DOCUMENT MOBILITEIT ALGEMEEN

In dit document staan drie artikelen die samen een beeld bieden van de stand van meningsvorming over mobiliteit in delen van de wereld. De nadruk ligt in deze Engelse artikelen op het personenvervoer.

Het eerste artikel (2-15) beschrijft de rollen en posities van de belangrijkste **stakeholders** rond mobiliteit in isde rijkere landen van de wereld. Focuspunt waren de **OECD landen**. Het artikel is een bewerking van hoofdstuk 4 van mijn boek Inclusieve Transport (Elsevier, 2019).

Het tweede artikel (16-24) beschrijft de situatie rond **mobiliteit in de armere wereld**, in de ontwikkelingslanden. Dit artikel, ook een bewerking van hoofdstuk 4 van mijn boek Inclusive Transport, is noodzakelijkerwijs generiek en wat algemeen, maar biedt wel een inzicht in belangrijke krachten en machten bij de ontwikkeling van mobiliteitsbeleid aldaar.

Het derde artikel (25-70) beschrijft de omgang met **mobiliteit en het mobiliteitsbeleid in Japan**. Japan kan worden beschouwd als het land met bezien vanuit duurzame mobiliteit beste track record. Het artikel is primair het verslag van een studiereis naar Japan. Ik beschouw Japan als een inspirerend laboratorium voor mobiliteit in ons deel van de wereld.

Artikel 1

THE MOST IMPORTANT STAKEHOLDERS IN MOBILITY: OECD WORLD

1. National politicians and policy makers; economic growth as the core

I did an inventory of the national plans for the richer countries of the OECD world. The best entrance for such an inventory offers the website of the ITF, the International Transport Forum. In fact, it is in most countries rather problematic to get a clear overview of their prevailing transport policies and their plans for the future. This situation can arise from a bad communication strategy or can be related to the circumstance that in many countries national transport policies are immediately split- up in a myriad of different policy subjects. An extra problem is that written prevailing policies are often not the same as real life policies.
And what strikes me is that most transport researchers just discuss policies without giving clear insights how they arrived at their knowledge. Did they really study the policy plans? Most researchers in another for our work highly relevant academic discipline - public policy science -do complain about the difficulties getting the prevailing policies clarified, as I noticed visiting their World Conference, Milano, July 2015. However, I seldom hear transport researchers on this issue!

When countries have a transport plan this plan focusses on the unimodal transport networks (road network, rail network, air network), their functioning and the investments needed. Basically, the plans focus on infrastructure provision. Although almost all plans acknowledge that the unimodal networks should grow into one interconnected intermodal transport or mobility network, and although almost plans also acknowledge that all networks exist to make mobility of persons and goods possible, real elaborated foci on *inter-modality* and on *user perspectives* seem to be missing or remain marginal. Next to the modal infrastructure investment paragraphs most plans pay attention to traffic safety and to a lesser part to reaching environmental standards related to noise and air quality. The attention for reaching and building sustainable mobility differs, but mostly sustainability or sustainable development is treated just as an extra chapter, often as a “stand- alone”- theme (mostly related only to environmental issues), and not as *the* basis for all policy. The focus in almost all plans remains very much on transport as a necessary and important condition to reach economic growth, defined in traditional economic frames.

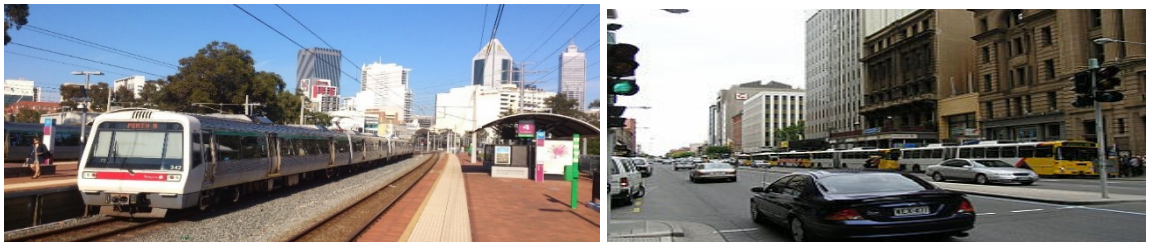
Adjacent to the plans and the planning documents for a number of countries more elaborated articles on their national policies can be found. For Austria, Emberger (2017) analysed the official documents regarding transport policy at the national level. In the last plan, the Gesamtverkehrsplan (2013) there are four types of objectives; social, safe, environmental and efficient, with into the social objectives a strategy for making stations barrier free for the disabled and a bonus /males system for punctuality in public transport. But in his vision the real focus of the plan is somewhere else; *“Still some European countries – Germany, France, UK, but also Austria - focus mainly on economic efficiency and growth, with much less concern for environment and equity. This leads to strategies which prioritise policy instruments relating to road infrastructure provision. It follows that if objectives are set inappropriately (they are unbalanced) a designed strategy cannot achieve sustainability.”* Moving to Germany Fichert (2017) signals a route back. In the development of transport policy plans (transport planning is in its core left to the Bundeslander, the only “transport plan” at the federal level is a roads plan, the Bundesverkehrswegeplan, 2016)) some 15 years ago a strong intention could be noted to

influence traffic developments and to reduce transport developments and influence modal splits, but in more recent years a more pragmatic and industry oriented approach has been established.
Japan offers another picture, as Shibayama (2017) clarifies. The Basic Plan on Transport Policy of Japan has three pillars; establishing international and interregional passenger and freight transport systems a basis for growth and prosperity, creating resilience for disasters and aging infrastructures, and creating usable transport systems enabling "socially rich" lives. This last pillar (more in 6.4) creates the basis for an integrated strategy on transport disadvantage.
Rau, Hynes and Heisserer (2016) present for Ireland an interesting debate. In Smarter Travel, a plan created in 2008, there was a rhetoric introduced towards sustainable mobility. But this rhetoric has not been central in transport policy practice, in fact; "*entrenched top-down and car-centric decision-making contrasts with a rapidly expanding array of multi-actor governance processes, particularly in the area of sustainable transpor*t". And the authors note even stronger: "*the apparent lack of radical reform in how transport is governed could also be interpreted as a sign of a car-centric "business as usual" approach which has only temporarily disappeared under a thin veil of "smarter transport" rhetoric".*
All in all, I have to conclude sustainable mobility is not in the core of the prevailing national transport policies. Involuntary transport disadvantage themes lead a marginal existence in these policies, and sustainable mobility is treated, but does not form the basis of the policies. In fact, sometimes there even seems, at least in Germany, in Ireland, but also in the UK (where the Social Exclusion Unit in 2003 created an important stimulus for social aspects of transport policy) a move back to " business as usual", meaning more car-centric and modal infrastructure- based policies.

2. Urban policies, politicians and planners: liveability, differentiation and innovative themes

In mobility policy there are mostly two main centres. The national government in some federal countries partly or completely replaced by regional, state, or Lander (regional) governments (e.g. United States, Germany, Australia) and the city governments of the most important cities and urban areas.

In 2010 a paper was presented by Klinger, Kenworthy and Lanzendorf called *Mobility Cultures in urban areas; a comparative analysis of 44 German cities*. The authors looked at the relation between urban organisation and mobility choices. They noticed big differences in mobility organisation and mobility choices between cities. In general, in these cities 48 % of all trips were made by car, but the range differed between 29 % and 65 %. 12 % of the trips were made by public transport, with a range from 4 to 19 %, cycling accounted for 9 % of the trips, with a range from zero to 28 %, and walking accounted for 30 % of the trips with a range from 19 % to 40 %. The results of their factor analysis showed six groups of cities, with quite different positions on car dependence. At first there were the cycling cities, most university cities in the Northern part of Germany (for example: Aachen), cities with rather low car dependence. A second group were the transit metropoles; rather big cities with very well - equipped public transport systems (for example: Frankfurt and Cologne). A third group were smaller cities with an orientation to public transport, all situated in former Eastern Germany. These three groups of cities have relative low car dependence rates. A fourth group consisted of 14 more average cities. And finally there are two groups of car oriented cities identified; the car cities with a cycling potential, like Duisburg, and the car cities with a public transport potential, like Bochum or Wiesbaden. These cities have now high car dependence rates.



Perth versus Adelaide; great investments in PT versus the Australian car capital

The focus in this differentiation is on modal split, as here statistics could be found. The central message is that urban mobility policies differ very much, and that, seen from the perspective of success of public transport, sustainable mobility or of attention to social inclusion via transport there are as many frontrunners as there are laggards. And being a frontrunner or a laggard seems less a function of the country where the city is located, and more a function of the urban governments themselves, as in each country frontrunner cities are neighboured by laggard cities, see for example in Germany Frankfurt am Main (37 % car use) and , at 30 kilometres distance, Wiesbaden (57 % car use).

Many innovations in transport and mobility originated in cities. In Jeekel (2018) an overview of innovations starting from cities was presented, using Goldman and Gorham (2012) who identified in four directions of structural innovations in urban mobility: Liveability, Intelligent Systems Management, New Mobility and City Logistics. The direction of Liveability started in the late sixties, when citizens took initiatives to diminish the dominance of private vehicle motorization in urban policies in most cities in the developed world. Innovations are pedestrianism, traffic restraint precincts, traffic calming, cycling strategies and shared space. Intelligent Systems Management, taking off in the late eighties and early nineties of the last century, is essentially about systems for public transport, and about managing car traffic flows. And New Mobility is a recent area of innovation, focussing on IT-solutions for urban mobility, mainly for the public transport functions of private vehicles, related to the sharing economy, and on smart mobility in relation to data and smart cities (see also 5.5).

Many innovations, many initiatives. Cities are learning from experiences in other cities. In Europe platforms for exchanging experiences and practices have been created, of which Polis, Civitas, and the European Platform on Mobility Management (EPOMM) are the best known. Marsden et.al (2012) presented several case studies on this issue. It is interesting that the European Commission has played an active role in stimulating urban mobility developments and in supporting platforms and cities. May et.al (2017) discussed the role of a new instrument, the SUMP, Sustainable Urban Mobility Action Plans. I noted this earlier, looking at poverty in relation to transport; the European Union is active in these domains, and often more active and certainly more helpful than national governments.

In essence, in Europe the following seems to be happening. Looking at mobility policies we should distinguish between urban, regional, national and European politicians. Urban politicians have to find an equilibrium between car-dependent electorates at their city limits and the inner- city households, more interested in the performance of public transport. Most regional politicians are in favour of decentralisation and suburbanization, looking for investment equity in their regions. National politicians are as we noted, and related to their often more right-wing political biases, keener on sustained support for car infrastructures. And finally, European politicians and funding schemes have given support to cities and have been instrumental in creating environmental regulations on air quality, climate change, and in funding research on multimodality in cities and city regions. With this situation comes a difference in frames. In this positioning the European Commission often supports the urban governments. Even stronger, Halpern (2014), although critical about the lack of institutionalisation of E.U. urban mobility policies in the general transport policies of the E.U. (often the result of pressures created by national governments), is positive about the E.U. policy energy : *“the*

policy activism demonstrated by the E.U. did put urban mobility back onto the political agenda". It is rather clear that reaching sustainable mobility is at the European civil service considered as more urgent than at the national administrations.

In a scheme, this leads to the following situation:

Characteristic	National governments	Urban governments
Goal orientation	Dominance of economic goals	Equilibrium between economic, ecological and social goals
Frame*	Predict and provide, recently: smart mobility	City as a place, sustainable mobility
Political colour	Majority mostly right wing	Majority often left wing
Relation with European Commission	Rather often inharmonious	Cooperating, from the same goal orientation

All in all, there is a potential battlefield between national and urban policies on mobility. Sometimes this battlefield can be seen in public. In the Dutch national parliament, there was a majority to make further low emission zoning in Dutch cities impossible. Only via threatening with court procedures the urban governments could stop this majority in the national parliament who wanted to put a ban on further zoning. In other countries the same battles can be seen over banning diesel cars from cities. Another example comes from the evaluation of the Urban Mobility Policy of the E.U. (Panteia, 2013) where it is stated that, whereas the European Commission has done useful work, it has been difficult to obtain widespread take-up because *"the necessary multiplication and dissemination at the level of the member states (the national governments) has not taken place".* Urban governments should be supported by national governments in reaching sustainable mobility objectives. May et.al (2017), Broekhof, Erickson and Lee (2015) and OECD (2014) advice national governments to establish strong national policy frameworks and incentive structures, and to provide financial resources to cities. From the inventory in 2 it is clear that this is not often happening yet. Rather often national governments are not supportive at all.

This situation is not only existing in Europe. In *Expect more conflicts between cities and state*s, Quinton (2017) clarifies that policy battles in the United States can be expected, as political colours differ, where most states have Republican majorities, whereas cities have Democrat majorities. This division between the urban world and the national/state world will be an important theme the next decade in many richer OECD countries. States and national governments have a bias in supporting the rural and suburban, and essentially the car centred and economic "business as usual"- perspectives, with little attention to the themes central in this book, whereas cities seem more supportive towards sustainability and liveability, with Knight (2017) noticing that cities worldwide are setting climate goals that are far more ambitious than the targets agreed upon by national governments.

Moving back to the mobility domain, in many urban areas recently the connection between sustainable mobility and accessibility has been made. A central element in reaching sustainable mobility is social sustainability. The most important indicators of social sustainability as related to transport are safety and security, and health conditions, affordability of mobility (share of household net income), accessibility of key services, social equity ,meaning equal entrance to mobility, and social cohesion (Jeekel, 2017). Accessibility planning is thus an important element of sustainable urban mobility. Duranton and Guerra (2016) even argue that accessibility should move to the centre of urban development. Important questions will be : "*how can transport disadvantaged households get, or*

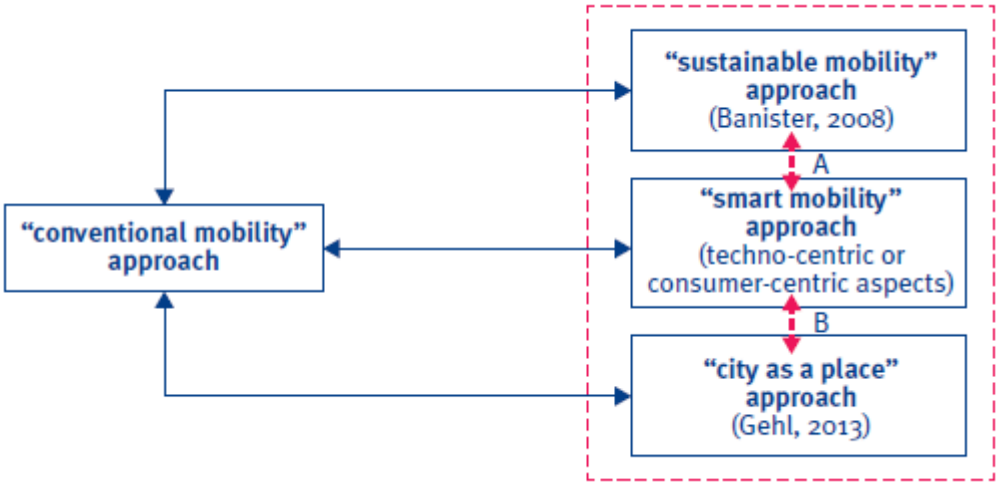
keep, easy access to important services? " and "*how could poorer neighbourhoods, with their intricate links between housing and mobility be restructured to make these neighbourhoods more vital and flourishing parts in the urban fabric?"* The already mentioned SUMP's (sustainable urban mobility plans) could be an important instrument in bringing climate change and equity/social inclusion targets together (Arsenio, Martens and Di Ciommo, 2016). The focus on these SUMP's should be on people's needs, long-term vision and strategy, participation of stakeholders and structured learning processes. All elements lacking in almost all national transport plans!

However, in emancipating social sustainability and the accessibility issues a caveat is necessary. There is a tension between equity and environmental objectives. For example, when not designed properly, climate change policies for mobility could be detrimental for vulnerable population groups. A consensus could be found by introducing the "sufficiency principle" as developed by Martens (2016) meaning *"to ensure that all citizens are offered transport options that enable access to key destinations and services"*. To realise policies based on such a "sufficiency principle" related to provision of mobility services a policy on regulating and structuring land use would be necessary.

To conclude, there is more dynamism in the urban world than at the national level when it comes to finding creative and inspirational policies for the future.

3.Transport research and transport researchers: the focus on engineering and traditional economics

Which results have transport researchers as a community delivered? Have transport researchers been a force in getting involuntary transport disadvantage and the other themes of this book on the agendas of decision makers? To answer such a question I present four frames for studying mobility as introduced by Papa and Lauwers (2015).



The traditional approach, *conventional mobility*, is about "predict and provide". Mobility is accepted as useful, for economic growth, and for the functioning of society. Predictions on future demand for mobility are made (via transport modelling) and infrastructure for mobility is provided based on these predictions (often with the support of some cost-benefit analysis in traditional economic frames). For decades "predict and provide" has been the dominant approach, with a focus on demand predicting, transport modelling, appraisal, and cost-benefit analysis.

In the seventies, in cities another frame came up. In cities, providing infrastructure for all transport demand led to liveability problems, as early was signalled by Jane Jacobs in her famous *The Death and Life of Great American Cities* (1961). Out of urban concerns developed another frame, the *City as a*

place- approach, in which mobility in urban areas needs to be seen as an integral but not a dominant element in design and policies leading to liveable cities (Gehl,2013).

In the eighties, when sustainable development was coined, for example with the Brundtland report (1989) again another approach was introduced. *Sustainable mobility* questioned the conventional approach, at first from ecological frames, and questioned in principle the need or even the urge to provide for all demand. It questioned *and* the demand (demand management became an issue) *and* the provision (wise provision of infrastructure, instead of just provision). Later, and according to the original Brundtland objectives, the sustainable mobility- approach was enriched via a greater focus on economic and social sustainability (Banister,2008).

A few years ago the newest frame was coined, *smart mobility*. Smart Mobility is in essence about the use of IT in mobility systems and in vehicles and is based on data approaches that could lead to real life demand- supply matches and new mobility services. Smart Mobility is still rather techno- centric and introduced a non – existing frame in the world of transport and mobility, the so called the "ecological modernization"- frame. This frame, already known in other domains, has as its basis the notion that sustainability can be reached, with the support of technology, and within the actual economic conditions of modern societies, even more; sustainability could lead to profit making. In this respect smart mobility seems to be nearer to the conventional mobility- approach than to the other two approaches, this being an important reason for its early success.

But what is the main focus of the transport researchers related to these approaches? What is their dominant approach?

In trying to answer the question at a general level it is striking to see that very little has been published on the sociology of transport research and on the sociology of the transport research community. Research questions such as "*what are the institutional arrangements, including funding and agenda making"*, and "*what are cultural and personal biases of researchers and how are these biases creating and influencing directionality in transport research*" seem to be lacking. To the best of my knowledge there is virtually no debate on these questions or even on the direction the transport research should take *vis a vis* the great societal challenges on mobility. Yes, there are some individual pleas (see Bannister,2015,Whitelegg,2015,Urry,2007 for example), but a discussion on conditions and directionality of transport research at a more general level seems to be lacking. *The degree of self-reflexivity of the community of transport researchers seems rather low.*

These are rather strong comments. I will elaborate them a little bit further by introducing what I consider to be the most important societal challenges to passenger transport. Challenges where, in my vision, the transport research community should immediately relate to (Jeekel,2016).

The first challenge is the *challenge of urban mobility*. The future will be urban: according to the United Nations, of the world's total population of 6.8 billion people in 2010, 51 % was living in urban areas and this urban share will rise to 61 % of 8.2 billion people in 2030, and to 70 % of 9.2 billion people in 2050 . We will be faced with more megacities and with more mobility in these megacities. How are we going to find solutions here, how can we diminish transport disadvantages, as it will be clear that just "predict and provide" cannot be the answer?
The second challenge is about *IT in mobility.* ICT has moved to the world of mobility. Cars can now be seen as "computers or iPads on wheels". ICT is rapidly changing mobility. Many new technical possibilities are arising in terms of sensors, control, driving support and automation, in the area of combining and integrating data, trip organization and trip planning. Which new possibilities and problems could be created?
This brings me to the last challenge, the challenge of *energy and climate*. The match between energy and mobility in creating cleaner vehicles is still being played. Each few years there seems, at least in

the media, to be a new winner. But the real challenge here is to direct investments in energy infrastructures and to create policies both in such ways that the end result will be a sustainable future, economic, ecological and social, and this means at least 60-80 % emission reduction in CO2 from mobility and transport in 2050.

Where is the answer of the transport research community to these challenges? What are the cores of their debates? I must admit, I visited many transport research -conferences, and considered them rather often boring, at least in respect to connecting to these challenges. Many papers are presented, with short comments after each paper, but I saw little directionality, and, more important, I saw little sense of urgency. It often looks like ploughing the same fields over and over again… Searching for an answer to this state of art I came across two important articles. Keblowski and Bassens (2017) explain that the dominant approach in transport research is still neo- classical. Neo- classical approaches combine two core perspectives: transport engineering and transport economics.

There are great differences and differentiations between and in these disciplines, but they have a neo - classical basis in common. And this neo-classical body of knowledge is based on two basic principles. At first, transport is approached as an essentially rational discipline. Modelling, mathematical models, micro- economic positions and options dominate. And secondly, engineers and economists both envision the most important role of transport to be a major contributor to economic growth. As economic growth also is the dominant objective in national policy planning; "*neoclassical engineering and micro-economist approaches continue to be received in particularly ways in policy circles. Neoclassical conceptualizations and methodologies have given transport an aura of an almost uniformly expert - led, highly technical and essentially "rational" scientific discipline, coded in mathematical language*.". This orientation is intractably linked with the "predict and provide"-approach.

Schwanen, Banister and Anable (2011) looked at the state of art in scientific research on climate change mitigation in transport and arrived at the insight that quantitative research underpinned by positivist epistemologies continued to prevail, although participatory and/or qualitative research methods were increasingly used. These authors present also a historic perspective as they state:; "*after World War II transport studies as a discipline came into existence to regulate and facilitate the growth of automobile transport; a predict-and-provide approach grounded in instrumental rationality developed*." This is still to be seen as the dominant approach and thus certain ways of thinking and doing research with regard to the decarbonisation of transport seem to dominate. Mitigation via technology, via economic instruments, via infrastructure provision prevail, in the vision of the authors.

Most transport researchers still seem to work from these mentioned paradigms and often find open doors with decision- makers in governments and the business worlds. They share the view that providing infrastructure is conditional for economic growth, and economic growth is needed to keep the prosperity in the richest countries in the world. The other themes, such as climate change, or involuntary transport disadvantage, are by the dominant paradigm in transport research seen just as externalities, or, at best, as unintended consequences. Many traditional transport researchers are linked with businesses, with companies, and a rather great number of them have, in combination with their academic research, consultancy tasks, jobs or even companies themselves.

