

## Global service platforms in local markets: case taxi services

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**Abstract** In this paper we discuss digital platform economy and use theory of Governance of Commons by Elinor Ostrom as a lens through which we look at related problems and social issues, such as tragedy of the commons. We discuss how communities can react to side effects and overgrazing of free, common resources by norms and rules. We illustrate the issue with the opening of taxi service markets to new entrants such as Uber.

**Keywords:** • Digital platform economy • Governance of Commons • Uber • Taxi • Common resources •

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## 1 Introduction

Digital Platform Economy has been aired for its efficiency, innovativeness, and disruption of the markets. In this article we discuss the relationship of platforms such as Uber and their national equivalents with the limitations of physical infrastructure and markets. Our article pinpoints that even though the platforms may hold their promise this may not be what the communities need, want or can sustain.

We illustrate the unprecedented side-effects of the disruption on the markets with Uber in Metropolises of the U.S. The side effects include doubts on safety, unfair pay and worsening working conditions, as well as congestion and pollution on streets. There after we analyze changing taxi markets in Finland.

The potential remedies to situations where new platform businesses threaten to disturb the markets range from privatization of assets, regulative mechanisms to local agreements (Ostrom, 1990).

This paper is structured as follows: First, we describe the benefits and arising concerns of platforms as experiences on their unforeseen effects are accumulating. In the next chapter we use the alternative theories to explain how to tackle the problems of externalities, socially undesirable behavior and overgrazing the common resources. In Chapter 4, we illustrate the situation with Ubers at New York and other metropolises in U.S. In Chapter 5 we analyze the impacts of opening of taxi market in Finland. The paper ends with discussion and conclusions in Chapter 6.

## 2 Benefits, complexity and concerns of platforms

Amazon, Facebook, Airbnb, Lyft and Uber are examples of digital platforms which have changed the way we work, socialize, create, and share value in the economy (Kenney & Zysman, 2016; Sundararajan, 2016). These digital platforms, defined here as sociotechnical assemblage of the technology, associated organisational processes and standards (de Reuver et al., 2018), have been praised for their new innovative business models that may even disrupt the current markets and create more consumer surplus with their innovative, technology-based business models facilitating multi-sided markets.

*Multi-sided market* is the core concept of platforms. Often the platforms match different groups of users, such as buyers and sellers, and can differentiate them for capturing better profits, growth prospects, and providing superior or cost-effective service for the customer. Instead of focusing on profit maximisation in a single market, platform owner's business model primarily aims at serving several user groups and tries to find balance between openness and lock-in of customers (Ballon & Van Heesvelde, 2011). The customer markets can be defined as separate markets for each customer group, or as single market to all customer groups with different set of products and services. To estimate the benefits to one party using the platform, the platform owner must consider the benefits (increase in efficiency and profit) on both sides of the market, i.e. towards the customers and partners/suppliers/producers. This is at the core of the superiority claims of platforms such as Uber and Airbnb.

*Network externality* is another important concept related to platforms. Positive network externalities mean that the larger number of users on the platform, the higher is the perceived or expected utility from using the platform (Katz & Shapiro, 1985). This fosters growth and innovation, but complicates the analysis of competitive markets, because the utility can vary substantially between the segments, depending on their valuation of the expected benefits in the future.

Even though the public discussion many times is about which of the platforms will win and dominate the markets, in reality the combination of multi-sided markets and positive network effects with risk-seeking venture capital can create situations where competitive, oligopolistic and monopolistic markets exist simultaneously. In addition, predicting the emergent side effects on the environment and vice versa (i.e., indirect externalities), and the dominant market structure becomes then almost impossible. It can lead towards *tipping markets*, where one platform dominates the market, either by indirect network effects of interdependencies of different customer and supplier groups, or by cross-subsidisation of the sub-markets by the platform. On the other hand, it can also lead to so-called *multi-homing* behavior, where customers are not connected with one platform of multi-sided markets only, but use other platforms, too.

The literature on platforms also points out the regulatory role of platforms, as they create markets of their own. Boudreau and Hagiu (2009), for instance, show by case examples, how setting the prices was not enough to assure proper

functioning of the multisided platform ecosystem, but required regulation of access and interactions by contractual, technical and informational instruments.

### 3 Governance of Commons

Many of the problems explained in the Chapter 2 stem from self-interested behavior, negative externalities or from the changes on the use of resources, which the platforms exploit or affect in their business.

