

Citizen Perceptions of Government's Resistance to Shared Parking

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“ We're pretty disappointed this is the city's stance on it currently, when really we've just as citizens tried to help the situation by getting the cars off the street. ”

A resident in Ottawa
January 2020, CBC News

Sharing economy services is one of the fastest growing segments in today's economy, especially in urban centres. However, some cities have taken a negative stance and sought to prohibit sharing economy services, which has raised tensions between citizens and the local government. This paper adopts a case study approach to investigate what the main topics are in citizen perceptions of their government's resistance to shared parking in Ottawa, the capital city of Canada, where shared parking is considered illegal. In so doing, the study applies topic modelling on readers' comments following news about local residents being threatened with legal action by the city for providing shared parking services to government employees suffering from insufficient office parking resources. Based on six identified topics, the study establishes a conceptual framework that contributes to the literature on sharing economies by illustrating how citizens perceive their government's resistance toward sharing economies. The paper considers whether sharing economy services could be an innovation that would benefit societies, and how understanding citizen perceptions through online comments can help a government to solve policy issues and create win-win resolutions.

Introduction

Over the past decade, “sharing economies” have surfaced as a huge challenge for cities and governments (Vith et al., 2019). Although the term “sharing economy” lacks a clear and widely accepted definition (Gyódi, 2019; Pedroni, 2019), studies commonly emphasize the use of “slack resources” and the ways collaborative consumption can be beneficial for both individuals and societies (May et al., 2017). In a particular sharing economy, “idle resources” are allocated for “peer-to-peer” (P2P) sharing with people outside of one's typical social networks (Frenken & Schor, 2017). In such situations, the “access over ownership” principle allows individuals to use goods and services that they could not afford or would not otherwise choose to own (Constantiou et al., 2017; Netter et al., 2019). Sharing assets can nevertheless lead to more efficient use of resources when properly organised, drive down costs, supplement incomes, and enhance social interactivity (Greene & McGinty, 2016; Leung et al., 2019). It also marks the rise of new business models built around social technology platforms (Kathan et al., 2016), which are breaking

down industry boundaries (Russo & Stasi, 2016), and providing cities with new opportunities for economic growth (Zon, 2015).

Nonetheless, city governments have tended to vary in their interpretation of the opportunities and challenges of sharing economies, as well as in making an authoritative response (Vith et al., 2019). Thus, some cities have prohibited sharing economy services such as short-term rentals, while others support the provision of such services, and a large number of cities have simply refrained from taking a clear position on sharing economics (Hong & Lee, 2018). Both ignorance and resistance toward sharing economy services seem logical, as government officials rarely get credit for being innovative, but rather easily get punished for their missteps (Zon, 2015). However, Pawlicz (2019) argues that introducing regulations to prohibit sharing economy services may lead to fewer innovations and reduced economic activity in the city. In general, rules and regulations are a major barrier to sharing economy adoption in many cities (May et al., 2017). On the other hand, even strict regulations can contribute positively to the supply of sharing economy services by making it

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explicit what is legal and what is illegal (Uzunca & Borlenghi, 2019).

According to Hofmann et al. (2019), there is a need to understand the tensions between citizen users and the authorities, which have arisen from government's negative attitude toward sharing economies. Further, prior studies (for example, May et al., 2017; Ganapati & Reddick, 2018), call for more research on the barriers and opportunities related to specific sectors and integrations of sharing economies. In urban research, shared mobility, particularly ride hailing (for example, Uber and Lyft) is among the most studied and debated of sharing economy services in the context of cities (Ganapati & Reddick, 2018). However, Novikova (2017) argues that there is still need for research in a related sector, namely, at the intersection of shared mobility and physical infrastructure, such as buildings, roads, and parking. In fact, shared parking, which refers to matching seekers with available parking spaces on demand by lending or renting out unoccupied parking space such as residential driveways and private parking spots (Boysen et al., 2019; Kim et al., 2019), is an exemplary but under-researched area of sharing economies (Xu et al., 2020).

This study aims to understand what the main topics are in citizen perceptions of a local government's resistance to shared parking in Ottawa, the capital city of Canada where shared parking is considered illegal. In so doing, the study applies "topic modelling", which is a machine-learning based automated content analysis method, on a publicly available data set of 414 online news readers' comments that followed a recent CBC news article. This particular article was about local residents being threatened with legal action by the city for providing shared parking services to government employees who suffer from their employer's insufficient office parking resources. By identifying and discussing key topics in readers' comments, and creating a conceptual framework based on the empirical findings, the study contributes to the literature on sharing economies by showing how citizens perceive their government's resistance to economic sharing of resources, an innovation that would seem to benefit society. The paper explores how understanding citizen perceptions through online comments can help the government solve policy issues through crowd suggested win-win resolutions.