This state of art of transport research is reflected in the set-up of the most important general conferences for transport research. I selected four important ones; TRB, TRA, WCTR and ETC, and looked at their committee structure, as the programming and content of these conferences is mostly linked to these committees. Also here infrastructure, modal research, and operations or economics dominate. To give an example; TRB, the yearly conference organised by the Transport Research Board

of the U.S. is by far the greatest conference of the four. This conference has more than 220 standing commissions. On their website the committee structure can be seen, however, a great number of committees is counted under more than one heading. The TRB committee structure is as follows;

Sector	Type of committees	number	%
Design and Construction	Bridges, pavements, construction, infrastructure	127	33
Operations and Preservation	Maintenance, traffic management	43	11
Safety, System, components and users	Freight transport, passenger transport (along the modes), safety and human factors	80	21
Policy and Organisation	Administration, Data, Policy issues (21)	73	19
Planning and Environment	Environment and Planning 15, Forecasting 19, Society 14	65	16

Altogether somewhat less than 30 % of all TRB committees is working on intermodal and society-related issues. The far greater part of the committees is infrastructure-, economics- or operations-based.

All in all transport research in general has a certain dominance of engineering and transport economics, is organised along the individual transport modes, is working on constructing, maintaining, assessing and operating the different mode - oriented transport systems (road, rail, air). Researchers working on issues relating transport to societal challenges are still a minority, and this is reflected in the structure of the committees behind the most important general transport conferences. There is a bias towards working on existing systems from traditional mono- disciplinary frames. And it looks as if there is only a minor connection to the four great challenges as introduced.

And I am struck by the *Anglo Saxon bias* in the literature. Almost all authors in the best- known academic journals originate from the United Kingdom, Australia, Canada, and even authors from the Netherlands or Scandinavia are using Anglo Saxon frames. It looks as if literature from the French, the German, or broader, the Third World - language areas is non- existent. This, however, is not the case. There is a rather rich French literature on these themes, while the German literature is less rich, but available. It comes to my mind that academic authors that are not publishing in English, tend to be forgotten or marginalised!

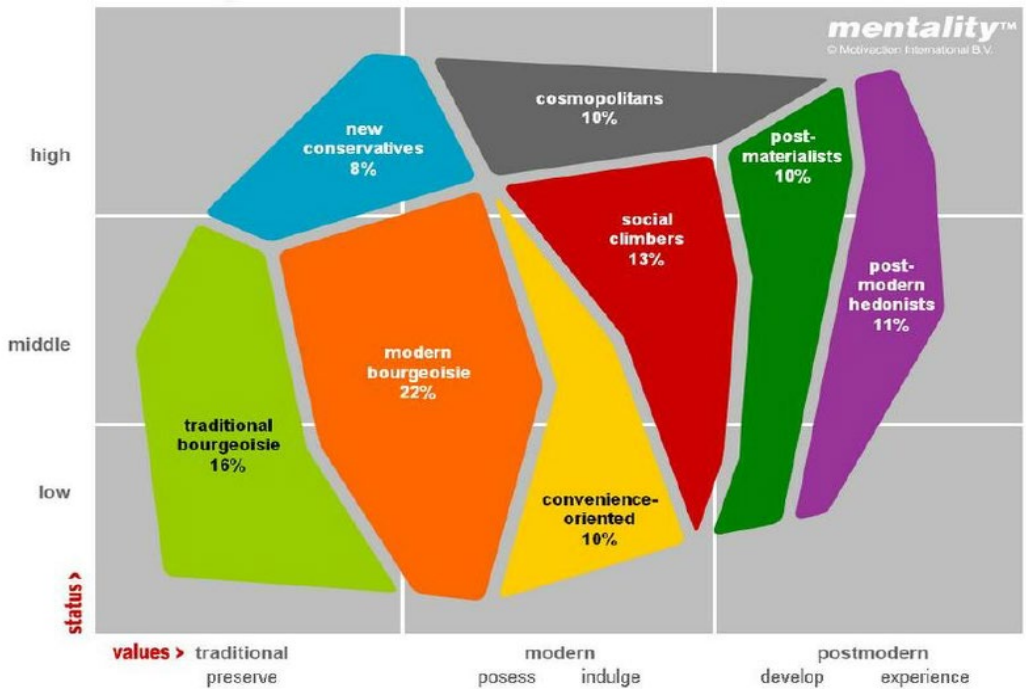
The community of mobility researchers has until yet not been able to produce a short number of messages or “take – away’ s “. Their writings have an *“impression of difficulty*” To clarify what I mean; I still miss directionality. And I miss clear and understandable language. Consensus needs to be built on creating a stimulating narrative, with some accepted indicators, that could be presented to audiences outside academia.

Jones (2014) notes another interesting element. Although most traditional researchers see transport as derived demand, their modelling and even more their appraisal techniques seem to be based not at this derived demand but on the circumstance that transport is – for simplicity - treated by them as direct demand. Treating transport as derived demand should mean that modelling and appraisal should be based on the drivers of the leading demand, on the sources of that demand, such as the wishes of consumers in consumption processes and the strategies of companies in business processes.

4. The majority of households: subscribing to DCO, the Car Dependence Organisation

In all richer OECD countries politicians behave according to majority rules. For mobility issues that majority seems clear as in general 80 % of all households have cars available. The attitudes of all these car owning households are important basic material for politicians, and broader, for all decision makers. These attitudes are often studied via standard statistical categories; age, income, gender, education, but these categories can be seen, at least partially as "zombie categories""(Beck,1992), as our societies are now so open, transparent, individualised and complex, that people with the same characteristics on these categories can lead completely different lives

The Dutch marketing advisor Motivaction classifies the population in 8 mentality groups (Motivaction, 2002). This classification is based on the assumption that people with the same socio-economic-demographic profile can have completely different lifestyles and consumption patterns. Motivaction argues that who you are, what you think, what you appreciate and what you do is more dependent on personal preferences, norms and values than on statistical characteristics. On the Y- axe the socio- economic status is presented; low, middle, high. The X- axe has a new variable; a value- orientation. Three value orientations are identified, from left to right; traditional value orientation (preserve, conserve and maintain), modern value orientation (possess material things and indulge yourself) , and post -modern value orientation (develop, learn and experience).



The actualised database has been related to mobility. And this gives interesting results.
The differences according to mobility between the 8 mentality groups are great, and most important differences concentrate on action space, on income to spend on mobility, and on attitudes towards car use or public transport use. For politicians this last element is important. The new conservatives (8%) and the social climbers (13%) are very car dependent and love car driving, as do, to somewhat lesser extent, the modern bourgeoisie (22%) and the convenience oriented (10%). Thus, *in a country such as the Netherlands at least 53 % of households are fully car- oriented.* Two mentality groups stand in- between, as they travel mostly by car, but are not partisan car- oriented; the

traditional bourgeois (16%) and the post- materialists (10%) , this last group being the most ambivalent of all groups; they love to be sustainable, however travel very much by car (second behind the new conservatives). Only two groups stand out as being more non- car than car- oriented; the cosmopolitans (10%) , and the postmodern hedonists (10%) , both city- oriented groups.

For national politicians these data are clear; 80 % of the households use cars quite often, and of these households a rather huge majority loves car driving. And the in attitude non- driving households, with a concentration of involuntary transport disadvantaged households are mostly living in the urban areas. The majority cannot be clearer! This situation is being strengthened by the national political language, that concentrates (and here I can use my own experience as a former politician!) in all richer OECD countries on the huge middle class, and especially on the middle- class families. Middle class families are seen as *the basis of the electorate*. The middle classes and especially the middle- class families are the most car dependent social class (car ownership here; 96 %); cosmopolitans are mostly richer (and most often pairs or singles), and post- hedonists are rather often singles, students or city dwellers. Stated the other way around; in groups vulnerable for transport disadvantage or for social exclusion via transport we noticed in part A the bias towards poorer households, elderly, disabled, adolescents, singles, *all categories outside the mainstream of the national electorate*, as perceived by the national politicians, and, also important, by the media.

This could clarify the circumstance that the focus in national politics is on car driving, on keeping car driving affordable for the middle classes, and on seeing sustained individual car driving as an interest of the majority of the electorate. Most car -oriented households themselves are very keen on attacks on their driving. Kent (2014,2015) does show in her interesting work on car culture how reluctant most car -oriented households are in really considering alternatives. Driving is seen as the easiest way of transport. Public transport is seen as physically difficult, as most types of public transport, but also the active modes, *"require the body to carry various objects that would not otherwise need to be carried for a commute by private car*" (Kent,2015) . But the car does more, as it gives its drivers a sense of freedom, and even more, a sense of empowerment. Cars *are "a place where the tactics of modern life are mastered and expressed"* (Laurier, 2011). Cars are felt as a very personal and private space, for many people necessary in their worlds full of stress.

National politicians understand these feelings of many car drivers. And they are not confronted with the experiences of the non- car drivers and the involuntary transport disadvantaged, as many of their urban counterparts are. Basically, national politicians are in relation to the majority of the electorate, faced with only one great problem related to car driving, and that is a felt lack of road and parking capacity, leading to congestion. This bias in national mobility policy towards this "middle class mobility problem" indicates that national mobility policy in our western risk societies is essentially policy for the huge middle classes. Their risks (fears for attacking car driving, costs of car driving, congestion) are taken very seriously!

Here we should move one level deeper (see Jeekel, 2014). Discussions on frequent car use with car users mostly reach a point where they acknowledge that their frequent car use creates some problems, even for themselves, or for their families and friends (obesity, stress, traffic unsafety). But mostly car drivers see no solution; they often conclude that in their daily life car use is a necessity. How do national politicians and policy makers use this ambivalence? The basic answer is probably; in majority they do not use it, except in the area of traffic safety, where they create campaigns and instruments to make traffic safer. The situation that car users feel that they have no choice but to drive is not elaborated by politicians and policy makers. This circumstance goes *to the heart of the arrangements in modern western societies. People are expected to be flexible, to have the possibility to reach all sorts of locations in a fast way, to arrange for themselves the chances in the world that has spread out also trough location decisions of governments.* In other words: *national politicians and*

policy makers more or less expect hypermobility of their citizens. There seems to be no reflexivity on what politicians, policy makers, but also employers, basically ask from citizens when it comes to organising their mobility. It is interesting to note that whereas in modern societies there now are great debates on what should be responsible food, such debates on responsible mobility seem to be lacking. What are the boundaries on mobility, is or should all driving be considered responsible? Most national politicians and policy makers consider lifestyle-oriented policies in mobility a ‘‘no go area’’ (Jeekel,2014). Normative judgements on the way households live their lives, or realise activities are in the mobility field only accepted in traffic safety policies. A comprehensive policy on car mobility would put questions like ‘‘*why this demand for car mobility?*’ and ‘‘*are we going to accommodate all car mobility*?’ at its core. As the reaction of a big part of the car users is feared, most national policies try in their design and wording to be as neutral as possible. That this mostly means a bias towards the status quo and a lack of attention to the experiences of the transport disadvantaged is taken for granted.

So, political wisdom leads to using the perspective of the car- oriented households, leads to take for granted hypermobility, and leads to take for granted the lack of normative discussions on mobility.

5. The business world; resistance to regime change

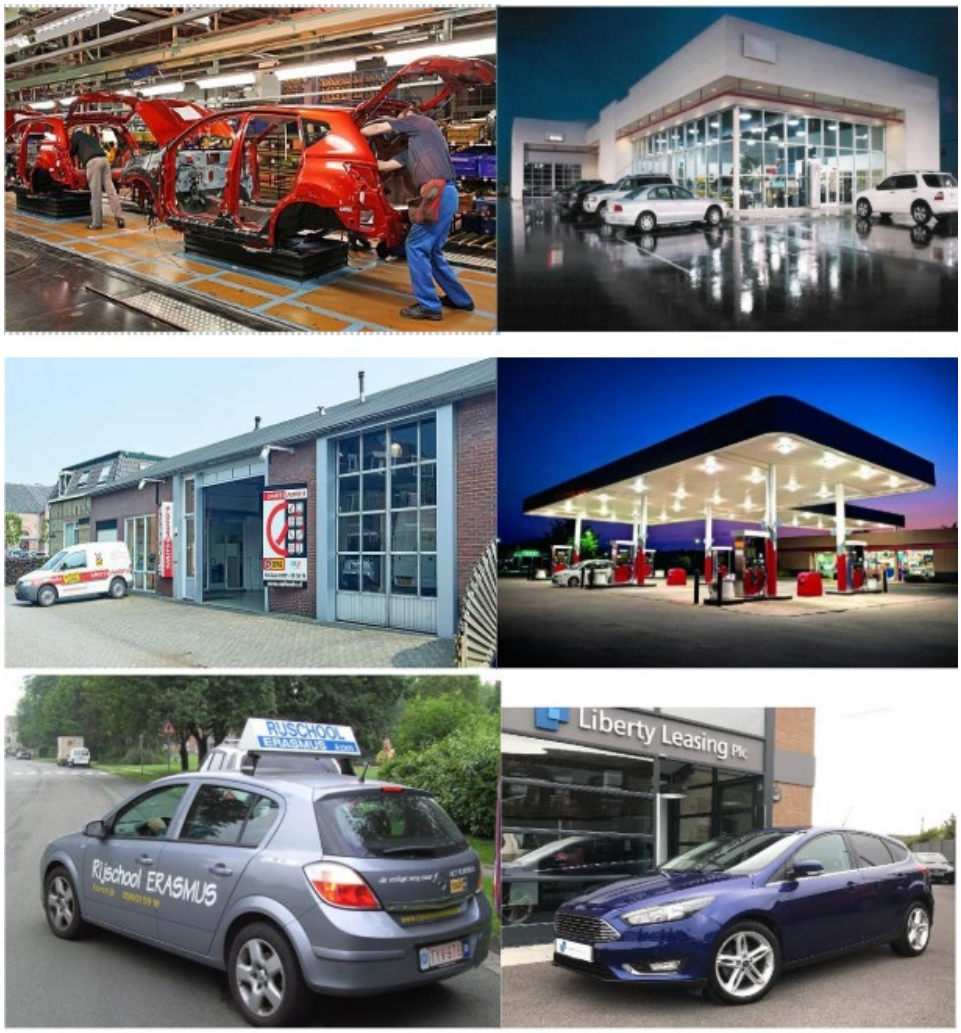
In the richer OECD -countries a car dominated infrastructure has been created consisting of highways networks, petrol stations, highway locations, networks of firms, companies and service delivery organisations, and socio- spatial arrangements related to locations and time schedules. Many households are employed in this fairly recent structure, that is now an integral part of modern western societies. The car is in the centre of the established surface transport regime. The durability of this system can be, in the words of Cohen (2012); “*attributed to a powerful iron triangle comprising automobile manufacturers (and allied industries), construction/real estate developments interests, and transport policy makers and planners”.*

An iron triangle. Using such a term identifies a rather stable regime, producing and reproducing realities. I will look in somewhat more depths to this iron triangle and start with the focus that was acknowledged in national transport plans. The focus was on the role of transport in economic growth, or better, in economic development. The transport systems combined are seen as great helpers in reaching economic prosperity, even so, that bad maintenance, and lower investment levels in the two most important systems, the car and aviation related systems, are considered to be detrimental. The growth of mobility is seen as the positive, necessary, and never- ending path to prosperity, at least by the more right -wing part of the political spectrum. In all liberal market economy dominated societies this right- wing part almost always reaches the majority. Spangenberg (2010) describes this “growth discourse” and notes that in this discourse the need for economic growth is considered so fundamental that public budgets are used to stimulate consumer spending in an economy where “*the optimal growth rate is assumed to be the maximum possible rate*” (Spangenberg, 2010, also Essebo and Baeten,2012) .

Transport infrastructure and mobility act as the basic structure and as a basic stream for the functioning of the economic life. Most national politicians see themselves as the maintainers of economic growth, and see the need to constantly invest in infrastructure, and to cherish growth in mobility. They fear, especially for the middle classes, financial ruin and economic crisis. And their remedy is constant renewal, constant building, constant accumulation and constant investments in the two most important transport systems, the car system and the aviation system.

However, all these investments, and this mobility growth are now confronted with boundaries, as many citizens do not accept the ever- growing investments projects, fearing for their cherished landscapes and liveability, whereas ever growing mobility by cars and airplanes leads to pollution and climate change via CO2 emissions. For three decades a new discourse, on sustainability and liveability is gaining momentum. But at the national level and related to transport and mobility, this discourse is still the weaker discourse.

There is also another reason for this circumstance: employment. The "structure of auto space" contains a network of companies and organisations daily delivering products, artefacts and services.



The structure of "auto space"

The O.E.M's (the car manufacturers) are great employers, and their supply chains create extra employment for many other companies. This could be considered the range of most important decision drivers of O.E.M.'s:

- 1. No further loss of former investments
- 2. Continuity in networks of suppliers and production
- 3. Car purchases in developing countries
- 4. Good image with potential customers
- 5. Overcoming overcapacities
- 6. Comfort of the car

- 7. Active role as employer in the region
- 8. Safety of the car
- 9. Car purchases in OECD countries
- 10.Good image in (inter) national policy circles
- 11. Sustainability goals

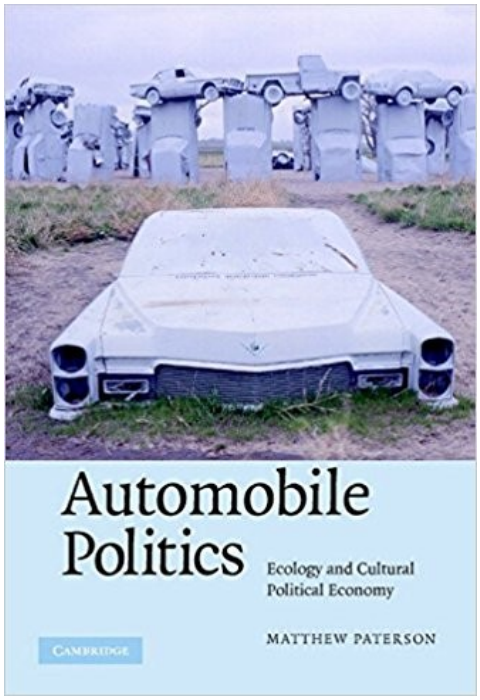
I looked at the important economic stakeholders related to the dominant transport system, the car system, and noted the following structure (Jeekel, 2013);
- the commercial stakeholders: car dealers, garage owners, the car manufacturing industry, car insurance companies, oil companies, petrol station managers, driving schools, parking companies, lease companies, IT service providers and the providers of travel data and information.
- the government parties: highway or road agencies, juridical services, the enforcing institutions, policy makers and politicians, financial institutions, tax organisations, incident and emergency institutions, municipalities and the regional governments, transport research institutes

There are many connections between all these stakeholders, but to the best of my knowledge there are only a few systematic and sustained connections between them. And these stakeholders ,together responsible for what can be called “the system of car mobility” and “the structure of auto space”, have never been pressed to design together a robust, resilient and future oriented system of car mobility, reaching sustainability criteria and fitting in a broader system of mobility for modern western societies.
Each stakeholder could optimise its own niche. Most commercial stakeholders need many car drivers, driving many kilometres and miss self- regulating institutions that can implement policies within their group, that are perhaps not the absolute best for their individual members, but could be seen from the common good as the most sustainable approaches for the years ahead. Most commercial stakeholders’ branch organisations are rather weak and most individual members will not accept forms of self- regulation.

All in all, in mobility and transport, we are faced with a situation that all economic stakeholders expect from governments and politicians to keep track on the road to even greater economic development, whereas they are not joining forces to create alternatives for challenges that lead or have led to societal problems. Their only joint effort seems to be to keep the car system running, for the rest many of their interrelations are full of conflicts. This non- alignment of most interests leads to the situation that the *governance capacity* of the car mobility sector is low. “Governance capacity” is a term coined by Innes and Boher (2003, 2010 and by Healey (2007). It defines the capacity of all stakeholders to create joint solutions to societal challenges. This means always reconciling conflicting ambitions and interests. To mobilise institutions and organisation to work towards common defined goals and targets, and to get decisions out of the debating rooms. Easier said than done; this is about the creation of capacity to act jointly! This governance capacity is now high for some domains and low for others. In domains with a low governance capacity lots of reports are written, lots of research programs are worked out, lots of debates are held, but the end result is just a stand- still, with the same discussions being held over and over again. At the surface, the system of car mobility still looks rather stable, and stable incumbent regimes are the outcome of various lock-in processes and path dependencies (Klitkou et.al, 2015). Or, as Marletto (2010) concludes, the heart of the incumbent car regime is twofold: the ability of the core actors to resist to change, and strong lock-in phenomena creating difficult path dependencies. Stable regimes favour incremental innovations as opposed to radical innovations. National politicians, being afraid of the employment consequences of radical innovations, are in majority defenders of the economic stakeholders and thus of incremental innovations.

There is a more hidden argument for supporting the incumbent regime of car mobility by most national politicians. This leads to the *role of the Treasury* in many OECD countries. The car system is rather heavily taxed, in the Netherlands for example with purchase taxes, with infrastructure taxes, and with fuel taxes. These taxes lead to the circumstance that road users expect national government to deliver what they want and leads to a conservative position of the Treasurer. Now each year 14 billion euros are received via all car and road related taxes, and the Treasurer wants to keep stable revenues. *Thus, the Treasury and the Ministry of Finance still like to see driving by heavy vehicles, which are not fuel efficient and not sustainable, and lead to the highest tax revenues*. Although in the Netherlands some minor taxation measures have been taken in the direction of sustainability, with lower taxes for purchasing cleaner vehicles, the reality of taxing car use is still not compatible with reaching sustainable mobility.

As can be noticed in all this economic wisdom the involuntary transport disadvantaged are nowhere to be seen. They just form no category whatsoever in the economic considerations of the leading national politicians and business circles. In their frame of mind fighting transport disadvantage, fighting social exclusion via transport, and creating more affordable mobility only costs money. National decision makers are glad to leave these questions to the wisdom of their urban and rural colleagues. On this general view there are some exceptions, as I will present in chapter 5.



