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What's in an App? Investigating the Moral Struggles Behind a Sharing Economy Device

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Abstract

In recent years, the sharing economy (SE) has attracted considerable attention, both scholarly and popular, relating to its capacity to enforce or undermine extant economic conventions. However, the process through which technological developments can effectively have this outcome of altering extant conventions on what is morally acceptable or desirable is still unclear. In this paper, we draw on the work of Boltanski and Thévenot (On justification: economies of worth. Princeton University Press, Princeton, 2006) and the notion of *agencement* to investigate the moral and performative dimension of controversies related to the SE. The research stems from a qualitative case-based study of the controversy following Uber's implementation in Montréal's taxi market. We contribute to the literature on the SE through an empirical study of the moral debates entailed in the unfolding in situ of a SE device. We also add to the literature using the 'Orders of Worth' framework (2006) by showing how a compromise is solidified. We find that beyond discursive strategies, it is the concrete recomposition of laws, conventions, devices, persons, etc. that harmonised different definitions of the common good. Finally, we contribute to the literature on the relationship between technology, ethics, and social change by capturing the specific values that legitimise Uber, and by following their unfolding throughout a controversy.

Keywords Sharing economy · Controversies · Orders of worth · Agencement · Technology

Introduction

Over the past few years, platform businesses such as Uber, Facebook or Google have substantially transformed the ways in which individuals interact and associate with each other (Srnicek 2017). Given their role as intermediaries, many of these businesses have found themselves in controversial situations not only with regard to the strategic threat they pose to incumbents, but also with regard to the values and objectives they prioritise. For example, the private messaging app WhatsApp has recently been embroiled in controversy regarding its responsibility in the propagation of fake news related to Brazil's election (Boadle 2018). Under the guise of privacy, its end-to-end encryption allegedly allowed the sending of bulks of inflammatory and fabricated messages to millions of citizens, with no way for authorities, independent fact checkers or even the platform itself to monitor them.

Sharing economy (SE) businesses such as Uber and Airbnb, which offer alternative means of organising economic relations by intermediating decentralised exchanges between individuals, often provoke similar controversies. In particular, important questions are raised about topics such as taxation, working conditions, privacy or sustainability (Laurell and Sandström 2017; Murillo et al. 2017). More generally, scholars inquire about whether SE represents a "new pathway to sustainability" (Botsman and Rogers 2011), carrying values like sharing, collaboration, social equity and democratisation of economic relations (Belk 2010), or whether it could in truth constitute a form of "neoliberalism on steroids" (Murillo et al. 2017), renewing with even greater intensity economic values and market rules.

Existing research shows that the technological devices on which SE and, more broadly, platform companies rely are not morally neutral. They are value laden by design, and are part of networks of human and nonhuman entities that enact specific realities to the expense of others (Introna 2014; Martin 2018; Martin and Freeman 2004; West 2017; Whelan

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2019). As such, their legitimacy and traction depend on a tacit or explicit, formal or informal, acceptance of the moral preferences they entail by significant stakeholders (Introna 2014; West 2017; Whelan 2018). This acceptance sometimes implies substantive changes in what is conceived of as the appropriate way of doing things in a given sector. Despite the importance of this topic in view of the proliferation of contentious networked technologies, it is still unclear how such changes in conventions come about. What is evident, however, is that these clashes between moral preferences are at the heart of many of the controversies involving SE devices.

In this paper, we thus set out to further our understanding of the moral preferences entailed in SE platforms by following actors of empirical controversies as they try to make sense and address their moral and normative concerns relating to SE, and as they try to coordinate and agree practically and in action on the appropriate or desirable 'way of doing things'. To do so, we build on the work of Boltanski and Thévenot (2006) and the notion of *agencement*. At the centre of Boltanski and Thévenot's contribution is the idea that social arenas feature a finite repertoire of moral principles and conceptions of the common good that coexist and sometimes clash (Boltanski and Thévenot 2006). These conceptions of the common good perform as conventions, as they make it possible to organise action, to structure behaviours by offering a way of solving problems. A growing body of literature relies on their 'Orders of Worth' framework (2006) to investigate controversies. These works focus on discursive struggles to analyse the way different actors mobilise competing definitions of the common good to justify themselves and construct intersubjective agreements following situations that raise uncertainty, such as the introduction of new technologies (Dionne et al. 2018; Gond et al. 2016; Nyberg et al. 2017; Patriotta et al. 2011).

While they map how morally competent actors justify the (il)legitimacy of decisions by enlisting a plurality of moral principles, such explanations of controversies are often confined to the level of abstract morality, and tend to slip to the sole consideration of belief systems, representations or rhetorical strategies. They are thus neglecting "the confrontation with circumstances, with a specific reality, … the involvement of human beings and objects in a given action" (Boltanski and Thévenot 2006, p. 128), which is central to the proposition of Boltanski and Thévenot and, arguably, to the understanding of how material features can sustain or alter conventions. According to Lemieux (2014), 'On Justification' puts forward "[an] 'ecological' approach that examines the various ways in which material and organisational constraints not only permeate specific social situations, but also encourage human actors to mobilise the normative resources embedded in their reflexive, critical, and moral capacities (p. 163)." By returning to an 'ecological' reading

of Boltanski and Thévenot and adding to it the notion of *agencement*, that we define here as a local assemblage of human and nonhuman entities that act and give meaning to action, we can thus position our analysis at the level of the concrete work of 'moral engineering' of actors.

Building on these theoretical considerations, we ask: how do SE *agencements* change the collective understanding of what should be valued at the scale of the market? To address it, we conducted an in-depth case study of the controversy following the implementation of a SE device, namely Uber, in Montréal's taxi market from October 2014 to October 2017. Like most metropolises, Montréal's taxi industry is highly regulated and governed by a supply management system. Uber's arrival in such markets, with its novel business model and its refusal to submit to existing rules, has significantly disrupted local taxi market all around the world (Lashinsky 2017). Our case study is based on media coverage of the actions, discourses and devices of the major actors.

Our contribution is threefold. First, we contribute to the literature on SE through the empirical study of a controversy which highlights the plurality of normative and moral concerns raised by SE. Second, we contribute to the body of literature relying on the 'Orders of Worth' framework (2006) to investigate controversies by showing how an 'ecological' reading of Boltanski and Thévenot improves the understanding of the concrete work of reengineering entailed in building compromises. Finally, we contribute to the literature on the relationship between technology, ethics, and social change by showing how specific values are unfolding in time and space, through the engineering operations of actors, to support or undermine the legitimacy of technological developments. By putting together these streams of research, we thus understand better the content and the processes of the transformations that occur following a technological development.

We first review the literature on SE and the contributions of the stream of research that focuses on technology, ethics and social change. We position our perspective by detailing our use of Boltanski and Thévenot (2006) 'orders of worth' framework, and then discuss our methodology and contextualise our empirical case, followed by a presentation of our main findings. We finally draw together these findings to discuss our initial question and address their theoretical implications.

The Sharing Economy

The term 'sharing economy' describes economic initiatives that rely on peer-to-peer relationships to provide access to underutilised goods and services (Schor and Fitzmaurice 2015). It includes businesses that rely on digital platforms

to intermediate decentralised exchanges between users, customers, workers, etc. (Acquier et al. 2017). In fact, for some initiatives such as Uber or Airbnb, the platform of software and data analytics is the main—and most crucial—asset owned by the company (Srnicek 2017, p. 75). These platforms are not mere exchange places: they also show up with an assortment of mechanisms that regulate exchanges and ensure their quality, such as the often discussed evaluation devices.

Despite growing scholarship, the nature of SE is still highly controversial, in particular on the moral front. Because it offers an alternative configuration to traditional markets, SE might also help perform alternative moral realities. In extant literature, SE is framed in mainly two ways. In their SE 'manifesto', Botsman and Rogers (2011) presented SE as an alternative to hyperconsumption practises and a challenge to capitalist markets. For some authors, these new forms of consumption may also bring more social equity, sustainable practices and social interactions (Botsman and Rogers 2011; Tomalty 2014). However, others suggest that unlike 'true' sharing, SE is not necessarily altruistic or prosocial and can instead be motivated by economic interests, expectations of reciprocity or functional motives (Bardhi and Eckhardt 2012; Belk 2014; Lamberton and Rose 2012). For others still, these new platforms are to be read in the context of the evolution and intensification of capitalism rather than as a rupture from it (Malhotra and Van Alstyne 2014; Morozov 2013; Murillo et al. 2017; Srnicek 2017). For example, Murillo et al. (2017) have identified several areas of social impact of SE devices, where scholars have problematised the utopian propositions of the SE manifesto and shed doubt on its alleged positive social impact.

This corpus highlights that the moral character of SE is still elusive, and that "tensions are inherent in the sharing economy, both conceptually and in practice" (Acquier et al. 2017, p. 8). For example, in a recent empirical research, Laurell and Sandström (2017) highlighted the coexistence of market and non-market framings in an institutional analysis of social media surrounding SE. In this sense, some point to the plurality of organisational forms and practices of SE, as well as to their cultural rootedness (Mair and Reischauer 2017).

