Policy Toolkit

The key fundamentals to an understanding of disurptive technology and regulatory policy

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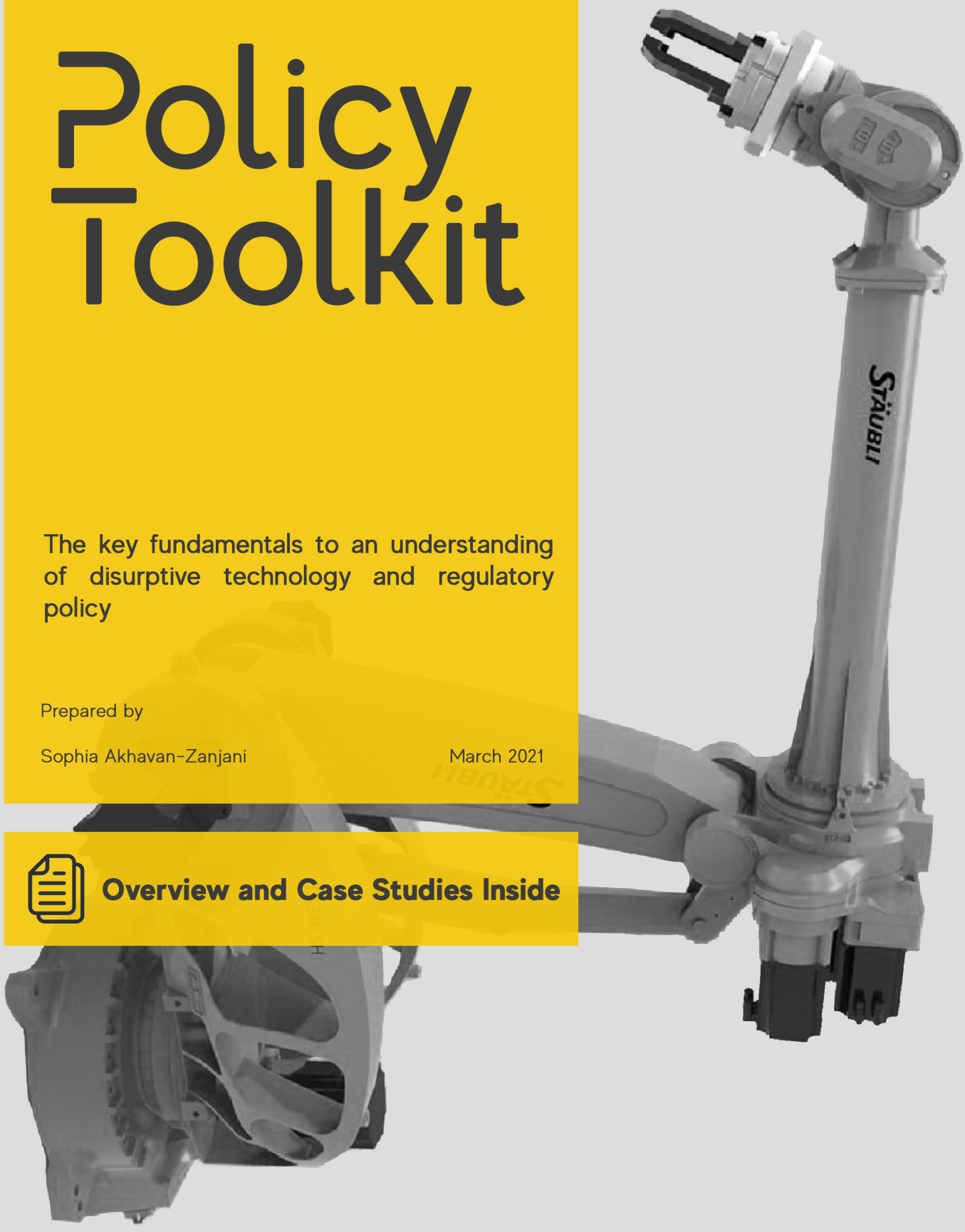
Overview and Case Studies Inside



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Purpose

This policy toolkit seeks to assemble fundamental knowledge regarding disruptive innovation and regulatory policy. Inside, readers will find an introduction to what disruptive innovation is and what it looks like. Next, an overview of the four types of policy disruptions will be introduced. These policy disruptions will provide insight into analyzing and understanding the case studies.

