

Denne artikel er publiceret i det elektroniske tidsskrift
Udvalgte Artikler fra Trafikdage på Aalborg Universitet
(Selected Proceedings from the Annual Transport
Conference at Aalborg University)

ISSN 1903-1092

www.trafikdage.dk/artikelarkiv

Modtaget: 11.09.2017

Godkendt: 11.06.2018



Agreeing on the future – Long term transport planning, a trial in Copenhagen

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Abstrakt

Making long-term forecasts implies dealing with a considerable amount of uncertainty. In this paper, there is a brief review of some of the methods used to predict and plan long-term mobility demand and the strengths and flaws of these methods are discussed. With the purpose of picturing Copenhagen's mobility for the years beyond 2050, the "Future Workshop" method was used in order to organize a participatory meeting among young persons involved with mobility and city planning. In the workshop three different long-term future visions were elaborated and for the purpose of this paper analyzed under the Triple Access System theory prism. Among the three envisaged futures, two of them seem to imply an increase in physical mobility demand, while one expects a reduction. This reduction in mobility demand is expected to be partly 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 is more discussed and more relevant today than the future discussed in the past. More than a play with words and tenses, there has been a recent emphasis on investigating and trying to forecast not only the next years' transport demand but many decades ahead. The reason for this increased interest can be manifold, such as climate change concerns, CO2 emission restricting goals that must be achieved, 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 of transport and mobility was envisaged based almost exclusively on technological development, fueled by the nuclear and space races of the 1950's and 1960's, nowadays, there is a multiplicity of approaches and input parameters besides the purely technological. If at times a technology based future could picture a world with images of flying cars, or self-driving cars carrying people

reading the newspaper on real paper and not on a screen; other factors such as societal and labor market changes, environmental awareness, consumer behavior and preferences have for some time now, also been included in the mix used to project transport demand. Nevertheless, in many cases the inclusion of these subjective slow-changing long-term parameters also called “megatrends” (Salucci, et al., 2012) and (Esposito & Tse, 2018) has still happened majorly by a process of quantification and simulation.

In Denmark for example, the National Transport Model, “Landstrafikmodellen” (LTM), has capabilities of running long-term simulations in order to predict how changes in input parameters such as population location, general income, car ownership and modal choice will influence future transport demand, on the other hand, models in the fashion of LTM tend to have their reliability sensibly reduced for long-term forecasts, as documented among Flyvbjerg et al. (2006), Parthasarathi & Levinson (2010), Nicolaisen & Næss (2015). Besides factors such as data input quality and model quality affecting reliability, closed systems akin to transport simulation models are not able to incorporate geopolitical and contextual changes (Næss & Strand, 2012), which are aspects expected to influence output, especially in long-term horizons. Moreover, Næss & Strand (2015) also claim, based on the definitions of Brems et al. (2007), that such type of models are not compatible with “strategic planning” (long-term, low geographical resolution), but that they could be useful on a limited scale “operational level” (application oriented, geographically limited).

On a different approach using both qualitative and quantitative inputs, Litman (2016) analysed socio-economic and demographic megatrends 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 opinion compilation in order to develop scenarios. These scenarios, that include qualitative data input, although not a “pure”, closed system transport model, still would fit under the definitions of strategical, tactical and operational level adequacy. In this case, these “soft predictions” (Næss & Strand, 2012) are less adequate to operational level, clear cut instruction to decision makers, but would better fit “tactical level” (mid-term) future analysis. If on the first cases of closed system future scenario modeling the result expected is an extrapolation of the present, i.e. in the didactical schematization of Börjeson et al. (2006) “what will happen”; the aforementioned cases of “soft predictions” sit in the grey area between predictive and explorative scenario typologies, they may include the “what can happen” perspective due to their consideration of the system as being open, or semi-open (Jespersen J. , 2013).

