Social Factors Influencing the Societal Adoption of Bicycles

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Societal Factors Influence Technology

A mode of transport, a means of exercise, or simply a fun pastime, cycling has been a major part of our lives for the past century. However, the degree of influence cycling has had varies by location based on a number of social factors, including prevailing cultural opinions, language choices in the media, and perceptions based on infrastructure availability. The societal adoption of bicycles is best explained through the lens of the Social Construction of Technology (SCOT) framework. This framework is based around the idea that human actions and opinions influence how well technologies are received. In some cases, existing cultural notions can put up barriers to prevent widespread use of the technology, such as expectations and perceptions of the intended user, and context is needed to understand the greater picture of ideas. In other cases, media influencers can affect societal views through their language choices, as well as their decisions on how and what to promote through advertisements and other media forms. Moreover, the availability of resources has a direct impact on how readily people are willing to accept a technology. Understanding the social factors that impact the adoption of bicycles, in particular, is important because it allows policymakers and other officials to make informed decisions about the most effective and meaningful methods of promoting cycling.

Development of Biking Opinions

Society's perception of biking often begins at an early age and is a result of presiding feelings in society. In the United States, people have begun to label biking as "uncool" and even "childish" by early middle school (Underwood, 2014). Considered a pastime for youth, biking

receives an unfair reputation as juvenile. This idea is driven further as peers start to trade in their bikes for cars in high school. In her analysis on the topic, Sarah Underwood suggests that biking's reputation is directly tied to prevailing attitudes about associating cars with independence:

> Getting a driver's license at 16 years old has long been an American rite of passage… to teens, driving is considered an essential coming of age experience, and it has become an established aspect of teens' maturation and socialization process (Underwood, 2014).

Teens with driver's licenses are seen as more mature than their peers, so more and more teens abandon their bicycles to fit this image of prestige.

In adulthood, these ideas from childhood are reinforced even more strongly. From her research, Underwood demonstrated that cyclists who continued to ride throughout high school were much more likely to continue this activity into adulthood (2014). People have tended to self-identify as either a cyclist or a non-cyclist, with the idea that by the time they reach adulthood, they have already been cemented into their chosen identity with no room to change. In this way, the societal opinions from a young age have influenced how profitable the biking market can be as the number of consumers is limited to those who have ridden a bike regularly as a child.

The importance of preconceived notions toward biking developed during childhood is particularly important in comparison with e-scooters. In recent years, companies like Lime and Bird have rapidly risen in popularity as people seek affordable and efficient ways to get around. With bike-share systems offering similar programs, it is puzzling why bikes do not have a similar level of appreciation in cities. What is it about e-scooters that have caused them to take over

cities so quickly? Because scooters are still such a new addition to society, many of the theories regarding their rise to fame are still highly speculative, but Lime recently released data from a research survey conducted at the end of 2018. In this study, Lime reports that they are attracting a new audience distinct from the cycling community. They found that 57.4% of Lime riders surveyed had not ridden a bike in the last month, and 26.6% of them hadn't ridden one at all in the last year (Lime, 2018). After synthesizing this information with Underwood's commentary, it is reasonable to conclude that Lime's new consumers are part of the group that is hesitant to join a pre-existing cycling community, with whom they feel they do not belong or feel inadequate to join. It is likely that this audience, who demonstrates enjoying the freedom of individual mobility and independence from automobiles, is discouraged to pursue biking. The introduction of e-scooters to the market did not come with an existing community; everyone was equally new to the technology. In this way, preconceived social factors regarding cycling identities have stunted the popularity of biking in today's age, while the novelty of e-scooters has appealed to a new demographic.

Social Context is Important to Understand Technological Success

The social circumstances of a technology's development also serve to influence the ways in which society views technology. This phenomenon is a key tenet of SCOT known as interpretative flexibility. The best example of opinions surrounding bicycles is with the introduction of the recumbent bicycle, a model in which the rider's feet are placed in front of them rather than below as seen in the standard upright bicycle. In 1933, Francis Faure famously broke Oscar Egg's impressive cycling record, while riding a recumbent. This upset came after a

40-year period of wide acceptance of the upright bicycle as the superior bicycle model and left the existing biking community shocked and angered (Ahmed et al, 2015). Ahmed puts it best when he writes, “Why did the factor of speed matter so much to interpretative flexibility in the case of the [standard upright bicycle], but not in the case of the recumbent?” (2015). In the decision to switch to the standard bicycle we see today, its speed proved paramount over the predecessor, the high-wheeler. Speed was the driving factor in the public’s embrace of the upright bicycle. However, when the recumbent bicycle was introduced years later, its superior speed met a different fate.

At the time of the introduction of the recumbent, bicycle producers were well positioned to continue manufacturing the standard bicycle, and a shift to the recumbent would mean restructuring their entire business. Similarly, other relevant social groups would have a lot to lose, such as professional cyclists that would have to invest in new equipment and exercise new muscle groups and city planners that would need to accommodate infrastructure for new geometries of bikes. In the case of the development of the standard bicycle, stabilization was achieved when the different social groups agreed on a design that met the needs of each respective group (Pinch and Bijker 1987). The recumbent bicycle never developed a design that satisfied more than just a niche group of professional cyclists looking for maximal speeds, and thus, the recumbent never reached stabilization. Additionally, there were simply fewer societal obstacles in place to prevent favoring the standard bicycle over the high-wheeler, such as a large existing professional cycling community and many existing biking-specific accommodations in cities. Pinch and Bijker’s concepts of relevant social groups and stabilization help explain the lesser popularity of the recumbent design today.