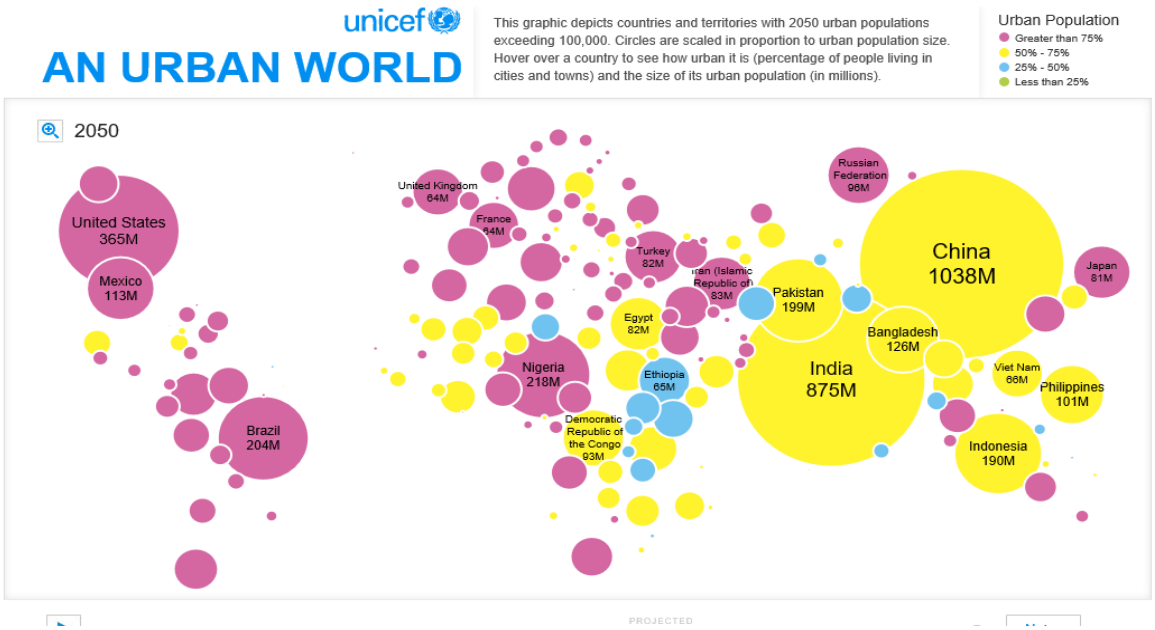
On the attitudes of the economic stakeholders Geels offers in *Regime Resistance against Low-Carbon Transitions* (2014) an interesting overview. In his vision since the seventies the power of firms to shape policies and debates has increased. Important here is the emergence of the pro-business neo- liberal discourse, and the construction and careful design of "communication power" within companies. And with the reign of the liberal market ideology policymakers and many, certainly right wing, politicians sympathize with businesses. In Geels' own words "*this policy style has made (UK) policymakers more skilful in dealing with incumbent firms and technical experts than with citizens, cities and social movements, which helps explain why large- scale technical options receive more attention and funding than alternative transition pathways".* On this theme also the somewhat older book Automobile Politics of Paterson (2007) seems actual. Paterson sees intricate linkages between the worlds of business and the world of national politics. In his vision the role of cars in reproducing contemporary capitalism gives structural power to car companies, and this enables them to resist many kinds of unwanted developments.

Artikel 2

MOBILITY AND MOBILITY POLICIES IN THE DEVELOPING WORLD

1. The generic picture on mobility policies in developing countries

Looking at the situation on policy formation on transport and mobility in the developing world three elements are striking. At first, there are only few national transport strategies and policy plans, that move broader than just a few maps on infrastructure. To give an example, the 2011 transport strategy for Tajikistan (ABD, Developing Tajikistan's Transport Sector,2011) is only about roads, railways and airports, and was develop by the Asian Development Bank. This leads to the second striking element: the role of funders and advisory bodies. Most literature on transport policies in the developing world originates in the offices of funders like the World Bank, or the Asian Development Bank, or in offices of consultants from NGO's, private companies or universities from the richer OECD countries. The last striking element is the divide between policies for rural areas, where road building is connected to poverty alleviation and policies at the urban level. These urban policies mostly dominate, and I will concentrate on this theme. Here again, only few national governments are leading. As stated in Financing Sustainable Urban Transport (GIZ, 2013) there are two fundamental models: centralised programming and financing, and decentralised policies. Some countries have national funding programmes but leave implementation of urban policies to local governments.

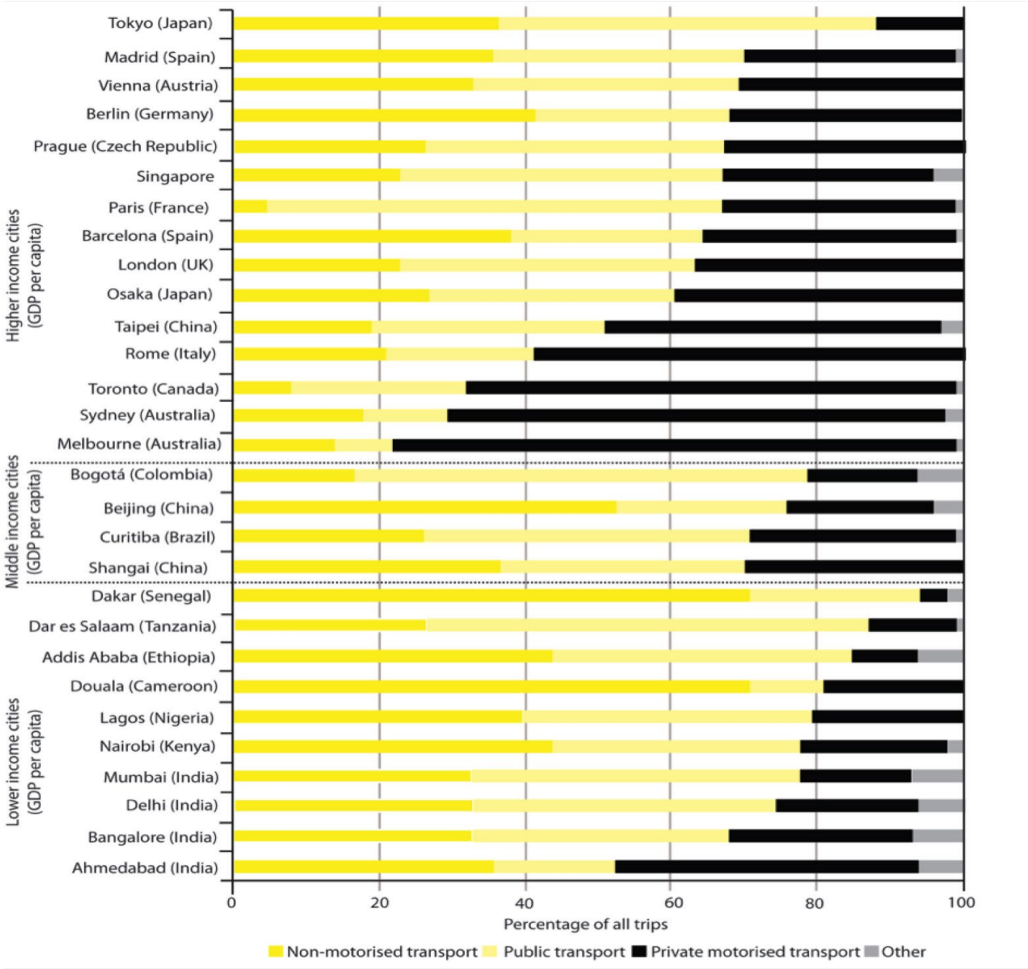


Many cities in the developing world are now already facing great mobility problems. Cities were never built for fast traffic, but with high densities and so many people huge mobility infrastructures are

needed. Faiz (2011) compares Mexico City with Shanghai. Mexico City spread incrementally as its edges moved further out, and spatially, its field of movement is very restricted, houses are everywhere. Shanghai has a sophisticated rapid rail system, that functions as the core of the mobility system. The permanent congestion in many cities in the developing world has great consequences as many mega- cities produce the greatest part of their country's gross domestic products (GDP).

As in most cities the majority of households does not have access to cars, a greater part of investments should be related to public transport, as the basis for transport systems, and to the active modes. For the active modes like walking and cycling the bad air quality presents a health risk. A part of this bad air quality finds its source in older polluted cars, in motorised paratransit, and in the great amount of motorised two wheelers, such as motorcycles. Creating and maintaining safe, reliable and affordable public transport is a great challenge. This transport is costly, and often major funds are lacking. But also new public transport provisions such as metro systems (India now has only two!), or Bus Rapid Transit arteries have to be built in already very densely occupied areas, creating many conflicts. Creating appropriate public transport networks is an enormous task in most cities.

Figure 12
Modal shares of selected cities

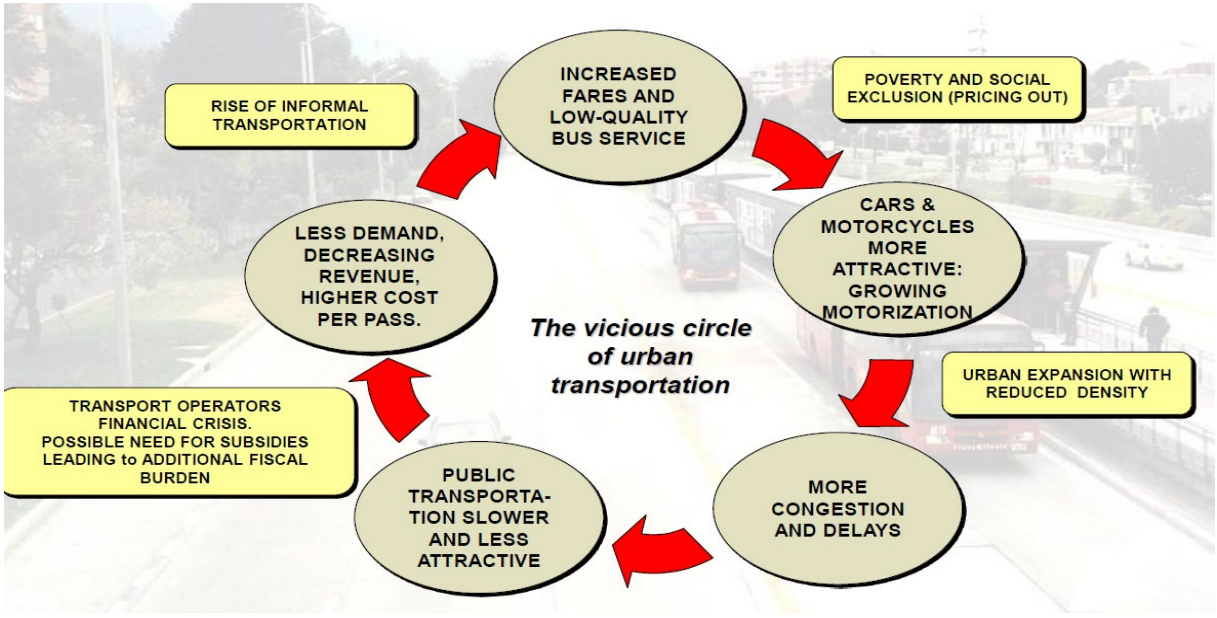


Source: LSE Cities 2014 adjusted from UN Habitat 2013

There are a few good examples where creating public transport networks has been successful. succeeded. Take for example Bogota, the capital of Colombia. 60 % of all trips in Bogota are made by

public transport, the same percentage as in Paris. In many cities in the developing world non-motorised transport is still more important than public transport. This is the situation in all Indian cities of the table (LSE, 2014), in all African cities mentioned, and in Beijing. Only Curitiba in Brazil, Shanghai, and Dar es Salaam have public transport shares that are higher than non- motorised transport shares. Cars dominate the modal share in the OECD cities of Melbourne, Sydney, Toronto, most American cities (not on the table) and Rome. On average in cities in the developing world cars have 20 % of the modal share.

Public transport in cities in the developing world faces an "in between"- situation. When service delivery is not appropriate and when fares are too high, and not affordable for greater parts of the households, people switch, in two directions. The richer households move to cars, or to motorised two- wheelers, the poorer households to walking, cycling or paratransit. The potential for safe, reliable and affordable public transport is then lost. In a scheme (Ardila-Gomez,2012);



The situation is dynamic. As Cervero (2013) did write, even in 2005 in 85 % of the 78 largest cities in the developing world experienced a faster growth at their suburban belts than at their urban cores. With growing prosperity car purchase is growing and many urban governments buy agricultural lands and lease to developers at much higher prices. Loh and Brieger (2014) present Kuala Lumpur as a newly rather affluent city adopting the same low-density suburban paradigm that exists in North America and Oceania. *Private transport dominated policies* with a concentration on the two end points of the mobility spectrum could result in most households walking, cycling or use of paratransit in polluted conditions, and a growing minority of middle class and richer households being car dependent.

On the other side *public transport dominated policies* have been developed, in Shanghai, Curitiba, Bogota, or Santiago de Chili. The concentration is than on coordination between public transport

services, upgrading paratransit, attention to the active modes facilities with walking paths and cycling paths, reaching air quality standards, and specific policies to car use. In Bogota (see picture) this has led to paving streets for pedestrians and cyclists, streets that normally are paved for cars. Public transport dominated policies are more sustainable (figures in Huizenga, Peet and Gota, 2016). Differences between the two routes are huge. Private transport dominated policies lead in 2050 to a 75 % car dominance in the modal share, and to on average 35 % more CO2 emissions (baseline 2010), whereas public transport dominated policies lead to an equilibrium between car use and public transport and to minus 30 % CO2 emissions. In advising on public transport related policies often the "*avoid- shift- improve"*- principle is being used (Umwelt Bundes Amt, 2012), to clarify;

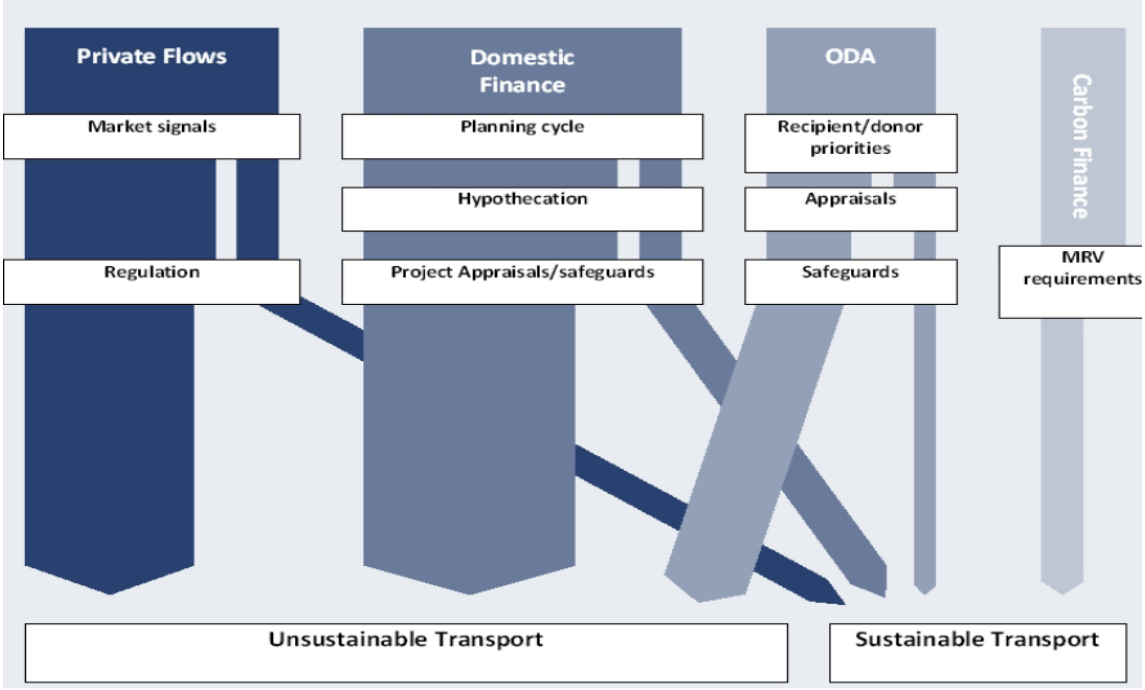
Principle	Developed countries	Developing Countries
Avoid	Reduction of vehicle kilometres travelled	Avoid generation of vehicle kilometres travelled
Shift	Shift from private vehicles to public transit and non-motorized transport	Prevent shift from public transit and non-motorized transport to private vehicles
Improve	Amend and downsize existing vehicles	Make future vehicles as clean as possible and discourage the up-sizing of vehicles

Looking at developing strategies for urban mobility in the developing world, a battle between these two approaches can be seen, between the easier private route, leading to polarisation on mobility access, to congestion, and to sustainability problems, and the more difficult public route, where many investments will have to be made. This battle is also a battle between world views, a battle between the funders and the advisors, and lastly a battle between short term pragmatism and future orientation.

First the world views. There is now a library of documents presenting visions on urban mobility that are public transport based (Umwelt Bundes Amt, 2012, Stiftung Entwicklung und Frieden, 2012, World Bank, 2014, UN High Level Group, 2015, to name a few). Almost all advisors move in their advice for cities in the developing world away from individualised mobility. This leads to strange ambivalences, as probably most employees of these advising institutions, living in richer OECD countries, lead completely individualised mobility lives themselves, considering this probably rather normal. *It is as if they have come to the conclusion that their normal practice is wrong, or at least not socially and environmental sustainable, and should be denied to the people in the developing world, whereas they can (or will) not succeed in changing policies in OECD countries.* So where, as we have seen in this chapter, in transport policies of OECD countries there is at best only some mitigation of the car dependent practices, they advise a complete shift for the people in the developing world, exactly the shift they are unable to make themselves! Consistent should be a position to also fight car dependence in OECD countries. For its consistency I must admit that I like the vision of Hansen and Nielsen (2014) stating that for most Asian middle class families the car *'is an icon of aspirations for wealth, status and comfortable living; for governments it embodies the developed and modern society*". Furthermore, I consider visions on creating sustainable public transport networks in cities in

developing countries at a fast pace only appropriate when these visions include strategies on how to fight corruption, how to balance fragmented local governance structures, how to diminish silo thinking and how to outpace short term actions by chosen politicians. Otherwise it is just friendly advice for the Sunday!

Also, not helpful for reaching consensus is the situation that funders take other positions than advisors. GIZ (2010) the German Development Aid Society, presented an interesting figure on patterns of financial flows for transport in developing countries. Some 75 % of all funding is related to unsustainable transport, mostly creating road networks, from a vision that investments in infrastructure will create economic growth, in traditional terms. As Pojani and Stead (2015) write; "in many developing countries, where new road construction is often seen as a yardstick of modernization, governments have often allocated public expenditures in favour of new road construction at the expense of other urban transport investments and the maintenance of existing infrastructures" Only 25 % of funding is related to more sustainable options. Thus, whereas advisors advise in the direction of sustainable transport, funders are still moving in the other direction.



This leads in developing countries to a spectrum of solutions. Some urban governments are on track to sustainable mobility, investing in the banning of cars (above a certain levels), creating facilities for walking and cycling, investing in Bus Rapid Transit Systems. But many governments follow both routes, leading to this (Karachi).

Kuhimhoff et.al (2014) see the same division in their paper on Automobility in the BRIC countries, with China, India and Russia trying to follow a route to lower car dominance, but Brazil moving to more American or Australian car cultures. And finally, there are a great number of cities where public transport in modern sense is lacking or nearly lacking. When this is actually still the situation, cities can, due to their high costs only construct public transport systems over a few kilometres in a few limited corridors, which do not meet the transport needs of their populations. This seems the case in many Sub Saharan African cities (Olvera, Plat, Pochet,2013), but for example also in Karachi. There were attempts to develop a mass transit system but these failed due to lack of political will and absence of administrative and institutional ownership. There is no massive transit system, and fares are high. Karachi tried to build its way out of congestion via car infrastructure, but this also failed. There are now high levels of pollution, of motorcycles, of QINGOI a bike commute vehicle, and of health problems (Urban Resource Centre, 2015). Commuters make arrangements, asking truckers to transport them in groups, or setting up school vans for their children. Karachi is only example of the situation on mobility in almost all cities in Pakistan (Masood, Khan, Naqvi, 2011).

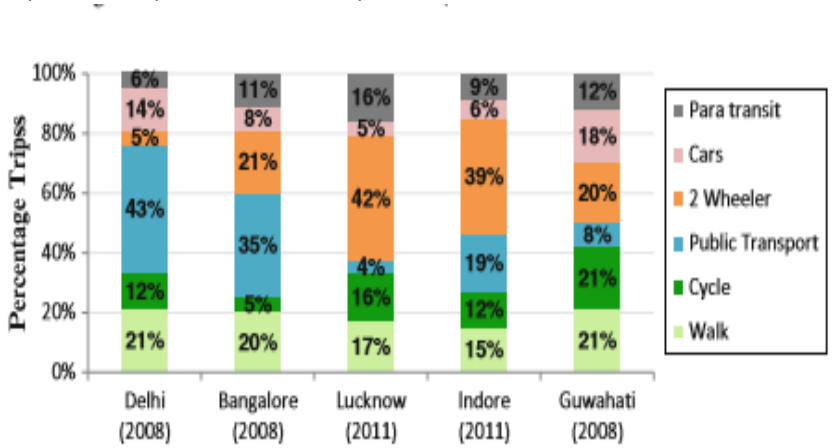
One final remark at the end of this paragraph. It is striking to see how few academic articles in good journals have been written on mobility problems in developing countries compared to mobility problems in the OECD world, whereas the magnitude of mobility and transport problems is far greater in the developing world. Here again a bias among researchers can be noted. Most literature on themes discussed here is grey literature or consists of articles published in more marginal academic journals!

2 Experiences and expectations on three continents

Here I would like to concentrate on the mobility experiences and expectations of households and individuals in the developing world. Many of them are confronted with public transport that is not available or not functioning at appropriate level. The choice of households and individuals then moves in two separate directions. Richer households purchase cars, or motorcycles. And poorer households shift to forms on non- organised paratransit, to cycling, or just walk long stretches. An all of them, except the car drivers or car passengers are immediately confronted with noise and bad air quality. Health related to mobility is an important issue in developing countries. Venter (2011) focused on the affordability of mobility in South Africa and explains that in many cases poorer urban households have to pay more for public transport trips than richer counterparts, as many poorer households live further

away from the central areas, in the urban peripheries. Pucher et.al (2005) show the same circumstances for China and India. But poorer urban households have alternatives, and although for example in South Africa some 15 % of households see affordability as their major transport problem, for most households the service quality delivered on mobility is the more serious issue. In rural areas some 40-50 % of all households see affordability of mobility as their main transport problem. More infrastructure could be a solution, but Setboonsang (2012) clarifies that often building infrastructure does not lead to more affordable transport. And it seems better from a perspective of poverty alleviation to invest in lower class roads than in highways. And as there often are problems with funding infrastructure maintenance, the alleviation is often only a temporary relief.