This toolkit will also include a list of key considerations when making decisions regarding regulatory policy. It will look at form, timing, durability, and enforcement in the context of regulatory policy.

Finally, three case studies will be provides to demonstrate the fundamentals of regulatory policy in action. The three cases include: E-bike emergence in China, Uber and taxi relations in Toronto, and telecommunications in the early 2000s. These case studies demonstrate various types of policy disruptions and disruptive innovation in the real world.

What is Disurptive innovation?

Disruptive innovation can be defined as innovations that shake the established trajectory of performance improvement, or re-define what performance means.

It can take the form as either a new technology or a new way of doing business. New technologies include new ways of producing goods, new combinations and applications of existing products & services, and the application of technology to specific societal problems. New ways of doing business include new products, new services, new ways of delivering products & services and addressing unmet consumer needs.

What technology and business methods have in common is that they cause a large paradigm shift away from incumbent industry or call for the creation of an entirely new paradigm. These large shifts cause regulatory challenges for policymakers because of their impacts on:

- Consumer Preferences and Behavior
- Industry Practices
- Delivery Channels
- Existing Regulatory Frameoworks
- Traditional Rulemaking for Complex Issues
- Pacing Between Regulation and Innovation

Disruptive innovation can also be a relative term. Business models and technologies that are disruptive in one industry might be incumbents in another. Further, disruptive innovation does not force incumbents to exit, but can make them retreat to high-end markets or co-exist.

Sustaining Innovation	Disruptive Innovation
Problem is well understood	Problem is not well understood
Existing Market	New Market
Customer believes product	Customer doesn't know
Market is predictable	Market is unpredictable
Traditional business methods are sufficent	Traditional business methods fail
Innovation improves performance, lower cost, & incremental changes	Innovation is dramatic and game changing

To address the stiff and rigid nature of regulatory policy in the face of disruptive innovation, dynamic regulation has emerged as a potential solution to make traditional rulemaking more flexible for complex issues.

This process incorporates feedback loops and anticipatory elements to adjust rulemaking to enable more spontaneous action. It also involves fewer stable rules to reduce the influence of any specific group and make rulemaking more adaptive.

The feedback loops occur between outcomes and institutions, between public and private rulemakers, and between the rule and rulemaking process.

The unrestricted flow of information can encourage a relevant and decentralized information feedback loop and help lower unforeseen incidents. Having a more dynamic and responsive rulemaking process lies at the heart of responding to disruptive innovations.

Key Term - Incumbent: a long-standing and established leader or producer in a given industry

What is a Policy Disruption?

When buisness and technologhical innovation occurs, it can upend existing models in a regulated industry. This misalignment between disruptive innovation and regulatory policy is called a policy disruption.

End-Run Disruptions

End-runs are conscious choices by entrepreneurs to exploit ambiguous or unclear laws and rules.

Businesses will argue that their technology is distinct enough from the incumbent industry that it does not need to be subject to costly regulation. Current examples today include Uber sidestepping taxi regulations.

In some cases, the disruption might not be caused by truly disruptive technology, but a bold declaration by an entrepreneur that the existing rulebook does not apply to them.

In the case of uber and traditional taxi companies, if taxi companies were to suddenly claim they are no longer taxi companies because they would manage their own fares, dispatch from an app, and let go of their former employees, then current regulations on taxis would no longer apply to them because of these business innovations.

What makes Uber distinct is that it directly challenges the current regulations that protect incumbent taxi companies.

The primary question of end-run disruptions is how truly innovative the technological or business innovations are compared to the incumbent industry. The fewer similarities between the two, then then more legitimate the claim is that the current regulatory environment does not apply.