A simple answer to the moral posture of SE thus seems unlikely to be found in the decontextualised analysis of its practices and impacts. On the other hand, the numerous controversies that happen worldwide around devices such as Airbnb or Uber appear to be prime witness of the moral issues at play. Few empirical studies currently feed on these controversial situations, as the reflexion are still largely at a field and inter-field level (Laurell and Sandström 2017; Mair and Reischauer 2017). Yet, during controversies, actors themselves are plunged into deep uncertainty and complexity as SE initiatives take root. Following them as they try to make sense and address their moral and normative concerns, as they try to coordinate and agree practically and in action on the appropriate or desirable 'way of doing things', would allow to engage more deeply with the specific realities that are engineered after an SE initiative disturbs existing ways of doing things.

Technology, Ethics, and Social Change

A growing body of literature has investigated the link between ethics and technological developments (Introna 2014; Martin 2018; Martin and Freeman 2004; West 2017; Whelan 2019). One of its important ideas is that technologies (and more broadly material elements) are considered as full actants rather than in the background of human activity, including when moral issues are at stake (Martin and Freeman 2004). Accordingly, the analysis of moral issues must be done in conjunction with the analysis of the material provisions that make possible specific moral realities.

This stream of research hence makes the point that despite their apparent inertness, technologies are inseparable from the social. This idea is further developed with the concept of *agencement*, which is most commonly but perhaps imprecisely translated as 'assemblage' (Gherardi 2016). As Martin (2018) shows in her work on algorithms, Actor-Network theory (ANT) offers useful tools to think about how specific realities, including moral realities, are sociomaterially constructed. Within ANT, entities such as facts, technologies, organisations or markets are seen as the outcomes of a continuous work of assemblage of sociomaterial elements (Callon 1998). *Agencements* are these processes of "heterogeneous engineering" (Gherardi 2016, p. 689), configurations of human and nonhuman elements that have in common to give form to a shifting and emergent mode of collective action by the framings it organises (Callon 2017, p. 402). *Agencements* are thus configured around a specific aim, an intrinsic logic, which formulation and signification can change over time, but that nevertheless guides and gives sense to the action (Callon 2017, p. 403). *Agencements* help enact some realities rather than others (Alcadipani and Hassard 2010, p. 428), and morality is thus conceived as "a performative outcome of the heterogeneous sociomaterial nexus (Introna 2014, p. 267)".

The notion of *agencement* has several advantages for our purpose. First, it has a topographical function as it outlines and defines compositions of heterogeneous entities. *Agencements* can be accessed at multiple scales (e.g. technology, organisation, market...), as they have a fractal design. We can thus bind together *agencements* by the specific action that unites its components and gives them meaning, regardless of their scale. Secondly, we can qualify this specific action on the moral dimension, notably by finding the types of calculation and valuation that are made possible within the *agencement*. Finally, the notion of *agencement* carries

within it that of *reagencement* (Alcadipani and Hassard 2010, p. 423). *Agencements* are in permanent motion, as they are driven by forces, some of which tend to reinforce and reproduce existing frames, while others contribute to transforming them (Callon 2017, p. 416). It implies that different realities or another world could be realised or performed. "Realities are not immutable—they are shaped, enacted and contested" (Roscoe and Chillas 2014, p. 424).

Following consonant reflections, scholars of technology, ethics and social change acknowledge that technological developments are "political 'locations' where values and interest are negotiated and ultimately 'inscribed' into the very materiality of the things themselves" (Introna 2014, p. 265). Moreover, technological developments have moral consequences. Relying on ANT's concept of script, Martin (2018) shows that designers inscribe algorithms—which play an important part in many SE platforms—with a specific conception of users, of their competences and with hypothesis on their context of use. Algorithms thus "create moral consequences, reinforce or undercut ethical principles, and enable or diminish stakeholder rights and dignity" (p. 2). Similarly, organisations act themselves in ways that perform certain realities at the expense of others. For example, Whelan's (2019) analysis of the relationships between Google and copyright illustrates how the human and nonhuman constructs that make up Google can associate in ways that make new rules and cultural norms possible, or can even "alter the 'natural' popular good in new ways, and … can also make new 'conduct of conduct' considerations and cost-benefit calculations possible" (p. 51).

Since they are not morally neutral, the adoption of new technological developments rests in part on a tacit or explicit social acceptance of the moral preferences they entail. This idea is for example made explicit by Whelan (2018), who highlights that many Internet-enabled marketplaces, such as Uber, rely on a common understanding of surveillance as necessary and justifiable to allow for other common goods such as convenience or safety to be realised. West (2017) hints at a similar idea by contending that for customers to overcome their concerns about privacy relating to the tracking technologies that bring about data capitalism, there needs to be justifications, narratives, that frame technology as a social good. Another example is given by Martin (2018), who describes sentencing algorithms, where stakeholders must consider—tacitly or explicitly—as legitimate the delegation of power that comes with the use of such algorithms.

The normative and moral preferences that are inscribed within technological developments may or may not be compatible with the 'way of doing things' in specific contexts. For example, the lack of online privacy may be considered legitimate or not, and accordingly a technology which relies on the lack of online privacy will or won't be able to

go forward under these specific circumstances. In the latter case, changes will be needed, either at the scale of the technology itself or at the larger scale of the context where this technology operates. Scholars of technology, ethics and social change do not seem to focus directly on how such changes in social acceptance or moral preferences come about, i.e. how technological developments (and the practices they entail) that would, at one moment, be considered illegitimate can come to change what is seen as acceptable either by formal mechanisms (e.g. legislation) or informal mechanisms (e.g. social acceptance, adoption). In other words, the passage from the sociomaterial to specific moral and normative concern appears to lack clarity.

Through the notions of *agencement* and *reagencement*, we thus have the tools to investigate the process through which the characteristics of a technology can bring about processes of reagencement, and to conceptualise how technological developments can alter the sociomaterial composition of an *agencement*, the nature of the relationships within it, and its moral significance (i.e. the type of reality it performs). To further this discussion, we now turn to scholars who have studied controversies as processes through which new agreements can be reached on the appropriate way of doing things. Indeed, the importance of moral legitimacy and the visibility of moral struggles are nowhere as salient as when technological developments become embroiled in controversy.

Controversies and the 'Orders of Worth' Framework

Controversies have attracted increasing attention in organisational studies. As evidenced by its growing influence, the 'Orders of Worth' framework developed by Boltanski and Thévenot (1991) in 'On Justification' is particularly fruitful for studying controversial situations. This "sociological theory of value" (Stark 2009) comprises a finite repertoire of definitions of the common good that can legitimately be used as normative grounds for justification, evaluation and critique in public debates (Cloutier et al. 2017). Each of these moral principles acts as the foundation of what the authors call 'orders of worth' or 'worlds'. In the original framework, the authors identified six orders of worth: *inspired*, *domestic*, *fame*, *civic*, *merchant and industrial*. Further developments of the framework led to the introduction of the *green* order of worth (Lafaye and Thévenot 1993) and the *project* one (Boltanski and Chiapello 2011). The different worlds are briefly introduced in Table 1.

The worlds function as coherent representations of 'what should be', and thus sustain the work of actors as they seek foundations for the legitimacy of their arguments. Accordingly, actors are considered morally competent, since their social affiliations do not tie them to specific worlds. Boltanski and Thévenot thus seek to reconstruct the point of view

Table 1 The worlds of Boltanski and Thévenot

World	Common good (ideal)	Examples of qualities/criteria of value
Inspired	Grace, inspiration	Passion, ingenuity, singularity…
Domestic	Tradition	Respect, politeness, trust, responsibility…
Fame	Renown, fame	Popularity, being known, being visible…
Civic	Collective action	Solidarity, fairness, lawfulness…
Merchant	Competition	'Right' price, free market, wanted goods…
Industrial	Technical efficiency	Reliability, efficiency, functionality, modern…
Green	Environmental friendliness	Sustainability…
Project	Activity	Adaptability, ability to engage in temporary projects…

of actors themselves, as they try to cope with the uncertainty and complexity that characterise controversial situations.

Because of its pluralistic stance and its acknowledgment of individuals as competent social actors, it allows scholars to analyse discursive struggles, and specifically how actors play on collective understandings of the common good to solve a dispute. For example, Patriotta et al. (2011) analysed a controversy around a nuclear accident to study how a company tried to restore its legitimacy. Similarly, Taupin (2012) studied a controversy in the credit rating industry. The legitimacy of the industry was at stake following multiple failures, and was maintained by the adoption of various strategies during justification struggles. Dionne et al. (2018) addressed the role of the evaluation processes of actors involved in a public debate. They identified 'evaluative moves' generated by the actors to influence the evaluation process towards their own assessments of the situation. Building on Boltanski's more recent work, Nyberg et al. (2017) combined orders of worth and power relations to study the shale gas controversy in the UK. Gond et al. (2016) also adopted a perspective on power to study justification struggles during a controversy concerning shale gas exploration.