Biking Opinions Are Influenced by the Media

In this modern age of the internet and instant communication, it is no surprise that the media has a large impact on the way people view the world. Similarly, the media influences the biking industry in a major way. First, the language utilized in marketing campaigns promotes a jargon in the average citizen's vocabulary with connotations that influence views. Language choices can be the difference between feelings of acceptance and rejection or the difference between admiration and condemnation. The media also plays a role in shaping the image of cycling; choices to portray cyclists in one manner or another can paint a vastly different picture. Activist groups have worked to change the phrases used to discuss cycling and its fit into society. Tom Fucoloro, the publisher of the Seattle Bike Blog, argues that, "When you start thinking of somebody as a 'driver; or somebody as a 'cyclist' or somebody as a 'pedestrian'… it's easy to think of someone as part of a tribe" (Andersen, 2015). Tribalism puts up unnecessary barriers between people of different interests. These titles discourage personal connections, under the premise that a difference in opinions on this one interest signifies a difference in all interests. Instead, Fucoloro encourages people to talk about "bicycling" as an activity, rather than "bicyclists," an identity, to prevent alienation and tribalism. Fucoloro demonstrates how language can shape one's association with a group and how one views their identity.

The Seattle Neighborhood Group (SNG) has been rather successful at changing attitudes about biking by advocating for different language choices. Per their mission statement, SNG is a group of Seattle residents that "educates, organizes and collaborates with residents, businesses, government entities and other organizations to create safe communities through equitable engagement, with a focus on underserved populations" (SNGI, 2012). SNG identified the term

"war on cars" rising to popularity, threatening to halt any improvements to bicycling infrastructure in the city. It is rooted in the idea that any addition of bike lanes or bike racks would necessarily mean that space was being taken away from car lanes or parking spots. Through awareness of this phrase, SNG hopes to change the mentality that cars and bikes cannot coexist. In her take on the significance of legislation changes to improve cycling infrastructure, Sousa emphasizes that biking legislation is highly influenced by these personal beliefs regarding the matter. She writes, "…the proposals to encourage the use of transit and nonmotorized transportation, have been based on informal conceptualizations, designed without prior research and focused mostly in providing information about the negative consequences of using automobiles" (2014). SNG fought to promote the idea that biking and driving improvements were not mutually exclusive and to reframe improvements to bicycling infrastructure as beneficial to all.

Furthermore, advertisements in the media have a direct impact on views of the biking industry. Most modern biking advertisements feature the most elite bikes with features far above what a typical user may want or need. This places a barrier which stops novice riders from jumping right into the activity without first investing large sums of time into background research first. In his editorial, Rick Vosper (2012) poses the question, "So why do bike companies keep advertising bikes that 99 percent of consumers don't buy in magazines that 99 percent of consumers don't read?" Companies choosing to target their ads to a very select audience create a difficult barrier for the average user to overcome, and riders who are not already enamored with biking might not be inclined to put in the extra effort or might feel that they do not belong in this niche group. The target audience of the media brings up the SCOT

principle of relevant social groups. The design and marketing of bicycles must consider the interests of the professional bikers, novice riders, and even anti-cyclists.

The media further promotes the position of anti-cyclists by emphasizing the belief that biking is not a cool or practical option. Zipcar, a car-sharing service, has a campaign entitled, "Sometimes you just need a car." The campaign features images of people on bicycles, mass transit, or other modes of transportation floundering to carry all of their belongings. One specific image depicts two businesspeople struggling to carry all of their work materials while riding a bicycle (Colville-Andersen, 2011). This image is particularly problematic for cycling advocates because it promotes the idea that biking is not an activity for professional adults, who should be able to afford the "superior" option of a car.

Biking Opinions Are Influenced by City Infrastructure

The public's reception of bicycles is also directly influenced by existing resources in the area, namely bicycle racks and bike lanes. This phenomenon is best explained by investigating the indirect network effect. The indirect network effect is the idea that the success of one product is dependent on the success of a complementary product, which in turn is dependent on the success of the first. This supports the SCOT ideal that successful innovations cannot be explained by assuming that they work better than failed innovations; rather, other factors- in this case, the interplay of two connected products- influence the outcome of a product. For instance, the success of CDs is directly related to how well CD players are received, and the success of CD players is dependent on the success of CDs (Zhou and Li, 2018). The indirect network effect

places technologies into a space where consumers can envision their potential success or failure prior to their adoption as the technologies are immediately related to known variables in society.

