

# Political Factors in Bicycle Sharing Systems

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## Abstract

Bicycle sharing systems let subscribers take bicycles between docking stations placed around cities. The design and implementation of such systems has technological challenges, but also depends on political decisions. This paper explores how liberty, equality and democracy plays a role in this design and shows why it is important to explicate the politics of bicycle sharing systems in the design fase before implementation.

**Keywords:** Bicycle Sharing Systems, Politics of Artefacts, Liberty, Equality, Democracy

## 1 Introduction

In 1965 Luud Schimmelpenninck, member of Dutch counter-culture movement Provo, released a so-called ‘White Bicycle Plan’, which called the municipality of Amsterdam to yearly buy twenty thousand bicycles that were to be painted white and distributed around the city. These white bicycles were to be public possession and free for everybody to use. After the municipality declined, the Provos took matters in their own hand by painting a few dozen of bicycles white and spreading them around the city for free usage. Even though the system collapsed in a few days (bicycles were stolen or destroyed and police officers removed them, arguing that they invited theft), the white bicycle plan was the genesis of a new type of public transport, which nowadays we call *Bicycle Sharing Systems*.

Although no new bicycle sharing systems were started the first few decades after the white bicycle plan, a new initiative was started in Denmark in 1991. Systems were started in the cities of Farsø and Grenå, and eventually resulted in a revival of bicycle sharing systems. Now, almost half a century after the white bicycle plan in Amsterdam, bicycle sharing systems are increasingly gaining popularity and exist in many cities on continents around the globe.

In this paper we will be looking at the politics that are involved with bicycle sharing systems. In his famous essay *Do Artifacts Have Politics?* (Winner, 1980), Langdon Winner presented the case of New York City master builder Robert Moses, who allegedly had two hundred low-hanging overpasses on Long

Island built in such a way that they discouraged the presence of buses on parkways. Twelve-foot tall buses would not fit under the overpasses, whilst automobiles would. In practice this meant that poor people and blacks, who relied on public transportation, could not (or with more difficulty) reach public park Jones Beach, a problem that car owning whites from upper and comfortable middle classes (all Moses' terminology) did not face. Even though the historical correctness of Winner's example is challenged by Joerges (1999), it does show how political dispositions (Moses' alleged social-class bias and racial prejudice) can be imbued in technological artefacts.

We view a bicycle sharing system as a technological artefact, made up of different parts such as the bicycles, the docking stations and payments systems, amongst others. Having established that technological artefacts need not be politically neutral, we want to investigate how this applies to bicycle sharing systems. Our research question is: *What political factors affect the design of bicycle sharing systems?* It is not our aim to come up with a definite 'final' answer to this question. If that were at all possible, it would better suit the scope of a master thesis or even a phd-thesis. Instead, we aim to take a first few steps, addressing key elements of bicycle sharing systems and key political philosophical concepts taken from Swift (2013). We will start the paper with an introduction to bicycle sharing systems and how they have evolved. Subsequently, we will look how political conceptions of *liberty*, *equality* and *democracy* influence design decisions regarding bicycle sharing systems. In conclusion, we will formulate how and why these examples show the importance of political awareness in designing such systems.

## 2 Bicycle Sharing Systems

We already mentioned in the introduction that the first generation of bicycle sharing systems, the white bicycle plan, consisted of nothing more than white painted bicycles that did not contain a lock. Bicycles could be taken and deposited anywhere, with no control whatsoever. In practice this meant that many bicycles were only taken in the sense of stolen and if deposited at all, it was in the canals of Amsterdam. It is no surprise then that the system collapsed just a few days after it started. The term first generation system is coined by DeMaio (2003), who provides a history of bicycle sharing systems and argues that we are on the brink of a fourth generation.

The second generation of bicycle sharing systems started in Denmark. The biggest of these was the one of Copenhagen called *Bycyklen*, that already addressed many issues from the previous generation. Major improvements include the use of bicycles specifically designed for intense usage and the introduction of docking stations spread around the city where the bikes could be picked up and returned. Also new was that this system was not free of charge, but required payment. However, just like the first generation, *Bycyklen* suffered from theft, which can partly be ascribed to the fact that the user of the bicycle stayed anonymous.