The solution usually offered to avoid negative externalities is privatization (Buck, 1992). We could make clear the property rights and liabilities by making the resources private. It is claimed that if one party can establish the property right, there will be a bargaining process leading to an agreement in which externalities are taken into account. Thereafter it is a matter of finding proper balance of regulation of markets and introduction of pricing.

However, in certain circumstances the above solution is not working, but rather creating the *tragedy of the commons*. tragedy of the commons is illustrated with an example originating from Hardin (1968): There is a common village pasture, which can support only a limited amount of cattle, but all the villagers are entitled to pasture their animals on the field. Each villager benefits from his own animals and suffers from the deterioration of the commons when his and others' cattle overgraze. In this situation each of them is tempted to add more and more animals because he is getting direct benefit from his own animals and bears only a share of the costs resulting from overgrazing.

The tragedy of commons is apparent in situations, where property rights cannot easily be established (such as with the air, sea, or roads). The usual claim is that rational, self-interested individuals will not act to achieve their common interests, unless the number of individuals is small or unless there is aforementioned enforcement of regulation taking place. The premise for such situations is that any person, who cannot be excluded from obtaining the benefits of a collective good has little incentive to contribute to the joint effort, but to free-ride on the effort of the others for self-interest. An extensive literature discusses the effect of free riders, concluding that common pool resources would inevitably be destroyed because of lack of care (Buck, 1992). To avoid such tragedies of the commons the central governments should control common pools of resources

that cannot be appropriated (e.g. most natural resource systems). They can intervene in directly through taxes, or directly with controls and regulations, such as selling permits, licenses or limiting the use of the common resource pool.

Nobel-prize laureate Ostrom (1990), suggests an alternative solution to govern the commons. Continuing the example of the common village pasture, she notes that the herders, who use the same meadow year after year, have detailed and relatively accurate information about carrying capacity. Thus, they should have the best information required for making optimal decisions on the usage of the common pasture. The community members can “*make a binding contract to commit themselves to a cooperative strategy that they themselves will work out.*” And, when they are herding their animals, they can observe the behavior of others and report contractual infractions.

The outcome of this is in strike contrast with the idea of self-interested behavior regulated by central authority: “*groups are capable of avoiding the tragedy of the commons without requiring top-down regulation*” (Ostrom 1990, 2009). Ostrom’s main argument is that small, local communities establish rules overtime to avoid overusing common resources. Instead, these rules are both economically and ecologically sustainable, at least if core conditions listed in Table 1 are met (Ostrom 1990, 2009).

**Table 1. Eight core design principles by Ostrom, 2009**

<ol style="list-style-type: none"><li>1. <b>Clearly defined boundaries;</b> members know that they belong to a group and why do they belong exactly to that group, and what are the limits of the common resource.</li><li>2. <b>Proportional equivalence between benefits and costs;</b> there is a connection between earnings and effort, e.g., appropriation of rents is not enough.</li><li>3. <b>Collective choice arrangements;</b> i.e., agreements must be reached in consensus by those affected by the agreements.</li><li>4. <b>Monitoring users and condition of the resource;</b> Harmful self-interested, self-serving behavior can be detected.</li><li>5. <b>Graduated sanctions;</b> Repeated self-serving appropriators are assessed graduated sanctions according to seriousness and context of the violation by group members, or by officials accountable to these appropriators, or by both.</li><li>6. <b>Fast and fair conflict resolution;</b> Conflicts can be handled without excessive costs, locally, and without internal conflicts breaking the group.</li><li>7. <b>Local autonomy;</b> The group is autonomous to manage its own matters without external authorities intervening.</li><li>8. <b>Nested enterprises:</b> When the resource is closely connected to a larger social-ecological system, governance activities are organized in multiple nested layers. (Ostrom, 2009)</li></ol>
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In conclusion, the literature proposes three remedies for the challenges arising from non- functioning markets: privatization, regulation or local commitment.

How is this then related with platforms? As the platforms are keen to disrupt markets, they exploit the common pool of resources without considering overgrazing or indirect negative externalities. Furthermore, they are also keen to expand, fueled by venture capital and IT, which means unprecedented spread of the services to the new areas, ‘overgrazing’ the local resource pools, and causing tragedies of commons. This is evident in metropole areas, where the increase of Airbnb is regulated by city councils. Similar challenges are with Uber and Lyft due to the increasing evidence on their unanticipated indirect external effects on congestion, pollution and diminishing use of public transportation (Erhardt et al, 2019).