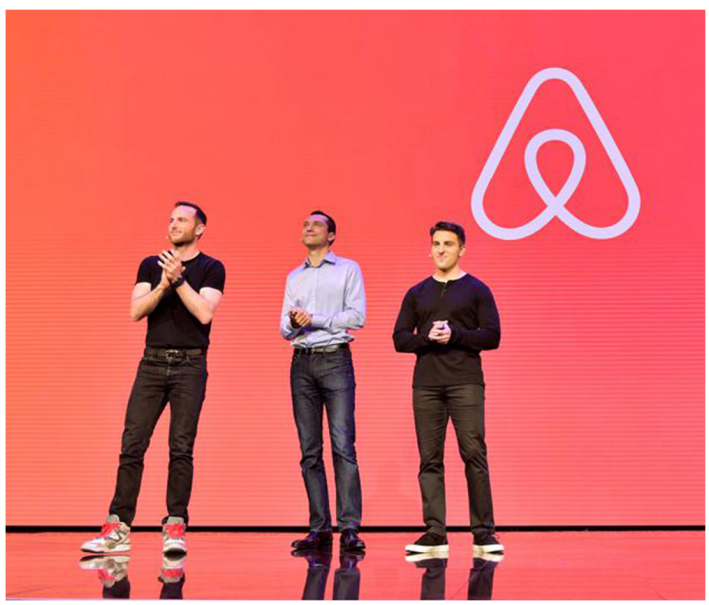
Exemption Disruptions

Exemptions are a result of a business clearly fitting a current regulatory system but are creating a undesirable condition that regulations failed to control or mitigate. This is often done through legal loopholes, waivers, or exemptions to the rule.

A current example would be the case of Airbnb where "hosts" engage in a discriminatory "guest" selection process that would be illegal under the Fair Housing Act in the United States.

The exemption from this housing law applies to those renting homes they already owned or rooms in homes they already live in. It was considered a small scale compromise necessary for passing the Fair Housing Act. However, Airbnb has scaled up the room rental market into a large industry and has made selection discrimination as easy as a smartphone swipe.

Exemptions encourage policymakers to revisit the scope and terms of the regulatory exemption and decide whether it needs to be addressed with new strategies.



What is a Policy Disruption?

Gap Disruptions

Gaps are cases where business innovation creates new policy problems where current regulations do not apply. These types of policy disruptions ask the question of whether to create an entirely new regulatory regime or extend the current one to manage the new policy problems.

For example, the rise of the internet leads to the rapid growth in targeted advertising algorithms that track user's browsing habits.

The advertising industry was disrupted by these new methods because there were no existing regulations being evaded or compromised by companies such as Google and Amazon.

This policy issue raised concerns regarding privacy and data security, yet it did not exist as far as advertising regulation was at the time.

Solution Disruptions

End-runs, exemptions, and gaps are all examples of underinclusion, whereas solutions present the problem of regulatory overinclusion. It arises when business innovation solves a problem that led to the regulation of the incumbent industry to begin with.

For example, the rise of renewable energy sources threaten the incumbent power generation and distribution agencies such as oil and gas.

In this case, renewable energy has considerable benefits for individuals and climate change mitigation policies. Further maintaining the regulatory status quo can impede the penetration of this new technology into the energy industry.

Policy Disruption	Conditions	Policy Mismatch	Legal Questions
End-Run	Innovator challenges application of the existing regulatory framework by pointing to business model distinctions between it and incumbent firms.	Innovator presents many of the same social harms that led to regulation of incumbent industry.	How possible is it that the existing regulatory regime does not apply? How should regulators react if it does apply?
Exemption	Innovator fits an exemption, waiver, or other relief from the existing regulatory framework not available to incumbents.	Scale of innovator's use of exemption presents social harm not foreseen when exemption was included in regulatory framework.	Should the exemption be closed? How? How would the actions of those benefiting from exemption change?
Gap	Innovator threatens incumbent firms, but no existing regulatory framework cover its business model or technology.	Neither the effects on the incumbents nor the possible social harms of the unregulated innovator are being managed.	Is a new regulatory framework needed? How should it be designed? Should it be included in existing framework or in a separate regulatory action?
Solution	Innovator faces barriers under the existing regulatory framework, but presents superior social outcomes compared to incumbent firms.	Existing regulatory framework is holding back a business model to technology leading to better social outcomes.	Should a new framework be developed to regulate incumbent firms more aggressively, or to open the way to new innovation?

Key Considerations

Form

Form provides insight into how the regulations will be implemented. These methods can be categorized into four broad groups, each with their own costs, benefits, and risks.

In a traditional sense, **rulemaking** is clear, authoritative, dense, robust, and transparent. It can be found in rulebooks and guidelines. It can also involve public participation and provide a space to include public concerns. Rulemaking is best used when the problem is widespread and foreseeable and when actors are public and can be easily held accountable.