This issue was for the first time addressed by bicycle sharing systems of the third generation. This generation is characterised by the introduction of technologies in the systems that are not related to the experience of riding the bicycle itself. Such technologies are for example the usage of smart cards or GSM numbers to identify the users and electronically locking racks at docking stations. In 2005 advertising agency JCDecaux launched Velo'v, the largest third generation bicycle sharing systems to that date in Lyon, which included 1500 bikes. This was a breakthrough moment in multiple ways. The first way is that it was a major success, at the end of the year the system had fifteen thousand users and each bicycle was used an average 6.5 times a day. Secondly, the business model of Lyon's system was a breakthrough, for it showed that it was possible for commercial entities to run such a system. Former systems were always sponsored by municipalities or organisations like universities. The success of Velo'v inspired the municipality of Paris to launch their own bicycle sharing system called Vélib' two years later, which has since grown from 7000 bicycles to 23600 around the city and suburbs. These successes were a turning point for bicycle sharing systems and started a revolution by causing interest from cities from all around the world. Within a few years, over a hundred systems were operational, spread around Europe, the America's, Asia and Australia, with a total of 140 thousand bikes and almost ten thousand docking stations (Shaheen, Guzman, & Zhang, 2010).

In the meanwhile, different models of provision have emerged for bicycle sharing systems. DeMaio (2009) identifies six different models: governments, quasi-governmental transport agencies, universities, non-profits, advertising companies, and for-profit. In the governmental model, a government operates the system and holds all responsibility for it. This has many advantages, but also means that all liability is with that government. In the second model, quasi-governmental transport agencies provides the service. An example is the Dutch OV-fiets, which is operated by the national railways. The advantage of this model is that it extends the reach of these transport agencies, covering the so-called 'last mile' between home/work and station. Such agencies also are likely to have experience with the logistics required for these systems. Universities form the third model, they may implement bicycle sharing systems within the limited area of their campuses. This is mostly applicable to U.S. based universities. Fourth are non-profits that are created to run a system. They are interesting for governments to subsidise, because they take away that governments liability. The aforementioned Bicyklen from Copenhagen is an example of this model. The fifth model is that of advertising companies running a system. They may over a local government to run it, in exchange for advertising rights on bikes, docking stations and other outdoor locations. This is a very popular model, advertising companies like JCDecaux and Clear Channel Outdoor run bicycle sharing systems in multiple cities. Finally, for-profit companies forms the sixth model. These are similar to advertising companies, except that the majority of their income is generated by subscriptions. For-profits have the advantage that they do not have to wait for government initiatives and are not heavily subject to political debates in city councils.

Because of the success of bicycle sharing systems, many suggestions are made for the next generation systems. For these fourth generation systems, im-

provement are expected in efficiency and usability. One very important logistic challenge with bicycle sharing systems is the positioning of the bicycles. Docking stations have limited room for bikes, and some stations are more favourite as pick up location and others as return location. In hilly cities this may have to do with the altitude of the docking station, but the popularity can also be a function of time. Docking stations near railway stations can be popular as a pick up location during the morning congestion and in the evening by popular as returning location. This is partially solvable by using trucks to move bicycles between different stations, but fourth generation systems will use advanced mathematical models such as (Lin, Yang, & Chang, 2013) to maximise efficiency. Usability improvements can be diverse, such as the introduction of electrical bikes for disabled people and connecting subscriptions to other public transport subscriptions. Also the usability of docking station will improve, for example by making them solar and battery powered, which makes them easier to install or add capacity.

### 3 Political Factors

We now turn to describing how different political concepts and a difference in disposition towards them can play a role in the design and implementation of bicycle sharing systems. We will take the political concepts *liberty*, *equality* and *democracy* each of which (next to *social justice* and *community*) have a dedicated chapter in Swift's book on Political Philosophy.