The above examples illustrate the potential of the 'Orders of Worth' framework for furthering the insights of the literature on technology, ethics and social change by foregrounding the moral and political dimensions of controversies. However, a key insight of this later literature is seemingly overlooked in extant usage of Boltanski and Thévenot's framework. Indeed, objects are generally put to one side, passively awaiting for qualification, while humans are on the other, as outside observers having alone the moral ability to qualify objects. Such a perspective is restrictive for our purpose. First, extant literature on technology, ethics and social change shows that technologies themselves are not morally neutral. They are composed of networks of human and nonhuman elements that perform a specific reality. Second, technologies do not exist in a vacuum: they are also part of networks of material and non-material actors that likewise perform a specific reality. In other words, more than quests for intersubjective agreements about meaning, controversies are about particular arrangements that imply

the interaction of actors with material devices. As a result, to better understand how changes in conventions occur, a better engagement with the material reality of controversies related to technologies is needed.

Following the call of Martin and Freeman (2004), which drew attention to the importance of having a broader understanding of technology, we take a different perspective on controversies by using Boltanski and Thévenot's framework in a more 'ecological' way. Indeed, while the material dimension of controversies may be underdeveloped within Boltanski and Thévenot's literature, the 'Orders of worth' framework is in itself alert to such an issue:

> The worlds of Boltanski and Thévenot are populated by a multitude of beings, some of them human, some of them things. Whenever these beings appear, the state in which they operate is always qualified at the same time. The relation between these person-states and thing-states (which constitutes what we define as a *situation*) is the object of our study (Boltanski and Thévenot 2006, p. 1).

This framework thus invites us to investigate controversial situations in order to identify the elements involved in the coordination of behaviours according to different moral principles. It positions the analysis at the level of the interactions between technology and society, and conceives judgements as dependent of situations characterised by a material environment that contribute to collective action (Cloutier et al. 2017, p. 12). Such an approach consists of mapping the situations with "the actors involved and the disposition of available material artefacts at that specific moment in time" (ibid., p. 11).

By building on the idea that sociomaterial elements are put together in order to perform certain realities at the expense of others (*agencements*), and building on Boltanski and Thévenot's work to investigate the moral impetus of these *agencements*, we are thus equipped to follow the changes in the collective understanding of what should be valued.

Methods

We used a case-based, qualitative, methodology. This choice is justified by our focus on the concrete conditions of engagement of people and objects in controversial situations, which calls for a thick description of events. Our longitudinal design was also influenced by Langley (1999), for whom process research is concerned with understanding "how things evolve over time and why they evolve in that way, and process data therefore consist largely of stories about what happened and who did what when—that is events, activities and choices ordered over time" (p. 692).

Case Selection and Context

We studied the public controversy surrounding the arrival of Uber in Montréal's taxi market, where it posed a direct challenge to the taxi industry. In many cities, Uber's arrival provoked raging controversies opposing Uber's and taxi's proponents. Montréal (Canada), where Uber was launched on October 31, 2014, is no exception. We chose Montréal's controversy as a representative of the controversies provoked worldwide by Uber.

Founded in 2009 in San Francisco, Uber is a multinational mobile application that puts passengers in direct contact with drivers. Uber has been associated with SE and is often cited as one of its flagships (Srnicek 2017; Sundararajan 2016). Its business model relies on private car owners who 'share' their car and their time with people who are in need of transportation, in exchange for money. Uber's platform acts as the coordinator of these collaborative exchanges, facilitating the processes of matching, tariffing, and providing quality control for both partners. Its app allows people to virtually hail a privately owned car by indicating a pick-up site and a destination. A geolocation device then match the closest available Uber driver with the requester. During the ride, the drivers follow the driving instructions indicated on its app, thus not requiring prior knowledge of the city's topography. Once the ride is finished, the payment is made through the app, using the customer's preregistered credit card. An evaluation device embedded in the app then asks both the driver and the customer to rate their partner on a scale from 1 to 5. Participants who repeatedly get insufficient scores are automatically suspended. Those that commit reprehensible actions may also be permanently deactivated. Besides a base fee, as well as per minute and per kilometre fees, fares can be adjusted according to an algorithm to encourage drivers to show up on the roads during shortages, a practice called 'surge pricing'.

The taxi industry in Montréal is heavily regulated. The central piece of legislation is the supply management system: each taxi car must be associated with a permit, which are limited in number. Given the protection provided by this system, taxi services are essentially similar from one company to another. Permits are sold on an informal market, from one person to another, usually using online classified ads. In 2011, before Uber's arrival, the mean cost of a taxi permit approximated CAD 190,000 (approx. USD 145,000) (Péloquin 2016). A distinctive trait of Montréal's taxi market is that although some businesses own several permits, most are owned by distinct, private, taxi drivers. For this reason, the market value of permits is critical to owners, as they are often an important part of their retirement savings. Cab fares are determined by regulation, and a commission is responsible for their annual revision. Drivers must follow a 150-h training and meet other requirements to obtain a mandatory taxi driving licence and a taxi driver's permit.

Uber contends for its part that its drivers are regular car owners who do not fall under the scope of these heavy regulations. They thus operate without permits and with prices mostly below the mandatory fares—although their prices can sometimes skyrocket when demand soars.

Although the City of Montréal has been delegated responsibilities towards the application of regulations, the bulk of the power regarding taxis and similar services is in the hands of the Provincial Government of Quebec.

Data Collection

We relied on secondary data and, more specifically, on press coverage. Various sources were also consulted to get a broader understanding of the taxi industry, and to ensure the reliability of data. Among these were briefs, stakeholders' websites, press releases and transcripts of parliamentary proceedings. An outline of the data set is presented in "Appendix 1".

Press coverage is especially appropriate to the study of controversies. Having to justify themselves in the public eye, actors resort more or less explicitly to principles of common good both to establish the legitimacy of their claims and to critique those of others. By doing so, they reveal their understanding and preferences about what should be valued. Media coverage is therefore a key site for observing these dynamics. In addition, media coverage also allows for a holistic account of the controversy to be sketched, as it chronicles whole situations and events with their myriad of elements besides discourses. It also allowed us to follow the controversy as it unfolded rather than only looking at snapshots of it. Finally, this specific controversy has been written about extensively in the media, offering substantial opportunities to collect the discourses of key actors.

The articles were retrieved from four national and local daily newspapers, chosen for their availability in an electronic format and their daily coverage of the controversy (see Gond et al. 2016; Patriotta et al. 2011 for similar

methodologies). These newspapers are *Le Devoir* (LD), *La Presse* (LP), *Le Journal de Montréal* (JM), and *24h Montréal* (24h). The four selected outlets are published in French. The only English-speaking daily newspaper covering significantly the City of Montréal, *The Montreal Gazette*, was excluded as the published version of this newspaper is not readily available in an electronic format.

It is important to emphasise that each newspaper and reporter is susceptible to its own ideological leanings, which could influence the nature of the discourses or events reported. The reliance on four different outlets from different leanings makes it possible to alleviate this difficulty. LD is a left-leaning newspaper targeting intellectuals and Quebec nationalists. LP is a voluminous newspaper written with a federalist bent and a slight economically conservative leaning. JM is a tabloid focusing on sensationalist stories and sports news, with a socially and economically conservative editorial leaning. 24h is a free daily paper distributed in Montréal's subway. Its target audience includes allophones (of whom the first language is neither French nor English) and millennials.

When referring to the point of view of actors, we based our analysis exclusively on direct quotations of actors rather than journalists' statements about them. Therefore, unless otherwise specified, each 'in text' quotation is a direct quotation of an actor, as reported by journalists. Despite this, quotations may still be misrepresentative if taken out of context or reformulated by journalists. In addition, the access to media may arguably be unequal among actors. To ease these methodological concerns, we supplemented our analysis with numerous documents produced by actors themselves (official reports, websites, press releases, briefs), as well as documents that were less likely to be altered (transcripts of parliamentary proceedings, opinion articles) to ensure that the voices of actors were correctly represented in our data.

We systematically collected newspaper articles using 'Uber' and 'UberX' as keywords. After eliminating duplicates and irrelevant articles, 852 articles were retrieved for deeper analysis. Our coverage of the controversy starts in October 2014 with Uber's launching in Montréal, and ends in October 2017 with the renewal of the pilot project allowing Uber to operate legally. Although events and debates are still occasionally surfacing, this time frame adequately covers the most heated moments.

Data Analysis

After a first reading of the dataset, we identified key moments and carried out a temporal bracketing (Langley 1999) of the controversy. This strategy is suited for studying the interactions constituting a phenomenon or the mutual shaping processes (Langley 1999, p. 703). We identified three periods, characterised by "a certain continuity in the activities within each period and … certain discontinuities at its frontiers" (Langley 1999, p. 703). In this case, the three periods are outlined by the level of generality/specificity of their discussions, their content and their focus.

In a second phase, starting from the conceptions of the common good identified by Boltanski and Thévenot, we performed an inductive reading of our data to build the 'worlds of taxi'. The grid of Boltanski and Thévenot is context-specific and is to be constructed from the point of view of actors themselves, as we can only seize conceptions of the common good in the concrete situations where objects are put in action together (Boltanski and Thévenot 1991, p. 186). For example, the *industrial* world within academia is not the same as the *industrial* world within agribusiness or within the taxi industry. The 'worlds of taxi' are a translation of the forms of common good as they are encountered in specific contexts, and are hence the first step in the construction of a more refined coding apparatus (ibid.). These 'worlds of taxi' are rich ecosystems of subjects, objects, qualifiers and relations representing a coherent version of the reality 'as it should be' according to one specific moral principle, one way of doing things.