Literature Review

The "excess capacity" of resources such as houses, cars,

and parking places is present when an owner does not consume their resources all the time, thus enabling them to lend or rent out resources to those in need (Frenken & Schor, 2017). Private car parking provides an example of a resource with potential for sharing, as a parking spot is empty once its owners drive a car out, until they drive back to park it (Xu et al., 2020). The objective of parking sharing is to match local parking demand with empty parking spaces (Russo & Stasi, 2016; Xu et al., 2020), such as household driveways or additional parking options.

Users seeking parking space often use a sharing platform to specify their target position and rental interval (Boysen et al., 2019), and then pay for the service. Despite parking spots being "immobile" rather than "mobile" resources like cars (Boysen et al., 2019), peer-to-peer parking services are commonly considered as "Uber for parking" (Zvolska et al., 2019). Boysen et al. (2019) note that when people need a parking space, they are often willing to accept whatever is available, as long as it is 1) large enough for their vehicle, 2) available during the requested rental period, 3) does not cause excessive walking to the target position, and 4) is affordable.

However, many local governments have started to regulate sharing economy services such as shared parking, in order to manage the disruptive effects they may generate (Kim et al., 2019; Hong & Lee, 2018). Extant laws and regulations to manage safety, workforce, privacy, and tax issues in such community-oriented distributed systems are either inapplicable or differently applicable for sharing economies (Leung et al., 2019), and which are therefore in need of being updated (Greene & McGinty, 2016). Also, citizens are argued to have an interest in defending the sharing economy against the unfair limitations imposed by extant laws and regulations (Pedroni, 2019).

The most socially innovative regulatory changes should address not only the interests of government and business, but also those of citizens who are ultimately the primary users and voluntary providers of shared services (Hofmann et al., 2019; Zvolska et al., 2019). That said, a government may not at any given time have a good or clear understanding of its citizens' interests. As well, public opinion is somewhat divided on how to regulate sharing economies (Leung et al., 2019). While some see strict regulation as justified because a sharing economy is a "grey zone" that may support unfair competition and lead to monopolistic power of sharing platforms, nevertheless, anti-regulatory opinions still

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suggest that regulation would only protect incumbents and discourage entrepreneurship and citizen innovation, as well as limiting people's property rights (Ziegler, 2017; Paik et al., 2019; Pawlicz, 2019).

Regulatory responses and prohibition against resource or property sharing reflect governmental resistance to sharing economics. Part of that resistance is related to local political competition. A greater level of political competition is associated with a more favourable regulatory response towards sharing economy services (Hong & Lee, 2019).

This suggests that elected politicians with less political competition (for example, long tenure in office) are more likely to ban sharing economy services such as Uber in favour of traditional service providers such as taxi companies (Paik et al., 2019). In addition, Vith et al. (2019) argue that a particular city's response to shared community services is associated with how local governments perceive sharing economics. In short, those cities that view sharing economics as social endangerment and market disrupting tend to lean toward more regulations against it, while those cities that perceive sharing economics as socially enhancing and both market and ecologically transformative tend to support it. Importantly, Lulin (2017) points out that any city that is aiming to become a "smart city" needs to be supportive of its citizens sharing with one another more regularly, and thus adopt a model in which people become co-producers as users of a number of services.

Method

This research used an instrumental case study approach to examine citizen perceptions about governmental resistance to shared parking. In an instrumental case study, the case such as an incident can be discussed in an in-depth manner, while the research interest is in understanding something more general than merely the case (Stake, 1995). In this study, the broader interest lies in understanding how citizens perceive their government's negative attitude toward sharing innovation that could benefit society. The case is briefly described below.

Case: federal employees' parking problem in Ottawa

In January 2020, CBC news media reported about a dispute in Canada's capital region. The City of Ottawa's bylaw department had sent notices of zoning non-compliance to several local residents for renting out their driveways to federal employees (Johnstone, 2020). The city was threatening to take legal action against the

residents if they do not stop renting out their unoccupied parking space to employees who work at the nearby headquarters of two of Canada's federal agencies (Johnstone, 2020). As these agencies did not have sufficient parking resources, many employees were parking on the neighbourhood streets (CBC, 2017). The city's bylaw department issues annually 1,800 tickets in the area, as those parking on the streets need to move their car every three hours to avoid being ticketed (CBC, 2017). While some frustrated residents were patrolling the streets to help bylaw officers know which cars had violated the parking limit (Johnstone & Pritchard, 2016), others were more supportive.