As suggested by the theorists above, the outcome can be highly unpredictable, and hence other approaches than the standard means of regulation and introduction of pricing mechanisms are in need. This is especially true, when it involves the threat of overgrazing common pool resources, or changing the status quo of locally agreed and locally committed social arrangements. We illustrate the former with examples from metropolises in the U.S. and the latter from the deregulation of Finnish taxi markets.

#### **4 Illustrative example of Taxi services in Metropolises of the U.S.**

The success story of Uber platform tells about better access to taxi services, both in terms of availability of services and average decline in prices. For instance, safety and similarity are appreciated by globetrotters, who receive similar service in cities all over the world, and safety for the drivers is appreciated in some areas.

In Uber, each driver is expected to own a car used to render the service and the drivers are not employed by Uber, but the drivers get paid per gig. There is no centralized dispatch service-center, but service requests are automatically processed by Uber’s algorithm; drivers can use their smart phones to receive and respond the service requests from users by an app. This application also allows customers to place orders through it, which also locates customers automatically for the driver. Furthermore, customers can follow in real time the location of the ordered driver such that they know when to expect the car to arrive. Payment is

handled automatically through the smart phone app at the end of the ride, when also customers rate the service publicly with the application.

Impacts to markets are easily seen for instance in the New York: There are officially black taxis (limousine and premium for corporate customers), green and yellow taxi cabs (midrange, street hailed), and small livery companies for hire vehicles, which carry less than 10% of paid trips in Metropolitan New York. Uber services and other similar platforms offering ride services (PRS) have disrupted the prevalent market segmentation by changing pricing and increasing pre-arranged rides. As a consequence, the supply has increased, and segments are overlapping, thus in general meeting better user needs for transportation.

The new entrants have gained big market shares quickly. Figures vary, but Uber's market share of the US ride-hailing market is between 69% and 74% (Iqbal, 2018). For instance, in New York PRS now outnumber yellow taxis four to one (Wodinsky, 2018).

However, there are several negative impacts as well: The studies reveal that PRS has added billions of miles of driving in the largest metro areas in the US at the same time that car ownership grew more rapidly than the population (Schaller, 2018). Uber taxis actually use more mileage per trip, because they have to pick up the customer. And they prefer not to park but to drive around, because parking is expensive. Thus, 20-50 percent of miles are without passengers (Law, 2018). Importantly, PRS actually compete mainly with public transportation, walking and biking. In major U.S. cities, the popularity of FHV has "*reduced the use of buses by 6% and light rail by 3%*" (c.f. Law, 2018). Thus, it seems that the increased supply has lured people to switch from public transport to taxis making limited street space congested. These findings are confirmed in another assessment of the effects of uberization in San Francisco; it found that contrary to the vision of PRS, it is actually the biggest contributor to growing traffic congestion in San Francisco (Erhardt et al, 2019).

In 2018, two years after entry of the PRS, New York decided for limitations (New York City, 2016). The license's duration was shortened to 12 months, driver minimum wage and minimum fare price was introduced, number of PRS cars cannot grow, but in wheel-chair -accessible category, or where PRS service is in short supply (Wodinsky, 2018). Still, the taxi drivers consider not to be part of

the deal and there has been recently strikes due to worsening income by drivers (Rapier, 2019).

One could also argue that it is a matter of time, when the markets will find the right balance between regulatory measures, pricing, demand and supply, but, for example Uber has been operating in San Francisco since 2010, and in New York since 2011, so the explanation is neither credible, or feasible. Hence there is a need for better, more local approaches, such as the one proposed by Ostrom's design principles.

## 5 Analysis of taxi services in Finland

In Finland, taxi markets have been highly regulated, authorities admitting taxi licenses on regional needs basis. However, the authority in charge of regulation, Finnish Ministry of traffic and communications, informed in Autumn 2016 that taxi business is to be deregulated. The expectation was that deregulation would result in more taxis, better service, cheaper prices and more taxable income for traffic investments. Since Autumn 2018, there is no more regulation on the amount of taxi cars, the taxi licenses are national (instead of regional), official requirements on vocational competence and local knowledge are omitted (passing a simplified test is sufficient), and pricing is liberated.