Using these 'worlds of taxi' as guidelines, one of the authors then read all the articles and coded each passage where an actor was cited according to the moral principle that was built upon in their argument. "Appendix 2" shows examples of this coding. We estimated the prevalence of each order of worth within each period. We then produced thick descriptive chronological narratives for each period, through a narrative strategy of sensemaking (Langley 1999, p. 695). These narratives are the main product of our research, as our aim is to recount how technological developments can fundamentally bring into question and ultimately change the collective understandings that characterised previous *agencements*. It is the most suitable strategy when the aim is to "present as completely as possible the different viewpoints on the process studied" (Langley 1999, p. 695), which is consistent with our pluralist perspective. Our approach implies to never consider objects, people or events in isolation, but always in connection with a contextual whole.

One of the difficulties with the concept of *agencement* is that it is scale-free. Indeed, *agencements* are structured similarly to 'fractals', and can be decomposed in further constitutive *agencements* or can be associate with other elements to form new *agencements* (Callon 2017). In the case where the analysis involves more than one type of *agencement*, as is the case in our controversy, it can quickly become quite confusing. For example, 'Uber the multinational' is an *agencement*, as are 'Uber in Montréal' and 'the evaluation device of Uber in Montréal'. To circumvent this difficulty, we made a subsequent distinction in the narratives of each period in order to distinguish between the affected scales. Table 2 describes the

Table 2 Scales of agencement

Scale of agencement	Description
Market *agencement*	*Agencement* that organises exchanges related to passengers' transportation by automobile for remuneration in Montréal. This is where Uber and the taxi meet during the controversy
Uber *agencement*	*Agencement* that organises the activities of Uber in Montréal
Uber apparatuses *agencements*	*Agencements* that perform specific functions (e.g. evaluation apparatus, geolocation apparatus, etc.)
Taxi *agencement*	*Agencement* that organises the activities of accredited taxi services in Montréal
Taxi apparatuses *agencements*	*Agencements* that perform specific functions (e.g. taxi permit apparatus, complaint apparatus, etc.)

main scales to which we refer in our analysis, while Fig. 1 schematises the organisation of these scales.

We were hence able to "produce narratives of *agencements* that capture the materiality, the passions and beliefs, and the practices of attraction and engagement within these complex assemblages which underlie such nests of associations" (Gherardi 2016, p. 689). Moreover, this further subdivision into scales of agencement allows us to better show the dynamics of change between the scales of *agencements*, and ultimately at the market scale, which is our main concern.

Results

The following section dives in the controversy to look at how Uber has provoked changes in the conception of the appropriate 'way of doing things'. We first narrate the major debates and events of that characterise each of the three periods of the controversy. Each period is then divided according to the different scales that are discussed or where the effects of *reagencement* are the most manifest. Table 3 summarises the findings.

First Period: Uber's Arrival and Disruption (October 2014–December 2015)

This period begins with the introduction on October 31, 2014, of Uber in Montréal, and covers roughly its first year of operation. During this interval, actors are positioning themselves towards the new player, and current practices are scrutinised. Consultations are held, and Quebec's Transport Minister stresses multiple times its firm opposition to Uber. However, behind the public discourse, the appropriate course of action appears unclear. Decision-making is continually postponed. Debates regularly surface, as taxi drivers are becoming impatient with the lack of governmental decisiveness.

Uber Agencement

From the beginning of the controversy, Uber is framed as being safe, efficient, reliable, and simple of use (*industrial*). As one user explains: "I don't understand why taxis have not yet adopted the technologies that make Uber so convenient: automatic cashless payment, receiving an immediate email receipt and easy-to-use app" ("Leslie", customer, February

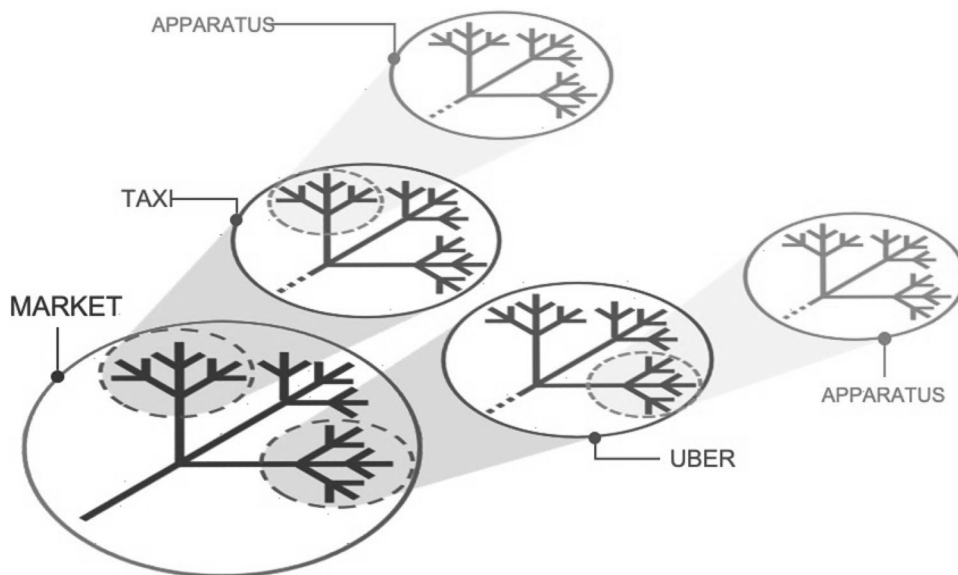**Fig. 1** Fractal structure of the scales of agencement

Table 3 Summary of findings

	Period 1 October 2014–December 2015	Period 2 January 2016–August 2016	Period 3 September 2016–October 2017
Predominant orders of worth	*Industrial, domestic*	*Civic, industrial, merchant, project*	*Civic, project*
Mechanisms through which SE *agencements* change the collective understanding of what should be valued	Apparatuses equip participants by formatting valuations. Specific qualities become sine qua non conditions to market participation Tight coupling of qualified links, i.e. of the relationships between elements of the *agencement* at the scale of apparatuses that enable specific qualities to be enacted The efficiency of the structure of SE *agencement* to enforce certain qualities undermines existing *agencements* at the scale of the market	Uber's *agencement* is structured to enact different orders of worth simultaneously and in a concerted way, which gives it legitimacy, and hence strength (undermines existing *agencements* at the scale of the market) Uber's *agencement* is in extension of sociomaterial networks that anchor its legitimacy and desirability in realities that are enacted elsewhere	Uber's *agencement* is integrated at the market scale *agencement* by tangibly altering it New conventions are realised through compromises embodied in an array of devices

6, 2016, *JM*). The evaluation device embedded in the app is particularly interesting to customers. The most prominent feature at this stage is thus the whole apparatus that ensure a quality of service. This concept, a hybrid between *domestic* and *industrial* worlds refers both to the politeness, professionalism, trustworthiness and overall affability of drivers (*domestic*) and to the efficiency, simplicity and reliability of their service (*industrial*).

'Quality of service' Apparatus, Uber Agencement The *agencement* intended to make the quality of service into reality is centralised, streamlined and disintermediated. It is composed mostly of cars, drivers, the evaluation device, Uber (its designers, engineers, decision makers, etc.), and users. We can thus describe its relationships as 'tightly coupled'. This has the effect of conferring an important strategic role to the evaluation device, through which the *industrial* and *domestic* quality of the relationships within Uber is largely played out. Furthermore, participants are 'equipped' with this evaluation device, of whom the counterpart for the taxi is rather fuzzy. This mechanism shapes the content of the evaluation, the role it plays in the processes, its importance and its consequences. It gives users power by equipping them, although this power is strongly reined in through the device.

Taxi Agencement

The arrival of Uber sheds light on the state of dilapidation, the outdatedness and lack of quality of service throughout the taxi industry. The dispatch systems are inefficient ("Is

it legitimate to have to call three or four companies to be sure to get a cab? [Marcil, I., October 19, 2014, *JM*]"), the electronic payment terminals are absent or out of order, the cars are battered, the drivers are getting lost and don't own GPS, etc. Further to this, the bad quality of service is called out: filthy cars, rude, reckless and sometimes aggressive drivers that are talking on the phone during rides… This view towards the *industrial* and *domestic* values of the taxi industry is well summarised in a quote from a columnist:

> When I take a cab in Montréal, I feel … unwelcome. Go figure. It should be the opposite, of course. Especially with the ongoing fight with Uber. And yet, almost every time, I feel like I'm bothering the driver. I feel like I'm not the customer he was hoping for. That's strange. I'm not saying anything about the disgusting state of its car, about his rash driving. I don't even complain when he screams through his phone all along the ride. And yet, he sighs at me when I tell him my destination (never far enough), when I dare interrupt his phone conversation (even to clarify the itinerary), when I take my credit card out (even if the Visa and MasterCard logos appear on its roof sign). It was true before Uber. And it still is today. As if, to them, the customers were there to serve the taxis (Cardinal, F. July 7, 2015, *LP*).