#### 3.1 Liberty

The first political concept that we will use is *liberty*. We will discuss several ways in which different items regarding freedom that Swift mention are applicable to bicycle sharing systems. A first interesting item here is regarding the ownership of the bikes in such a system. In countries where bicycles are popular means of transportation such as The Netherlands, Germany and Denmark, the classic model is that a person has one or more bicycles that they have bought. This bike is their possession and they keep it at their home, where it is available at all times. If they want to go somewhere, they just hop on the bike, cycle to their desired location where they either put them in a bicycle stand (if available) or against a wall or other object. When they want to go back or continue their journey, they take the same bike and proceed in the same way. The use case for bicycle sharing systems is different. Here a person has a subscription to use a bike from the system, but they are not entitled to one specific bike. Bicycles are available from a limited amount of docking stations and users pay for the time between when they pick up and return a bike. This changes the concept of property, from being the private owner of a bike, to being a steward to the bicycle assigned at that moment. Does that mean that private bicycle holders have more freedom than bicycle sharing systems subscribers? They do in a sense, for they have obligations towards fellow subscribers, such as keeping the bike in a decent condition and not painting it as one wishes. Also they are constrained in that they cannot keep a bike too long (most bicycle sharing systems require bikes to be brought back within a day). In this sense, they have less *freedom as*

*doing what one wants*<sup>1</sup>, but only in a very shallow way.

More interesting is to look at how different models of provision influence the freedom of people. We mentioned six models that differ in range from publicly to privately operated. The model in use influences the availability of the system and therefore decides between *the effective v. formal freedom*<sup>2</sup> people have in using it. Availability here means how many people are actually able to pay for a subscription if they wish so. The installation and operation of bicycle sharing systems costs a certain amount of money and that has to be paid for. Within the current models, there are roughly three types of income: public money, advertising money and subscription fees. Governments can increase the availability by direct subsidy and allowing advertisements, in exchange for a lower subscription fee. But this is a political decision and it will firstly be competing with other political ambitions and secondly, be challenged by people who argue, to more or lesser extent, that this form of redistribution (public money comes from taxation) is wrong. Even if they do not oppose redistribution per se, they can claim that the freedom gained is not in proportion to the freedom lost by the extra tax paid. Also they might argue that public money towards (a preferred) system disturbs the market, leads to higher overall expenses and infringes the freedom of other entrepreneurs.

## 3.2 Equality

The next political concept is that of *equality*. We have already seen that politics can influence the effective freedom to use bicycle sharing systems, but that alone does not ensure that people have equal access to it. We limit ourselves here to bicycle sharing systems that are deployed within one city, such as the Vélib' in Paris. This need to limitation already shows that on levels higher than municipalities people are not treated equally, but we now only want to be concerned with equality within the area in which a system aims to operate.

Next to financial reasons, such things as the situating of docking stations, the way a system is marketed, the quality of infrastructure and even the availability of biking skills are relevant (Buck, 2013). Especially in the case were bicycle sharing systems receive significant support from the local government, administrators should aim at making it available to a body of users that reflect the diversity of that community. If a city council wants to have a bicycle sharing system in their city, they should understand what that encompasses. It is certain up front that there will be a difference in popularity between different docking stations. Earlier, we already mentioned that the altitude of a station or its usefulness for commuters may influence this in positive sense, but there will also be docking stations that will stand out negatively and have a relatively expensive upkeep per user. For example because the infrastructure surrounding the station is of low quality or dangerous for cyclists, or because the demography of that neighbourhood is such that its inhabitants are by themselves less inclined to use it. This differentiation in popularity is hard to avoid, for pop-

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<sup>1</sup>Swift p.59

<sup>2</sup>Swift p.55

ularity is a positional good<sup>3</sup>. In order for a station to be popular, meaning it is used above average, there must be stations whose usage is under average. Of course it does make sense to equip these docking station with less bicycles by default. Further optimization of the right amount of bikes at the right time is one of the challenges for fourth generation bicycle sharing systems. It might even turn out to be that it is worthwhile to negatively charge (i.e. to pay) people for cycling to stations that are favourite pick up locations and from stations that are favourite return locations. The way a system is marketed can also contribute to diversity of users. Advertising should be done in different media that target different groups and the advertisement itself (the message and the layout) may be adapted likewise. If some groups of inhabitants of a city are under represented, it could even be considered to put extra advertising effort in their direction.

