Sociable Autonomous Ridesharing

Transportation and Neighborhoods

Our urban life suffers not just from too many cars clogging streets, but from the way they have scattered our lives. If we wait for autonomous technology tell us what it wants, we may live even more distracted, placeless lives.[i] In contrast to suburban placelessness, healthy cities form around livable centers linked by corridors.[ii] These centers are often where earlier settlements stood at crossroads. Such places can be social hubs where people are likely to run into each other. Shared autonomous vehicles give us the opportunity to re-focus our lives on our local hubs.

The emerging consensus is that autonomous vehicles should serve the last mile to transit and popular destinations. In one recent study, 76% of the cities that responded wanted them for first-mile transit.[iii] Yet, such service is not inevitable. Even some of the most city-friendly visions, like NACTO's *Blueprint for Autonomous Urbanism,* emphasize heavy transit lines with stops that are too close together for efficiency and couldn't all support compelling uses like grocery stores and popular restaurants. (See e.g. p. 57)[iv] Instead, we can build upon the polycentric city's social hubs. We should combine these elements:

1. Social hubs at the transportation hubs in cities' centers,
2. Autonomous shuttles (auto-jitneys) to gather people into these hubs, and
3. Responsive express buses and trains traveling directly between these centers.

We should coordinate these with software – both for efficiency and for social comfort. The pieces are already falling into place. Auto-jitneys are already in use.[v] Smart planners are using transportation to support public life.[vi] Mobility services already coordinate rides across modes, including transit.[vii] We need to combine those transportation elements with our renewed love of dynamic, welcoming, multifunctional social hubs,[viii,ix]

The Shape of the Problem

Auto-taxis as the Default

If we don't push for auto-jitneys that provide "last-mile" service, we will probably wind up with congestion from taxi-like service. There are three main scenarios for exploiting autonomy in passenger vehicles:

A. Conventional private passenger vehicles that drive autonomously (auto-autos);
B. Taxis that drive autonomously (auto-taxis); and
C. Cabin-like autonomous jitneys in which people share the ride (auto-jitneys).

If we follow scenario "A," we will start with private auto-autos, but we will use them as auto-taxis. Mercedes's approach typifies the private auto-auto. It is a conventional luxury car with front seats that swivel around to make a conversation area.[x] Yet, once a car company makes a vehicle autonomous, all but the wealthiest customers will want to offer rides to friends, family, or even strangers: effectively, making them auto-taxis. Several companies are taking this eventuality seriously. Tesla is planning to start a ride-sharing network in 2018.[xi]

Scenario "B," auto-taxis, could increase traffic drastically.[xii] Experience with ride-sharing services like Uber can worsen congestion.[xiii] Uber and Lyft are already trying but struggling to bring people the "first mile" to transit.[xiv] Our streets that are already clogged with people driving alone have to accommodate both riders who cannot drive now and empty vehicles looking for fares. One of the founders of Zipcar, Robin Chase, calls this a "hell" scenario.[xv]

With scenario "B," we can use auto-jitneys to shuttle us through the quiet streets surrounding social hubs, from which we can get express transit. The European test program CityMobil2 and the more recent, smarter versions can mix with slow traffic and pedestrians. These shuttles don't need to follow fixed routes. Riders can summon them.[xvi]

Hubs, Spokes, and Geometry

Shared auto-jitneys and express transit won't meet at social hubs unless we ensure they do. There are competing models, including a centralized hub-and-spoke model, a web-like model, and our present sprawl model.[xvii] In the hub-and-spoke model, the neighborhood, square, newsstand, and so on made social hubs. People ran into people they knew there. Unfortunately, the radial model was too focused on downtowns. Jarrett Walker has shown how a grid or web of transit routes, rather than a pure hub-and-spoke system can get people where they need to go efficiently.[xviii,xix] His model spreads travel out while still making downtown the primary focus. That way, people can balance jobs and housing better. Autonomous driving needs to be integrated into a modern public transportation system, as Professor Mark Stevenson of the University of Melbourne has said.[xx] In a polynodal city, this is best done by using auto-jitneys to bring people to transit at those nodes.

Trust and Friendliness

Will people want to travel in ones, twos, and threes in auto-jitneys? The answer may depend on feeling comfortable with fellow riders. One meta-study shows that people find riding with strangers stressful – particularly in crowds.[xxi] Transit riders do things like placing bags on seats and stretching out (even "manspreading") to maintain a personal buffer space. Another study suggested that prospective riders might balk at riding with strangers.[xxii] Potential riders may

choose road congestion over riding awkwardly with people they don't know.[xxiii] Thus, the difference between Robin Chase's *heaven* and *hell* may hinge on whether the system will help us feel comfortable with each other.