As a result, the industry itself recognises that Uber's arrival is a catalyst towards the modernisation of the industry: "We have to stop blaming everybody for our problems, and start looking at ourselves. We have work to do, let's

clean up our act and, after that, we may blame others" (Taxi Diamond's CEO, Roy, D., November 11, 2014, *24h*). Despite holding Uber as obviously illegal, strong voices are rising to justify why this disruption may be welcomed in the "fossilised", "inert" and "declining" taxi industry.

Less than a month after Uber's launching, the Transports Minister announces that from December 1st on, background checks will be done on cab drivers, a measure admittedly intended to "stay competitive, since services like Uber already requires a clear criminal record before authorising a new driver (Poëti, R., Transports minister, November 17, 2014, *24h*)". The City of Montréal also quickly makes its intentions clear: they choose to "focus more on the improvement of the industry and a better quality of service" (Salem, A., member of the executive committee, City of Montréal November 7, 2014, *LD*). In August 2015 the municipal administration adopts a new action plan for taxis. It adds the obligation to accept credit and debit cards to make taxi services more efficient and modern. New regulations, to be implemented in January 2016, will also require drivers to wear business casual attire, and to open the door to their customer. Meanwhile, Montréal's biggest dispatch company, Taxi Diamond, improves its existing app with devices similar to Uber's. It allows mobile payment and the rating of drivers on a five-star scale. The company also allocates more inspectors to control customer service.

'Quality of service' Apparatus, Taxi Agencement Unlike within Uber, the *agencement* that performs the quality of service is highly decentralised. It is comprised of drivers themselves, laws, regulations, elected representative who design and vote laws, the inspectors who are intended to apply them, the dispatch company, the process to handle complaints, etc. Each of these numerous actants exercises control, directly or indirectly, on the due process, with every one of them holding in part the power to enact *industrial* and *domestic* worthiness. Furthermore, these relations are largely composed of human entities that can exercise a deliberate control on their action, i.e. they can choose to act or not, and how to do so. Conversely, each actant has arguably little control over other actants. In sum, we could describe the links composing this *agencement* as only 'loosely coupled'. The idea of loose coupling refers to the fact that the links between its elements are not potent in enacting the specific qualities that are intended. For example, the user which finds itself stranded in the ghastly car ride described earlier by columnist F. Cardinal is little equipped to enforce some sort of *domestic* or *industrial* worth. He could lodge a complaint, but the process is protracted and a lasting solution is all but guaranteed. Similarly, the regulations intended to enforce *domestic* or *industrial* worth are reliant on the deliberate action of a network of decentralised actants to make it into reality.

Market Agencement

The first point is obviously the introduction of a competitive dynamic in the market, which characterises the *merchant* convention. With Uber arises the ability to make meaningful comparisons, to classify and order options. However, while the new competition does open up a playing field, everything has yet to be done. Participants, have yet to debate and act upon new definitions of 'what should be' from a collective point of view.

In this first period, the most prominent way of ranking comes from the *industrial* and *domestic* orders of worth. Beyond the outset of a major confrontation between the *civic* and *merchant* worlds, which we will return to in the second period, we see that Uber succeeds in imposing conventions that revolve around the *industrial* and *domestic* worlds, with qualities such as reliability, safety, efficiency, and, most prominently, the hybrid 'quality of service'. These qualities were, of course, part of the taxi well before Uber arrival, as evidenced by the *Act respecting transportation services by taxi*, adopted in 2001, which states as its purpose, "to increase the safety of users, improve the quality of services offered". However, they were hardly enacted.

This analysis thus shows the dynamics of change at different scales of *agencement*. At the scale of the *agencement* that performs the quality of service, we already see a striking disparity between Uber and the taxi, which affects the importance that is attributed to *industrial* and *domestic* orders at the market scale. Changes at the scale of the taxi and of its 'quality of service' apparatus also occur. Although some changes made at the scale of the taxi's *agencement* do not alter significantly the way it is structured, some do so, or at least intend to do so. For example, a new law adopted later in the controversy makes it mandatory for dispatch company to equip clients with means to evaluate the quality of service. Interestingly, some dispatch companies explicitly state that such notations will not be made available to customers, and will only be a tool in assessing the competence of drivers. Other measures adopted by authorities and taxi dispatch companies themselves also intend to tighten the couplings, as is the case with the addition of new inspectors and mystery shoppers.

Second Period: Legislation (January 2016–August 2016)

At this point, demonstrations are escalating and the pressure is increasing towards the government. Shortly after the

Transport Minister suggests it could take two more years to legislate, he loses his seat in the Cabinet. His successor, who leans on the legalisation side, quickly proceeds by calling a parliamentary commission. In May 2016, when a bill is finally presented, the tables have turned. Following this bill, Uber's drivers would virtually be subjected to the same regulations as taxicabs. They would be required to rent taxi licences at a weekly fare. The penalties for illegal transportation would be considerably increased. The taxi industry exults, while Uber threatens to leave if the bill is adopted. A few weeks later, under intense pressure, the government ultimately adopts an amended version of the bill, allowing Uber to continue its operations for 3 months to give more time to negotiations.

During this period, there is an expansion of the dispute at the scale of the market, as actors now debate more broadly and in general terms of the values that should now on be performed or prioritised. A striking aspect of this period is thus how Uber, which is almost unanimously considered illegal under current rules, can continue to operate for so long. Uber's claims about having a different model, and thus not having to follow the rules, does not fool many. As argued by some, the government could seemingly put an end to Uber's activities, and the measures in the first draft of the bill would presumably have succeeded in doing that. The illegality of Uber should be the end of the story, but it is far from it, and at the end of this period, it is still mostly unbothered.

Uber Agencement

It is interesting to investigate how Uber can so powerfully embody different values that it comes to undermine existing conventions at the scale of the market. A force that exceeds that of rhetorical strategies appears to be in action. Indeed, we find that Uber's *agencement* itself explains in part this strength, as it allows with dexterity a coalition, an *alignment* (Whelan and Gond 2017) of orders of worth. *Agencements* are called upon enacting simultaneously several orders of worth. However, all configurations do not appear equal to the task. Some 'hold together', in a non-conflictual state, different orders of worth better than others, as is seemingly the case with Uber. This addition of orders of worth that are enacted simultaneously gives great legitimacy, and hence strength to Uber. For example, part of the efficiency (*industrial*) of Uber relies on its price fixing mechanism (*merchant*). *Merchant* and *industrial* worth work together, are aligned, in such a way that it is difficult to isolate and undermine a specific order of worth (e.g. *merchant*) without having to justify an attack on another (e.g. *industrial*). They thus bring the impression, strongly put forward by Uber's proponents, that Uber 'has it all', which contributes to undermining previous, more aleatory *agencements*.

Further to this, it appears that there is, through the controversy, a confrontation of realities that go beyond those of the taxi or Uber. Uber is a nexus, but there are relationships with innumerable human and nonhuman entities that extend and exceed this nexus. For example, the *industrial* worth associated with Uber is often mentioned in reference to other technological developments such as autonomous cars, or more generally the wave of new digital technologies. There are also abundant references to what appears as an obvious reality to many, i.e. that progress, independently of its desirability, cannot be stopped, and historically have never been [e.g. "Historically, every movement that tried to stop a technological development has failed" (Couillard, P., February 5, 2016, *24h*)]. Examples given by interveners include weavers, lamppost lighters and typographers, all of whom gave way to technological developments. Similarly, the *project* worth which is put forward by Uber is anchored in the reality of work precarization and hence of workers in need of gigs to make ends meet. In other words, although it is repeatedly labelled as 'revolutionary', Uber only exists in extension of sociomaterial networks that anchor its legitimacy and desirability in realities that are enacted elsewhere, outside its focal *agencement* but in relation with it.

Given the frequent references to such sociomaterial entities located outside the realm of the controversy in support of Uber, they appear especially compelling in formatting and orienting the collective understanding of what should be valued at the scale of the market.

Market Agencement

What is preponderant at that moment is the conflict between the *civic* form of worth and the tremendous pressure that is brought up by the multiple orders of worth that are used to legitimate Uber. On the *civic* front, the debates are ongoing in an attempt to justify the *status quo* of the previous organisation of the market. Especially put forward at this stage is the idea of fairness: fairness in the market (everyone must follow the same rules), fairness towards the taxi drivers (who had to invest heavily to own their permits) and fairness towards all of society (paying taxes and "doing its fair share"). A taxi representative states in a press release: "By its inaction, the government allows the population of Quebec to be robbed and the drivers to be poached of their revenues… The prime minister must intervene to reinstate the rule of law" (Jugand, B., February 10, 2016). The *civic* form of worth is the main criticism among those who oppose Uber, and even among those who are favourable to Uber.

The *industrial* justification of Uber is at this stage the most pivotal, but the discussions are now oriented towards the idea of the inexorability of progress, which entails that the laws should be adapted to mostly allow new technologies while limiting their excesses. "We cannot stand in the river and stop its current (Hamel, J., May 15, 2016, *JM*)", says a member of the youth wing of the government's party, while Uber's GM in Quebec affirms: "The Province of Quebec must follow the movement towards modernity, innovation, and show their support towards the new technologies that are happening here (Guillemette, J.-N., January 28, 2016, *LD*)". The strength of this form of worth is made particularly explicit by the Prime Minister himself a few months later, while he addresses the ongoing negotiations with Uber: "What we really care about, in the first place, is innovation. We care for it, we approve it, we want it. But we want it to be fair. And if we are able to find an agreement, then all the better" (Couillard, P., September 8, 2016, *LD*).

