Denne artikel er publiceret i det elektroniske tidsskrift
Artikler fra Trafikdage på Aalborg Universitet
(Proceedings from the Annual Transport Conference at Aalborg University)
ISSN 1603-9696
www.trafikdage.dk/artikelarkiv

Agreeing on the future – Long term transport planning in Copenhagen

Jean Paulo Endres, jendres@ruc.dk
Roskilde Universitet

Abstrakt

To make long term forecasts include a considerable amount of uncertainty. In this paper, a short review of some of the methods used to forecast mobility demand and planning is made and their strengths and flaws are briefly discussed. For planning Copenhagen's mobility for the years beyond 2050, the "Future Workshop" was chosen in order to organize a workshop among young mobility and city planning interested persons in Copenhagen. In the workshop three different future visions were elaborated and later analyzed under the Triple Access System theory prism. Among the three envisaged futures, two of them seem to imply and increase in physical mobility demand, while one expects a reduction in physical mobility demand, which will be substituted by increased spatial proximity and digital connectivity.

Introduction

A quick look at the last couple of years' general press, niche and academic publications for transport and mobility, shows us that the future transport demand today is more discussed and more relevant than the future discussed in the past. More than a play with words and tenses, there has been a recent emphasis on forecasting and investigating not only the next years but many decades ahead. The reason for this increased concern can be manifold, such as climate change concerns, CO2 emission restricting agreements, increased and accessible computing power for modeling, industrial and commercial interests of omnipresent giants such as Google etc.

If in the past, the way the future was envisaged was based almost exclusively on technological development, fueled by the nuclear and space race of the 1950's and 1960's, nowadays, there is a multiplicity of approaches. Besides technological development, other factors such as societal changes, behavior and preferences have also been included in the mix used to forecast transport demand. Litman (2016) analysed socio-economic and demographic trends with high potential for influencing transport

demand, likely so, Sessa & Enei (2009), Salucci et al. (2012) and Zmud et al. (2014) had already listed underlying similar drivers and trends for long term forecasting of transport demand based both on statistical data and expert opinions in order to develop scenarios.

In Denmark, the Landstrafikmodelen (LTM), has capabilities of running simulations in order to predict how changes in input parameters such as infrastructure, change in general income, car ownership will influence future transport demand.

Another way that the future has been looked at was by studying past and present visions, or "utopian futures", especially from architectural schools, as Jensen & Freudendal-Pedersen (2012) have done by analyzing Archigram, the Situationist Movement and BiG, (Bjarke Ingels Group) proposals for how personal mobility-space should be organized. Urry (2016) has dissected ways of looking into the future, ranging from "new catastrophism" to complex systems and claiming for the inclusion of the Social Sciences in a so far technology dominated field of forecasting future transport demand and planning.

These many approaches varying from the strictly technical as in the case of simulation models akin to the LTM, qualitative scenario building by experts, and utopian future visions developed by architects, possess their strengths but all of them have at least one weak point. In the case of the utopian futures, elaborated by architectural branches, it can be said that although at times a wonder future is envisaged it has the weakness of counting with a "top-down" implementation. An example often cited is the case of the Brazilian capital Brasilia, projected by multi award winning architects Oscar Niemeyer and Lucio Costa, the top down approach of the project's execution has failed to accommodate after its inauguration the very workers who built the city, also, it has been branded as a dated and too rigid project which privileged almost exclusively the private car as a mean of transportation reflecting the modernist hopes of the time.

In the case of transport models like the LTM, there is an issue regarding the long-term forecasts. For depending exclusively on available statistical data, long haul forecasts become less and less reliable due among other reasons for the "known unknowns" and "unknown unknowns" (Urry 2016), i.e. the model is not able to include change fast enough through the years on how input parameters influence each other following societal changes and/or technological breakthroughs. Moreover, according to Lyons (2016), the "predict and provide" nature of transport models is self-fulfilling; the example that is given regards a model forecast expecting the increase in road traffic for the next decades in a given region. Based on this forecast, it is decided to add one more lane to the motorway that serves the region, and as a consequence of that added lane there is an increase in road traffic, confirming the previous forecast and deeming it correct.