In an interview, a local resident said that people had been asking to rent his parking place (Johnstone, 2020). He thus thought that he had found a solution to the persistent parking problem in the neighbourhood, and a way to earn extra money by renting out his driveway to four federal agency employees (Johnstone, 2020). However, the City of Ottawa does not allow the rental of residential driveways unless the rental is part of a tenancy agreement (Carlucci, 2016).

The city's strict bylaws have also prevented shared parking platforms from entering the Ottawa market (Carlucci, 2016). According to their notice of violation, residents were breaking parking rules by renting their spots out to non-residents, and must stop immediately (Johnstone, 2020). The interviewed resident did not see any downsides to renting out his own driveway and, similar to many others doing the same, hoped that the city would consider a pilot project to allow residents to continue renting out parking spots (Johnstone, 2020).

The city's officials justified the action by stating that renting out a private driveway would technically turn it into a commercial parking lot. That would then require business insurance, and could lead to additional traffic and nuisance in the area (Johnstone, 2020). Applying for a zoning change would be expensive and a high demand for parking in the neighbourhood alone would not warrant the approval of rezoning (Carlucci, 2016). The vehicles parked on streets also provide safety concerns, as they limit access to emergency vehicles, garbage trucks, snow plows and fire hydrants (CBC, 2017). Further, the city was aware that some residents had paved their backyard green space to create parking spaces for rent, thereby breaking provincial regulations against paved backyards, which do not allow for proper drainage on properties (Johnstone, 2020). Acknowledging the limited parking availability around their offices, one of the federal agencies announced that

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they keep reminding employees to follow municipal parking rules and encourage them to take public transit, carpool or cycle to work (Johnstone & Pritchard, 2016; Johnstone, 2020).

Data collection and analysis

Instrumental case studies can make use of various types of data. Qualitative content analysis can be performed either in an inductive or a deductive manner (Elo et al., 2014). That said, Nikolenko et al. (2015) argues that information-rich case studies can benefit greatly from automated topic mining using topic models such as Latent Dirichlet Allocation (LDA). "Topic modelling" by now refers to a group of inductive computational techniques used for discovering hidden topics and their links in textual data. LDA is an unsupervised method for identifying key topics within a collection of documents (Lindstedt, 2019). An unsupervised model learns underlying topics for a set of documents and assigns each document a rating of affinity to these topics (Nikolenko et al., 2015). One main benefit of using an

unsupervised model for analyzing online comments is that it uses machine learning and has no critical presumptions on the meanings of the words, thus it works with texts in any discipline (Westerlund et al., 2018).

The research for this paper applied topic modelling on a data set of publicly available readers' comments from the commentary section of a news article related to the case. Comments were obtained as anonymous data, that is, without any kind of poster identifier. This approach follows that of previous research on sharing economies, which has made empirical use of online news articles (Leung et al., 2019). Zhang (2019) applied topic modeling over publicly available online data in order to identify key topics in consumers' opinions on sharing economy services. We therefore obtained a total of 440 readers' comments to a CBC News online article about the Ottawa's shared parking case by Johnstone (2020), and organized them into a spreadsheet for the purpose of topic modelling.