Another type of future projection has been the so called “utopian future”, as analyzed by Jensen & Freudendal-Pedersen (2012) in the cases of Archigram, the Situationist Movement and BiG, (Bjarke Ingels Group) proposals for how personal mobility-space should be organized. This type of future scenario can have a different geographical resolutions and time frames; what distinguishes such scenarios are the normative characteristics of its making. If on a backcasting scenario development there is a normative element which will guide the “backward steps” in order to accommodate that element as a final result; in utopian futures such as those animated by architectural movements, the normative element is the scenario itself. In Börjeson et al. (2006) typology, a backcasting scenario would fit under the normative type (preferred future), but the focus would be then in which steps would be necessary to achieve such future and that these steps would act as moderators always in touch with the contextualized reality of that point in time. On a utopian future, the scenario is delivered as a “read-made” vision to which necessary steps are ignored. Lyons & Davidson (2016), based on the actions necessary to achieve a given scenario, categorize given scenarios as “regime-compliant” and “regime-testing” and affirm that future scenarios that are merely predictive (probable future) will always be regime-compliant; in the case of utopian futures, it can be understood that they can act as opportunities for regime testing.

These examples of 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 and may serve different purposes of information, inspiration, testing, or strategical, tactical and operational functions; fit under different time-frames and geographical resolutions. It is also true that when using a certain future scenario technique in an application that is not adequate, far from optimal results can be expected.

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, also claimed by Næss (2012) and (2015). Moreover, according to Lyons (2016) and also seminally discussed by Owens (1995), 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.

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” ready-made rigid 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.

Finally, the future scenario that includes both statistical forecasts and qualitative parameters, although more nuanced than the computer model and less rigid than the utopian futures; for not usually counting with a normative element, these scenarios can tend to be regime compliant. I.e., even if typologically these scenarios can be located in the grey area between predictive and explorative, they tend to limit themselves to “what will happen” and “what can happen” patterns but do not touch upon “what is preferred to happen” or “how can the preferred be achieved” refraining 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”, in which the study of the future should at least include the young, albeit the persons who are most likely to live in it. Moreover, due to the uncertainties and actual discrepancy between forecasted and actual futures involved in long-term scenarios, especially quantitative, forecast type as discussed by Flyvbjerg (2006), Lyons & Davidson (2016) as well as Myers & Kitsuse (2000) reclaim the “planning part of planning” in opposition to a dominance of passive forecasts in future studies by stating that “the best way to know the future is to make it”.

Scope, context and analytical tool

In this article, there will be reported and analyzed three “raw cut” versions of three different scenarios elaborated using an alternative but well established method, the “Future Workshop”. This is done in an attempt to reconcile a predictive future (the future that is expected) with a normative utopian future (the future that is wanted). In other words, a consensus which finds final compromise in a possible future by counterweighing probable and preferred futures.

Following Börjeson et al. (2006) typology, the scenarios produced using this method would fit under the normative/transforming category. On the one hand and as it will be shown in the methods section, the first phase of the workshop starts in an explorative manner, the second phase includes a utopian phase, setting up a horizon that must be achieved and therefore making it normative. This categorization is rather evident since the Future Workshop method is part of the action research group of metatheories and to promote change and emancipation is one of its premises. On the other hand, Börjeson et al. (2006) focus very much

on the back-casting/necessary steps. This is also the case in many Future Workshops, on this particular one, although the participants will be requested to draft the steps necessary for the envisioned scenario to be coherent during the realization phase; the focus of the analysis will be in capturing the breadth of inputs and to find some commonalities among them in order to execute the analysis. The reason for this specific focus is twofold and it has to do with: a) the Future Workshop methodological characteristics of multiple iterations of scenarios and rearrangement of necessary steps, through continued contact with the participants, which is not portrayed in this article; b) the specific context of the workshop as a starting point of a larger research that intends to analyze the adequacy of current planning and transport policies in relation to envisaged long-term futures.

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

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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.