I will present experiences and expectations in three continents and for countries. Starting with Asia, the focus will be on India (Verma et.al, 2015) and Vietnam. Singh (2012) shows that in India the share of buses in cities is low compared to cars and two- wheelers. There are only few rail- based systems and only very few metro systems. Paratransit is everywhere. Of the 468 Indian cities with more than 100.000 inhabitants, only 61 have formal city bus systems (Gadepalli, 2016). And urban governments often fail to provide good public transport and have often been very supportive towards the automobile industry, seeing car and motorcycle ownership as an expression of economic growth. What is missing in India is legislation covering urban transport requirements. All writers note the coordination problems between different institutions in the domain of mobility and transport. Partly the problems are not about funding, but about not reaching alignment. Data for creating appropriate policies are often lacking. And buses are often old and in need of repair. Policy advise (IIHS,2014) often ends with recommendations such as "*sustainable mobility systems in Indian cities can only be created and enabled through clear responsibilities, legislative authority, financial independence and professional competence.* I consider these types of recommendation extremely unhelpful, as they have no relation whatsoever to the real situations, and are recommendations that even cannot, as we saw in this chapter, be realised in the richer OECD countries. Better start with a clear focus, with a choice for a car system, or for a public transport-based system as for example one of the better cities Achhemabad (Cervero 2013) has done and invest in new buses. Be pragmatic and think about next practical steps!



Vietnam offers another picture. This is motorcycle country. There are 39 million motorcycles in a population of 89 million inhabitants (Hansen, 2017). In fact, Vietnam moved from a bicycle country to this "motorcycle country". Cars are still expensive, the built- up area of a city as Hanoi is dispersed, and Vietnam has invested in public transport from a national perspective, with good intercity public transport, leaving a gap in intra- urban public transport. Far more job locations can be reached by cars and motorcycles than by public transport (Nguyen et.al, 2013) In recent years, with the Doi Moi – the opening up of the economy- the numbers of cars increased enormous, bringing experiences or safety and welfare. But households remained, also after car purchase, using their motorcycles for a majority of trips. There is a gender issue here, as women walk far more and for longer distances then men (Tran and Schlyter, 2010). Vietnam has a clear policy at national and urban levels, and believes, as a form of legacy from the communist era in planning and coordination (Phin and Dotson, 2013).

Moving to Africa, the greatest country, Nigeria, faces enormous challenges in its passenger transport. Gujba, Mulugetta and Azapagic (2013) developed four scenarios on mobility and energy. In the Business as Usual scenario with great increases in car purchases the environmental damage will double to 2030, despite the assumption of an increase in fuel efficiency of 35 %. For a perspective of sustainable mobility this result could be mitigated by promoting and incentivise public transport. But the authors note: "*this would require considerable policy dexterity and political audacity in a country where representative democracy is still in its early stages".* Femi (2013) clarifies that policy initiatives related to passenger transport are adequate in comprehensive in terms of content and context, but that implementation was tardy and spasmodic. Salau (2015) clarifies the importance of good planning from the example of Lagos, where at this moment still 80 % of all trips are made by public transport. Only 26 % of all households owns a car. So when investment could be directed in further development of public transport from this non – car dependent basis, more sustainable futures would be possible. In this planning accessibility to services should be an important element as almost all health centres in a region in Nigeria were concentrated and not spread throughout the region, creating long journeys for the households and individual needing health care (Adewoyin et.al, 2015).

In Brazil, there is again another situation. There are thousands of Master Plans (Polidoro, de Lollo, and Barros,2012) existing in Brazilian cities, but urban expansion, and related to this, mobility provision, is not controlled. The reason seems to be the inflexibility of the planning concept *vis a vis* the extreme flexibility in developments in these cities. Sprawl occurs everywhere, creating difficult circumstances for public transport provision. Urban planning and transport planning need to be connected, and this is often not the case. In a case study of Curitiba and Rio de Janeiro, Kiepsch (2012) signalled that the coordinated approach from Curitiba made the great difference. Demand for official public transport did fall in recent years in most Brazilian cities as a function of growing car dominance,

high bus and metro fares, bad quality and bad efficiency leading to a proliferation of informal, or pirate transport. Almeida Motta, Da Silva and De Sequeira Santos (2013) noted that over 37 million Brazilians (nearly 20 %) were unable to use the public transport because they cannot afford the fare. This leads to an interesting picture on modal share in cities with more than 60.000 inhabitants, with walking accounting for 37 % of all trips, cars for 27 %, public transport for 25 %, and rail, bicycle and motor bike all 4 %.(Kuhnimhof and Weiss, 2015). In the congested Brazilian cities many middle class households still rely on public transport. Their bad quality of service in combination with high fare prices did already lead to severe riots in Brazilian cities in 2013. People just expect better value for money, and this will be a theme in many cities in developing countries in the next decade.

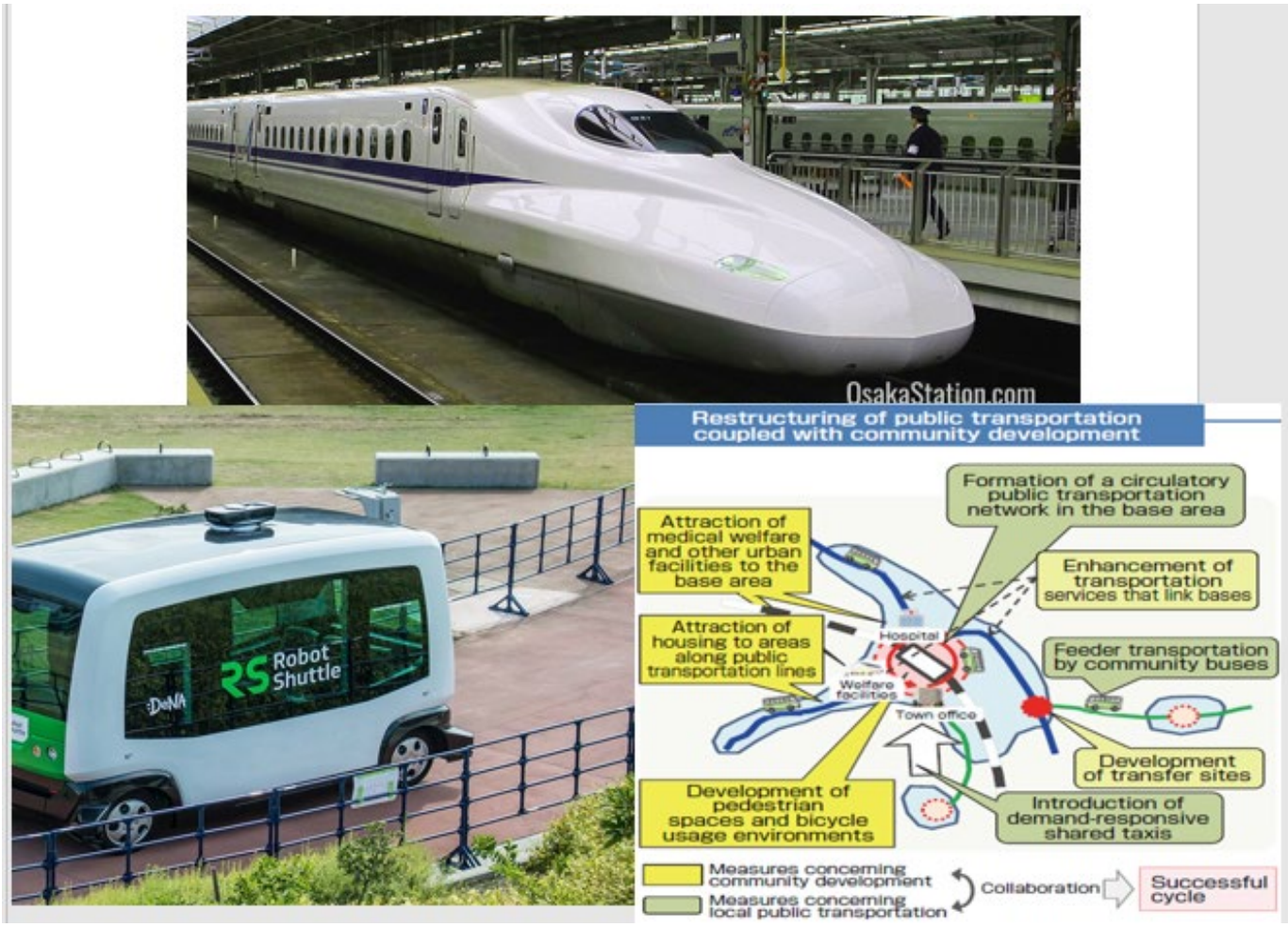
3 To conclude

The attention on transport disadvantages and social exclusion is rather low in transport policies across the world. But reasons and magnitudes related to this state of art differ. In the OECD there is a dominance of car dependence. National policies are aimed at facilitating the 80 % majority of car driving households and at the role of transport and infrastructure in economic growth and economic flexibility. Goals on sustainability are seen as difficult outsiders, and involuntary transport disadvantage receives only minor attention. In cities this attention is greater, and sustainability, often in relation with liveability moves there to the core of many urban policies. A battle between national and urban paradigms can be expected in the next decade.

Such a battle can already be seen in many cities in developing countries. In developing countries involuntary transport disadvantage is a majority problem. In rural areas road investment policies are essential and should originate from the perspective of the most vulnerable in relation to access to services and health care, the women and the girls. In cities there seems to be a split between funders and advisors. Whereas advisors present futures on public transport, most funders finance car based solutions. This creates difficulties for urban governments in developing countries. Should they invest in public transport- based mobility futures or on car- based mobility futures? And although there are far more involuntary transport disadvantaged in developing countries, there is a lack of policies, as most governments, already struggling to get mobility running on a day to day - basis, expect households to walk, to cycle, or to take paratransit, when they are unable to afford the public transport fares. On the national and the rural level, the bias in mostly on road building, as a way of building out of poverty.

Artikel 3

SUSTAINABLE AND SMART MOBILITY IN JAPAN



REPORT STUDY TOUR, MAY 2018

PREFACE

Between 19 May and 26 May 2018 I visited Japan. I had ten sessions with Japanese professionals on mobility and transport, and gave a lecture at the Waseda University in Tokyo.

My aim was to understand the situation on sustainable mobility and smart mobility in Japan. I concentrated on performances, concepts, narratives, challenges and problems. The idea for a study tour to Japan found its source in astonishments. Looking at the data it became clear to me that among the richer OECD countries Japan has the best performance on sustainable mobility, with CO2 emissions decreasing, and with a modal split in kilometers travelled that is far more sustainable than in any other country. And on smart mobility I noted that technology development in Japan is related to societal goals and objectives.

I was even more astonished to learn that in most other OECD countries there seemed to be a lack of attention for Japan's performances, by policy makers and in academia in the transport world. Both communities mostly work from global, more Anglo Saxon frames, and Japan just does not fit in these frames. I had to visit Japan to see with my own eyes whether my idea that Japan is best "state of art" in sustainable mobility and smart mobility was correct. I have not been disappointed. This report is the result of the study tour.

Many people have made my study visit a success. At first I would like to thank the Innovation Team, headed by Hein Jan Chrisstoffels , of the Dutch Embassy, and then especially Mihoko Ishii. And I would like to thank the colleagues from Eindhoven University of Technology who have been supportive.

But mostly I would to thank the 11 professionals that offered me the important insights;

Dr. Hirotsugu Maruyama, Eco-Mo Foundation

Prof. Takashi Oguchi, University of Tokyo, ITS Center

Dr. Fumio Kurosaki, Institute of Transportation Economics

Prof. Yasuhiro Daisho, Waseda University, Tokyo, Next Generation Vehicles

Dr. Hidenori Yoshida and Dr. Azusa Goto, National Institute for Land and Infrastructure Management (NILIM), ITS Division, Tsukuba

Prof. Kiyohito Utsuminoya, Kansai University, Faculty of Economics, Osaka

Prof. Hironori Kato, University of Tokyo, Department of Civil Engineering

Dr. Keisuke Matsuhashi, National Institute for Environmental Studies (NIES), Tsukuba

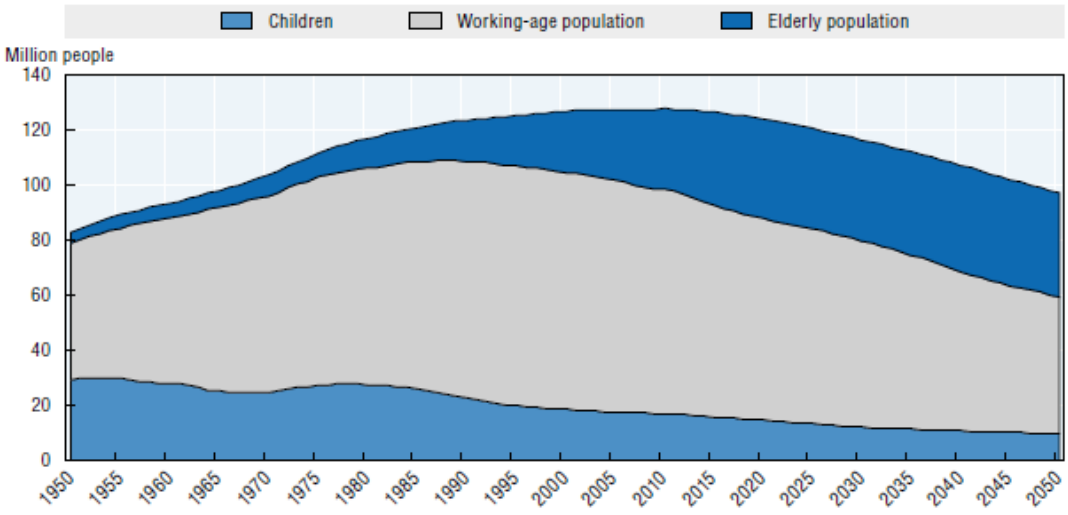
Dr. Yasunori Muromachi, Tokyo Institute of Technology, School of Environment and Society

Prof. Fumihiko Nakamura, Yokohama National University, Urban Transportation Planning.

CHAPTER 1 INTRODUCTION TO JAPAN

Japan, the third economy in the world, is shrinking in population, due to very low fertility rates (OECD,2016). And the decrease in population goes fast, as this figure shows.

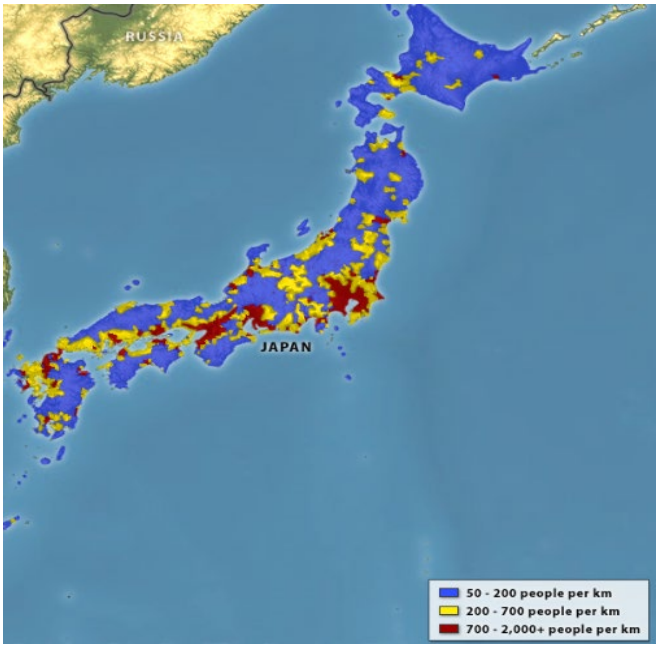
Figure 1.1. **Japanese population and age structure, 1950-2050**



Source: OECD (2015a), "Historical Population Data and Projections (1950-2050)", *https://stats.oecd.org/Index.aspx?DataSetCode=POP_PROJ* (accessed 16 October 2015).

With the Japanese population and age structure there is simply no way to sustain high living standards and quality public services in a "super- aging" Japan, unless the country is able to achieve much higher productivity growth. Productivity growth is now concentrated in Tokyo, where 30 % of the total Japanese population lives. Tokyo is the great job creator and has at the same time the lowest fertility rate in the country (OECD, 2016; 1,19), fitting in the law that "*density is always negatively correlated with fertility*" (OECD, 2016, 149).

The geography of Japan is interesting. Japan has an area of 380.000 km2, and most of the country consists of mountainous regions and complicated coastlines. Almost 70 % is forested, only 12 % is cultivated and only some 40 % is habitable. This creates high densities in the habitable areas. No other OECD country has such a high share of its total population (127 mln) living in high-density areas (60 %), nor is any country experiencing the kind of dramatic demographic change that is unfolding in Japan.



The very low fertility rate of Japan seems related to the price of living for households, with high budgets needed for education and housing in the major cities. But there is a more important institutional reason, which is the rather low share of women in the labor market. In most Japanese households only one income is available, so calculation leads to not being able to raise many children. There is a dominant societal pattern, and here I would like to quote the

OECD Territorial Review on Japan (2016,48); "*Women with children find it particularly difficult to sustain regular, full time employment owing to the country's long- hours culture.. Moreover, the commutes are very long, employment practices can be relatively inflexible for regular workers and child- care is lacking. And labor markets still tend to force a choice between career and child- bearing"*

The three main major urban areas (Tokyo, 39 mln. Nagoya, 9 mln and Osaka-Kyoto-Kobe 18 mln) house more than half of the Japanese population and are responsible for even more than half of the GDP creation. Tokyo urban area has a relative better performance than the other two areas. Not Tokyo is the problem but the lack of economic vitality in the rest of the country. Outside the three major urban areas economic vitality is rather low in smaller regional cities, and somewhat higher in the rural areas.

From the OECD Territorial Review the following state of art arises. Japan spends high budgets on innovation, but scores rather bad on entrepreneurship, as Japanese society is relatively risk- averse. Regional innovation systems are Japan- centered and disconnected from each other. And the education system is expensive for households, and not directed at stimulating creativity.

Japan is, due to its geography, the most infrastructure intensive major economy in the world. Not only in the major cities, where networks of public transport dominate, but also in rural regions, where investments in bridges, tunnels and earthquake proof constructions are necessary. Much of the infrastructure was built in mid- 20th century and is now deteriorating, leading to high maintenance costs, now and in the next decades.

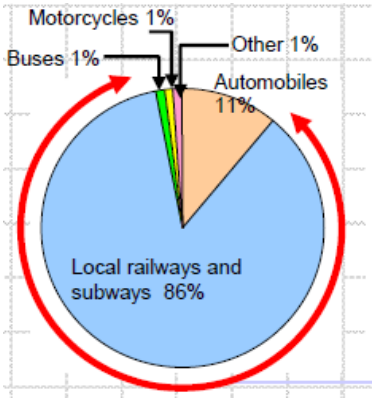
Japan faces at least four major challenges; economic vitality, population decline, aging society, and global warming, and these four, together with creating earthquake proof structures, are the key of the governance agenda in Japan, with the attention on global warming somewhat declining after the Fukushima disaster of 2011.

MOBILITY IN JAPAN: GENERAL ASPECTS

Looking at the mobility state of art of Japan, what immediately strikes every researcher is the high share of public transport in the statistics of kilometers travelled. Where in Europe Switzerland has the highest share (18%), in Japan a share of 30 % - plus can be noted. Car mobility has a share of 60 % (most richer OECD countries; 80 %).

			2012	2013	2014
port volume[1)]	Passengers (×100 million passenger-kilometers)	Total	13356	14000	14285
		Motor vehicles for private use	7924	8389	8522
		Motor vehicles for commercial use	739	757	746
		Railways	3951	4044	4144
		Maritime	30	31	33
		Aviation	712	779	841

Data from ; Japan Research Center for Transport Policy (2015).



Responsible for this high share of public transport are the major urban areas, where 65 % of all kilometers travelled are made by rail, metro or bus (the 86 % here is without cycling and walking, and is inner Tokyo, 23 wards, 9 mln.).

Car ownership in Japan has figures comparable to other OECD countries. 80 % of all households own cars, and on average car owning households have 1,45 cars. This leads to 77 mln. passenger cars in Japan or 595 cars per 1000 inhabitants.

The great difference is in the car usage. A car in Japan drives yearly on average 5200 kilometers, whereas a car in the Netherlands drives 11.800 kilometers. Japanese households on average do not use their cars pretty much. Here a great difference can be noted between car use in the major cities (nearer to 2000-3000 kilometers yearly) and the rural areas (levels comparable with the Netherlands).

In Japan also cycling and walking have some importance, at least in the urban areas. Especially in modal split of trips this can be seen. Urban Japanese people like to walk, or see the need to walk to reach the PT connections.

Japan has with its high densities an interesting position in the world of mobility. A figure from OECD (2016) could clarify'.

Table 3.1. **Advantages and disadvantages of high urban densities**

	Potential advantages of high urban densities	Potential disadvantages of high urban densities
Mobility	• Reduce fossil fuel emissions/carbon footprint by decreasing the total number of vehicle trips and the number of kilometres travelled per trip. • Enhance accessibility, as people live closer to where they work, shop and play. • Make transit more economically viable and efficient. • Enable public health benefits from more walkable and bike-friendly environments. • Create efficiencies in mixed-use developments through shared parking.	• Exacerbate traffic congestion, parking problems; increased traffic accidents. • Create pedestrian congestion and congestion in public transport. • In compact, monocentric cities may only have significant positive environmental effects when a greater share of commuters use mass transit.

The importance of rail transport in Japan leads to important narratives. Rail companies are important stakeholders in Japanese society, as will be explained later in this document.

Outside the urban areas mobility presents another picture. In the rural areas, the regional cities and the outlying suburbs cars dominate mobility. Here modal shares for public transport are almost never higher than 10 % of kilometers travelled.

In fact, **Japan shows from mobility perspective a very polarized society**. On the one hand, there are (A) the three major urban areas, where public transport dominates, and car mobility is relatively low. On the other hand, rural areas, outlying suburbs, but also the regional cities, with sometimes a population of 600.000 inhabitants (B), are fully car country, with diminishing public transport.

All stories about Japan and its mobility originate in Japan A, and Japan B (with nearly the same population) tends to be forgotten. But in Japan itself the problems of mobility in Japan B are taken very serious, as we will see later in this document.

In the near future only the Tokyo region will increase in population, not from child birth, but from in migration from younger , well – educated singles from Japan B (Xiong, Zhang and Kayama, 2016). All other Japanese regions will decline in population, with huge decreases especially in the smaller regional urban areas. Until now it is quite unclear what this will mean for mobility. Important here is whether population in the declining areas will just become more dispersed, as we know dispersal always leads to more car mobility, or whether spatial policies aiming for more concentration of the remaining population will succeed. This is a central issue in chapter 4.