Finally, the scenario future made by experts, although more nuanced than the statistical model and less rigid than the utopian futures, it shares both the characteristics of uncertainty and of being "top down", failing to include the wishes and desires of those who will in fact live in that designed future. One claim made by Urry (2016) and Lyons (2016) regard the "democratization of the future", for Urry the study of the future should at least include the young, i.e. the persons who are most likely to live in it. The author also discusses the need of "rejecting the future" and to go away from technological determinism. Lyons, on his turn, explains about the uncertainties involved when dealing with complex systems and a way to mitigate such uncertainties is to "make the future" instead of waiting for it to happen.

In this article, an alternative but well stablished method will be used to reconcile "the future that is expected" with "the future that is wanted". In other words, a consensus which finds compromise among probable, possible and preferred futures, by gathering in an open environment persons of different backgrounds without any hierarchy in order to generate knowledge through their interactions.

The results from the collected data will be analyzed in the light of Lyons (2016) "Triple Access System" (TAS) theory. In the TAS schematic representation, it is proposed that the contemporary society's economic and social activities are enabled and defined by our land-use, telecommunications and transport systems. The interactions between these elements form what the author categorizes as "enduring aspects of human condition": Spatial proximity; Physical mobility and Communication. In this sense, what is implied is that the concept of accessibility, be it physical or virtual can be to a certain degree exchanged and adapted. This exchangeability happens as a consequence of the interactions among the land-use, telecommunications and transport systems, which can satisfy an accessibility demand by providing physical mobility, spatial proximity or digital connectivity.

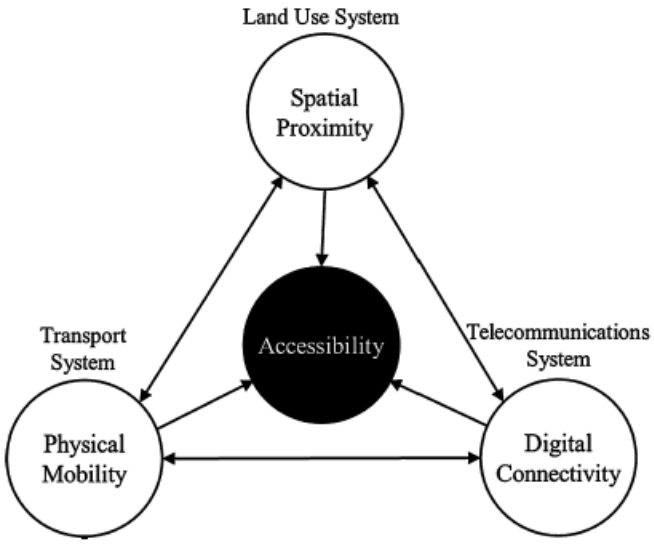

Figure 1 Triple Access System (TAS) Lyons (2016)

Due to the intrinsically qualitative nature of the method, the result is a one-of compilation of the preferred futures discussed at the workshop. Nonetheless it's validity lies upon the "level of generalization", intended with the results (Aagaard Nielsen & Svensson, 2006). In this particular case, the envisaged futures

generated at the workshop will serve as a way pointer and as an example of what it could be expected to result of a larger empirical collection.

Method

In order to not only predict the future dictated by technological and societal change, nor to establish a monocratic vision of what the future should look like; an inclusive method should be used. If the future needs to be democratized and created, opposed to only expected (Urry 2016), the method used for the creation of such a future should give the possibility for the participants to think as freely as possible. Moreover, the participants should not be subjected to any form for hierarchy that could hinder their inputs. When discussing Copenhagen's long term mobility planning, the ideal would be to include as many users of the city's public and private transport infrastructures as possible. On the other hand, for the scope of this research, such broad participation is not possible. To mitigate this limitation, the participants had some previous knowledge about transport and mobility due to their professional or study background, ranging from architects, transport planners, city planners, urban planning students and mobility consultants.
A method that has been used in similar contexts and that is capable of creating a free environment for discussion is the "Future Workshop". In this action research method, the interactions among participants generate new knowledge by compromise and consensus.