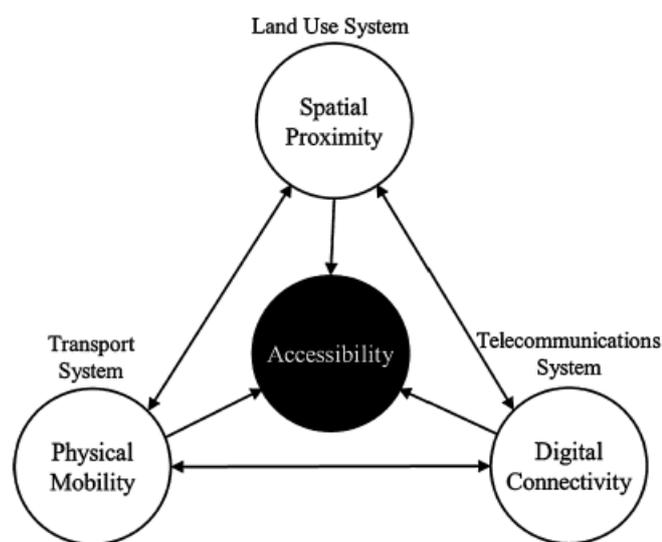


Figure 1 Triple Access System (TAS) Lyons (2016)

Due to the intrinsically qualitative nature of the method, the result is a one-of collection of the future scenarios obtained through intersubjective knowledge creation during the discussions 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 and as mentioned above, the envisaged futures generated at the workshop will serve as a way pointer for analysis of current planning and transport policies. Rather than a representation of broad citizen participation in Copenhagen, the results are treated as examples of what could be expected among the result of a larger empirical collection.

Applied 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 of 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, it took place in June 2017 and counted with 10 participants. The aim was to create futures regarding personal transport planning, including socio-economic aspects, the livable city, use of space and traffic planning borderlines by having as a

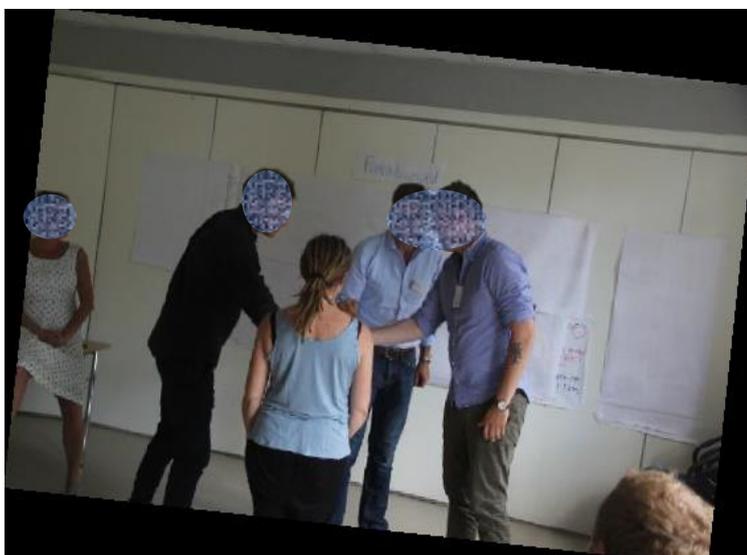


Figure 2 Wordless group presentation

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

scope beyond this particular analysis is to further investigate how much current policies are addressing issues or creating pathways for the future scenarios beyond 2050.

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

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

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 user 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.

On the other hand, there is still the problem of distance. The city must be thought as containing dynamic and static functions. 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.