Meanwhile, the *merchant* dispute takes a growing place in the controversy. Uber's arrival forces stakeholders to position themselves towards the nature of the market itself, i.e. if the supply management system should be kept as it is, or if the market should be a competitive one, allowing Uber and/or others to bring in their own way of doing things. To one extreme, there are demands to completely liberalise the market by abolishing the permit system and several regulations with it. Most positions are more nuanced, by proposing a two-tier system that would uphold the extant taxi system, while creating a new legislative framework for Uber, effectively putting an end to the monopoly of the taxi.

Also of interest is the heightened articulation of values related to the *project* world. The resistance of Uber and its proponents towards the initial bill is linked to its ability to maintain its business model based on technology, intermittent work and dynamic pricing, among other things. For example, the youth wing of the government's party asserts that the bill must take into "consideration the fact that small players can offer part-time services, now that technology makes it easier for service providers and service recipients to connect (CJPLQ, June 3, 2016)". At the market scale, we hence observe the emergence of an interest for such business models structured around the *project* worth.

Consistent with Boltanski and Thévenot's perspective, we thus find that different orders of worth, many of which are powered by Uber's agencement, fight on equal terms, as the controversy opens up a process through which the appropriate way of doing things is 'up for grabs'. The forms of worthiness entailed in the *civic* world, which anchored many previously established conventions as the scale of the market do not necessarily have precedence over other newly summoned values such as progress.

Third Period: The Pilot Project (September 2016–October 2017)

Two years after Uber's arrival, in September 2016, a 1-year pilot project is finally adopted, pending permanent regulation. The pilot project is negotiated in extremis, after difficult discussions where Uber threatens once again to leave town. This agreement compels Uber to pay royalties on each ride, to pay taxes and to follow certain regulations such as the requirement to possess a professional driver's licence. Essentially, it legalises the Uber 'model': the possibility for anyone to become a driver, as well as the various components of the application. To the great frustration of the taxi industry, the deal creates a two-tier system and leaves unsolved the delicate issue of the value of taxi permits. The following year, upon renewal of the pilot project for an additional year, new constraints are added towards Uber, and specifically the obligation to follow a 35-h training for drivers. For the third time, Uber threatens to leave town, as they argue that such requirement would threaten their business model. A cabinet shuffle ultimately solves the crisis by putting a new, younger (and hence, as Uber contend, more technologically savvy), Transport Minister in place, which reassures Uber on the flexibility of the government regarding the application of this new obligation. At this point, most of the negotiations are unfolding behind closed doors between Uber and the government, rather than through public deliberations. Still, debates resume as the pilot project is announced.

Market Agencement

Unsurprisingly, the taxi industry, which had made the existence of a single regime its priority, is rising to barricades. The logic of their arguments is consistently *civic*. Notably, they argue that technologies must follow the laws, not the other way around. Citizens and their representatives—not private companies or vested interest—must decide the content and intent of laws, and companies have to follow them. They therefore accuse the government of having "got down on all fours in front of a crooked multinational (Chevrette, G., taxi representative, September 10, 2016, *LP*)".

Meanwhile, Uber continues to fight to protect its specific model, rooted in *project* values. For many of its proponents, the law must be adapted to new technologies, rather than the opposite. For example, the youth wing of the government's party condemns the idea that the pilot project would ask an "innovating model to adopt heavy and complex administrative shackles… We can't ask a sharing economy enterprise to adjust to the rules of the taxi industry!" (Stril, S., Youth wing of the government's party, September 22, 2017, *LP*).

When the pilot project is first adopted, the company appears particularly ambivalent as it questions the flexibility of the new model for its drivers: "We continue the assessment of impacts on the reliability and flexibility of the services we offer to Quebecers" (Guillemette, J., September 10, 2016, *LP*).

Upon renewal of the agreement the following year, the scenario repeats. This time, it is the addition of a compulsory training of 35 h which poses a problem.

A 35-hour training is unheard of in the sharing economy. Why require so much? Would Quebecers who rent their accommodations on Airbnb be required to have a 35-hour training [in hotel management]? […] We have developed a model that is different from that of the taxi industry, and what we ask is to recognize that difference (Guillemette, J.-N., September 27, 2017, *LD*).

This period is characterised by new attempts to bring together and align different moral principles through the engineering of new sociomaterial devices. The legislative dispositive is of particular interest, as it can at least theoretically 'make or break' Uber in Montréal, either by easing their way in or by putting up so many barriers that their operations cannot be viable. Indeed, SE does not exist in a vacuum and, in political contexts where the rule of law is respected, newcomers must be accommodated to operate. As ultimate decision makers, the government must juggle notions of innovation, market competitiveness and quality of service—all of which have been introduced with Uber and are giving the company a legitimacy that is hard for the government to ignore. They must also address the pressing issue of fairness to taxi drivers. Beyond these more traditional issues, they also have to address a new logic, the *project* worth, which appears irreconcilable with the current functioning of the taxi market. In fact, the great closedness of the taxi market—created by the numerous regulations and the quota system—is in complete opposition to the logic of openness, adaptability and flexibility put forward in the *project* world.

Agencements are a local assemblage of human and nonhuman entities that act and give meaning to action. In the second period of the controversy, much was debated about the meaning to be given to the action, i.e. about the qualities that were to characterise the market. Here, the work at hand is to reorganise the human and nonhuman entities so that they can actually perform this reality. However, the government is confronted to the constraining nature of sociomateriality. Without a constraint of agreement and the necessity to translate this agreement sociomaterially, actors could easily agree

that all moral principles brought up by their opponents are legitimate. For example, even the taxi drivers can recognise the desirability, at least in abstract, of innovation and progress. However, when it comes to building a law that brings together all these values, bounded and stabilised through the purpose of the law, it is more problematic, as some of them are contradictory when they are applied to a finite entity such as a specific market.

In this sense, the discussions about a one-tier versus two-tier system are significant of the difficulty of bringing together certain moral conceptions of the market. In this case, a one-tier system would represent either the domination of the *civic* world—if Uber is bound by the same regulations as the taxis—or of the *merchant* world—if the quota system is eliminated. Meanwhile, the choice of a two-tier system—creating a professional and an 'amateur' lanes—allows to keep some importance to *civic* values while also giving place to the new form of worth that is the *project* worth. It also attempts to uniformly apply some of the *civic* values all over the market, by forcing Uber to pay taxes as well as royalties intended to compensate the taxi industry for the unfairness of the situation.

Discussion

In this paper, we explored through an in-depth case study of how SE *agencements* can change the collective understanding of what should be valued at the scale of a market. In this section, we first review and discuss our findings. We then present our contributions to extant literature.

We found that certain apparatuses that make up Uber entail tightly coupled relationships that are centralised around critical devices (e.g. evaluation device, dynamic pricing apparatus, geolocation device…). By equipping participants and/or by formatting and orienting behaviours, they can perform certain conceptions of the common good more powerfully than the apparatuses that characterise the taxi industry (permit, taxi driver, car…), with the effect of undermining these existing ways of doing things and putting forward the importance of specific qualities. Crucially, many important moral decisions that impact stakeholders are delegated to these critical devices, which often rely on algorithms. For example, the dynamic pricing apparatus determines the price of service (and therefore the earnings of drivers), while the evaluation device determines the activation/deactivation of participants. However, as Martin (2018) highlights, with the great responsibilities assigned to algorithmic devices in decision-making also arises an equivalent accountability for the moral reality that is enacted. In this

sense, although we have focused on the 'what' and the 'how' of the changes in collective understandings of what should be valued, much has yet to be said about the 'for whom'.

In this instance, many of Uber's algorithms seemingly have inscrutable designs, as they are "designed to be difficult to understand and argued to be hard to explain" (Martin 2018, p. 10) as well as being protected by corporate secrecy. Because of the inscrutable design of its algorithms, Uber can seemingly reap the benefit of 'being worthy' without being easily—if at all—accessible to further scrutiny from stakeholders. For example, although the claims on Uber's dynamic pricing apparatus qualify them as enforcing *merchant* and *industrial* conventions for all its users, it is impossible to be sure that it does not serve a different agenda. It raises an interesting challenge to Boltanski and Thévenot framework, because despite every investigation on the worthiness of something, an inscrutable algorithm leaves us only with assumptions that have virtually no way of being put to the test.

Further to this, the opacity of algorithms coupled with the tight coupling around these algorithms brings out the question of the due process in many important decisions, as algorithms can shortcut the due processes entailed in the taxi industry *agencement*. For example, taxi fares are determined through a yearly process of consultation with stakeholders with the help of a publicly available index that considers several factors such as mean salaries, cost of fuel, consumer price index, etc. Meanwhile, the true functioning of Uber's algorithm of dynamic pricing remains mostly a mystery. This is not to say that the reality performed by the taxi industry *agencement* is bias-free. However, its processes to ensure the established conventions are really those that are enacted (and that they are enacted without prejudice) are more transparent and can thus be more easily put to the test.