Adjudication is more discrete, quick, and concrete. It is effective for targeting outliers and extreme cases that cannot be tackled through broad rule making. Due to its swift discretion, this method does not leave much room for public participation and concern.

In the realm of disruptive technologies, adjudication is often the action taken by an administrative agency that acts like a court, holding parties accountable when regulations have been violated.

Guidance does not require parties to comply with rulemaking. This allows regulatory bodies to act in a quick and low cost way to signal their industry preferences. This method is best used to coordinate lower level agencies, personnel, and bodies or to further clarify the rules already in place.

Often the argument for guidance is that some is better than none. The little room for public input and unenforceable nature do not make them desirable for many situations.

Finally, **alternative forms** of regulation include negotiated rulemaking that allows for parties to be involved more at the cost of slower implementation times.

Another alternative that has been experimented with are **waiver systems** that allow an agency to suspend the application of its rules by granting a "waiver" or expectation to parties on a case-by-case basis.

These regulatory alternatives are especially in need by agencies that are overcapacity and have few resources.

Does Form Matter?

A question worth considering is "does form even matter"? It does remain possible that the form of policies is overstated.

Guidelines regularly resemble rules or "nonlegislative rules", and courts review whether these nonlegislative rules have the force of law.

Furthermore, parties generally comply with guidelines and industries treat them as binding even though there is little legal standing due to practical purposes.

Lastly, these various forms are not mutually exclusive and many agencies use a mix or blend of the approaches discussed above. Perhaps, the distinction between the forms might not matter as much as the outcome of the policy itself.

Key Considerations

Timing

Timing is crucial for when agencies act and if they act at all. It encourages policy-makers to weigh the costs and benefits of waiting longer for better information or from acting quickly.

When acting too slow the benefits of regulation can be foregone, information becomes overvalued, and waiting for more information becomes counterproductive.

For example, when new medical device software was growing rapidly in the 1980s, the longer the Food and Drug Administration waited to regulate it, the more overwhelmed they became as they realized how truly complex the technology was.

In contrast, industries can benefit from early and clear regulation. Regulation implemented early on also avoids conflicts between parties before they become entrenched and adversarial.

However, regulation implemented too quickly can suffocate an industry and stifle future innovation.

The tight regulations on radio equipment resources restricted the development of telecommunication infrastructure in the early 2000s. This case is explored in greater detail on page 12.

Durability

Durability refers to whether regulatory policies should be permanent, temporary, or conditional. It also asks whether there are better ways to tweak regulatory interventions to different innovations.

Since technology grows rapidly, rulemaking cannot be too durable and must have some flexibility and room for growth. Further, durability can be dictated by form.

The key issue regarding durability is crafting lasting policy in uncertain situations. The most common techniques used to manage this problem are sunsets and deadlines.

Sunset regulations refer to policy that is temporary and has a finite duration.They are flexible because they can be amended, repealed, extended, or reathorized. Sunset regulations are most useful when the outcomes of interventions are highly uncertain because the damage inflicted is limited by its finite duration.

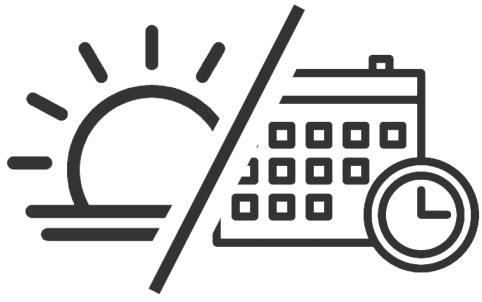
It also allows policy makers to gather better information and update the process, leading to quick reaction times towards new uncertainties and risks.

Deadline regulations are the foremost regulatory method taken by political actors.

They can take the form of clean air regulations, endangered species listings, or telecommunication standards. Deadlines excellent for dealing with persistent agency delay and for speeding up regulatory processes.

However, deadlines have the tendencies to overestimate new risk over established ones and lead to either over or under regulation. This is also partially a result of exacerbated cognitive bias in a sped up regulatory process.

Furthermore, deadlines can incentive industry actors to attempt to weaken or defeat the regulation as a precaution.



Key Considerations

Enforcement

Enforcement dictates how rigorously an agency should monitor and sanction noncompliance and is only limited by the political and resource constraints of the agency.