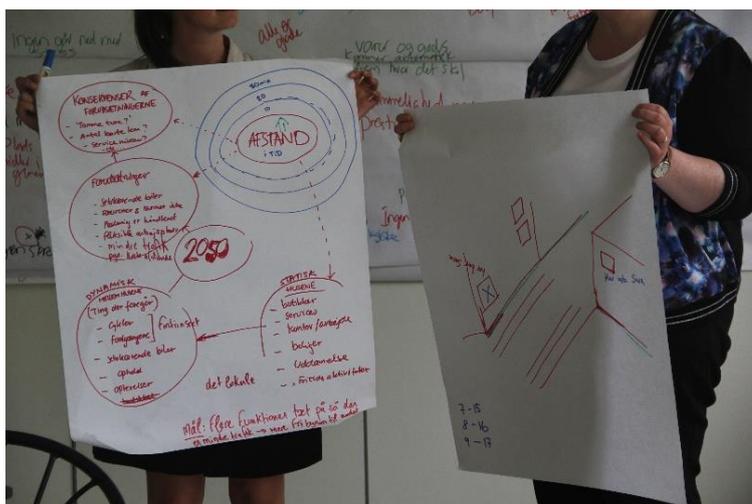


Figure 3 Realization phase presentation - City space, time and distance

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 decentralized, 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 statement that was regarded as most relevant by the participants through their votes in the critique phase was 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. From the TAS perspective this is relevant in the sense that spatial proximity as a substitute to physical mobility has limitations if the intention is to substitute motorized transport by walking; it is not enough to have locations near if they “feel” distant when walking due to large blocs, monotonous surroundings or other characteristics detrimental to good walkability. There was also reference to traffic occupying too much space. On the other hand, the other statements of the critique phase 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 on 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, a compact city or compact areas of the city in which many daily tasks can be accomplished. 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; in fact, if the theories of “Moral Offsetting” (Levy, 2015) are applied, an increased awareness about environmental impacts in one area may represent a justification for less green behavior on another.

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, which is revealing of the path-dependence of a car based system.

“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. On the other hand, the “working from home” concept that has not been stated in any of the phases, but brought up in this scenario and is a concept rather popular in future trend studies can be said to be inconsistent due to the fact that labor intensive activities still need a physical presence of the worker at the workplace. Generally, labor intensive activities tend to be the ones paying less, if compared to intellectual activities and therefore reducing the given worker’s range location choice as near or far from work, or near or far from high quality public transport. Nevertheless, when examining a city like Copenhagen and its metropolitan area, the amount of “production jobs”, or physical labor-intensive jobs has in the last decades fallen considerably in proportion to “creative jobs” or jobs that do not necessarily need the worker physical presence. The discussion becomes then if that “dirt is being swept under someone else’s rug”, which is out of the scope of this paper. Regarding spatial proximity, the “city space, time and distance” 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. Here, it must be emphasized that different public services may have different potential for promoting the spatial proximity/physical mobility substitution. Large workplaces are unlikely to generate less demand by decentralization, a daycare center or a sports facility that would be divided into smaller units could perhaps reduce demand, but what it seems logic to do is to locate such traffic generating knots closer to public transport hubs. 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 teleworking, the private and public sector could contribute for reducing physical mobility demand to and from work, although it is not a guarantee of less car use if there is increased free time.

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.

Discussion and conclusion

From a brief review and categorization of some of the methods used to forecast future transport demand and guide planning, the “Future Workshop” method has been used due to its democratic and inclusive characteristics to generate knowledge and 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).

It could be seen that The Future Workshop method, which traditionally has been used as an empowerment and emancipation mechanism to its participants, can be adapted and utilized with participants that do not necessarily need emancipation or empowerment, but that due to the freedom and no hierarchy environment it provides it is a valid way to bring together persons from different backgrounds and levels of experience in a way that they feel comfortable and encouraged to participate and give their inputs. On a negative side, it has to be mentioned the “crisis of representation” that must be dealt with by the researcher when trying to transfer to paper the way the interactions happened at the workshop. For example, some of the presentations at the workshop have been without words, other interactions and discussions when dividing statements into themes were rather interesting, but impossible to capture and

transmit in writing. An attempt was made by transcribing *ipsis litteris* the final scenarios created by the 3 groups, but even that does not do justice to how the presentations happened. The participants have received a workshop report and have had the opportunity to comment and bring new inputs.

In this method, ideally, the participants will be kept in touch and a continuation of the workshop is necessary in order to work further on the consistency of the scenarios and on the steps towards them. This continuation can be done after running the created scenarios through experts; which is a positive point of Future Workshop created scenarios is that most readers can understand how different elements hang together and inconsistencies are rather visible, discussable and correctable, differently from “black-box” type scenarios where to understand simple parameters, much work in understanding what happens under the surface must be done. The accuracy and reliability and “similarity to reality”, of the scenarios generated through the future workshop method does not seem vitally relevant as long as the method is used for its intended purpose of long-term horizons.