In consequence, we can wonder, as Murillo et al. (2017) do if SE does not enforce forms of the common good at the expense of the equality and dignity of persons. In Boltanski and Thévenot's framework, the justifiability of an order of worth necessitates that human beings have a common dignity, i.e. an equal potential of access to worthiness (Boltanski and Thévenot 1991, p. 98). In other words, it states that a being should not be evaluated as unworthy in an order of worth 'A' for any reason other than because they are actually unworthy in the order of worth 'A'. However, Fisman and Luca (2016) highlight that SE platforms might enforce racial or gender-related bias, which means that victims of such bias would not have equal access to some forms of worthiness associated with SE. For example, depending on their ethnicity and gender, drivers might gather significantly different ratings on Uber's evaluation device (*industrial*

worthiness) which goes against the fundamental dignity of persons at the heart of the construction of legitimate orders of worth.

In sum, as much as Uber may be more efficient at enforcing certain principles of justice, it is also conceivably more efficient at enforcing bias. Given the centrality of algorithmic devices in SE, and hence in the enactment of certain moral realities, given also the inscrutability of crucial parts of their design, SE appears particularly vulnerable to enforcing negative impacts on the dignity of persons.

Another characteristic of Uber, which contributes to undermine the taxi industry *agencement*, is its ability to open up the controversy both in terms of a rise in the generality of claims, and in terms of new links and associations. We especially developed the idea that there is something bigger than mere rhetorical strategies going on within the controversy. We found that the strength of some values brought up by Uber's proponents, and in particular those associated with *industrial* worthiness, was to be found in Uber's *agencement* itself as well as in its relationships with entities that extend and exceed Uber's local *agencement*.

Indeed, as Whelan (2019) highlights, the sources and modalities of 'politics' are multiple. In particular, he brings out that firms are "informed and influenced by historical apparatus" (p. 22), and that they can act strategically in order to "articulate and assemble law, ethical and utilitarian dispositive modalities" (p. 22) and deliberately enact specific realities and futures. Similarly, we find that specific forms of worth can also be informed, influenced, deliberately articulated and assembled in order to enact a specific reality. Beyond the techno-solutionist (Murillo et al. 2017) or technological utopianism narratives (West 2017) are *agencements* that anchor Uber's legitimacy about the *industrial* worth in solid sociotechnical networks composed of heterogeneous elements. Innumerable sociomaterial devices (objects, instruments, technologies, tools…) that go beyond rules, norms, laws, customs or systems of social relations are active in formatting and steering behaviours and interactions (Callon 2017, p. 46).

In addition, these sociomaterial components can and do constrain the expansion of new moral principles. SE—or any innovation whatsoever—does not emerge in a vacuum: it takes place in an existing *agencement*, with its objects, people, metrics, rules of functioning, etc. In this case, most crucially, there is a supply management system, with permits that have a value, with permit owners that have invested in those, with taxi drivers that own cars, etc. It's not a tabula rasa, where a firm can impose unilaterally new ways to do things. Beyond the "cultural context" (Mair and Reischauer 2017), composed of "taken-for-granted sets of meanings and rules" (p. 14) that shape what is appropriate and what is not

in a specific context, we show that the contingency factors that influence the way a specific technological initiative will be embedded in existing *agencements* are not only of a social nature.

Contributions

Our contributions to the literature are threefold. First, we contribute to the literature on the SE through an in-depth study of an empirical controversy. We address the ongoing debate over the framing of SE as either a form of 'neoliberalism on steroids' (Morozov 2013; Murillo et al. 2017), or a more sustainable mode of consumption (Botsman and Rogers 2011). As it seeks to identify a dominant logic that could typify a cluster of SE initiatives (Mair and Reischauer 2017) or more broadly SE at large, extant literature on SE seemingly reconduct the classical opposition between 'economy' and 'values' by opposing market and nonmarket logics (Laurell and Sandström 2017). In doing so, it misses the opportunity to investigate how 'economy' and 'values' are mutually constitutive and are inseparable in practice. Boltanski and Thévenot's framework makes it possible to unfold how actors themselves reconstruct their world in situations marked by deep uncertainty—as are many of the situations where SE appears in new markets—and where things do not appear to actors as already formatted in two neat categories such as those of market and nonmarket logics. A range of criteria, represented here by the different *worlds*, are available to actors to evaluate situations and guide action. Consequently, our analysis allows us to see with richness and subtlety all the normative and moral concerns that emerge when we take as a starting point the point of view of the actors themselves. It allows us to see how things come together, interact, and intersect, to bring out a number of new and sometimes surprising qualities that can be associated with the SE initiative we studied. In short, when we analyse its real-life involvement with existing *agencements* rather than trying to abstract its moral stance, SE reveals a plurality of moral principles that goes beyond the duality accounted for in extant literature.

We also found a potentially replicable pattern to controversies around SE. There is initially a confrontation with the values that were not assiduously enacted in previous *agencements*, both at the scale of the market and the taxi industry. Uber primes values primarily associated with the *industrial* and *domestic* worlds. We observe that different *agencements* can develop with the same goal of enforcing specific conceptions of worthiness, and yet enact different realities. Qualities that were hardly enforced in traditional markets become, in SE, sine qua non conditions to market participation.

In the second phase, we observe a deep clash between the *civic* order that sustained incumbent market, and the features of Uber. The latter is characterised in part by its unruliness, but more so by the numerous forms of worth (*industrial*, *merchant*, *project*) used to legitimate its existence. Through the explicit process of reengineering, we observed that Uber does indeed perpetuate many market mechanisms, and part of its rhetoric is rooted in the *merchant* world, such as the importance of competition ('give choice' to customers) or the practice of 'surge pricing' which is promoted by Uber as a way to determine 'the right price'. We also noted the presence of values related to the *project* world, which according to Boltanski and Chiapello (2011) represents the 'new spirit of capitalism'. Our results hence challenge the view of SE as a contestation over capitalist values. We also find the ideals of progress and innovation (*industrial*) to be central and powerful in imposing new collective understanding of what should be valued.

Finally, beyond the mere quests for intersubjective agreements about what is valuable, controversies must 'land'. New 'ways to do things' are designed and embedded in *agencements* that aim at having sufficient legitimacy to hold out. This may necessitate compromises and trade-offs, as certain definitions of the common good brought up by SE might have gained enough legitimacy to be integrated in the new market scale *agencement*, sometimes at the expense of what was there before.

Second, we contribute to the body of literature relying on the 'Orders of Worth' framework (2006) to investigate controversies by showing how an 'ecological' reading of Boltanski and Thévenot, coupled with ideas put forward by scholars of technologies, ethics and social change can be useful to investigate the moral component of controversies. Boltanski and Thévenot's (2006) orders of worth framework recognise the crucial role of material elements in giving weight to moral arguments relying on different conceptions of common good. Meanwhile, the literature on technologies, ethics and social change leads us to consider these material elements as full actants in the enactment of moral realities. Taken together, these perspectives enrich the analysis of controversies as they allowed us to investigate the concrete work of arrangement and rearrangement of sociomaterial elements that occurs during controversies.

Using the notion of *agencements* as a methodological tool expands the understanding of Boltanski and Thévenot's idea of compromise, and its application to empirical situations of controversies. Our analysis shows how sociomaterial elements (regulations, compensation mechanism, certifications, etc.) are put together to make local agreements sustainable. Compromises are

constructed beyond discursive and somewhat labile resolutions that brings together and transcend two orders of worth. The compromises we observed were essentially *agencements* resulting from a recomposition of laws, conventions, devices, persons, etc. that harmonised different definitions of justice and of the common good. At the issue of this process, something stronger imposes itself. Conceived in this way, compromises structure action in such ways that certain common good are accomplished while others aren't. In this view, compromises are more robust than when conceptualised as the fruit of discursive moves leading to intersubjective agreements (Dionne et al. 2018). A limited amount of previous work on controversies have tried to see how, concretely, an arrangement or a compromise is sociomaterially constructed.

Finally, we contribute to the literature on the relationship between technology, ethics, and social change through our use of Boltanski and Thévenot's framework. While existing studies highlight that considering the moral load of technologies, they might entail changes in what is seen as appropriate or desirable, they only scratch the surface of the relationship between specific values and the perceived legitimacy of technological developments. In contrast, Boltanski and Thévenot's framework allowed us to capture, to pinpoint, the essence of these specific values, and therefore to put a name on the new conventions that legitimise technological developments by associating them with definitions of the common good. As a result, we were able to follow the unfolding in time and space of these new conventions, through the engineering operations of actors, to characterise and define the modalities of these new associations. We thus identified a pattern of how the specific values associated with a technological development can come to change what is seen as acceptable either by formal mechanisms or informal mechanisms.

By bringing together the literature on Boltanski and Thévenot and ideas discussed within the literature on technology, ethics and social change, we thus provide a new way of looking at the moral dimension of technological changes. Taken together, these streams first make it possible to investigate the 'moral content' of technological developments by uncovering the composition of the worlds of meaning that are constructed by actors through and around technological developments. Secondly, they highlight an engineering process through which these new worlds are designed.