The Ministry is following the effects of the deregulation on taxi markets with surveys, which form the main data source for our analysis. The Ministry anticipated that the main effects are the opening of the taxi business to new entrants and boost in innovation in transportation services. This came true: there are new entrants and the total number of taxi-licenses grew in Finland: In Feb 2019, there are 2762 (29%) taxi licenses more on the market (of total 12249 licenses) than at the end of the regulation in the Summer of 2018. Consequently, the taxes paid by taxis should have increased. However, the most recent statistics shows opposite results – the taxes paid by taxis actually decreased by one third from the previous three years according to the tax authorities – this discrepancy is expected to be due to tax evasion (Konttinen, 2019).

However, a more detailed analysis reveals that the regional differences are significant – the increase of licenses takes place in the big cities. Uber is operating only in the capital area in Finland. As cities are becoming dominated by



international taxi company subsidiaries, they are turning to oligopolistic leader-follower pricing: the price of taxi service increased by over 20% in the biggest cities. At the same time, sparsely populated areas suffer from increasing lack of taxi service, and this is causing severe problems for example to elderly countryside residents. The complaints about non-profitable business has increased (in public discussion a 25% decrease of income is regularly reported, with an increasing workload).

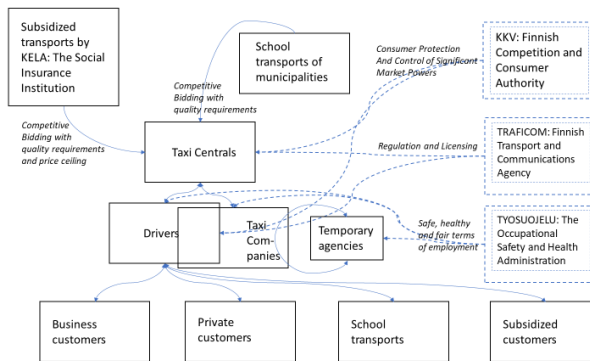


Figure 1. Taxi markets in Finland

After deregulation, the market changed as depicted in Figure 1. There are now clearly several distinctive markets for Taxis in Finland:

1. Business customers and private customers, who can negotiate the price when reserving transportation. The market *has turned to an oligopolistic supplier markets* in bigger cities, where a few international taxi companies dominate the market share and have been able to raise the price level recently. Typical price reduction of negotiating the price at the spot (taxi post) is -25% from the list price. On the other hand, during rush hours, or late-night hours the price can be many times the list price. In sparsely populated areas the situation varies. Small one car-one driver companies are not obliged to be on call, which means that the cars are not available as before, or at all. Bigger companies have no interest for the insignificant market.
2. School and daycare transportations are allocated through competitive biddings by municipalities. The prices are pushed down by combining

rides for the elderly and school kids. Typical winners are taxi companies of bigger size, who can guarantee regular, daily service. The market consists of *multiple monopsony-oligopoly structures*.

3. Subsidized KEELA-transport<sup>1</sup>, where a sole client determines a ceiling price and saves costs by requiring combined transports with minimum number of passengers. On the other hand, taxi centers act as proxies for small and big taxi companies and they are inspected by authorities for the quality of service. The political pressure for price reduction continues. Market has switched from *pure monopsony to monopsony-oligopolistic structure*. Half years after deregulation the studies show how service level and availability has deteriorated significantly in the special customer segment, such as elderly and people with wheel-chair.

In summary, the liberation of taxi markets has not moved towards perfectly competitive taxi market, but it has led to the growth of internationally funded big fleets of taxi companies, who can utilize the economies of scale. It is now clearly oligopolistic markets for private customers, and the previous oligopsonies (municipalities and KEELA) are facing oligopolies in their negotiations (instead of association of taxi drivers). This is in line with the theory predicting tipping and unpredictable markets in an uncontrollable manner.

The outcome in densely populated areas is better availability, but lesser profitability for taxi drivers, because the big companies were able to exert predatory pricing in the beginning and later increasing prices. The prices rose +14% in the capital area and +7 % in the whole country. At the same time there are some hints for slightly diminishing use of other public transportation like buses, trams, trains and metro in bigger cities. However, in sparsely populated areas the capacity reduction in taxi services is clear, and in some places, there are no taxi service, as the drivers quitted or sold their companies to big players.