The Future Workshop is part of a larger group of action research methods. It has been developed based on the works of Austrian future scientists Robert Jungk and Nobert Müllert in the 1970's and it has been widely used in different contexts in Denmark since the 1980's (Aagaard Nielsen & Svensson, 2006). One of the main characteristics of the Future Workshop is that the participants are removed from their "normal reality" into an environment without hierarchy where knowledge production is obtained through their interactions and consensus. (Jespersen & Drewes Nielsen, 2005).
The workshop is divided in three phases; the critique phase; the utopian phase and the realization phase. Each phase starts with a plenum session, alternated with group work and finished by a presentation of the group work to the plenary which can comment and discuss the presentation. The statements, discussions and presentations from the workshop are registered in text and pictures for the elaboration of a workshop protocol, which is sent afterwards to the participants for remarks. The following description of the phases is based on Jespersen & Drewes Nielsen (2005)

The critique phase:
After the theme of the workshop is presented to the participants they are invited to brainstorm following one principle: "We are consequently negative" and three rules: "short statements", "no discussion" and "all statements are allowed".

When brainstorming is concluded and all statements have been written up visible to all, there is a voting session in which the participants select the statements they found most important. When all participants have voted, the most relevant statements are grouped into themes, which are distributed among smaller groups formed by the participants. During the group work the participants are requested to develop a wordless presentation of their theme to be shown to the plenum, which will discuss and comment on it.

The utopian phase:
The principle ruling this phase is “Reality is out of function. We are situated in a perfect world, where everything is possible”. The participants brainstorm following the same three rules regarding short statements, no comments and all statements from the previous phase. Similarly, the statements are noted for all to see and there is a voting and grouping of statements by theme. Work groups are again formed and the task then is for each group to develop the envisaged utopia based on the theme they were assigned. The developed utopian vision is presented to all participants for comments and discussion.

The realization phase:
Ruled by the principle: “We keep our wishes and dreams, how can they become reality”, the groups begin to bring the utopian vision closer to reality, based on the discussions happened in the previous plenum session. The groups describe the steps towards realization and present their results to the plenum for final discussion and conclusion.

The workshop

The theme of the workshop was: “Mobility and city planning in Copenhagen – What city do we want and how do we get it?” The workshop was facilitated by an independent mediator and it took place in June 2017. The aim was to create futures regarding personal transport planning, including socio-economic aspects, the livable city, use of space and traffic planning having as a reference the year 2050. Copenhagen is known for its bike culture and the Finger Plan, and the city has ambitious goals of becoming carbon neutral by 2025, besides Denmark becoming fossil fuel free by 2050. On the other hand, car ownership has been increasing, the city

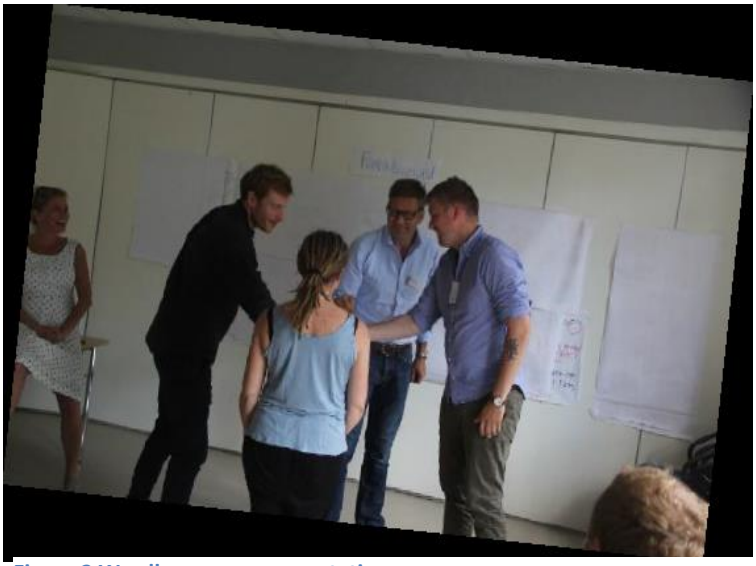

Figure 2 Wordless group presentation

has been receiving around 1000 new inhabitants per month, house prices are rising considerably with areas of the city being gentrified.