A Sociable Scenario

> *It's 8:00 in the morning on a Saturday and Sally wants to have coffee and visit a street market. She opens an app on her phone. She floats that scenario with her friends as she eats breakfast. Her friend Jane suggests coffee at 10:00. Another friend, Ann, wants to visit the street market at 10:30. Sally proposes the itineraries be reconciled and merged: the social app arranges their travel through a mobility service to meet for coffee at 9:30 and the market at 10:30.*
>
> *Her mobility app sends her an itinerary, Sally boards an auto-jitney at her house. It has its neighborhood's livery: tree leaves and local landmarks. Inside, she sees Bob whom she knows slightly from her daily commute. The seats are arranged so they aren't forced into each other's space or line of sight – but they chat anyway. Before she left, Sally's social app had told the mobility app her preferences. In this case, she was comfortable sharing with people she knew. If she were to ride with strangers, she would have the auto-jitney pick her up at the corner, so they wouldn't know her street address.*
>
> *The auto-jitney drives at a leisurely 15 miles per hour through secure shortcuts between leafy cul-de-sacs toward the coffee house. All the traffic off the main roads is limited to 20 miles per hour. Bob orders coffee to go through his phone so that it will be waiting for him at the counter. Sally and Bob walk into the coffee house, which shares a busy mixed-use street-corner with a supermarket, plenty of shops, offices, apartments, a plaza, and a library. Sally sits and chats with her friends.*
>
> *At 10:20, it's time for Sally and her friends to catch the bus to the street market. As they stand up, a couple unlock their bicycles outside, and walk toward the bus. The bus pulls into the intersection and stops at 10:22. All the traffic stops, and riders converge from all four corners. Avatars displayed at the bus's doors direct the flock of riders going to the market to the same part of the bus. There's space set aside for the bicycles. The bus stops at a couple more social hubs and heads for the market.*
>
> *At noon, it's time for Sally to leave the market for her home. An app counts down the minutes and then the seconds until the bus arrives. Sally says goodbye, gets on the bus, and spots her neighbor Alice inside.*
>
> *Back at the crossroads, another auto-jitney pulls up to the left side of the bus, and docks with a back door. Alice gets in. Sally follows her, swinging her shopping bag awkwardly onto a seat. A light above the door flashes on briefly. They ride to their homes.*

Three Interlocking Parts

Neighborhood Social Hubs. The most important part is to center our community lives on livable, walkable places. These should be not just neighborhood gathering spots, but places with plenty to do, workplaces, and civic functions: the kind of urban center that is known by name. Urban policy would be a jobs-housing balance in each, but not self-sufficiency.

Sally's auto-jitney dropped her off at a crossroads where she could use her time well. She balanced convenience, friendships, and time by going through a social hub with its own compelling destinations. Each social hub would be more than a retail destination: it would include workplaces and denser housing – all of it in a jobs-housing balance with its catchment area.

A social hub would be an existing hub of activity, or it might be a little downtown of the sort that trendy mini-cities try to emulate.[xxiv] It might be a historic downtown, an older shopping street, or an ethnically focused neighborhood – e.g. "Little Havana" or "Chinatown." It might also be retrofitted into a crossroads near a freeway.

Each social hub would be part of a network of places that anchor community life: a network of many centers. It would have a plaza, or perhaps a public winter garden at its heart: a real public realm designed for public life and public functions. Its community would be sufficiently large to have its own festivals, schools, institutions, and daily destinations like grocery stores. It would add workplaces, apartments, local institutions to the kind of retail that is equivalent to a *neighborhood center* or *community center.* Each would serve about 15-30,000 people.[xxv,xxvi] Each social hub would also be about 1-3 miles from the next one. At 15 miles per hour, that's 4-12 minutes between them in an auto-jitney. By focusing all the transit service into social hubs' centers, transit agencies would help to knit the urban fabric together with the social fabric. Riders would run into each other more frequently because they would all be crossing in the same vicinity.

