating a gap between disruptive technologies and government action. By the time regulators fully comprehend a specific technology and its associated risks, it often becomes outdated, replaced by newer technologies. This constant cycle of playing catch-up introduces two main risks. Firstly, regulations can quickly become obsolete as the market evolves, rendering the rules irrelevant. Secondly, ill-fitting regulations may hinder new innovators from entering the market, inadvertently benefiting early movers, and solidifying their dominance.

Another significant issue is the considerable uncertainties surrounding the benefits, risks, and trajectories of innovations. In the dynamic world of digital ecosystems, players can swiftly rise to dominance or be displaced by more innovative products. This rapid pace makes it harder for regulators to assess the long-term risks and benefits of specific technologies or business models. To navigate this ever-changing landscape, regulators must stay informed about the latest advancements and build capacity to understand the intricacies of emerging technologies – for example, through hiring computer scientists and involve them in the policy-making process. Equally important, they must avoid acting too hastily based on outdated or static perspectives.

Further, the complexity of digital ecosystems also poses a significant challenge for regulators. presents a significant hurdle for regulators. These ecosystems consist of numerous interconnected and interdependent players, including suppliers, distributors, and platform operators, each driven by their own interests and agendas. Conventional regulation based on neoclassical economic models or models based on a fall-back to a size-focused approach are ill-equipped to regulate such intricate digital ecosystems, as it fails to account for the interactions between components at different levels, the presence of feedback loops, and the existence of structural power asymmetries.

In addition, the transnational nature of the digital economy means that digital ecosystems often operate across jurisdictional boundaries. This introduces uncertainty for both regulators and companies alike. With multinational companies involved, determining which jurisdiction has the authority to regulate specific aspects of a digital ecosystem can be challenging, especially when multiple countries are involved. Moreover, different countries have their own distinct laws and regulations that may apply to digital ecosystems, reducing legal certainty for companies operating across multiple jurisdictions.

Overall, regulating digital ecosystems presents a far greater challenge compared to traditional technologies such as cars and medicines. With their constant evolution, global reach, and inherent complexity, these ecosystems require innovative and tailored regulatory approaches.

4. How to regulate? Regulatory Strategies for Digital Ecosystems

When it comes to devising regulatory models for digital ecosystems, there is no one-size-fits-all solution. The effectiveness of regulatory strategies depends on various factors, including organizational capabilities, business models, and involved stakeholders. Nevertheless, there are common strategies that can provide guidance in developing effective regulations that foster dynamic innovation and are compatible with the distinctive demands of digital ecosystems.

A promising alternative strategy involves embracing a hybrid regulatory approach that encourages contributions from private actors. The negative perception of regulation as burdensome red tape often stems from the association of regulation with top-down approaches employed by governments. Such approaches typically rely on stringent standards and enforcement through penalties. However the traditional command-and-control strategy, while prevalent, is not the only form of regulation, nor is it the most effective approach for regulating innovative markets and digital ecosystems. Involving multiple stakeholders with diverse interests and incorporating both soft and hard law, such as co-regulation initiatives, offer more adaptable and responsive approaches that are often considered attractive alternatives to a traditional purely state-led approach. These approaches are already being tested in the realm of pro-competitive regulation. A notable example is the Japanese framework implemented in 2021, which embraces a co-regulation approach by defining the general framework within the law while allowing businesses to voluntarily determine the specific details of their obligations. Similarly, Australia and the UK have put forth proposals that rely on the formulation of tailored codes of conduct, guided by principles to be outlined in the proposed legislation.

Flexibility is another crucial aspect of regulatory strategies for digital ecosystems. Hybrid and alternative forms of regulation inherently offer greater adaptability. However, specific regulatory strategies can be pursued to prioritize flexibility and experimentation. By developing governance structures and institutions that facilitate adaptive interactions, regulators can better respond to changing market conditions. For instance, Petit and Schrepel propose the use of provisional interventions that can be promptly adjusted and leverage feedback loops characteristic of complex systems. Another approach involved the establishment of regulatory sandboxes, which offer controlled environments for firms to experiment. While regulatory sandboxes are not without their challenges, they have demonstrated benefits in areas such as financial regulation and are currently being explored in the context of AI regulation in the UK.

Furthermore, a more integrated approach to stakeholder engagement – involving industry, regulators, academia, and civil society – is crucial. Engaging these diverse stakeholders fosters a deeper understanding of the risks and benefits associated with emerging technologies and the impact of introduced regulations. Information loops enable evidence-based decision-making and ensure that scientific, regulatory, and legal thinking evolve alongside fast-evolving business models.

Additionally, inter-agency cooperation plays a vital role in addressing the interaction and cumulative effects of different regulatory frameworks such as antitrust, pro-competitive regulation, and data protection laws. Regulators must navigate these challenges and strike a balance between various policy goals, even when they may seem conflicting. Initiatives like the UK Digital Regulation Cooperation Forum (DRCF) serve as examples of institutional designs aimed at fostering greater cooperation among regulators in addressing digital regulatory matters.

In summary, a shift in regulatory strategy is necessary to effectively address the challenges of regulating dynamic innovation in digital ecosystems. This shift should entail recognizing the distinct characteristics and difficulties inherent in supervising digital ecosystems and constructing new governance frameworks that align with them. Implementing this innovative regulatory approach will necessitate experimentation and the ability to learn from the process, understanding that neither sticking to outdated regulatory strategies nor succumbing to regulatory paralysis is the way forward when the goal is to create an environment that foster innovation while safeguarding other public policy objectives.

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