Conclusion

This study set out to better understand the moral realities that are brought up by SE devices as they enter existing markets amidst controversy. One of the interesting insights to emerge is the role of SE controversies in evaluating, in a moment of uncertainty and unsettledness, the values and objectives to be prioritised. While controversies may be perceived negatively, we instead find that they are at the forefront of the interaction of technology and society, as anything that was once taken for granted can come into play in an attempt to engineer new ways of doing things.

Although our study focused on a specific controversy, our contribution could be extended to other controversies that involve the introduction of SE devices into markets. Clashes similar to those that happen between Uber and the taxi industry happen for example with Airbnb and the hospitality industry. More broadly, our framework can also support empirical studies of the moral dimension of technological developments.

As it is taking a growing place in modern economies, SE raises important questions related to policy making on the side of governments, and strategy making on the side of incumbents. By helping to make sense of controversies and unpacking them, our framework offer tools to understand what is really at stake. It also evokes how laws, technologies, instruments, protocols and so on can be better designed to enforce their intended aims.

Compliance with Ethical Standards

Appendix 1

See Table 4.

Table 4 Outline of data sources

Newspaper articles	$N=852$
Journal de Montréal: $N=223$	
24h Montréal: $N=98$	
Le Devoir: $N=167$	
La Presse: $N=364$	
Press releases	$N=132$
Websites	$N=5$
Bureau du taxi de Montréal (Montréal's Taxi Bureau)	
Uber Montréal (https://www.uber.com/en-CA/cities/montreal/)	
Comité provincial de concertation et de développement de l'industrie du taxi (Provincial Committee for Consultation and Development of the Taxi Industry)	
La vérité sur UberX (http://laveritesuruberx.com) (The truth on UberX)	
Commission des Transports du Québec (Transport's Commission of Quebec) https://www.ctq.gouv.qc.ca/taxi.html	
Laws, regulations and ministerial decrees	$N=2$
Act respecting transportation services by taxi	
Ministerial decree on the agreement between Uber and the Government of Quebec	
Transcripts of parliamentary proceedings	$N=10$
Committee on Transportation and the Environment, Special consultations and public hearings on Bill 36, An Act to amend various legislative provisions mainly concerning shared transportation. Hansard, vol. 44, nos. 27 and 28	
Committee on Transportation and the Environment, Special consultations and public hearings on the backgrounder on passenger transportation by automobile for remuneration. Hansard, vol. 44, nos. 50–54	
Committee on Transportation and the Environment, Special consultations and public hearings on Bill 100, An Act to amend various legislative provisions respecting mainly transportation services by taxi. Hansard, vol. 44, nos. 69–71	
Briefs	$N=29$
Special consultations and public hearings on Bill 36 ($N=5$)[a]	
Special consultations and public hearings on the backgrounder on passenger transportation by automobile for remuneration ($N=14$)[a]	
Special consultations and public hearings on Bill 100 ($N=9$)[a]	
Brief of the Quebec Liberal Party Youth Commission on Bill 100	
Other documents	$N=2$
Guide québécois du chauffeur de taxi (Quebec's guide for taxi drivers). Source: Ministère des Transports du Québec	
Taxi! Maintenir un service professionnel et protéger son métier (Taxi! Maintaining a professional service and protecting the profession). Source: Montréal's Taxi Bureau	

[a]The detailed list of consulted briefs can be provided by contacting the corresponding author

Appendix 2

See Table 5.

Table 5 Quotations, the Worlds of Taxi

	Quotations
Domestic	"There's no human. It bothers me."
	L. Bilodeau, President "Taxi Coop Montréal" (dispatch company), February 3, 2014, JM
	"If a driver arrives in front of your house, calls you and asks you where you are, and you answer that you are in another taxi, there is awkwardness. It is this awkwardness that causes, over time, a respectful relationship."
	Guillemette, J.-N., Uber's GM, October 24, 2014, 24h
	"It would be important for young Liberals to do their homework, rather than attack their elders. They report Uber's falsehoods without an ounce of distancing or discernment."
	Chevrette, G., taxi representative, April 29, 2016, CNW
	"Dear taxi drivers, before getting the whole population in trouble with your day strike against Uber, why don't you start by respecting the new dress code from the Montréal taxi law? And why not clean your cars, which are generally dirty and smell bad? We may be more tempted to use your services if those two conditions were met."
	Lamarre, A., citizen, February 3, 2016, LP
	"A computer technician that only make ends meet with Uber could never offer me the same thing. Forget it! You can't improvise being a taxi driver. Driving a taxi isn't just a livelihood, it's a profession, a manner of being, a culture, even an asceticism. Old drivers with rickety cars are the best. You must have seen snow to acquire the wisdom procured by travelling thousands of kilometres and attending to so many different people."
	Rioux, C., columnist, July 10, 2015, LD
Market	According to Uber, we must never forget that the taxi "is not a public service, but a private company". These companies must expect that their operation "will be disrupted by the arrival of new competitors as well as technological development".
	February 18, 2016, LP
	"Why not take the opportunity to put everybody (taxis, Uber, and the coming others) on an equal footing by simplifying the regulatory environment for all? In the long run, consumers and service providers will equally be winners."
	Belzile, G., columnist, September 20, 2016, LP
	"This pilot project is an important step that allows the coexistence of several business models, to the greater benefit of users, and that encourages innovation and competition."
	Leblanc, M. President, Montréal's Chamber of Commerce, September 8, 2016, LD
	"This protectionist lawsuit is unfounded and aims to preserve the taxi industry's monopoly to the detriment of consumers."
	Uber, February 1, 2016, LP
	"The taxi is too expensive in Montréal, even I don't use it. If it takes competition like Uber to lower the price and attract more customers, I'm for it."
	Mickail, M., Taxi driver, October 30, 2014, JM
Civic	"There is a social contract between the taxi industry and the City of Montréal. This social contract is simple: drivers are under the scope of a lot of rules (training, mechanical inspections, etc.) and the City of Montréal sets barriers to entry (one cannot offhandedly become a taxi driver). […] It's an imperfect system that does its job of protecting citizens while allowing taxi drivers to earn a living"
	P. Lagacé, columnist, May 18, 2015, LP
	"Uber only targets one clientele and it is a more affluent clientele […] The lady who lives in a small dwelling in Rosemont and who needs a taxi to go to her CLSC, Uber does not want her as a client. It's questionable. Taxis are for everyone."
	Roy, D., president of a taxi dispatch company, July 11, 2014, LP
	"We believe in the National assembly's process. Afterwards, the government of Quebec will make the decisions."
	Coderre, D., Montréal Mayor, February 11, 2016, 24h
	"If you want to work on establishing regulations, you will need to start by respecting the ones that already exist. After that, if it is necessary to change it, we will do it together. The parliament is there for that"
	J. Daoust, Transports Minister, February 19, 2016, LD
	"Well, if Uber wants to leave, let it leave! We would prefer that it remains here for all sorts of reasons, but a company's duty is to conform to government regulation, not the opposite. Even if it is a techno multinational straight out of Silicon Valley, whose capitalisation is in the US billions…"
	F. Cardinal, columnist, September 27, 2017, LP
	"We have made efforts to adapt our legislative framework to their business model, but frankly, I do not think it is up to the Quebec government to bow down to a multinational."
	P. Couillard, Quebec PM, September 27, 2017, LP

Table 5 (continued)

	Quotations
Project	"We give the drivers an iPhone, and we do not charge them any fixed fees. We charge a commission of 15% per ride. But if they do not get any rides, if they go on vacation, they owe us nothing. It gives them more flexibility" *J.-N. Guillemette, Uber GM, July 14, 2014, LP* "I had a business that did not work. I had to find something quickly […] For many drivers, being an Uber driver is a sideline or a transition to something else" *Farid, Uber driver, September 8, 2016, 24h* "When you do this part-time, like a hobby, all these rules, it becomes a little too much." *Éric, Uber driver, September 14, 2016, 24h* "Our model is based on the flexibility of our drivers, who can get in their car when they want to meet Montrealers' transportation needs. If we impose a barrier to entry, it doesn't work anymore." *J.N. Guillemette, Uber GM, April 20, 2016, JM* "Part-time drivers are not interested in taking 35 hours of training. […] Some just want to try the platform before deciding if they continue. Others just want to work a few hours a week to pay the bills. 35 hours of training, it's not possible for them." *J.-N. Guillemette, Uber GM in Quebec, September 27, 2017*
Industrial	"It could be anyone, any criminal who gets his hands on a cell phone and transports people in a private vehicle. It's extremely dangerous for the customer." *Saliba, D., taxi representative, July 14, 2014, LP* "The taxi industry has been frozen for decades, it's time to modernise the way things are done." *Guillemette, J.-N., Uber GM, February 3, 2014, JM* "Quebec must follow the movement for modernity, innovation and support for the new technologies coming in the province, and we wish to do this through dialogue with the authorities." *Guillemette, J.-N., Uber GM January 28, 2016, LD* "I had to take a taxi about a month ago, and although I confirmed with the driver before leaving that he accepted cards, once we were at the destination, he told me his machine did not work. He even wanted to bring me to a bank so that I could pay cash. Since then, I do not go near taxis." *David, citizen, February 6, 2016, JM* "We cannot be against technological progress, and Quebecers are entitled to benefit from it." *Surprenant, C. Member of the National Assembly, Opposition Party, February 18, 2016, CNW*

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