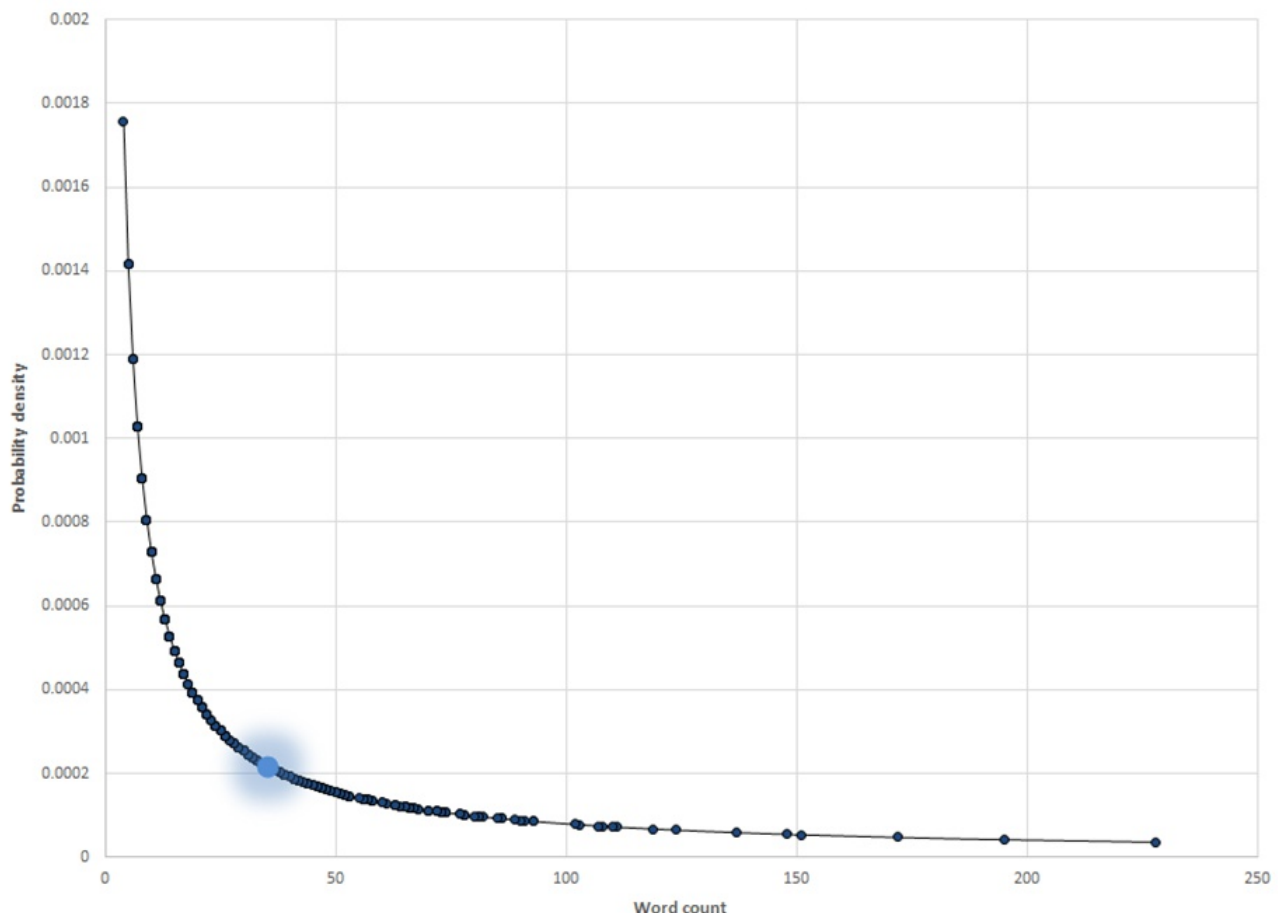


Figure 1. Lognormal distribution of word count

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First, the data were cleaned by removing very short (one to three words) and information-poor comments that Huang et al. (2010) call “spam”. As a result of the clean-up process, the final data set included 414 comments. Second, the data were investigated in order to ensure trustworthiness (Elo et al., 2014) and suitability for topic modelling this case.

In order to evaluate the trustworthiness of the data set, we examined the word count of the comments. The shortest comment had 4 words while the longest had 228. The lognormal distribution of word count in Figure 1 illustrates that the majority (61%) of the comments were short (fewer than 35 words), while 39% of comments reached or exceeded the mean value of 35 words. Further, only 3% of comments were longer than 100 words. The lognormal distribution of our data is in line with the notion by Sobkowicz et al. (2013), who

found that the comment length distributions of most postings in online discussion forums, including online news media commentary sections and social media platforms, follow the same pattern. Further, Sobkowicz et al. (ibid.) argue that such pattern reflects a real attempt by commenters to communicate their feelings and thoughts on a matter at hand to others and, thus, it provides evidence that the content is created by human beings rather than, for example, automated bots.

The radar graph showing the distribution of comments by their length in Figure 2 illustrates that the majority of comments were short. Most frequently, the comments were between 7 and 65 words, with an emphasis on the lower edge of the range. These results are in line with the findings of Huang et al. (2010), who argue that short comments typically hold a high percentage in online discussion data, and, apart from some extremely short