One cultural norm regarding enforcement is that federal agencies over-regulate new technologies, but compliance with these regulations is weak at best. Also known as **"hollow government syndrome"**, agencies are weighed down by expanding jurisdictions and stagnant resources that leads to underenforcement.

Staff become reluctant to ask for new resources and the agency's credibility is undermined because they failed to enforce rulebreakers. Furthermore, an undereforced regulation can negate the value of a durable, well-timed, and well-formed policy and sabotage the careful decisions that have been made.

In the sphere of disruptive technology, agencies have to rely on "threats" or disruptions to evolve as technology matures. When an agency fails to enforce, the damage that occurs to its credibility compounds and leads to greater problems later on.

When regulatory agencies have credibility they are able to foster trustworthiness between actors and the public is assured that they are protected.

Without this, regulatory agencies undercut their own reputation and lose integrity with their stakeholders.

Case Study: E-Bikes in China

Background

The e-bike redefined the performance expectations of 2-wheel transportation. E-bikes are easy to use, much cheaper than a motorcycle, and far more efficient than a manual bike. This was especially true for women, elders, and children that could neither have their transit needs met by a bike nor want to ride a motorcycle.

The innovation of the e-bike required a breakthrough in electric motors and battery technology to meet the demands of the mainstream urban user. Furthermore, the small-scale and low quality early production of e-bikes drew little attention from incumbents products, allowing e-bike production to grow in a space without threats.

Policy Action

In 1999 China implemented the national standard that limited the speed, weight, and power of E-bikes. The issues with this regulation was that it applied to all 2-wheelers with pedals and a battery.

This loophole led to manufacturers producing E-scooters with fake removable pedals because E-scooters offered more cargo space, more passengers, more speed, and more comfort compared to the E-bike. Furthermore, if manufacturers did not comply with the weight, width, and motor power regulations and they were simply subject to a poorly enforced fine. Between 1990 and 2010, only 16 percent of electric 2-wheelers met the E-bike National Standard.

By 2009, deaths from E-bike accidents were four times as high as 2004. to address these safety concerns, a new set of regulations were introduced for E-scooters and E-motorcycles, banning them from vehicle lanes, and requiring helmets and a driving license. However, due to resistance by consumers and manufactures, these regulations have been successfully splintered and deferred.

On the other hand, local governments that embraced E-bike and E-scooter production accelerated technology development and industry emergence.

Regulations managing air pollution, exhaust pipe emissions, and banning motorcycles for environmental reasons allowed the E-bike and E-scooter industry to grow safely.

Takeaways

The 1999 E-bike National Standard was a clear example of end-run policy disruptions whereby manufacturers found a loophole in existing regulations. In fact, the regulations encouraged large-scale production of E-bikes and E-scooters and redefined the performance features that Chinese consumers should expect from electric 2-wheelers.

Furthermore, the regulations carried little ability to enforce as the fines were left to the local authorities to hand out.

On the other hand, regulations facing the incumbent motorcycle industry benefited E-bikes and E-scooters in many ways and thrusted the industry into a stage of mass production.

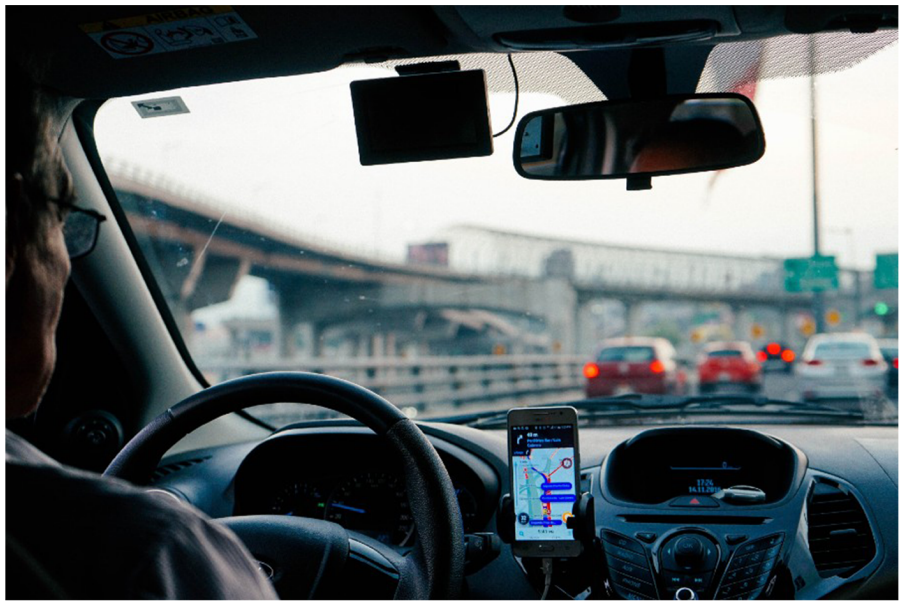
The electric 2-wheeler rapidly became the alternative to motorcycles as Chinese local and national authority began to clamp down on its production. Regulations have the possibility of not only stifling industries, but accelerating them and increasing their technological and production development as a whole.