In the case of bicycles and cycling infrastructure, the success of bicycles is severely limited without bike lanes and bike racks. To flourish in cities, biking must acquire a critical mass first and then more popularity is likely to follow. Zhou and Li propose that critical mass is an important factor to consider. They write, "To what extent and for how long the government should support the technology hinges on important aspects of the market, including the indirect network effects and the properties of market equilibrium" (2018). Understanding that acceptance may not be immediate, policymakers must determine how much and for how long they should invest in cycling infrastructure to reach critical mass.

It is also worthwhile to discuss the differences in investing in infrastructure for bikes with that of cars. Similar to bikes, cars need places to park and ride, and these spaces need to be safe and reliable for drivers to consider using them for daily use. For a thorough comparison of car and bike infrastructure, it is important to look at initial costs, resource investments, and profits returned. As Larsen reflects, "…car parking designs appear to be a mere 'paint-job' (making white lines and boxes for perpendicular and angled parking). But many streets are not even painted. Parked cars do not need designs to be stabilized and secured, so the white lines are often absent" (2017). Meanwhile, bike racks are bulky structures that require professional installation in their area of dwelling. In this assessment, car parking seems simple, but in reality, there are several hidden costs. Car parking as a system is most effective with the inclusion of parking signs, parking meters, traffic law enforcement officers, and parking fees. Without this protocol in place, cars would likely not be parked in an orderly fashion. These same stipulations are not true

with bicycle parking; there are no signs for bicycle racks, parking enforcement, or fines. Car parking makes good economic sense for cities because, with a simple paint job, they are able to return high profits through parking fees. This is not the case with bike parking. Cyclists are not charged to park their bike, so cities must cover the costs of installing the bulky, three-dimensional racks with no tangible financial return.

Recognizing these differences in infrastructure between cars and bikes allows us to comprehend the social factors that rise as a result of these structures. In a society that values order and prestige, it is crucial to organize vehicles in a way that reflects well on the city and offers maximal efficiency of its operations. Jonas Larsen provides compelling examples from a cultural study in Copenhagen. As the so-called "biking capital of the world", Copenhagen serves as a leader for other cities for their attitudes towards cycling and is highly influential in the way other cities implement cycling. Yet, their bicycle racks are complete with flaws, which reflect poorly on the city and the sport. Cyclists in Copenhagen utilize O-locks to secure their bikes onto grid racks, a combination that permits theft and damage. As a result, people are afraid to leave their well-loved bikes in racks that may present a threat. This implies that the bikes that are left in the racks are often battered, dirty, rusty, and needing some repair. With bikes thrown about in public spaces, the average citizen is left with a negative opinion. The growing opinion towards cycling is ambivalence as no one is investing time, money, or emotions into their bikes. More devoted cyclists have tended to lock up their bikes on lampposts and street signs, which allow a safer means of storing their bike. This creates a haphazard assemblage of bikes thrown about in the city, which positions cyclists as a nuisance to society.

Role of Policymakers

Cycling has numerous benefits at the societal level and often proves advantageous in terms of policy. The earlier discussion on the social factors that shape society's acceptance of cycling is important to aid policymakers in their decisions for their city. The European Cyclists' Federation (ECF) is a great advocate for the advantages of promoting cycling policy in the EU. ECF argues that current technologies, including typical bicycles, e-bikes and pedelecs, cargo-bikes, and public bike-sharing systems, are worthy of increased funding. In fact, the EPF has asserted that the benefits of cycling align with the mission of the EU:

> Because of the range of co-benefits which can be generated by cycling, it can contribute to numerous EU policy objectives including: transport and mobility; road safety; low carbon development; innovation and technology; air pollution; smart cities; industrial competitiveness and economic growth; environment and climate change; local development & cohesion; and health (Cesbron, 2015).

While it appears that EU policymakers should readily accept cycling, they must make further decisions about the use of funds should they allocate them to cycling. The EU may decide that cycling is the "best" technology because it makes strides in many of its sectors, but it does not mean that it will necessarily be adopted by the public, as evidenced by the SCOT ideology. For this reason, policymakers must realize the complexities of the social factors involved.

Many modern cities are changing their policies regarding biking, but they have not performed adequate background research to most effectively implement these new strategies. After installing bike lanes and bike racks, numerous areas have experienced an increase in gentrification. Most of the growth of cycling in US cities has been among white men, ages

25-64, and the percent of bike trips made by women and children fell from 33 to 24% from 2001 to 2009 (Pucher et al., 2011). Bike lanes have been primarily added to areas of higher wealth, which facilitates more mobility into these areas, in turn creating more business for shop owners. This creates a cycle bringing more wealth to areas already of higher income and limiting the visitors to areas without bike lanes. In order to promote growth in cycling appreciation across all demographics, policymakers must understand the social ramifications of installing infrastructure in certain areas and how these changes will be perceived. Identifying the effects that social factors have on the implementation of bicycling is critical to help policymakers make the best decisions for their districts.

Conclusion

Social factors have played a large role in the adoption of bicycles in society. The success of technology is directly influenced by the social factors surrounding it. In the case of bicycles, public stigma and language use, media attention, and available public infrastructure all directly affect the adoption of bicycle use. Using the social factors that affect the growth of the biking industry has direct applications to other technologies. Viewing these patterns as a case study will open up the world to developing more socially appropriate technologies.

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