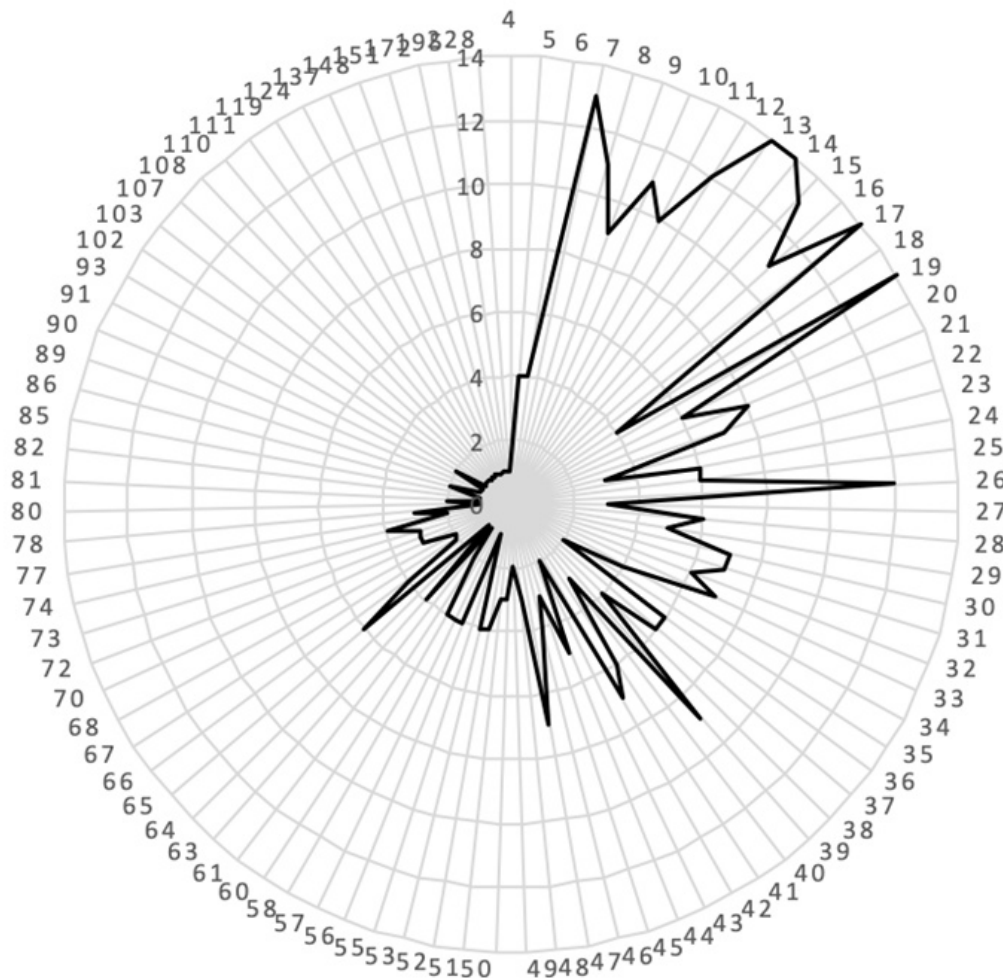


Figure 2. Distribution of comments by their length

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(one- or two-word) comments, they tend to be to the point. Longer comments instead may either be detailed and highly relevant to the topic or nonsensical and repetitive propaganda. Given that the majority of comments in our data were short and there were only a few long comments, the structure of the investigated data set supports its suitability for the intended data analysis. However, one needs to exercise caution with short comments, given that the topic modelling analysis method suffers when there is a sparsity of word co-occurrence patterns in short texts (Cheng et al., 2014).

Results

The topic modelling analysis resulted in six topics that were meaningful and easy to interpret: 1) Federal

government's role, 2) City government's resistance, 3) Sharing options, 4) Flopped systems, 5) Opinionated facts, and 6) Power play. These topics, each with 10 keywords with highest weights in the topic, were selected based on the analysis, and are shown in Table 1. They are further illustrated using word clouds as well as discussed based on drilling more deeply into associated readers' comments in the following sections.

Federal government's role – private parking sharing could be a solution to a problem created by the government

The first topic, "federal government's role", refers to the parking problem in the City of Ottawa, which is believed to have been created by the federal, provincial and municipal governments. The overall argument was that

Table 1. The six topics and their keywords

Topic	Keywords
Federal government's role	parking, rent, government, spaces, private, more, issue, work, employees, only
City government's resistance	issues, cities, accept, homeowner, plan, based, buses, cost, disease, happens
Sharing options	anyone, into, registered, charity, airbnb, free, driving, uber, look, probably
Flopped systems	system, useless, unreliable, tired, little, care, sounds, pressing, reliable, logic
Opinionated facts	vehicles, thought, threatening, wrong, everything, somebody, fact, full, snit, town
Power play	city, people, donation, park, property, driveway, space, rent, make, insurance

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the federal government does not build enough parking spaces for their employees. This problem persists everywhere they have offices. Some comments argued that the federal government does not understand where their staff are living; for example, many are living in the suburban areas with a limited access to the public transit system and located far from the office. Asking its employees to use public transit or bicycles to commute to work is therefore implausible. It does not solve the parking problem because there are always greater parking needs than spaces available. This was seen to relate to the government's bureaucratic behaviour and lack of innovativeness. If the government is unable to build more parking places for their employees, then private shared parking appears as an innovative and ecological solution. In any case, given the government's failure to provide a solution, the government should not interfere with private deals between owners of parking space and those in need of parking.