Case Study: Uber in Toronto

Background

Traditional taxis have been regulated by local governments in North America for decades. The number of cars, drivers, and taxi-companies was tightly controlled by regulatory authorities.

With the introduction of Uber, a popular digital ride-sharing service, anyone can become an Uber driver as long as they have a smartphone and suitable vehicle. The business innovation of digital ride-sharing has upheaved policy regulating taxis as the company exploits legal loopholes and ambiguous rules.



Uber launched in Toronto in 2012 and was immediately faced with 25 municipal licensing offences, which were ignored by Uber. The city then pursued a court injunction based on public safety to only have it dismissed in 2015. Officials were unable to prove that Uber broke any existing bylaws or was operating as an illegal taxicab service.

Policy Action

To address these policy disruptions, the provincial legislature was introduced to encourage more app-based companies, labeling Uber as a "transportation networking company".

In response, cab drivers staged large scale protests that ultimately were ineffective. In 2016, Toronto approved a new form of license called a "private transportation company" license that allows companies like Uber and Lyft to operate.

Under this law, companies pay a one time, nonrefundable fee of $20,000, as well as an annual $15 per drive, and each trip is subject to a $0.30 surcharge.

Takeaways

Uber changed the taxi industry by creating a new way to hire and hail private transportation services. By targeting low-end ride hailing services by applying existing technology in new ways, such as the double rating system, electronic payment, and taximeters based on GPS.

This innovation in business caused a severe underinclusion of Uber into the existing regulatory framework for taxis. This is a prime example of end-run and exemption policy disruptions that resulted in Toronto adopting an entirely new regulatory framework for Uber and alike companies.

This development might have also been motivated by how much Uber altered customer behaviors and references regarding ride hailing services as Uber is simply a more convenient taxi.

Toronto Mayor John Tory even expressed public support for Uber as a key innovation for the local ride hailing market.

Case Study: Telecommunications

Background

Telecommunication companies have been especially resilient to disruptive technology. The adoption of smartphones overwhelmed Nokia's business model, and the appearance of digital cameras subverted the business of Kodak, but various internet messenger companies such as Skype or Whatsapp have not toppled the incumbent industry.

The sustainability of the incumbent industry towards disruptive innovation because the innovation never targeted the incumbent infrastructure. Phone call traffic turned to video data traffic, or SMS message traffic turned to direct message traffic. In the end, the incumbent industry's infrastructure was still the basis for these new innovations.

Policy Actions

Regulatory policy plays a key role in determining the development of technology and specifically in the expansion of wireless networks. Natural resources used for wireless communications are very limited on a free access basis, limited to established companies and allocation has often been done on an economies of scale basis.

Worldwide Interoperability for Microwave Access (WiMAX) is a set of wireless broadband standards that regulates the allocation of wireless broadband resources for 3.5GHz networks, among many other functions. These regulations played a part in stifling wireless communications development in the 2000's because the main resource required for infrastructure was not in the common domain.

WiMAX centralized the decision making into the hands of the main players. This means decisions regarding future regulations and allocations will be influenced by past investments and the sunk cost phenomenon.

One major drawback of WiMAX was its lack of foresight, as it did not assume that networks of mobile providers would evolve beyond 3G infrastructure. Instead, it required that new networks would operate separately from cellular networks. This lead many incumbent companies feeling left out to dry, as many had invested in the creation of new networks.

Takeaways

The WiMAX case shows us evidence of severe pacing problems where the pace of development of technology is faster than the law that aims to regulate it. In this case, the slow response of WiMAX might prove pacing problems as beneficial to incumbent companies because it impedes disruptive innovations.

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