Regarding the TAS analysis of the three generated future scenarios, 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” scenario, 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 clear 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 to be substituted partly by accessibility obtained by increased digital connectivity and partly by spatial proximity, although the decentralization of functions potential for reduction in transport demand should be further discussed. An ideal type scenario (if reduction in car use is intended) could be to combine “City space, time and distance” with “Organization of transport” in a way of decentralizing functions or rather locating them around high quality public transport, in line with transit-oriented development and/or station proximity development policies.

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Appendix

Complete list of statements given in the critique phase of the workshop

Short Statement
Motorvejs køer
Biler der forurener
Trafik optager plads-Ikke plads til natur
Vejene er grimme
Dårlig P-Information
P-afgift
Afgifter på el-biler
Unge børdr ner grader
Folk kommer til skade
Folk bliver aggressive
Transporttid
Trafik skaber stress-for høj tempo
Svært med børnevogn
Trafikulykker
Mangel på metro og letbane tilgængelighed
Mangel på cykel parkering
Busser sidder fast i myldretid
Frygt for terror
Myldretid
"Sorte huler" (places not reached by public transport at times)
Trafik larmer
Fulde menesker
Regn/dårligt vejr
Overhalende motorcykler
Horrible oftenlige IT systemer
Cyklistkøer (trafik proper)
Ikke nok OPP
Selv mord i trafikken
Motility
Svært at komme på hjul
Vejene og togbaner skær byen over
De tager for lang tid
Mangel på p-huse
Cykeltve
Erhvers kærsel over for persontransport
Mangel på privatsfær i offentlig transport
Offentlig transport fungerer ikke for mig
Vi boer for lange væk fra arbejde eller omvent
Storskala er fremmedgørende for menneskers krop
U...varlig opholdsteder for sociale udsette
Togforsinkelser
Urbanisering samler folk på et sted
Dårlig udnyttelse af vandveje in København
Taxi kørsel

Mobil telefoner
Svært med akeve arbejdstider
Arrogante offentlige trafikselskaber
Turister på cykler
Cykler som srald

Complete list of statements given in the utopian phase of the workshop

Short Statement
Alle store veje under jorden
At stå op kl. 8:00
Plads til cykler
Arbejde til alle der har lyst
Langsynlighed og nervæer er prioriteter
Mindre trafik
Ingen går ned med stress
Man kan flyve fra A til B
Sammenhæng mellem miljø og klima (internalisering af eksternaliteter)
Ingen dårlig samvigtighed
Ingen skrald /100% renovation
Diverse byrum
Ingen fare, mindre opmærksom
Plads til alle transportidler i byen
Kærlighed mellem land og by
Arbejde under transport
Ingen rejsekort
Total ejerskab til person data
Meget kortere transporttid
Gratistranspot
Jeg kan komme alle steder, sted er ikke en issue, ingen begrænsning
Øget ruralisering
Byrum der rumer alt vi har lyst til og behov for
Stort net af grønne cykelstiger
Alle er glade
Alle arbejder tæt på hvor de bor
Transportmidler er mere tingengelig
100% lokal forbrug
Alle kan færder frit
Ingen køer
Alt er selvkærende
Alle kan færder trygt
Ingen myldretid
Ingen socialt udsætte
Ingen privat transport
100% forståelse af transport
100%fossil frit transport
Ingen erhvevstransport
Ingen regler, 100% tillid
Alt er i mennerker skala

Altid god tid til transport
Store nok cykelstier
Varer og gods kommer frem hvor det skal
Plads til alle Romaer
Blande communities, socialt
Transport on demand
"Jeg arbejder hvor jeg er"
Lige adgang for alle
Ingen overflødig kapacitet
Meditationskurser i busser
Ingen skrigende børn
Inkomst graduerede pris på transport
Transport mellem land og by i rekord tid
Dynamisk overgang mellem land og by
Natur fenomener er de materiale transportmidler skabes af
Virtuelle møderum
Vi transporterer os når vi sover
Ingen uheld overhovedet
Ingen P-pladser
Transport for vagt personale
Fleksibel arbejdstid/arbejdsplads
Rå sten by vs. Landsby idyl
AI off. Transport til tid
Off. Transport helle tiden
Ingen veje
Man kan ikke falde fra cykler
Folke fra lande kan kom til byen
Altid gratis P-pladser