So, there are major problems with service quality, price levels, competitive bidding and obviously tax evasion – by the public, the taxi liberation is considered a failure, and the differences between market segments is significant. Majority of regular customers and subsidized specialty customer groups feel that the effects of deregulations are negative (Uusitalo et al., 2019). Hence there is also a need

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<sup>1</sup> In Finland you can get reimbursement for your travel costs in connection with the treatment of an illness.

for alternative, probably market segment specific, more local solutions, as the central government is not capable to meet the objectives of the deregulation. One attempt for Ostromian solution is explained below.

### **Local adaptation of deregulated taxi service - ATaxi**

We also analyzed in more detail the reactions of one incumbent taxi service provider, a taxi drivers' co-operative ATaxi, which had operated over hundred years in Northern Finland. With its high standards ATaxi had created over the years locally well-known brand image of quality, credibility and safety. It served customers in the rather sparsely populated region with a fleet of 600 cars equipped with proprietary technology that enabled the drivers to receive and accept orders and accept debit/credit payments among the first in the world. Customers could order ATaxi by calling centralized call-center, which forwarded request to nearest drivers, the fastest of whom then took the order, previously via radio, later via the mobile Internet. In practice, before deregulation, the ATaxi had a monopoly position in the local market for almost a century – the situation was basically the same in other regions in Finland. Legal consultants helped ATaxi to evaluate the kind of changes they can make, not abusing its significant market powers, which ATaxi still possess. ATaxi realized that its competitive edge was that it offers reliable, safe, and high-quality taxi services. In order to be able to keep this value proposition, the company balanced the number of cars to serve the market well and still provide sufficient earnings to the drivers. Thus, instead of competing with price, it aggregated regional taxi data and estimated the number of taxis required to meet its service proposition. The rules of ATaxi membership, including rules for determining the number of drivers were agreed and put openly available from their web pages. These rules are revisited biannually, or whenever members see it necessary. In addition, the co-operative saw as a necessity to introduce new brand, and new channels through which the customers can identify, order and interact with the service.

## **6 Discussion and conclusion**

This paper discusses the side effects of platform economy: the unanticipated consequences and indirect externalities. The two identified unexpected effects on the community, based on theory and accumulating experiences of platforms in taxi business are the overgrazing of common resource pool and unanticipated

changes of the market structure. The former is illustrated with an of Uber in the U.S., where uberlike platforms' indirectly diminishes use of public transportation, and consequently increase environmental pollution and congestion. The latter case is illustrated with taxi services in Finland, where deregulation of taxi services changed the market structure significantly and failed to meet the set targets of the change. However, a regional taxi company operating in Northern Finland designed a local solution for deregulated markets, that was able to maintain the present quality of service without deteriorating the income of taxi companies and prices.

Next, we discuss the three cases: Uber, Finnish taxi deregulation and the countermeasures to the deregulation by ATaxi against the backdrop of Ostrom's *Core Design Principles* for groups capable of avoiding the tragedy of the commons by:

9. *Clearly defined boundaries; members know that they belong to a group and why do they belong exactly to that group, and what are the limits of the common resource.* Taxi drivers formed a professional community, and license system set geographical limits to the common resources: space and customer base. Uber in N.Y.C and deregulation threatened the status quo and served as an incentive to limit the overgrazing of street space (N.Y.C).The limited customer base of ATaxi in Northern Finland, who nurtured their professionalism despite the regulation in a limited geographical area and are (so far) able to avoid the complications of changing market structure elsewhere in Finland
10. *Proportional equivalence between benefits and costs; there is a connection between earnings and effort, e.g., appropriation of rents is not enough.* Disruption of the market and falling profits (N.Y.C), or threat of future decline (ATaxi) created an incentive to re-regulate the market by the community, so that the drivers can earn a living from their profession. This actually was the boost to renew the rules for ATaxi which returned the balance between earning and effort. In metropolises of the U.S. the taxi drivers started demonstrating, because of unfair share of income.
11. *Collective choice arrangements; i.e., agreements must be reached in consensus by those affected by the agreements.* Taxi drivers' unions were formerly negotiating for different markets in N.Y.C (black, green, yellow, livery markets); or serving all market segments in Finland (private, business, subsidized rides) with obligation to being on call and providing service in sparsely

populated regions. As the markets were deregulated, the consensus disappeared. Sparsely populated areas are suffering from no-access to taxi services and in N.Y.C., there was no respect to the upper limit of taxi cars, which drove the prices down and congested the streets. ATaxi maintained the on-call responsibility.