City government's resistance – city bylaws and rules need to be changed to meet with the new reality

The second topic, "city's resistance", revolves around arguments that although Ottawa has urban parking challenges similar to elsewhere, the city council, unlike in many other cities, refuses to accept private shared parking as a partial solution to the problem. Rather, the city wants to scare its citizens about violating bylaws, and penalize those who would offer an effective and mutual solution. Also, the comments pointed out that private citizens are bombarded with the letters from the city's lawyer, although it is in fact federal employees that break the city's bylaws by frequently exceeding the parking limits. The city's resistance toward sharing economies was seen as a result of the municipal government's eagerness to stick with what they are good at, namely introducing new rules and regulations.

Sharing options – it should be legal to offer sharing economy services or people will bypass the law

The third topic, "sharing option", argues that a person owning a parking place should have the right to let anyone park on it, as the city has allowed anyone with a property to list it on Airbnb. Renting out parking space could be limited to one or two parking spots to avoid someone paving their backyards. The emergence of shared parking apps and supportive insurance policies were thus seen as inevitable features of a smarter economy. At the same time, the comments addressed that there are many nonsensical rules, restrictions, regulations, and limitations, and suggested that people should fight them through civil disobedience. If such

resistance and advocacy for change does not result in new regulations, then there are options for local citizens to keep renting out their parking places within the current regulatory framework, such as letting people park for free, while accepting donations or taking "gifts" as a form exchange, or turning those in need of parking into "tenants" by renting out "incomplete apartments", with a free parking option.

Flopped systems – neither the city's public transit system nor its planning system is operational

The fourth topic, "flopped systems", puts forward that the city's recently introduced light rail transit (LRT) system is unreliable and sometimes completely shuts down the main line. At this point, people cannot be asked to use public transportation without expecting schedule delays. People have grown tired of persisting problems with the LRT and the City's obvious inability or unwillingness to handle the issue. Until the city fixes the LRT's problems and improves the city's public transportation system in general, the argument is that people should be allowed to park anywhere they want, including private residential driveways. At the same time, if the city could succeed in making the LRT system fast and reliable, there would then be need for fewer parking places. Further, the city's planning systems were not perceived as innovative, but rather as inadequate and punitive, in a way that does not help solving real problems.

Opinionated facts – the city is simply wrong about the matter and somebody has to fix it!

The fifth topic, "opinionated facts", put forward various "facts" and recommendations for action. The comments addressed what other cities had done in order to create a solution to shared parking, and recommended that the City of Ottawa amend their bylaws accordingly. Also, allowing shared parking for low emission and electric vehicles was recommended to promote the city's green policy. Many comments candidly argued that the city was wrong in this parking matter and should stop enforcing inflexible policies. Particularly offensive was what was seen as the practice of making money by ticketing defenseless people, and of employers pushing people to use public transportation or bicycle when they are not really an option. Further, some argued that resistance to shared parking is not due to the city's restrictive zoning bylaws, but rather because of the inane requirement for parking insurance, combined with the fact that government officials sometimes seem to enjoy policy bullying.

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Power play – governments have no right to restrict people who want to do (most kinds of) business using their own property

The sixth topic, “power play”, focused on the power asymmetry between governments and citizens. On one hand, politicians can exercise power by enforcing obsolete bylaws that allow the city maximize to revenue from parking tickets. Rather than support innovations that would benefit citizens mutually, they can side with the long-awaited, yet still unserviceable public transportation system. On the other hand, the

comments argued that people should be able to use their private property whichever way they want, including shared parking, as long as they pay taxes. As city bylaws are ultimately borne from the willingness of local citizens, some comments suggested that people should start acting in order to change them. That is, government should be responsive to the people, and not seeking to control them. Some arguments called for citizens to put more pressure on the government to accept shared parking, reminding that Uber and Airbnb were also first resisted by the government.



Figure 3. Word clouds of the topics

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Figure 3 shows word clouds of the six topics, emphasizing their key words. The size of a word in the cloud reflects its weight in the topic. The topics are as follows: 1) Federal government’s role, 2) City government’s resistance, 3) Sharing options, 4) Flopped systems, 5) Opinionated facts, and 6) Power play. In the following section, the study will implement a conceptual framework based on theory, the case, and the empirical results from the topic modelling analysis.

A Conceptual Framework

Applying the process by Jabareen (2009), the present study utilizes theory, the case, and the identified topics drawn from the comments in order to create a conceptual framework. Previous literature is rich with examples of creating empirically based conceptual frameworks from qualitative analyses (see, for example, Rajala et al., 2012; Hamilton et al., 2018). Jabareen (2009) argues that a conceptual framework is not merely a collection of concepts, but rather a “plane” of linked concepts where each concept plays an integral role in interpreting social reality. Further, a conceptual framework does not provide a theoretical explanation or a causal or predictive model, but rather helps to understand social reality through soft interpretation of intents (Jabareen, 2009).