The issue at hand here of course is what Swift describes in his paragraph about *equality of opportunity*<sup>4</sup>. So far, what we have discussed arguably comprises what Swift calls conventional equality of opportunity, which he puts between minimal and radical equality of opportunity (and reticently equates with right-liberal, left-liberal and socialist). Someone who would argue for minimal equality of opportunity would argue that it is enough already if we do not discriminate on who we give access. For them it would be perfectly fine to only locate docking stations at profitably locations such as railway stations, universities and shopping centres. “After all”, they would say, “everybody has the equal opportunity of taking a bike from the railways station to the mall”. Radical equality of opportunity would go further than conventional in measures taken to support usage of bicycle sharing systems in groups that are less likely to do so by themselves. In reality of course, these different interpretations of equality of opportunity form a continuum without clear demarcation criteria, but it is an important aspect to be aware of in decision making, for design decisions reflect political dispositions and are not pure technocratic ‘solutions’.

### 3.3 Democracy

We put our last point under Swift’s chapter on *democracy*. Just like the previous points were not exclusively related to liberty or equality, our issue here is not only a matter of interpretation of democracy. The matter at hand is what motivates governments to deploy bicycle sharing systems, and to what extent this is within the scope of their power.

There are many benefits that bicycle sharing systems have in relation to other means of public transportation. Most of these benefits are not of a highly political nature. These systems are suitable for short-distance urban trips because they make it easier to reach underserved destinations, require less infrastructure (although cyclist friendly infrastructure can stimulate usage), they are relatively cheap in capital and operational costs and do generally not add to vehicular congestion (DeMaio & Gifford, 2004). It is fair to say that these are benefits that can count on wide political support. Libertarians might argue that

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<sup>3</sup>Swift p.115

<sup>4</sup>Swift p.98

the whole involvement of government in such systems is wrong, but they will argue that with almost any public service, so it is not a complaint with bicycle sharing systems specifically.

The case is differently when looking at two areas that are influenced by bicycle sharing systems, that are highly political, namely public health and the environment. Bicycle sharing systems promote public health in a two-fold manner. Firstly, because people who are cycling are exercising and even if it is just for short intervals this is healthy. Secondly, because the more people use bikes, the less taxis, buses and other motorized vehicles are used, thus reducing CO<sub>2</sub>-emissions. The latter is not only beneficial for public health, but also for the environment (Larouche, 2012). Even though most people will not doubt these effects, they may oppose that governments coerce certain forms of behaviour. The clearest example here is the promotion of public health. Is it within the *scope of authority of democratic will*<sup>5</sup> if a government picks bicycle sharing systems over buses, grounding their decision in the promotion of public health? Politicians with a liberal disposition will be inclined to answer this question with no, those with a socialist disposition with yes. Liberals will argue that people are themselves responsible for their health. If they prefer an unhealthy lifestyle, they are entitled to do so. Interference from the government by effectively enforcing them to exercise if they want to use public transport is deemed paternalistic, which has negative connotation for them. Socialists might even agree that they are paternalistic (they will probably use a more neutral term), but they say it is well within democratic reach, for in the end a healthy body is in a person's own interest.

## 4 Conclusion

As we have seen, a wide range of design decisions in bicycle sharing systems are influenced by political dispositions. We have seen how the whole concept of such systems in the first place, and the selection of a suitable model of provision is related with and dependent on our views on liberty. When implementing a system, our conception of equality influences the design of the system, for example in selecting where to place docking stations. And we have seen that our political disposition towards the scope of authority in a democracy influences what arguments we may use to introduce bicycle sharing systems in the first place. This answers our research question, but as we already mentioned in the introduction, this is not a final answer to our question. Technological developments in the fourth and subsequent generations of these systems may increase or decrease the importance of specific factors, but will never remove politics from them completely.

Politics is not about solving problems the way it is done in mathematics, but about finding middle grounds between positions. But in order to find those middle grounds, it is necessary to have explicated what the competing positions are. Just like in many other technological artefacts, the politics in bicycle sharing systems are not evidently present. It is therefore advisable, especially in cases that affect many people and involve large amounts of money, to have experts

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<sup>5</sup>Swift p.191

(such as philosopher of technology) explicate them. This will improve the quality of debate and eventually the quality of the political solution. This, finally, is something that no sane politician, whatever their disposition, will oppose to.

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