Traffic on main routes stretching between social hubs might be as fast as ever. Yet, speeds would be only 20 miles per hour or so within the hub itself and on side streets.[xxvii] Most curb space would be available for pick-up and drop-off by auto-autos, auto-taxis, auto-jitneys and buses. Buses would stop in the roadway so validated riders could enter them from all sides.[xxviii] Train stations, if any, would be directly up or down stairs and elevators. Residents and businesses could take deliveries at neighborhood parcel lockers like Swipbox's.[xxix] All sorts of daily routines would take residents and businesspeople through social hubs.

Life could also be a little quieter in the 20-mile-per-hour neighborhood streets. Where residents of sprawl (and their homeowners' associations) agree, convenient paths for pedestrians, bicycles, and slow, quiet auto-jitneys could be cut between the cul-de-sacs. The area around each social hub would blend together with the next so that people living in-between them would have a choice.

Responsive Buses and Trains. We can use express transit to connect our neighborhoods together at their centers. If there are enough riders to fill a bus between two points, the bus need not make intermediate stops: it could cover 10 miles in 20 minutes at an average of 30 miles per hour, if it had priority at intersections. Such transit may or may not be automated; already drivers' unions are becoming concerned.[xxx]

Sally's bus to the market ran at express speeds. Her bus was scheduled when enough people wanted to go to the market. She used a Mobility-as-a-Service (MaaS) app that could coordinate auto-jitneys, public transportation, taxis, and even bicycling.[xxxi]

The transit system would travel efficiently between hubs.[xxxii] It could take the form of bus-rapid-transit, or the other traffic might simply have to give way. Since the system could "know" where people are going, buses might bypass each other – connecting hubs even if they are not on a straight line. Everything would respond to demand, rather than use pre-set schedules and uniformly large vehicles. The transit system would dispatch buses in whichever way would be most efficient, but riders would know their travel time in advance.[xxxiii,xxxiv] This efficiency, plus the carrying capacity of transit, would ease congestion. [xxxv] When transfers would be inevitable (on cross-town trips, for instance), software would let riders know what to expect. One bus might dock directly to the next. The riders going to each destination would be directed to the same part of the vehicle to avoid jostling, and to make sure that there is seating. Such a service would become more efficient over time, using software like that used for military logistics.[xxxvi]

Local Auto-jitneys. We can use auto-jitneys to collect citizens into neighborhoods.

Sally's auto-jitney was more *hers* because it was owned and maintained locally. It had a local look, and it prioritized friendly acquaintances and friends above strangers. Each auto-jitney would be a wheeled segment of the public realm.

Such a service is already feasible, as today's vehicles can cope with slow-speed traffic.[xxxvii] Auto-jitneys should be local: owned by a local nonprofit, cooperative, benefit corporation, or special improvement district. Rides should be kept inexpensive and free for transit riders. If the neighborhood itself owns the auto-jitneys, residents and workers could call them to ride to all their neighborhood's adjacent social hubs.

Most discussion of transportation focuses on the minority of repetitive, time-sensitive commuting trips. The other 3/4ths of our trips[xxxviii] tend to be more flexible – defined by their purpose: "night on the town," say. We could use software to define scenarios like "night on the town," "buying groceries," or "study group at the library." Riders may prefer to ride only with certain types of people. Some women might only want to ride with other women or with people they already know, for instance.[xxxix] Social apps and mobility services could organize trips according to riders' desired anonymity or sociability. Some researchers have found that catering to reasonable preferences about fellow riders may not lengthen trips too much.[xl]

Auto-jitneys would have to be designed for psychological comfort. They could signal their intentions to pedestrians and cyclists with intuitive signals.[xli] Inside, cameras with a behavior recognition system would also watch for odd behaviors and even involuntary signs of distress. When Sally swung her bag awkwardly, the on-board behavior-recognition system displayed a light over the door and sent video to security personnel, who made sure she was safe.[xlii]

Summary

Three interlocking parts would work together:

- Each social hub would not be just a retail destination; it would serve the daily needs of a populous, balanced community: it would be designed to build community.
- Riders would make place-to-place trips using buses and trains. People going to the same places would travel together, so they would often enjoy chance meetings.
- Local auto-jitneys would make local trips. Each auto-jitney would be an extension of its neighborhood.

Each of these parts makes the others easier to implement. They could all start at a small scale and build up together. The key is a vision of the city as a constellation of livable walkable urban centers interlinked with transit and supported by auto-jitneys. This vision places people over technology. It uses technical means like auto-jitneys and express transit to help people make favorite places in their neighborhoods.

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