Here, the study establishes a framework to understand the relationships between concepts that occurred from the case analysis above regarding citizen perceptions of their government’s resistance to shared parking.

The conceptual framework in figure 4 illustrates that there are two types of players involved in the power play over shared parking in Ottawa: local, municipal government (city) and federal government as “problem makers”, on one hand, and citizen as “problem solvers”, on the other hand. The federal government is creating the parking problem by not providing enough parking space for their employees and lacking innovativeness and urgency to solve this issue. The city is to be blamed for enforcing restrictive zoning bylaws, for keenness to rely on ticketing revenues rather than finding solutions to the parking problem, as well as their inefficient planning and public transportation systems that are further contributing to the problem. Local residents in this approach are seen as problem solvers, who could offer a solution to the problem by renting out their driveways and parking spots. A power-related conflict exists between these two types of players, as governmental bodies are still exercising power to penalize citizens for their innovative solution, while citizens are trying to change the city’s negative attitude to shared parking.

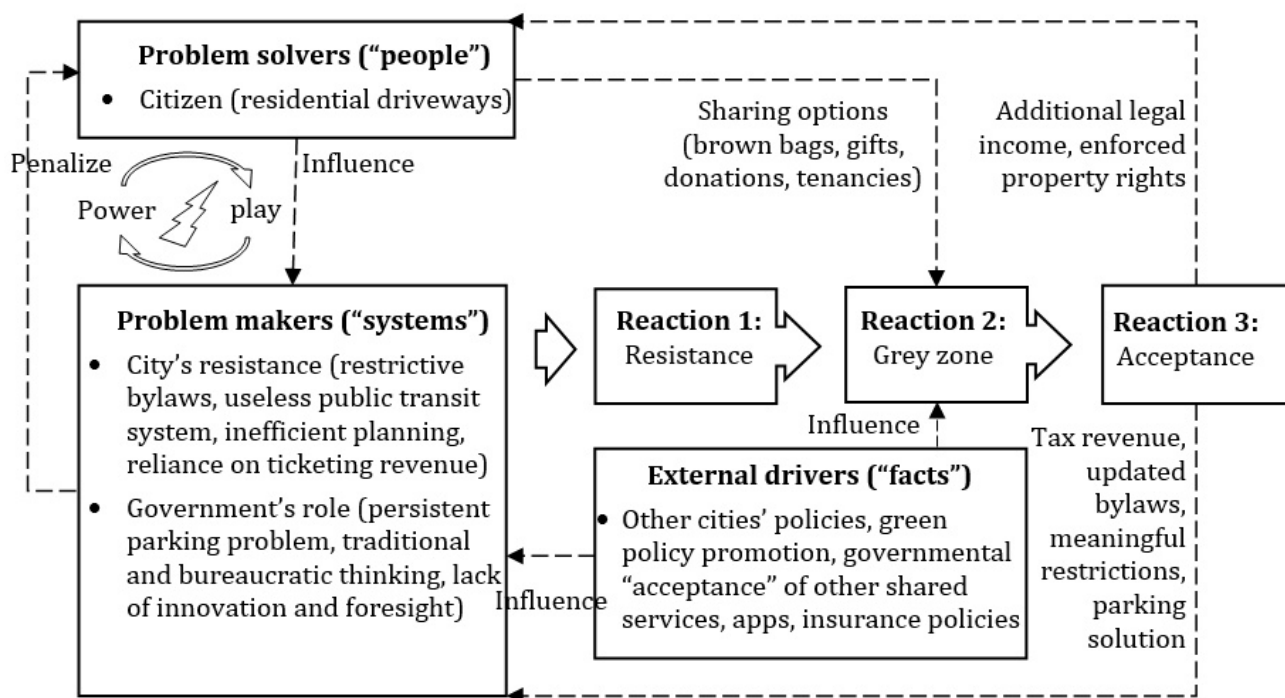


Figure 4. A framework of results

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A set of external drivers were seen to be putting pressure on the government to become more accepting of shared parking, including successful examples of other cities' supportive policies, Ottawa's sustainability goals, the city's acceptance of other shared economy services (for example, Airbnb), the growing adoption of sharing apps, and the possibility of having quick insurance to meet the requirements. While these external drivers were perceived as being properly framed to change the government's mindset to accept shared parking, commenters also support the emergence of a "grey zone", where shared parking was seen to happen anyway regardless of the government's attitude. This was seen to be due to basic civil disobedience with unregistered cash transfers and people using loopholes in the system such as offering "free" parking based on tenancy on paper. However, the ultimate goal would be to encourage the city to legalize shared parking. This would provide additional income to residents and enforce their property rights, as well as help solve the city's persistent parking problem, generate tax revenue, and update obsolete bylaws, while at the same time keep in place meaningful restrictions, such as limiting renting to one or two parking spots per household for safety and security purposes.