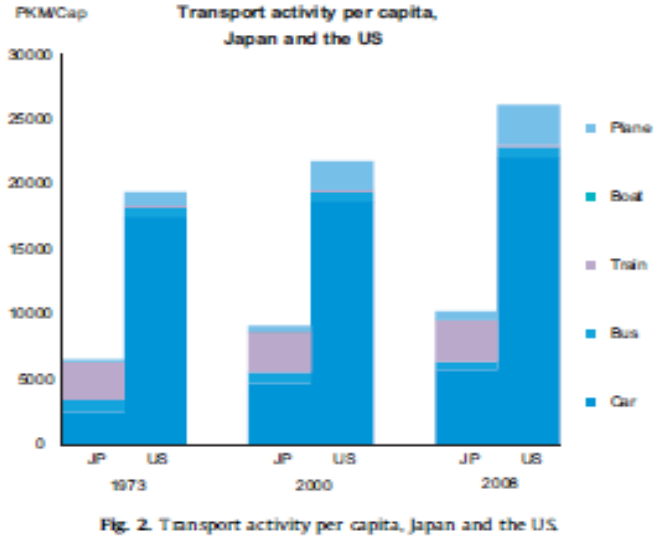
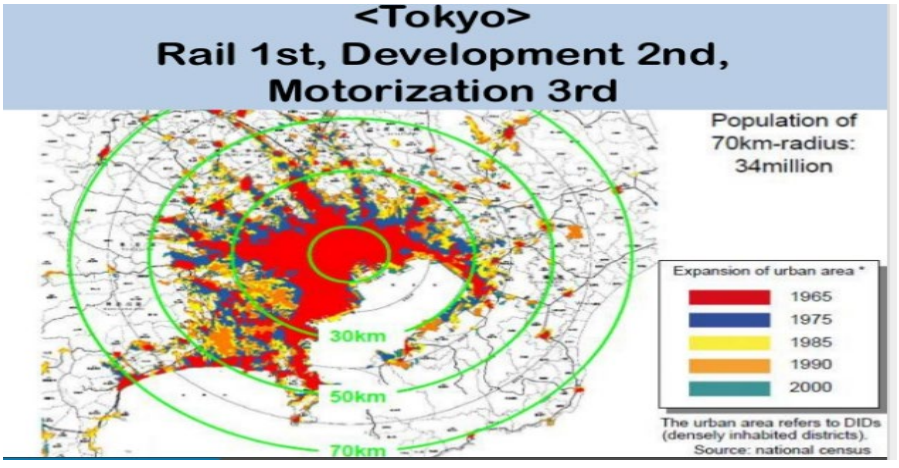


Fig. 2. Transport activity per capita, Japan and the US.

In an overview article *Energy efficiency in the Japanese transport sector* (Lipscy and Schipper, 2013) it was concluded that Japanese travel shorter distances and are more prone to travel by rail. And Japanese travel only 40 % of the distance travelled by Americans. Commuting distances in Japan are far shorter (in distance, not in time) also compared with the data of the Netherlands.

Important in the general mobility in Japan is the unfolding process of infrastructure. Rail infrastructure was developed since the early twenties of the last century, and cities were developed in relation to rail infra. The highway network was created rather late in Japan (David,2014) and all highways are tollways. The costs of highway routes were to be recovered by these tolls paid by users, by cross subsidization from other routes and by some public funding. Only recent housing is built in relation to the highways. But as population growth in the last decades was relatively minor, still most build- up areas are connected to the dense rail network.

Tokyo is an interesting example, as Nakamura (2018) describes. First on the development stages;



Secondly, on the automobile modal share. In the figure below (Morio et.al, 2018) can be seen that within the 40 kilometer zone the car modal share is very low with 0 to 40 %. In the suburban zones, mostly at 45 kilometer – plus from CBD this rises to 60 % and higher.

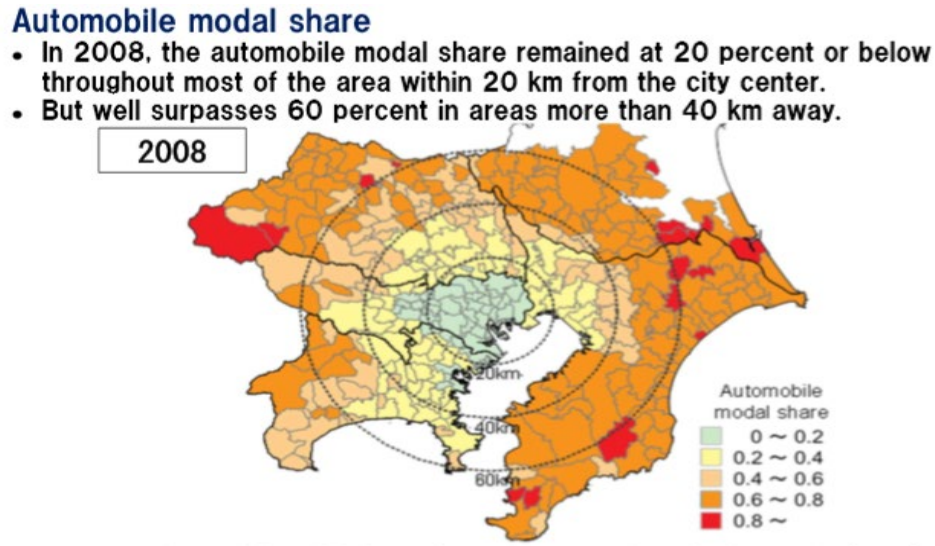


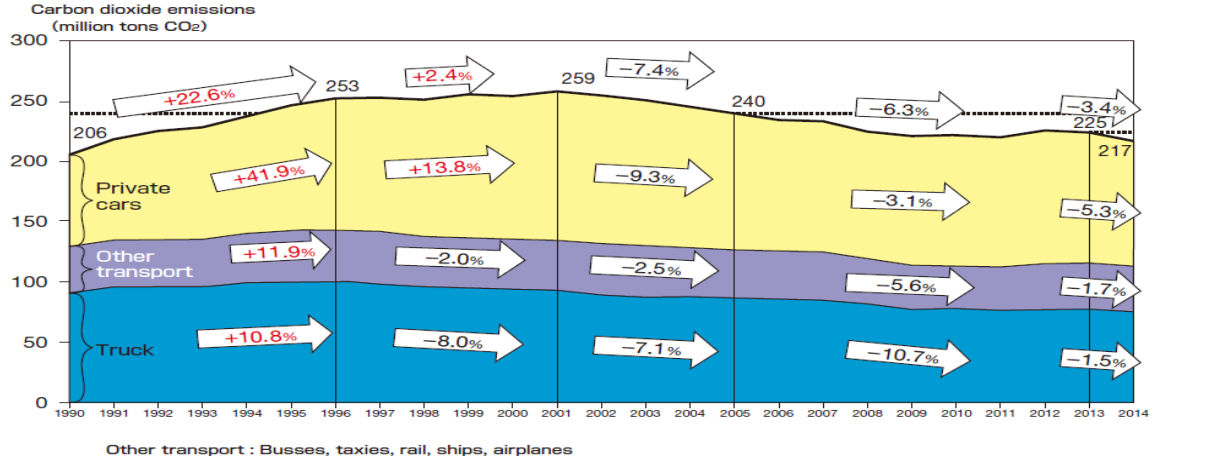
Figure. Automobile modal share of transportation volume by destination (2008) 27

CHAPTER 2 VEHICLES, INTELLIGENT TRANSPORT SYSTEMS AND GLOBAL WARMING TARGETS

Japan is one of the few OECD countries that has succeeded in decreasing its share of CO2 emissions from mobility in the last decade. As known, in most OECD countries these emissions have more or less remained at the same level or have grown. However, in Japan in recent years this decrease is slowing down. What are reasons for the decrease, and what are reasons for this slowing down?

First the decrease. These are the data for the period 2001-2014, on CO2 emissions (mgtons).

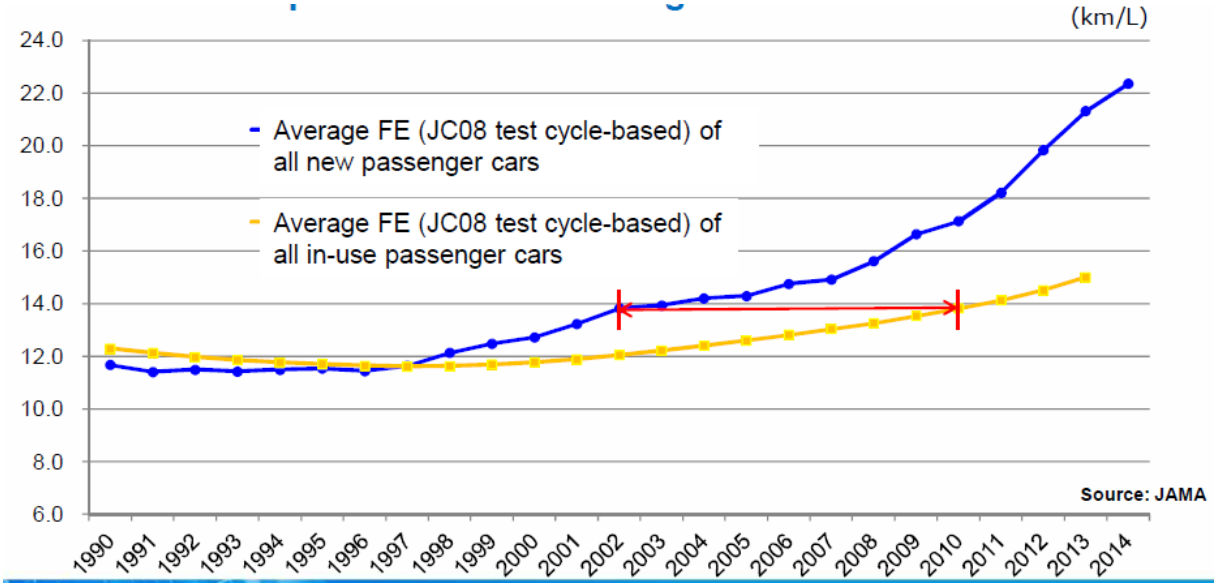
	2001	2008	2014	% total	In first period
cars	129	113	107	-19%	70 %
trucks	90	80	75	-16%	66 %
Other	40	35	35	-12%	100%
overall	259	226	217	-17 %	75 %



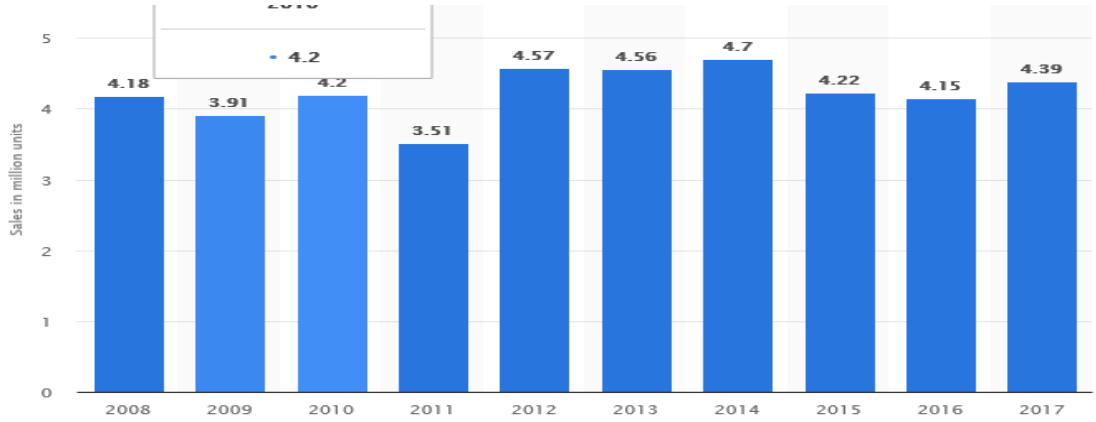
Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

The main factors in the reductions of CO2 emissions stem from the following sources (1990-2010) (JAMA, 2017). For trucks: improved load efficiency in trucks use (made possible because the market for truck transport in Japan is dominated by only 20 big companies, and targets were negotiated between national government and these companies), eco- driving and improved traffic flow. And for passenger cars: improved fuel efficiency, and improved traffic flow. As we concentrate here more on passenger mobility, the increase in fuel efficiency is the result of programs concluded between national government and car manufacturers. Average certified fuel efficiency is increasing yearly and car manufacturers are pretty confident in keeping track here.

It takes 8 years before the average fuel efficiency of cars in use can catch up with the fuel efficiency of new cars (JAMA, 2017).



This is important whereas from 2008-2011 less new cars were sold, so the impact of greater fuel efficiency in passenger cars will probably decrease in CO2 statistics between 2016 and 2019.



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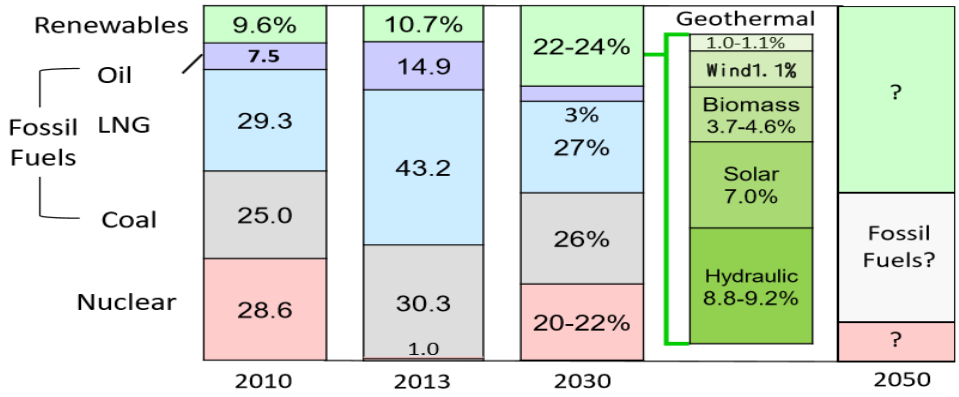
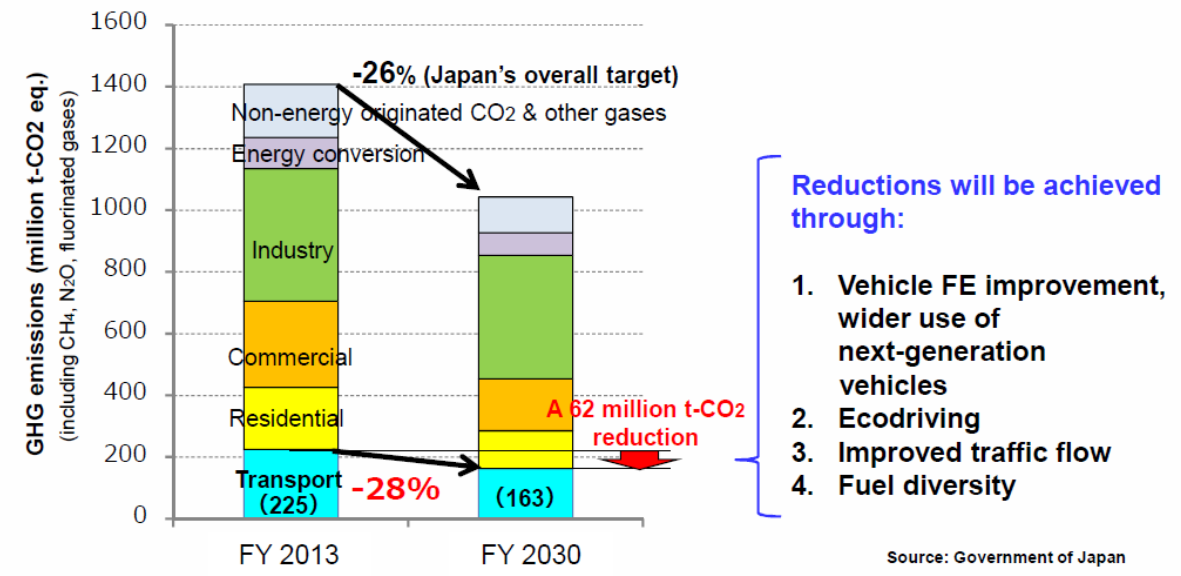
Important is the fuel mix in Japan. Here are the data (Daisho, 2018)



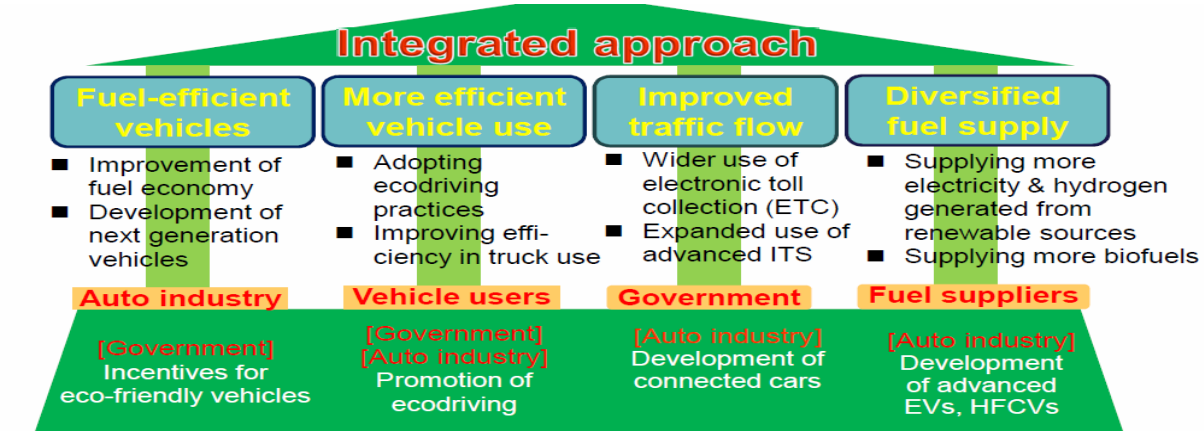
After Fukushima, nuclear energy was considered no longer to be an option. This meant that Japan had to move back to fossil fuels as can be seen in the data for 2013 (from 61,8 % to 88,4 %). Japan has a strategy for a more sustainable energy mix for 2030, with a fast increase in renewables, and an increase in nuclear again. And Japan tries to be as independent from fossil fuel producers as possible (for a broader perspective: Chrisstoffels ,2007).

Japan is not putting all its cards on electric driving and electric cars, but gives great attention to creating fuel efficiency in ICE cars. Average fuel economy could reach 50 km/L in 2050 by using higher efficiency hybrid systems together with using plug-in systems and lightweight materials (Daisho, 2018). Power generation will have to be low-carbonized for recharging the battery units. The focus is mostly on plug- in hybrids with a huge increase in fuel efficiency. But there are also investments in electric and fuel cells.

This fits in the Japanese approach to reduce CO2 emissions in general. Japan has presented its target for 2030 CO2 decrease at -26 % , related to basic year 2013 (after Fukushima!).

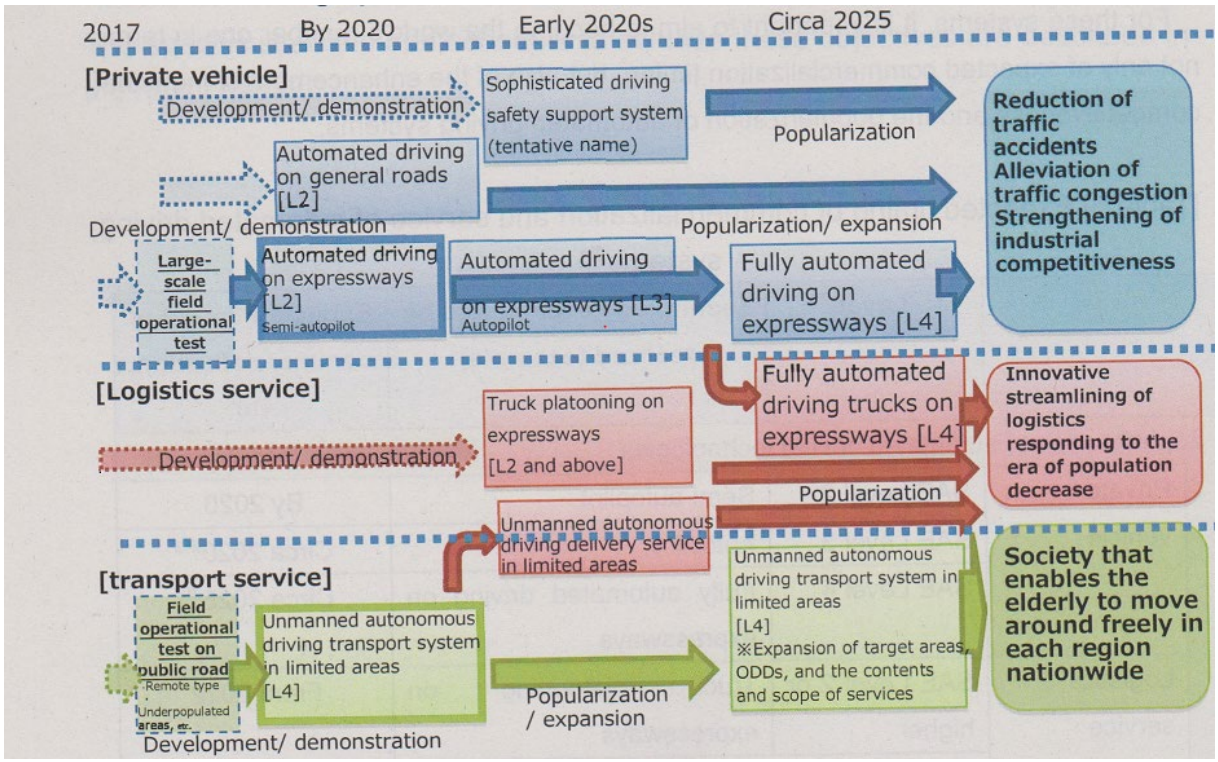


The target for transport is set at -28 % in 2030 (related to 2013). And for transport the Japanese government did present a four pillar approach (JAMA, 2017)



On *fuel efficiency* the key focus is on improvement of the fuel economy. In 2020 a level of 20,3 km/ltr should be reached, and hoped/expected figures for 2030,2040 and 2050 are 30, 40 and 50 km/ltr respectively. Also in Japan there is a difference between test fuel economy and real fuel economy in road driving (Mishina and Muromachi, 2017).