The statements from the critique phase revealed a broad spectrum of frustrations including "large scale is alienating for the human body"; "rush hour"; "not enough public-private partnerships"; "black holes not reached by public transport at times".

In total, 49 critique points were raised, 18 of them received one or more votes. In the table below are the short statements that received 2 or more votes.

Short Statement	Votes
Large scale is alienating for the human body	4
Rush hour	3
Taxation on electric cars	2
"Black holes" (places not reached by public transport at times)	2
Not enough public private partnerships	2
Traffic uses too much space, no space for nature	2
Lack of place for the socially excluded	2

Table 1. Short statements from the critique phase that received 2 or more votes

The voted statements were organized under three themes and groups were formed to represent them in wordless presentations. The themes were: "Use of space"; "Time and distance" and "Organization of transport".

The utopian phase statements broadened up the themes formed in the critique phase. "Time and space" had utopian ideas such as "flexible work hours and work space"; "a city space that has everything we want and need"; "work while on transport". The theme "organization of transport" was formed by statements such as "fossil free transport with brand such as organic products"; "transport on demand" and "no private transport. There was a new theme formed in the utopian phase "urban idyllic", formed by ideas such as "country side and city connection", "slowness and proximity", "all large roads under the ground".

In total 67 remarks were made in the utopian phase, 22 of them received votes. In the table below are the 8 short statements that received 2 or more votes.

Work during transport	4
A city space that has everything we want and need	4
No private transport	4
Transport on demand	3
100% fossil free transport system	3
100% understanding of the transport system (by users)	2
Free (gratis) transport	2
All can be transported safely	2

Table 2. Utopian phase statements that received 2 or more votes

The realization phase had the presentations from the groups with a focus on implementation and the necessary steps towards the envisaged future. What follows are three examples taken ipsis literis from the workshop protocol.

"***Organization of transport****: Two overarching mechanisms can be used in a soft-regulating approach to assist people in 'doing the right thing'. One could be the use of different means of transport pays the real price for it, in other words, that the final price reflects the cost for the consequences of that transport choice. The other approach could be the "easiest, fastest, most right" prioritizing by the public sector for the "right option" by providing this right option with either the best design, best price, most connectivity, etc. An implementation plan should include actions that could be taken towards a 100% collective transport in the city. That could start by making a political work that turns the subject into something more palatable, for example by bringing forward the positive aspects such as transport equity instead of a direct discussion of congestion charge. To increase the capacity of shared cars and city cars, and making it widely available to the population who should also receive easy access to information about how to use the system. There should also be a larger amount of options of different types of city cars that could cover different necessities. Finally, with this system, the amount of parking spaces could be reduced, giving space for other applications such as broader sidewalks and bike lanes, making those options more attractive."*

"City space, time and distance: *Some assumptions are made in relation to 2050: There will be at least some self-driving cars and as a consequence there will be freed parking space. There will be most likely a flexible work place and flexible working hours. With those assumptions, it can be said that the city space will also be used to something else than only to transport oneself.*