Discussion and Conclusion

This study aimed to understand the main topics in citizen perceptions of one particular government's resistance to shared parking. In so doing, the study topic modelled a publicly available data set of 414 readers' comments about Ottawa residents being threatened with legal action by the city for renting out their residential driveways to government employees. The persistent parking problem faced by some federal government employees in Ottawa, and its implications such as parking on the streets of the neighbourhood have been frequently discussed in the local news media over the past few years. After describing this case study, the analysis revealed six topics in the comments: 1) Federal government's role, 2) City government's resistance, 3) Sharing options, 4) Flopped systems, 5) Opinionated facts, and 6) Power play. Using the topics combined with theory, a conceptual framework was created to provide a more in-depth understanding of citizen perceptions of government resistance to shared parking.

Contribution to theory

The results have implications for theory across several fields. By identifying key topics in readers' comments,

and creating a conceptual framework based on the results, the study contributes to the literature on sharing economy by addressing how citizens perceive their government's negative attitude toward sharing economy services that would benefit society. Not surprisingly, citizens perceive the situation as "us versus them", where people are victims against an oppressive government. Further, in this case, citizens consider both the local, municipal government (city) and the federal government as overly restrictive, doing things "the traditional way", and being not only non-innovative, but also resistive of innovation that would help society. Consequently, citizens perceive the current situation as "power play" where city residents and the government are in constant conflict rather than collaborating to solve social problems.

The results support findings from previous research, which has addressed how government bodies associate their resistive attitude toward sharing economies, based on existing rules and regulations (Kim et al., 2019; Leung et al., 2019), and that they are often slow to move innovation forward (Hong & Lee, 2018). The results also support findings from previous research that suggest citizens tend to defend sharing economies against the unfair limitations imposed by obsolete laws and regulations (Pedroni, 2019). At the same time, the study emphasizes the balancing power of people in making change happen, particularly through their election behaviour, group pressure aimed at politicians, and even civil disobedience in protecting their rights. This approach aims to further legitimize shared economy services by making them integral part of the "grey zone", where the boundaries between legal and illegal are transitioning.

Implications to practice

The observed lack of collaboration between government and citizens in Ottawa is unfortunate. Lulin (2017) argues that any city aiming to become a "smart city" needs to support sharing systems, and adopt models in which citizens co-produce public services. The City of Ottawa's (2017) "smart city" report explains that their strategy is based on three pillars: a Connected City, a Smart Economy, and an Innovative Government. However, they (and other governments in a similar situation) need to make significant improvements to foster the third pillar.

This analysis suggests that the local government in Ottawa is perceived as restrictive, non-innovative, and non-accepting of innovation, which is quite opposite to

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their own stated goal. Also, the “smart city” strategy report does not mention sharing economy services at all. One may just wonder how this is possible. Given the growth of sharing economies globally, and calls by citizens to put pressure on government for changes, a new strategic plan should be updated to incorporate shared services and sharing systems.

Legitimization of shared parking, with some restrictions, would be a win-win resolution. Further, this study has shown how to use a machine-learning based content analysis technique over publicly available data coming from news commentaries in order to understand citizen perceptions, and how to use the results to create a conceptual framework that can help policy makers to better understand the situation in aid of finding a win-win resolution.

Limitations and future research

As usual, there are limitations in the study. First, the article described a case study of government's resistance to sharing innovation in the city of Ottawa, and analyzed a set of anonymous readers' comments to a news article about the case topic. As the identities of the commenters were not known, the comments could be biased with specific demographics or opinionated citizen activists. Thus, the results cannot be generalized to a large population and other geographical areas. Second, the topics and the conceptual framework were not validated by, for example, interviewing a group of Ottawa citizens. Future research could adopt other methods, namely interviews and surveys with citizens to validate the findings and provide support or need for refinement to the framework. Finally, the investigated data were characterized by short comments, which is common in online discussion (Sobkowicz et al., 2013). However, the mean lengths of comments associated with each of the six topics exceeded the mean length of all comments (35), varying between 41 and 54 (SD=5, $p < 0.01$). Thus, the identified six topics were dominated by longer comments in the analysis. This is likely due to fact that topic modelling suffers from a sparsity of word co-occurrence patterns in short texts (Cheng et al., 2014), and “locks up” to longer comments when there is high variance in comment lengths. Although eliminating long comments from the data might discard valuable insights, future research could apply cut-off of outliers in terms of excluding both the shortest and the longest comments, or breaking up long comments to short chunks in order to minimize variance in comment length.

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