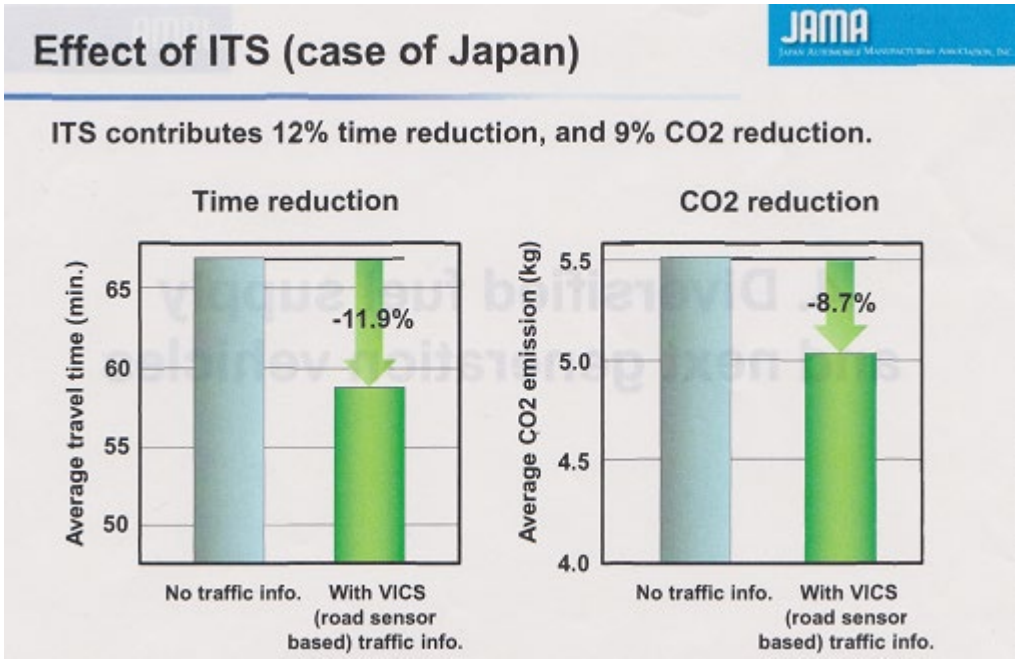
The other focus is on the development of next generation vehicles. This is a core theme in an important research and innovation program, the so called S-IP program (Daisho, 2015). It is interesting to note that work on *automated driving* is immediately related to societal goals, such as safety, transport for the elderly in rural areas, and automation in public transport (Strategic Conference, 2017, 27)



Eco-driving is considered important in Japan. It seems more focused on truck use than on passenger car use, and is about driver education. It leads to an increase in fuel efficiency and to a reduction in the number of accidents. Japan has an eco-driving promotion consortium consisting of three ministries and the National Police. And the EcoMo Foundation, an active organization from promoting activities on environment and transport, working nationwide on mobility management, mobility education, and certification of green management in the transport sector holds the secretariat (Foundation, 2017).

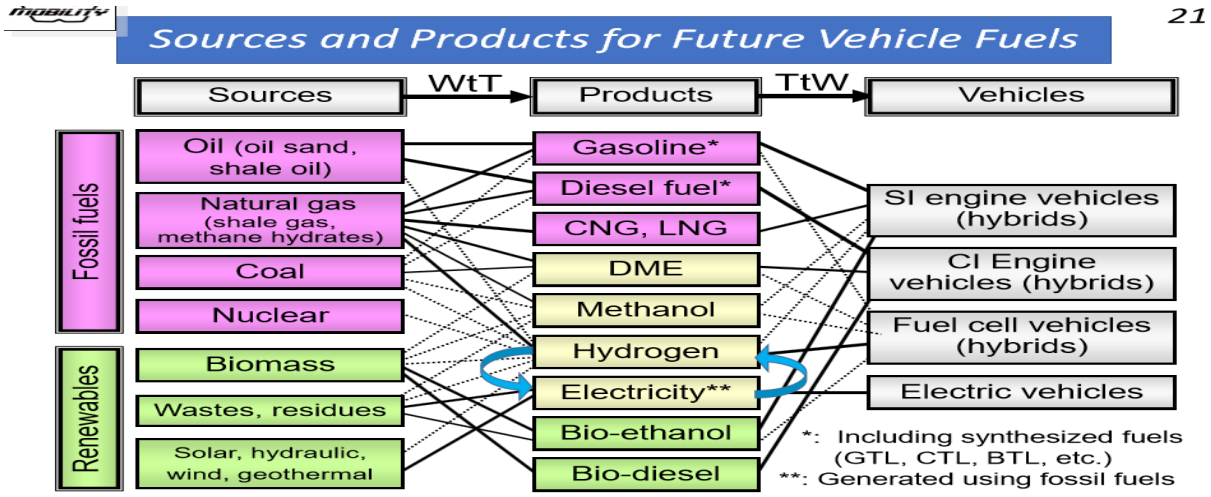
Improved traffic flow is related to the unfolding of *ITS* Intelligent Transport Systems. The idea is that stimulating a good flow in car traffic is helpful in two aspects, less congestion, and better CO2 performance. Traffic should just be organized properly, in cities (smart city, ecotowns) and on highways. The establishment of Electronic Toll Collection on highways is important in this respect. At Tokyo University prof. Oguchi is the director of a lab, named after him, that is working on ITS, with an orientation on basic theories and empirical studies on traffic flows, the development of traffic simulation models and its application to policy evaluations, and studies on traffic policies (Ogushi, 2017). The government part of this work is found in the NILIM, the National Institute for Land and Infrastructure Management, in the ITS Division (Yoshida,2018). Here a program on ETC 2.0 runs, on upgrading existing services, with a focus on smart tolls, big data, probe data from cars. In practice the work is on Vehicle to Infrastructure communication, on congestion avoidance, on safe driving support. In recent days a program on Collective ITS started concentrating on information for road management, and look ahead information.

Japan tries to quantify the impact of ITS, but acknowledges that figures are still rather soft.



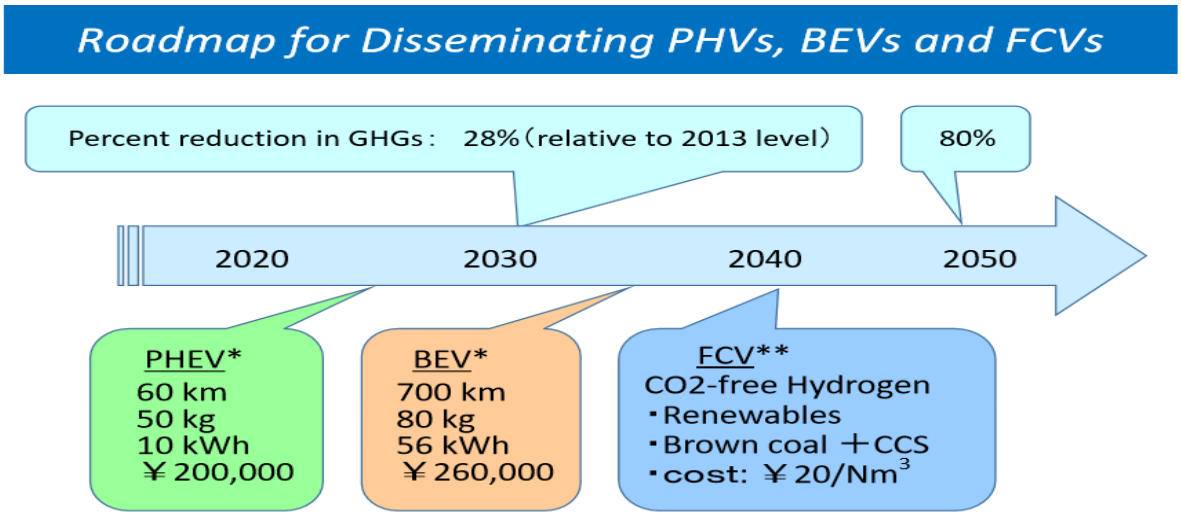
Japan wants to have “the world safest and smoothest road traffic society” and prepared for this objective a road map on Public- Private ITS (Strategic Conference, 2017). Researchers presented jointly a proposal on cooperative Its for safe and sustainable transportation in Japan at the ITS World Conference in Japan (Sakai et.al, 2017). Six development areas; mobility support, operation of vehicles, physical distribution of goods, road use, support for administrations, and use in information and data.

The last element in the integrated approach is the *diversified fuel supply*. Japan has an elaborate policy here, not focusing on one vehicle type or one fuel type in particular. The basic picture used looks a follows (Daisho,2018) *;

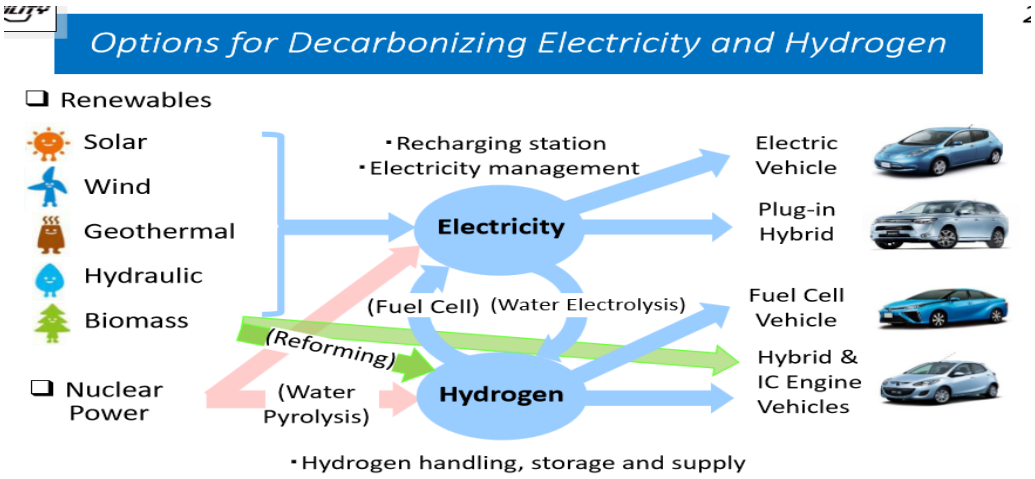


A CI engine is **compression ignition** engine while SI engine is a **Spark ignition** engine.

In the first period until 2050 the focus will be on plug-in hybrids with a great fuel efficiency, as there are too little alternatives yet for decarbonizing electricity and hydrogen.



As noted, renewables and nuclear energy 2.0 should increase rather fast in the Japanese energy mix , which would lead to a new situation around 2030-2035.



And although the national government and the car manufacturers share the direction for the policy , targets still differ, with car manufacturers showing significantly greater reluctance.

< Targets Achieved by Automakers' Efforts >

Vehicle Type		2020	2030
Conventional Vehicles		>80%	60 - 70%
Next Generation Vehicles		<20%	30 - 40%
	Hybrid Vehicles	10 - 15%	20 - 30%
	EVs and Plug-in HVs	5 - 10%	10 - 20%
	Fuel Cell Vehicles	<1%	1%
	Clean Diesel Vehicles	<1%	<5%

< Government Targets >

Vehicle Type		2020	2030
Conventional Vehicles		50 - 80%	30 - 50%
Next Generation Vehicles		20 - 50%	50 - 70%
	Hybrid Vehicles	20 - 30%	30 - 40%
	EVs and Plug-in HVs	15 - 20%	20 - 30%
	Fuel Cell Vehicles	<1%	<3%
	Clean Diesel Vehicles	<5%	5 - 10%

This means that still a policy gap needs to be overcome, with speeding up the energy transition and creating subsidies on purchase of next generation vehicles. This will be the debate in the next years. Japanese automakers are required to make continued efforts to achieve the increasingly stringent fuel economy targets, resulting in suffering from inevitably increased costs. The government has been and will be providing customers with tax incentives to enhance the share of next generation vehicles sales by reducing substantial vehicle prices.

This tax policy concept has been verified to be very effective along with a " top runner energy conservation law" to disseminate lower emissions and higher efficiency passenger cars (pers. message, Daisho, 2018).

Institutional it is interesting to note that the debate on these issues in Japan seems to be less hype-dominated. After presenting a joint direction the stakeholders and especially the national government and the car manufacturers start considering all technical and financial options. The consultants- and media based approaches leading to discussions when 100% electric driving could be the case is not the Japanese frame! The Japanese Automotive cluster can be seen as a strong network (Garuda Putra et.al, 2016)

At this moment in Japan there are 5,8 mln hybrids and 170.000 full electric vehicles. Jointly this is 8% of the Japanese car fleet. There is a subsidy on purchasing an electric car, with some tax exemptions and a small purchase subsidy. When an electric car is more expensive than a gasoline car, the price will be decreased (JAMA, 2017).

Fujisaki (2014) concluded that higher fossil fuel pricing in Japan will lead to higher ownership of lighter cars, to lower car ownership, to lower fuel consumption and to higher use of public transport

Research on next generation vehicles, ITS, innovative combustion technologies, but also on smart mobility solutions for transport in mountainous areas or infrastructure maintenance is concentrated in the so called Cross-ministerial Strategic Innovation Promotion Program (SIP).

A new SIP will start late in 2018, but the themes will remain more or less (Oguchi, 2017).

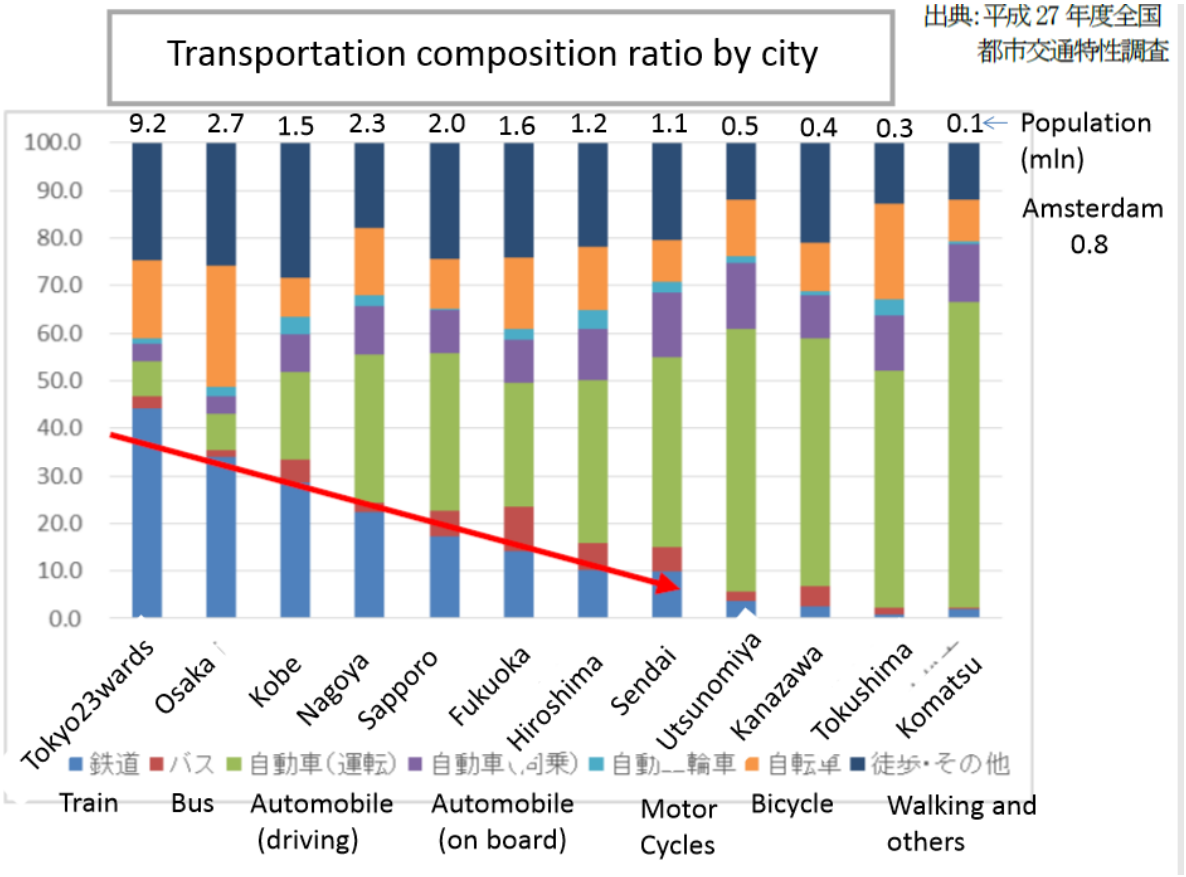
Societal Issues	Themes
Energy	Innovative combustion technology
	Next-generation power electronics
	Innovative structural materials
	Energy carrier
	Next-generation ocean resources development technologies
Next-Generation Infrastructures	***Automated Driving System***
	Technologies for maintenance/upgrading/ management of infrastructures
	Reinforcement of resilient function for preventing and mitigating disasters
	Cyber-Security for Critical Infrastructure
Local Resources	Technologies for creating next-generation agriculture, forestry and fisheries
	Innovative design/manufacturing technologies

CHAPTER 3 JAPAN A ; MAJOR URBAN AREAS, PUBLIC TRANSPORT, TRANSIT ORIENTED DEVELOPMENT AND CAR DISCOURAGEMENT

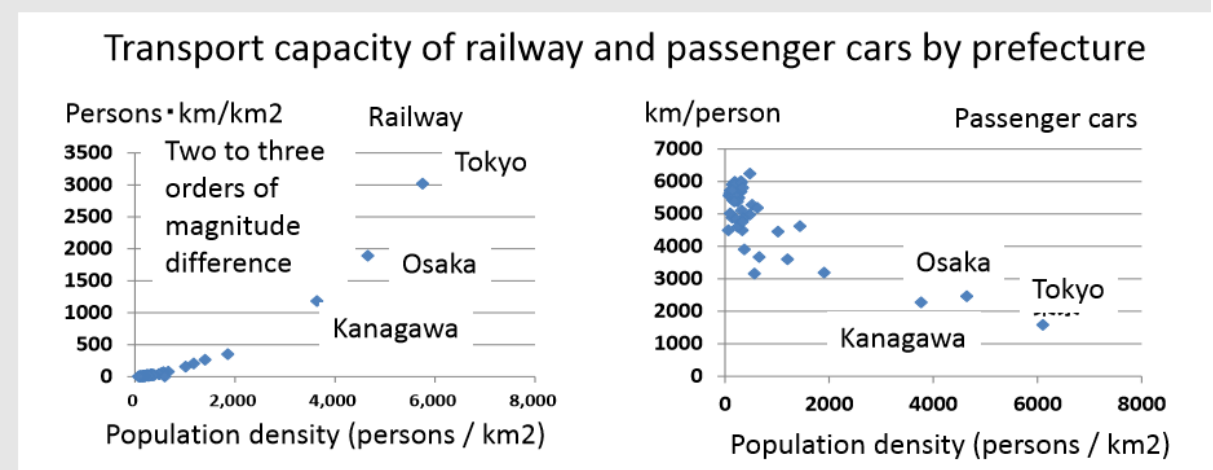
Japan A consists of three major urban areas, Tokyo area, Nagoya area, and the Osaka- Kyoto-Kobe area, and the spaces between these areas. Together Japan A is home for near to 70 mln. Japanese (some 55 % of the population). area, Japan A will in the coming decades, thanks to the Tokyo area, increase its share in the Japanese population. It is expected that in 2040 two thirds of the Japanese population will live in Japan A.

Modal split in Japan A; role of railways

Mobility in Japan A is pretty much related to public transport. However, PT in the modal split of trips differs, as can be seen here (Iwai, 2018);

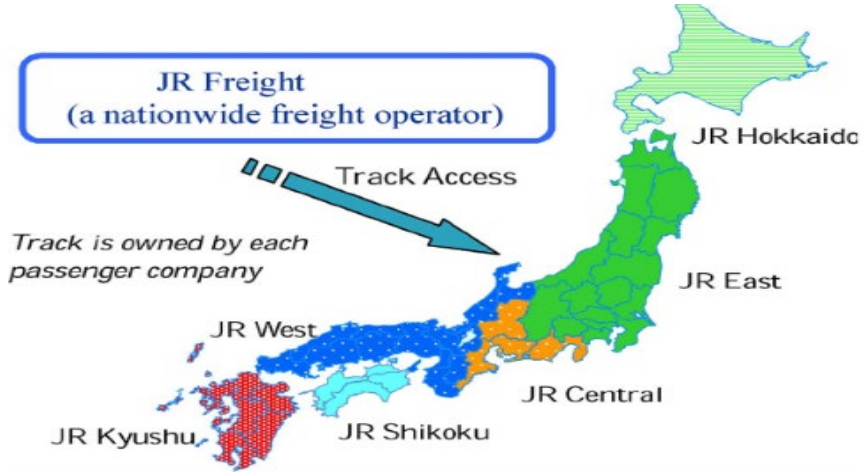


Almost 50 % of trips in Tokyo and 40 % of trips in the broad Osaka urban area are made by PT, and in kilometers travelled this share is even higher, in Tokyo near to 65 %. Car trips account for only 10 % in the Tokyo area, and 15 % for the Osaka area. Nagoya is the exception here with some 25-30 % of car trips. Nagoya is a newer city, with strong ties to the Toyota car company.



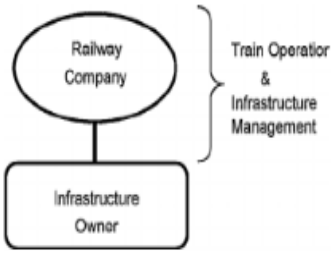
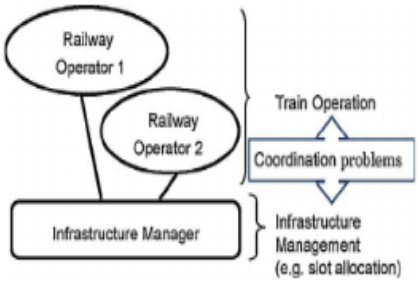
Railways: vertical integration and promoting convenience of travel

The role of the railway companies needs further elaboration. Until 1987 the important railway companies in Japan were part of the government. In that year the Japanese National Railways underwent a major reform are were divided into six vertically integrated companies. In this privatization these railway companies have been successful, as their share in transport volume and their efficiency has increased (Kurosaki and Alexandersson, 2014, Kurosaki, 2017). The three Honshu companies, JR East, JR Central and JR West have lifted their shares, and the three smaller JR's on the islands of Hokkaido, Shikoku and Kyushu have managed their operations more efficiently (Kurosaki, 2009). Japan also has non-JR private railways (see later).