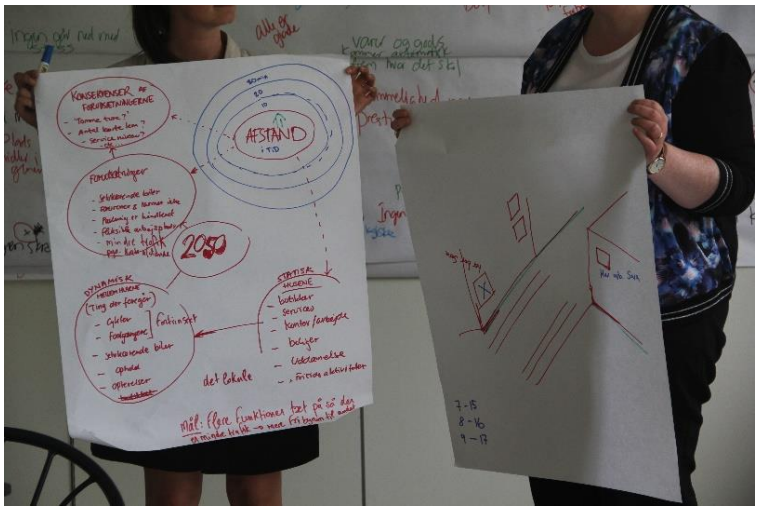

Figure 3 Realization phase presentation - City space, time and distance

On the other hand, there is still the problem of distance. The city must be thought as containing dynamic and static funcions. For example, dynamic would be what happens 'between the buildings', experiences, bikes, pedestrians and self-driving cars. Static would be what happens 'in the buildings', things that you need to go to, such as hospitals, shops, services, and some free time activities. The question then becomes a matter of reducing the distances one must move to satisfy that need. Once the distances are reduced, there will be need for less transport and consequently more space in the city for other activities.

But what could be done tomorrow? To understand the distance between static functions and decentralize them, so that one can reach them in shorter time/distance. Some of them perhaps cannot be descentralized, such as hospitals, but workplaces for example seem very easy to do. There is a difference in how hard it is to decentralize different functions and the political discussion should start with the low hanging fruits."

***"Self-driving future:** If we consider that we should use our transport time as work time, we need self-driving capabilities. In a plan from 2017 to 2050, we need to start with a political talk and a preparation of the political scenario. When that is in place, we do not need to develop a new technology or our own infrastructure system for self-driving cars, but to analyze the technologies that are available and take decisions that give us flexibility to choose the right technology when the time comes.*
There should be a differentiation between city and country-side. i.e. infrastructure capable of supporting self-driving cars should be implemented out of the city and a park and ride should function, thus minimizing the use of cars inside the city; there, the capabilities of using public transport and biking should be maximized, which is possible if cars are reduced or removed from the city.
The infrastructure on the road network can be implemented in phases on the highways giving the system flexibility not to put 'all eggs in one basket'".

Analysis

In the light of the TAS theory, it is possible to notice, although in a weak manner in the critique phase, some relations among physical mobility and spatial proximity. The most voted statement regarded the large scale (referring to physical size) of transport distances being alienating for the human body. What was implied can be understood from the point of view of the pedestrian, that the large scales associated with transport do not match with those that one would normally walk. There was also reference to traffic occupying too much space. On the other hand, the other statements do not seem to relate to TAS when referring more to the organization of transport on an administrative level in respect to taxation of electric cars and lack of public-private partnerships.

The utopian phase had stronger, but still not a full linkage to the TAS. The statement regarding being able to work while on transport regards the connectivity aspect of the theory but not in a substitutive way that could be imagined in "work from home" (which was not stated), or, "flexibility of work time and space", which was stated but did not receive more than one vote. In the possibility of working while transport the connectivity factor does not substitute the physical mobility demand. The statement "a city space that has everything that we want and need" can be understood as spatial proximity. The remaining statements do not imply a reduction in physical mobility, nor increased connectivity, but a reorganization of the transport system, with "free transport", "no private transport" and "transport on demand" in the no car ownership

or shared economy side and the “100% fossil fuel free transport system” and “100% understanding of the transport system” on the greening of transport and increased conscience about its impacts, not necessarily reducing mobility demand.

The three futures from the realization phase are rather distinct from each other. In the “Organization of transport” future, there is a claim for collectivization of transport, by either price regulation or best design inducing the user to choose the “right option” (collective over private). Physical mobility, is not reduced in this future, but its impacts are. The freeing of space in the city by reduced car ownership should act in the benefit of pedestrians and cyclists. Spatial proximity is not mentioned in this future, digital connectivity is, but only as much as to access a shared car.