12. *Monitoring users and condition of the resource; Harmful self-interested, self-serving behavior can be detected.* As the agreed use of common resource could not be, or was not allowed to be monitored, due to liberalization of terms of conditions, the situation promoted self-interested and self-serving behavior. In essence, the negative externalities (for drivers non-sufficient wages), and negative indirect externalities (congestion in N.Y.C, lack of service in sparsely populated areas, oligopoly price-hikes in densely populated areas) could be detected only afterwards, leading to unintended consequences. The local communities responded by re-regulating the market, or by establishing mutual consensus agreements and self-monitoring and -reporting by rules (see also 3. and 5.) and applications available to the customers, too. However, in Finland there is evidence of increasing tax evasion beyond the control of tax office.
13. *Graduated sanctions; Repeated self-serving appropriators are assessed graduated sanctions according to seriousness and context of the violation by group members, or by officials accountable to these appropriators, or by both.* It appears that both the platforms (N.Y.C.) and deregulation set centrally strict sanctions for the drivers. This differs from the past where sanctions were graduated, proportional, and maintained by the community, which is still the case with ATaxi.
14. *Fast and fair conflict resolution; Conflicts can be handled without excessive costs, locally, and without internal conflicts breaking the group.* Disappearance of taxi inspectors in Finland has led to situations, in e.g. big events, where there is no impartial authority over all taxi drivers for queuing, unloading, etc., or reconciling non-satisfactory service, or pricing has lead to fist fights for customer in waiting areas (IS xxx), which lead to local conciliation between taxi companies and municipality. The conflict resolution by the authorities is simply too slow and non-proportional demoralizing the profession.
15. *Local autonomy; The group is autonomous to manage its own matters without external authorities intervening.* Platforms and authorities have moved in the territory of self-regulated drivers and companies, with un-intended

consequences on availability (in restless areas of N.Y.C.; sparsely populated areas in Finland), quality of service (subsidized rides in Finland), and on pricing (greater Helsinki area in Finland, rush-hours in N.Y.C.). The central authorities are not able to solve the problems in our cases despite their attempts.

16. *Nested enterprises: When the resource is closely connected to a larger social-ecological system, governance activities are organized in multiple nested layers.* There is an indication that ways to enhance the situation is not by redistributing the resources (N.Y.C., Cities in Finland), or by pushing for harder competition and setting price ceilings in competitive bidding in subsidized rides in Finland. Instead, the parties should come together and acknowledge the limitations of market mechanisms and utilize platforms and re-regulation to give a try the Ostrom Core Design Principles to avoid over grazing of common-resources, or distortions on the distinct markets. This remains to be seen.

The examples in previous chapters show how the taxi services quality and supply increased in big cities, but on the other hand caused overgrazing of common resources, the street areas. Therefore, In US the communities were soon forced to restrain Uber by establishing new rules regarding number of cars and length of license periods. In Finland, the deregulation of the markets in the whole country did not work as anticipated by liberators. The emergent properties were many and hard to predict. Instead of perfect markets, the market was divided in several distinctive markets: the markets in big cities concentrated and is now dominated by international players. There are now more taxi cars driving around in the cities, but contrary to expectations, the prices rise. In special customer segments and sparsely populated areas the quality reduction in service level is clear. As a response to the above a local ATaxi community in a limited geographical area established rules to balance the number of taxi cars to serve the market well and still provide sufficient earnings to the drivers. Ministry is currently evaluating impacts of the deregulation in Finland and might be forced to take actions similar to New York and set restrictions to the taxi service markets, or alternatively, allow the local communities to establish their own rules for guaranteeing available, safe, and reliable taxi rides.

In the illustrative cases it becomes evident that there are no simple solutions, but the solutions are actually adaptations to the dynamic situations, which are hard

to meet by the standard means of privatization, i.e., by appropriating resources and introducing pricing mechanisms. Assuming multi-sided perfectly competitive markets is not true in the markets that can vary from monopsonies of customers to oligopolies of big taxi companies, or call centers, operating on limited common resources in terms of space or population.. This is further complicated, if the common pool resources are not taken into account. Nevertheless, the avoidance of the tragedy of the commons builds on social norms and characteristics of the community and adapting the platforms to their situations on an on-going basis.

More sensitive solutions to the situation could be provided by alternative approaches such as Ostrom's Core Design Principles. Combined with the power of multisided markets, it could be worth trying to achieve sustainable and better suited markets for the needs of the segments, both producers, aggregators and customers.

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