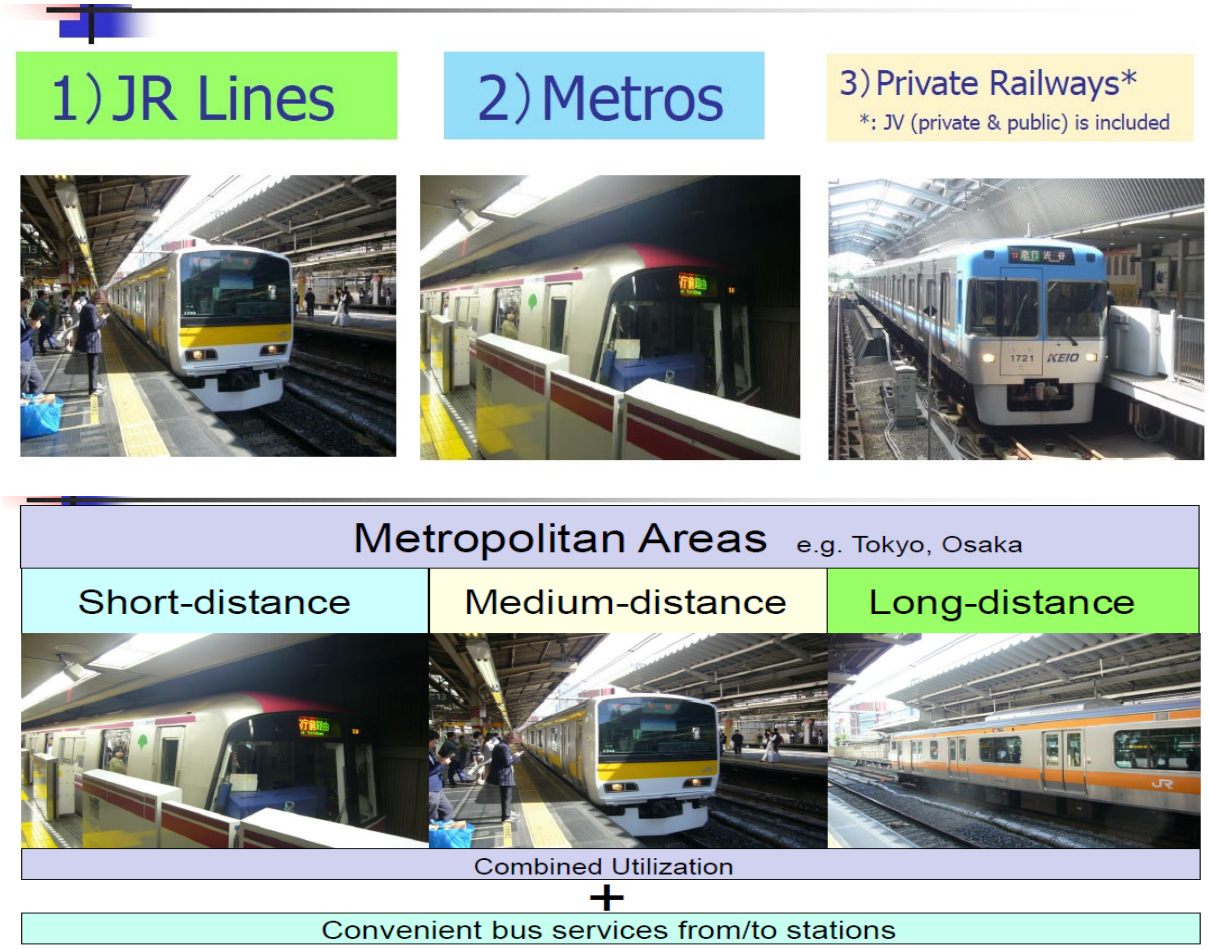


In Japan the passenger railway companies all operate and manage both infrastructure and

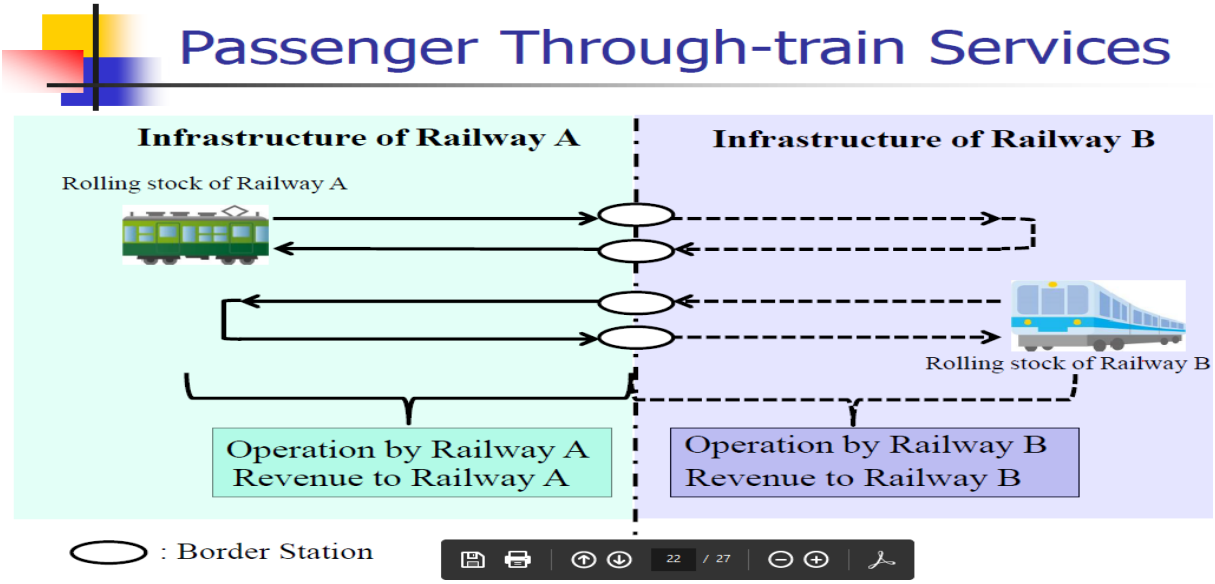
Comparison of vertically separated railways in Japan and Europe.

Vertical Separation in Japan	Vertical Separation in Europe
	
< Characteristics > A railway company implements all factors of the railway operation including infrastructure management. Thus, they do not have many coordination problems through vertical separation.	< Characteristics > Railway operation is separated into different independent organizations. Railway operators perform train operations, and an infrastructure manager performs infrastructure management, such as track maintenance and signaling. Thus, the sector faces coordination problems through vertical separation.

Source: Revision of Kurosaki and Okuda (2013).



And as a traveler you are not confronted with any boundary problems thanks to the combined utilization. It feels as a seamless urban rail network.



In 2005 a law was issued related to this construction, the Law for Promoting the Convenience of Urban Railways, which aims to enhance the network functions of railways using trough- services, as well as to develop and integrate stations with their surroundings. Based on this law, approved urban railway facilities such as the shortcuts between two lines can be constructed using public funds, even if a private railway takes over operations (Kurosaki, 2009). This law relates to a specific weakness, the so

called missing link problem. Different railway or metro lines are near to each other, but the companies see no business need to make the shortcut that can be very useful from traveller's point of view (Kato, 2016). An extra challenge will be to create PT-systems also fully fit for the growing number of elderly and disabled persons in Japan's urban areas.

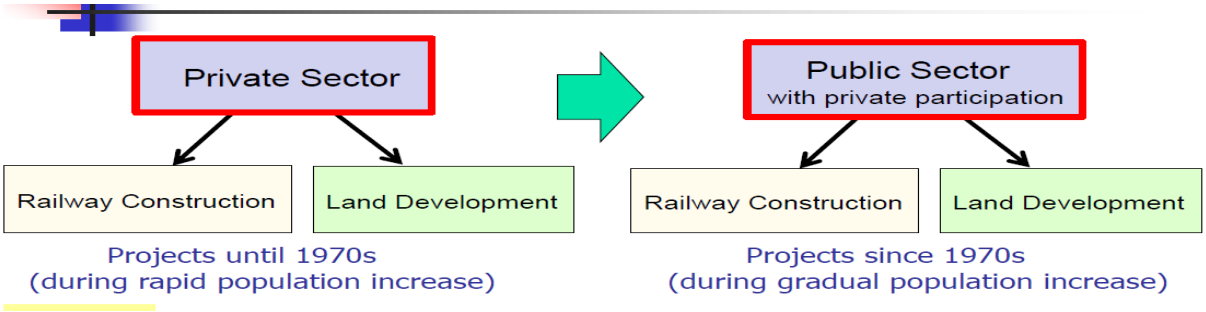
Major urban areas are in Japan connected by the High Speed Rail Network. The share of rail transport in interurban transport is high. Building the infrastructure for the high speed lines is a responsibility of the national government, and is one of the cases where infra and operations are not in the same hand. The public institution owns the infrastructure and JR companies pay a lease, based on the expected benefits to the company (Kurosaki, 2009). As Japan A is so densely populated, and rail transport has a high share of the interurban passengers, services are very frequent. This creates a strong urban network, even over fast distances (Tokyo- Osaka is 560 kilometer and 2.20 minutes by Shinkansen). New Shinkansen lines lead to shortening of travel times, to great increase in the number of railway users and to positive effects in connected regions (Kojima, Matsunaga and Yamaguchi, 2017)

Railway companies as actors in real estate and urban (re) development

Railway companies are allowed to work in other domains, such as real estate and urban (re) development. Railway companies can be considered to be major players and stakeholders in organizing the Japanese urban fabric. As Calimente (2012) states, by the time the automobile did start its rise in Japan in the mid- 1960s, Tokyo's dense rail network and its station area communities were already well established. And to quote *"high quality, frequent rail service to dense, mixed-use, safe, pedestrian-friendly developments has allowed Tokyo to achieve enviable rates of public transit usage and given Tokyoites the freedom to view automobile ownership and use (HJ) as a lifestyle choice rather than as a necessity*" (Calimente, 2012,19).

This possibility for railway companies to be also active in other related domains resulted more or less from a Nationalization Act of 1906 nationalizing 17 of the than existing 37 private railways. Forced to diversify a strategy was made, pioneered by Ichizo Kobayashi, president of Osaka Electric Railway, to develop and sell land along the train lines, constructing and operating department stores at stations and building tourist attractions along rail routes. This strategy can be seen as the start of transit-oriented development (TOD). Calimente (2012) takes this even broader and speaks about "rail integrated communities", as an alternative to car dependent communities, which now exist all over the world. Indicators for these "rail integrated communities" are ; density, minor car parking space, quality of streetscape design, property value within and beyond 500 meter of stations, pedestrian safety, quality of services and number of mode connections. The expansion of densely inhabited districts in Tokyo and the crucial role of rail transport is clarified in Mberego and Yi (2017).

In recent decades the relation between public and private in urban development did change, related to the new Integrated Development Law (Kurosaki, 2018).



This Law was created to realize better integration between railway (and railway oriented) construction and land readjustment. The railway companies now work jointly with the public sector. How this functions could be seen in the construction of the Tsukuba express, from Tokyo central to a new town (Kurosaki and Ogura, 2013).

Rail integrated communities do not need to look as fully high rise built -up cities. I was struck by seeing the urban patterns of Tokyo. It is certainly not everywhere high- rise. To present a few pictures :

Broader avenue

Street leading to this avenue

In central Tokyo

Abe and Kato (2017) present in *What led to the establishment of a rail oriented city? Determinants of urban rail supply in Tokyo, Japan, 1950-2010* an interesting insight in the societal dynamics related to transit oriented development. They concluded that a lag structure exists. The demand for rail services is each time greater than the supply, but suppliers in Tokyo seem to have been able to provide new services at a rather short time lag. However, a differentiation between areas in Tokyo should be noted (Kato, 2014) as in central areas this urban rail even gets stronger, whereas on the edges of the metropolitan area a decrease of population leads to a decline in rail demand, and a greater orientation towards automobile- oriented lifestyles. We are almost entering Japan B here!

Public transport; full prices, no subsidies

In Japan, decision makers and households are familiar with the circumstance that public transport functions without subsidies. This finds its rationale in the other business model for public transport companies, as they are allowed to create revenues from the market as private or privatized companies. Sometimes the share of these other revenues is greater than the revenues from providing public transport (Kurosaki, 2013). Other element is that employers in Japan take care of the costs of public transport to and from work. On average net household costs in Japan for transport are slightly lower than average (most richer OECD countries 15 %, Japan 13 %, also Lipscy and Schipper, 2013).

Already now, but certainly in the future, with the decreasing population it will become more problematic to offer intensive public transport without any form of subsidy, at least outside some tracks and outside the major urban areas (Saito, 2015). Whether a railway company is profitable also depends rather strongly on transport density, and in most areas this density will decline in the next decades.

Table 1 Basic Data on Japan's Passenger Railway Operators (Fiscal 2011)

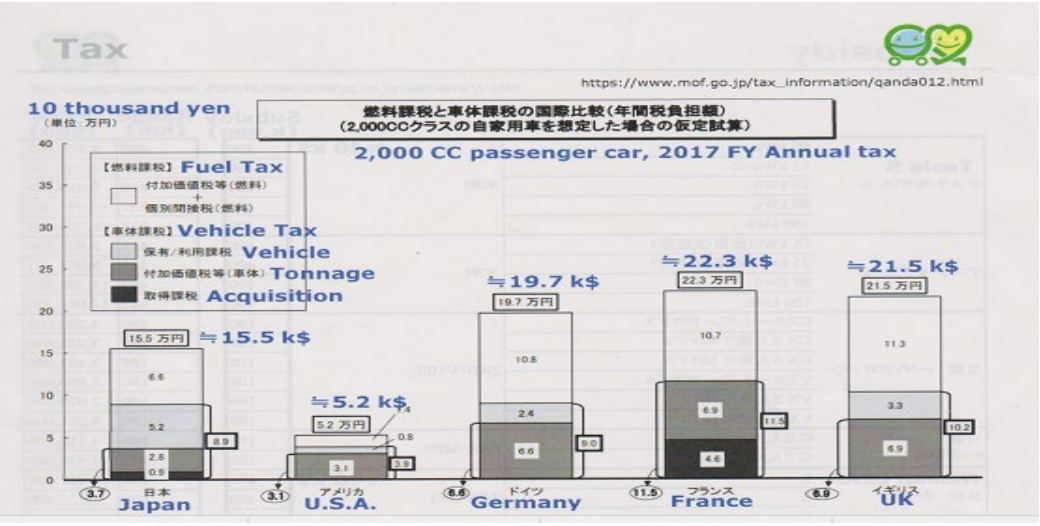
Classification	No. of Operators	Line Length	Passenger-km (million)	Revenue (¥billion)
JR Passenger	6	20,124 (72.6%)	246,942 (62.6%)	3693.7 (62.4%)
Major Private	16	2917 (10.5%)	116,609 (29.5%)	1,453.0 (24.6%)
Quasi-Private	4 + *1*	195 (0.7%)	2,202 (0.6%)	34.3 (0.6%)
Public Operated	11	615 (2.2%)	19,131 (4.9%)	485.0 (8.2%)
Smaller Private	106 + *16*	3,646 (13.2%)	7,943 (2.0%)	185.3 (3.1%)
Others*	33 (+17**)	231 (0.8%)	1,961 (0.5%)	67.5 (1.1%)
Total	176 + *17*	27,728 (100%)	394,788 (100%)	5918.8 (100%)

Number of operators in *italics* is for railway infrastructure companies.
* Operators of monorails, guideway transit, cable railways, etc.
** Supplemental business by operators not included in Others.
12 other freight railway operators including JR Freight are not included in the above table.
Source: Prepared from data in *Suji de Miru Tetsudo 2013* published by Institution For Transport Policy Studies.

Busses are not so successful as trains. Where trains get the biggest share of revenues in major cities and interurban high speed connections, busses operate at smaller scales and in intermediate regions.

Aspects of car ownership and car use in Japan A

Car ownership in Japan is above average of richer OECD countries, with 595 cars per 1000 inhabitants. Most households in Japan buy new cars. The tax system related to car purchase is rather difficult, and taxes are more or less on the same level as in the Netherlands. Since the early 1920s the Japanese government has promoted small cars to suit the income level, the road conditions and the shape of the Japanese people (Enoch and Nakamura, 2008).



Higher gasoline prices in Japan seem related to lower ownership of larger cars, to higher ownership of smaller and lighter cars, to lower car usage and higher PT ridership, and the impact is greater in Japan A than in Japan B (Fujisaki, 2014). However car use is far lower than in most richer OECD countries, with only 5200 kilometer travelled per car yearly (Netherlands for example ; 11.800). Whereas in Japan B car kilometers travelled is more in line with OECD averages, the great difference originates in Japan A, with on average some 2000-2500 kilometer travelled by car.

Japan A has circumstances which create this situation of very low car use. The first and foremost is the very high densities of the major urban areas. Car driving means long travel times, especially in cities where there is no grid pattern. For example in Tokyo and Osaka car travel in kilometers is only 14 – 18 % of all kilometers travelled.

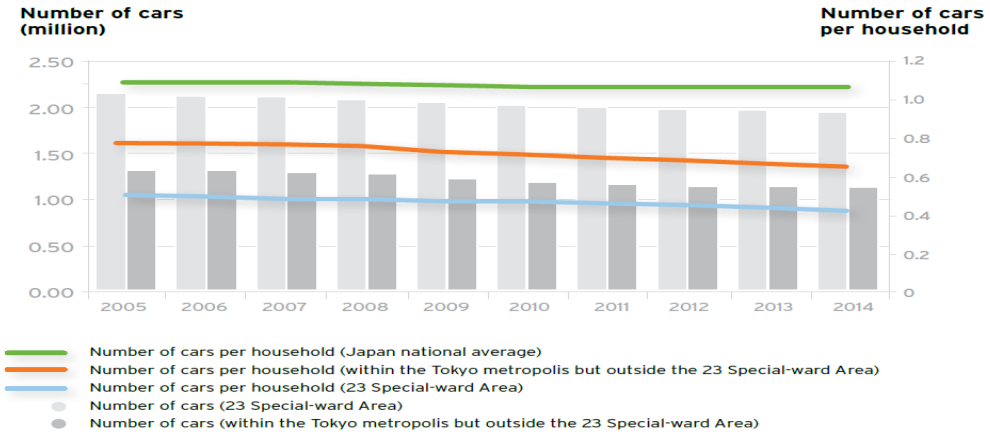


Figure 6.5. Number of Vehicles in Tokyo Metropolis and 23 Special-Ward Area (Excluding Kei Cars)
SOURCE: Kanto District Transport Bureau; AIRIA.

Travel in general is rather expensive in Japan regardless to mode share (not taking into account the role of employers), and among modes, car travel is particularly costly in comparison to other developed economies. Employers pay in Japan for travel to and from work 40 % of costs made by car travel and 100% made by public transport. When there is a good PT alternative, as is the case in Japan A, most Japanese employees thus prefer the PT alternative.

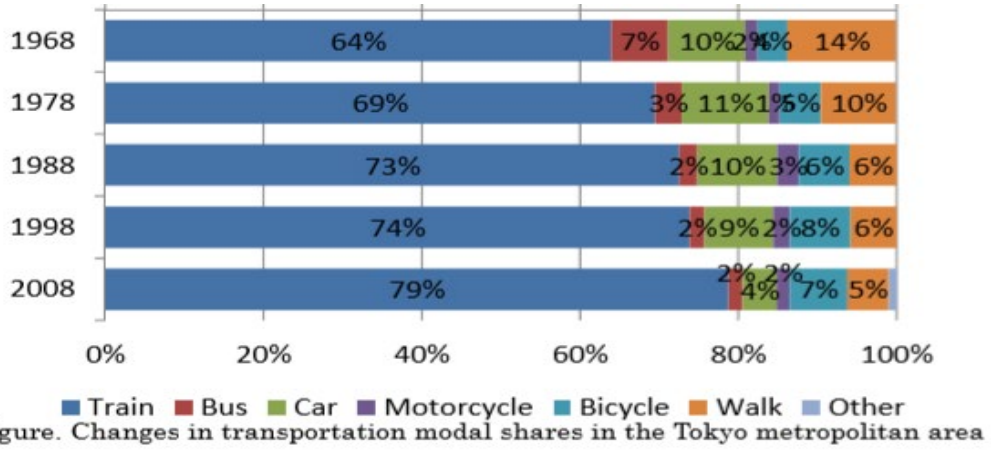


Figure. Changes in transportation modal shares in the Tokyo metropolitan area

In Japan A in recent years the share of car use is decreasing, in Japan B this share is increasing (Japan Nationwide Person Trip Survey, 2017).

There are extra costs, as each three years cars have to undergo a test on their quality, and these tests are tight, with many extra investments needed for the cars. And there is the specific parking policy (Kato and Kobayakawa, 2018). In 1962, the national government issued a unique act related to the storage areas for cars, the so called “Garage Act”. This Act requires that all individuals provide garage spaces for their own cars. This Act led to less cars in urban areas, but also to fraud. The Act was revised, including on- street parking, but only for limited time. And the strategy went from just enforcement to active management of car parking. In recent days there is investment in the relation of urban parking policies with land- use planning. Policies encourage car parking to be developed at

the urban fringe, and not inside the major urban areas, but as a reaction private entrepreneurs develop a network of small parking lots, created by tearing down older smaller houses near city centers.

All in all, in Japan A some forms of discouragement of car use can be noted, partly related to the spatial set-up of Japan A, partly related to specific policies. Car sharing is still a minor alternative, also because longer than 10 minutes walking from PT stations discourages car sharing arrangements (Kato, Inagi and Igo, 2013). More in general, especially in the urban central areas car trips are substituted by cycling and walking trips, as explained for Osaka in Waygood, Sun and Letarte (2015).