“City space, time and distance” is the future created at the workshop that relates most to the TAS theory. In this future, there are clear interrelations among the space, transport and communication systems. Physical mobility is in part substituted by digital connectivity due to flexible work hours and teleworking, thus freeing space in the city that can be repurposed. Regarding spatial proximity, this future demands that action should be taken to “decentralize static functions”. From a direct public administration point of view that refers to bringing public services closer to the population, thus substituting the demand for physical mobility by spatial proximity. From a private sector perspective, this decentralization is unlikely to happen unless there are increased zoning and use of space regulations. On the other hand, by incentivizing working from home, the private and public sector could contribute for reducing physical mobility demand.

The “self-driving future” implies a remarkable contrast between city and countryside. Although the workshop regarded the Great Copenhagen, it was claimed that the city cannot be seen in isolation from the rest of Zealand, since many people commute to the city. This future focuses on technological development, but no substitution between physical mobility or spatial proximity happens in relation to digital connectivity. Accessibility is still obtained by mobility, in self driving cars until the most convenient train station in the city fringe and then by collective transport or bicycle inside the city, where private car traffic should be reduced. This future plan claims for flexibility to take the correct decision just in time, although it does not seem flexible from the TAS point of view, since it prioritizes only the self-driving car (physical mobility) over other accessibility options.

Conclusion

From a short review of some of the methods used to forecast future transport demand and planning, the “Future Workshop” method has been used due to its democratic and inclusive characteristics to generate knowledge gather data from young mobility and city planning interested participants. A workshop has been

facilitated by an independent mediator and the criticisms, utopian views and created futures have been analyzed through the lens of the Triple Access Theory (Lyons 2016).

Three futures have been envisaged and in two of them (Organization of transport and Self-driving future), the demand for physical mobility seem to increase. This increase can be expected due to the high convenience and expected easy access to the self-driving car (Self-driving future), and by the greening of transport (Organization of transport). On the other hand, in the case of the "Organization of transport" future, the assumed increase in demand for physical mobility will be less impacting due to collectivization and sharing of transport options in detriment of private car ownership.

In the case of the "City space, time and distance" there are exchanges resulting from the interactions among the elements forming the Triple Access System. In this future, the demand for the physical mobility is expected to reduce and accessibility obtained by increased digital connectivity and spatial proximity.

References

Jensen, O. B., & Freudendal-Pedersen, M. (2012). Utopias of Mobilities. In M. H. Jacobsen, & K. Tester, *Utopia: Social theory and the future* (pp. 197-217). Ashgate.

Jespersen, P. H., & Drewes Nielsen, L. (2005). Involving Freight Transport Actors in Production of Knowledge - Experience with Future Workshop Methodology. In T. U. Thomsen, L. Drewes Nielsen, & H. Gudmundsson, *Social Perspectives on Mobility* (pp. 89-106). Ashgate.

Litman, T. (2016). The fure isn't what it used to be - Changing trends and their implications for transport planning. *Victoria Transport Policy Institute*.

Lyons, G., & Davidson, C. (2016). Guidance for transport planning and policymaking in the face of an uncertain future. *Transport Research A*, 104-116.

Lyons, G., Davidson, C., Forster, T., Sage, I., McSaveney, J., MacDonald, E., . . . Kole, A. (2014). *Future Demand - How could or should our transport system evolve in order to support mobility in the future?* Ministry of Transport - New Zealand, Wellington.

Salucci, M. V., Site, P. D., Hoppe, M., Seppänen, T., Christ, A., Arsenio, E., . . . Akkermans, L. (2012). *List of potential Megatrends influencing transport system and mobility behaviour.* Public Distribution. Retrieved from http://www.tmleuven.be/project/optimism/Deliverable-3.2-List-of-potential-megatrends.pdf

Sessa, C., & Enei, R. (2009). *EU transport demand: Trends and drivers.* Public distribution.

Urry, J. (2016). *What is the future?* Cambridge: Polity.

Zmud, J. P., Barabba, V. P., Bradley, M., Kuzmyaj, J. R., Zmud, M., & Orrel, D. (2014). *The Effects of Socio-Demographics on Future Travel Deman.* Transportation Research Board, NCHRP. Washington DC: Transportation Research Board.

Aagaard Nielsen, K., & Svensson, L. (2006). *Action Research and Interactive Researching - Beyond practice and theory.* Maastricht: Shaker Publishing.