(a) Highly commercial

(b) Mixed commercial

(c) Mixed residential

(d) Autonomous

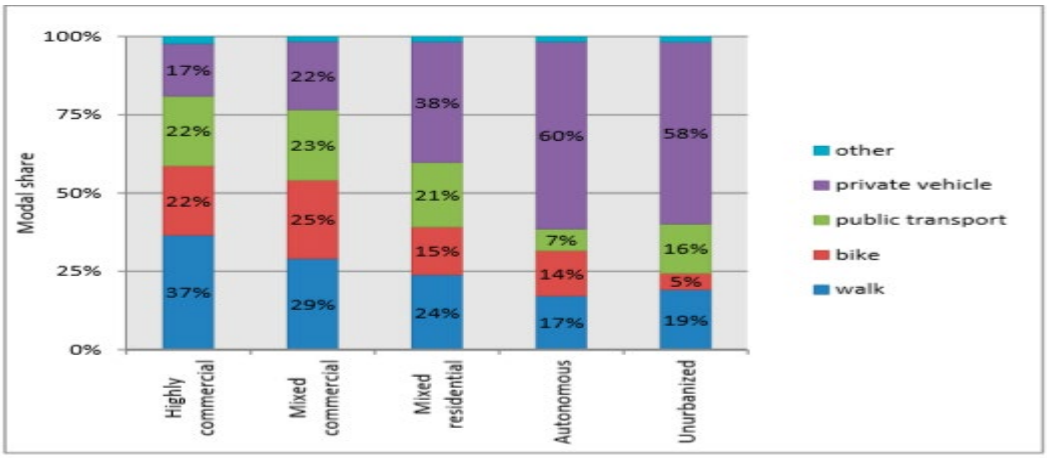
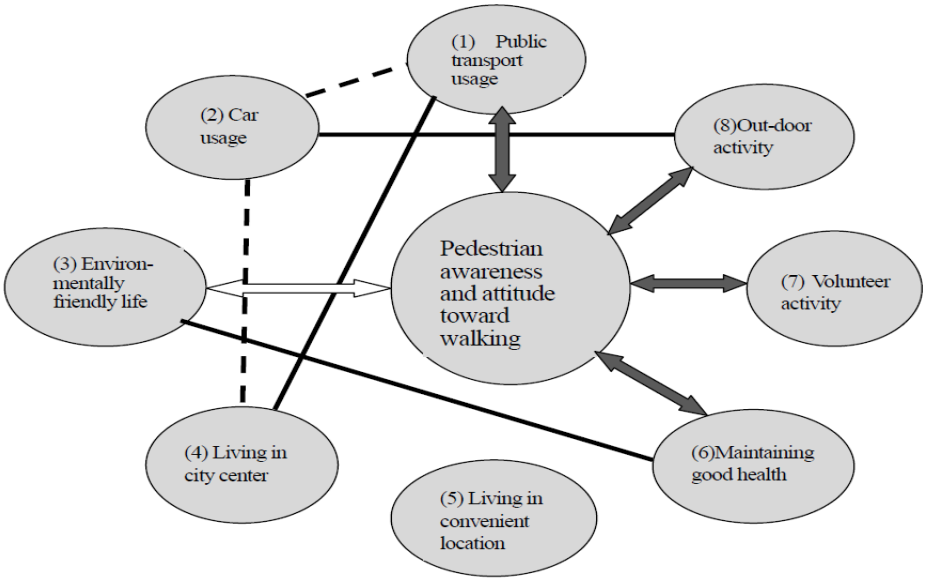


Figure 4. Modal share by built environment type.

Walking is also related to lifestyle indicators, as Tajima et.al (2013) concluded for five urban areas in Japan and for Sydney.



CHAPTER 4 JAPAN B ; RURAL AREAS, REGIONAL CITIES, CAR DEPENDENCE , DECREASING PUBLIC TRANSPORT, AND ACCESSIBILITY PROBLEMS

Japan B is car country and is seen as problematic for the provision of public transport in the next decades. However, solutions to the lack of accessibility for non- car households are created. Japan B is not well – known outside Japan, but in Japan problems of mobility in Japan B are taken serious. Tokyo and other urban areas (Japan A) have developed railway networks and are enjoying inexpensive and convenient transportation systems. However, in less dense areas, convenient public transportation systems are not in place, and cars are necessities for daily life.

Japan B is in decline, at least in its rural areas and in its regional cities. When Japan B is still growing in population it is in the outlying suburbs of the major urban areas. It handles about the suburbs that are not or only weakly connected to the urban rail networks.

Modal split in Japan B; car dependence

I came across Japan B when visiting Tshukuba (see picture), a newly built city some 55 kilometer from Tokyo where two government institutes , the NIES (National Institute for Environmental Studies) and the NILIM (National Institute for Land and Infrastructure Management) are located, almost fully unconnected to public transport services. Almost all employees travel by car. I had expected a smart city but arrived in a fully American oriented suburb. This is also Japan.

And I came across Japan B in many talks with the Japanese professionals. In most parts of Japan B vast number of young people migrate from rural areas and smaller cities to the three major urban areas as they see better perspectives there (Xiong, Zhang, Kayama, 2016). Overall satisfaction among young adults with their life in Tokyo, Nagoya or Osaka is higher. Younger adults are happier there than in other areas (Xiong and Zhang, 2016). There seems a need to invest more in mobility in medium sized cities (in Japan between 100.000 and 600.000 inhabitants). Take as an example the city of Mito.

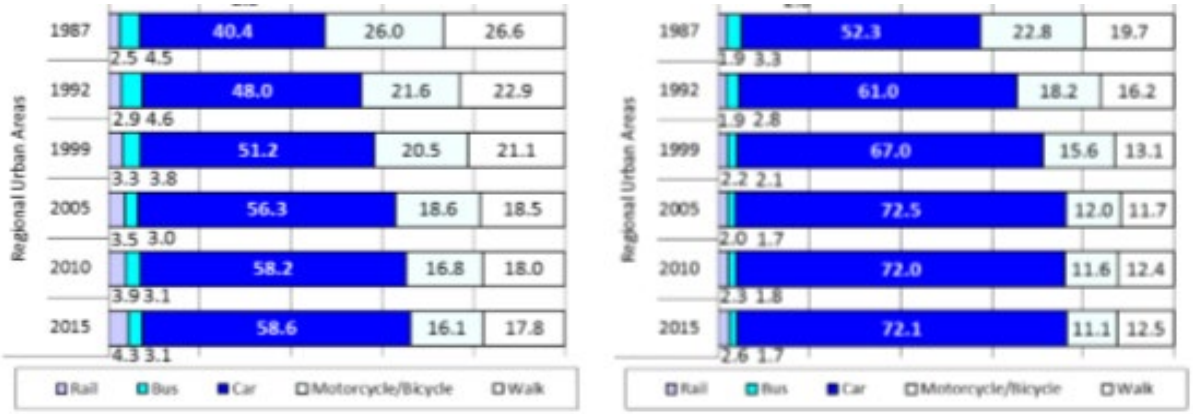
Mito is a city in North Honshu, has 260.000 inhabitants and is after stagnation since 1995 now losing population. For its public transport the bus line network in Mito city is not well organized and most lines are not doing well economically. The city is very car dependent, which causes the decline of the city center. And young people want to move to the major areas where it all happens. In fact, there are many Mito's in Japan.

Yubari, Hokkaido. Following the closure of it's coal mine and a city bankruptcy last decade, the town which once boasted a population of around 70,000 had (as of 2010) only around 10,000.

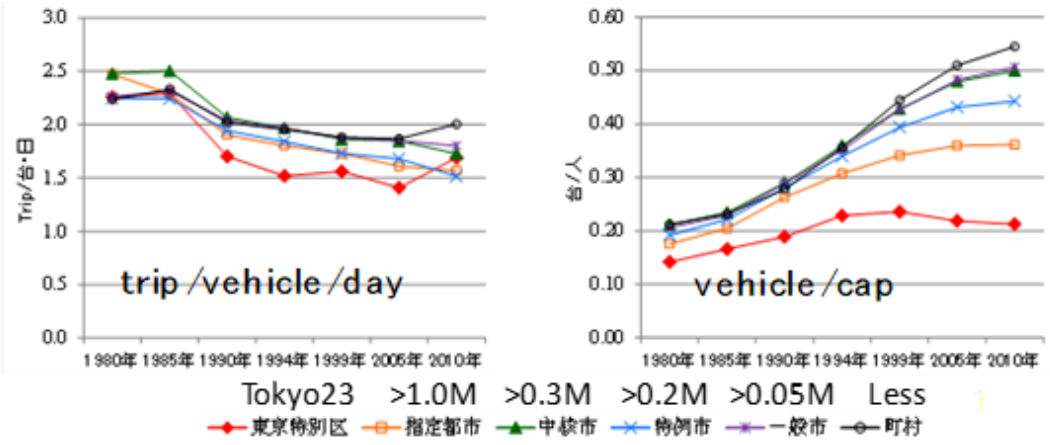
Here is an extreme example: Yubari on Hokkaido. Following the closure of its coal mine and a city bankruptcy last decade, the town which once boasted a population of around 70,000 has now only around 10,000 inhabitants.

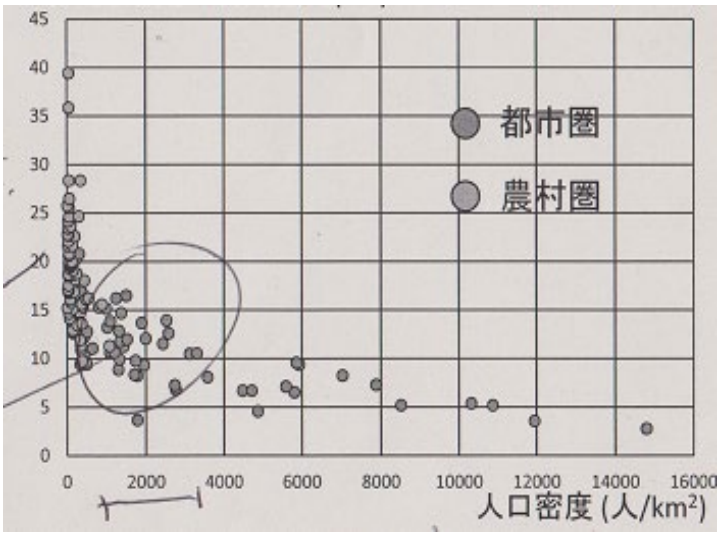
Japan B is highway oriented country. Historically, Japanese roads were not well developed. Until 1862 only the emperor was allowed to use a wheeled vehicle, and bridge building was also restricted. After 1862 railways came to dominate travel. In the 1950s Japan still had a weak road structure with less than 6% of the national highways paved. Late 1950s highway planning started, at first borrowing heavily from American highway planning ideas and techniques (David, 2014). In 1956 the JHPC, The Japanese Highway Public Corporation Act was established. The network was constructed with loans from the World Bank, and from frameworks made by the Ministry of Transport. For each highway there was a specific toll system. Since 1972 a system of toll was created areawide, with uniform toll rates. The highway network was constructed using borrowed money and debts were to be repaid with the pooled tolls of the highway users. The costs of each route were to be recovered by tolls paid, by cross- subsidization for other routes and from public funds. Japan is moving towards privatization and has an ambitious debt repayment program. It is questionable whether the Japanese highway system can ever lose its tolls, that increase the price of driving.

In Japan B the modal split is dominated by car use, see the results of the 2015 Nationwide Person Trip Survey for the Regional Urban Areas, and note that PT is very weak here (left; weekdays, rivht ; weekend).



Ownership of cars is higher, as is the amount of kilometers travelled by car (figures below, right, offered by Matsuhashi, during our meeting).





However, the average number of kilometers travelled by car in Japan B seems lower than 10.000 kilometer. An explanation could be that commuting distances are smaller in Japan than in most OECD countries, a function of density. This figure presents at the X- axis the population density of area and at the Y – axis the average commute distance. Note that even with low density the average commute distance is around 20 kilometer.

A rather strong decrease in population is expected in Japan B. As Yagi and Managi (2016) write this will, without policy measures, lead to an acceleration in car ownership, as remaining households will in future live in less densely populated areas, and the universal law *"lower population density means more car ownership"* will do its work. Especially elderly will remain driving, as driver cessation is only

accepted when there is a driving alternative, for example with volunteers. But this will not be so easy in aging local societies (Ichikawa, Nakahara and Takahashi, 2016).

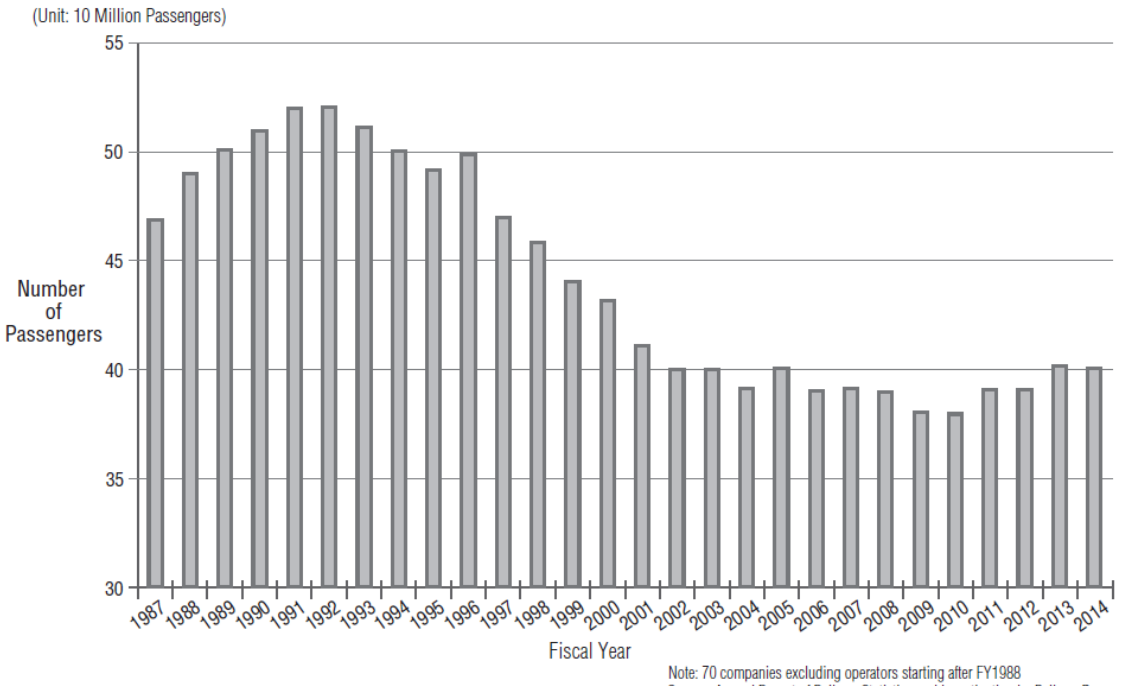
Shrinking public transport and accessibility in Japan B

Until relatively recently the PT arrangement in Japan did function; PT companies could get profit also from other activities than transport provision, PT had no government funding, and when there were losses on certain track cross -subsidization did do the job. With an increasing population this functioned. However with stagnating and even decreasing populations transport companies in less densely populated areas are running into problems. Two examples; without help JR Hokkaido needs to block half of its service, and a railway line from Kobe to its outer suburbs will have to stop services.

As Kurosaki (2017) notes, in many sparsely- populated areas there are growing concerns about the operational losses being incurred by local railways. Japan has not established a firm legislative system to sustain unprofitable railways in provincial areas. Cross subsidization can help, to a certain extent, but weakens the profitable segment of railway companies.

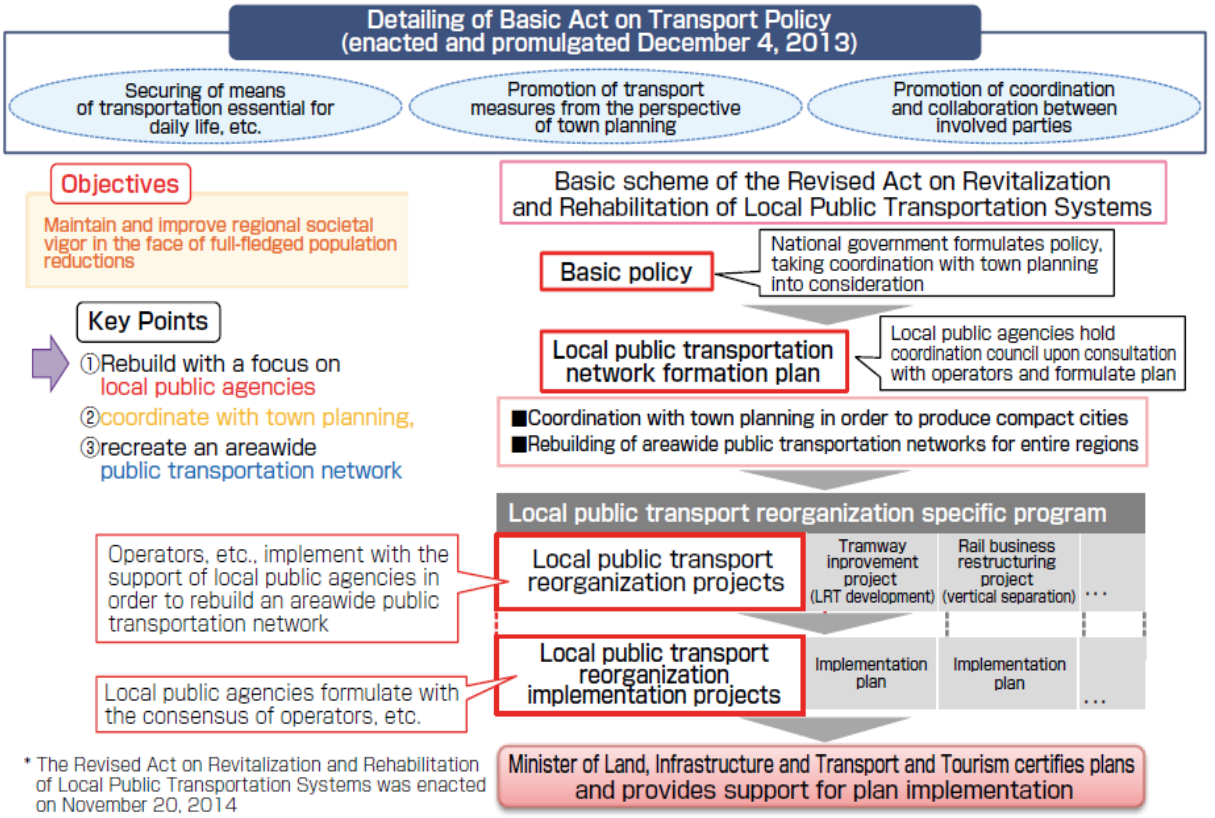
There has been already a decline in services (Utsunomiya, 2016), for busses between 2006 and 2011 2,7 % of total bus services, and railways lost since 2000 650 kilometer track, also 2,7 % .

Figure 1 Change in Local Railway Passenger Volumes



Local public transport in Japan is run by private companies of which many now have serious problems. But providing public subsidies to commercial companies has many difficulties in Japan due to legal restrictions (Saito, 2015). In 2007 the Act on Revitalization and Rehabilitation of Local Public Transportation Systems was signed. Under this Act regional councils did receive the responsibility for establishing policies for PT by municipalities whereas the national government provides support for

projects decided by these regional councils. On paper this all looks arranged, but in practice most governments and politicians are reluctant to spend taxpayers money on PT, as this has never been the case.



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Saito (2015) warns; " *under transport policies that rely too heavily on the principle of transport business making a profit, it becomes difficult to foster sustainable transport systems that contribute to overcoming global environmental issues, deal with the greying society, and supply transport services that will satisfy the populace*".

This especially holds true for many rural areas. Population will become more dispersed, and, by lack of appropriate PT services, more car dependent. From a sustainability perspective this should not be the road ahead. Part of the problems arise because in cost- benefit analyses on local railways the social and environmental benefits of rail compared with other modes not or only minor taken into account (Utsunomiya, 2018).

There is some research on accessibility problems faced by rural elderly citizens of Japan. Nursing care services are less necessary and less used when hospitals and shops are more easily accessible. And clinics are more used with increasing accessibility (Sasaki, Aihara and Yamasaki, 2017).

But underserviced areas are not synonymous with remote areas, as Matsumoto et.al (2013) found ; there are also non- remote communities facing accessibility problems to health care. And in Seto City (130.000 inhabitants, see picture) the highest densely populated neighborhoods had rather low accessibility to all urban facilities (Suzuki and Suzuki, 2015). It seems that this research area needs further elaboration.

Revitalizing Rural Japan ; societal solutions

Mobility and accessibility of services are only two of the problems the households in Japan B, and then especially on the more rural side of the spectrum, are facing. With the decrease trends in population many communities face severe aging and decline. The solutions for planning for decline are not so easy. From a European perspective it is clear that governments should start to support and subsidize local public transport for citizens not wanting or unable to use cars. However, it is also clear that this will be a quite expensive solutions as long as population decrease and dispersal of population will speed up.

From the literature I note a three layer structure in solutions ; concentration, regeneration and subsidizing public transport. At first more concentration of the remaining population would be wise. I noted a plea for concentration to local centers. It seems necessary to invest intensively in local center cities, to provide high-quality employment and education for young people, and to promote the settlement of young people by bringing together commercial and cultural facilities in local center cities. The key phrase here is bringing together (Kato, 2014). This is also useful from a transport perspectives, as Nakanishi, Matsuo and Black (2013) did show in a study about relocation related to communities struck by the East Japan Earthquake and Tsunami of 2011.

Related to concentration is rural regeneration. Degradation of living conditions went from hilly and mountainous areas to hamlets, to villages, to smaller regional cities, and is now entering the suburbs, and especially the resident of housing complexes. In these so called “old- new towns” the speed of aging seems to surpass that in mountainous areas (Odagiri, 2011, 40). Rural regeneration could stop the cultural processes of decline by revitalizing the social capital of the remaining locations. Participation is important, creating new businesses for example in tourism is, and more general this is about bringing pride back to communities.

Dilley, Shinzato and Ando (2017) describe the process of creating affectual attachments to place via a fictionalized example of a village called Matsutani (this picture is from the existing Matsutani Valley). This is about participation, self – initiated volunteer activities and creating a network of intermediaries. From a mobility perspective this is about creating systems of drive sharing and voluntary support in overcoming distances to services and shops.

Revitalizing Rural Japan ; smart mobility solutions

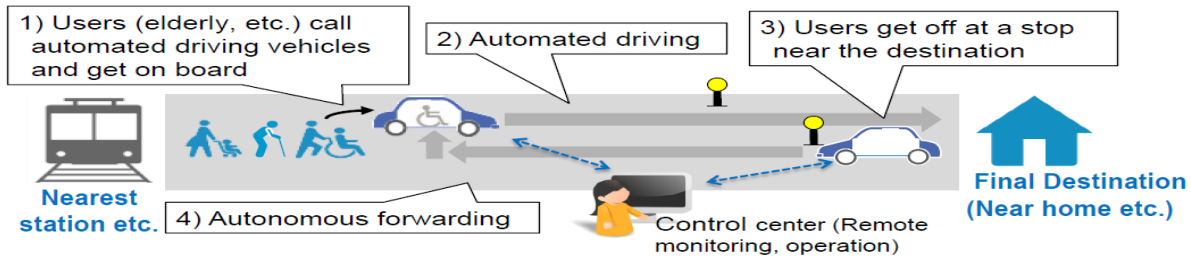
The framing of smart mobility does not exist in Japan. There is ITS. There is research on automated vehicles. And there are initiatives with a more societal goals, whereby cars and people movers with new IT technology are introduced. All in all it seems to me that in Japan development of new technology is more directly related to reaching societal goals and seems far less seen as just technics development for its own sake with the hope that it eventually new technical elements can be sold to individual customers and companies. And what I even like more is the non- existence of a hype culture. Japan seems to miss three hype- creating groups ; technology professors with media exposure but with a lack of interest in society, journalists hoping for new nice narratives, and consultants telling too optimistic stories. Especially the absence of consultants, rather ubiquitous in richer OECD countries, did positively strike me.

Japan has a tradition of road side stations (Koike, 2017). There is the Michi-no-eki, the planned road side station. Michi- no- eki' s have three functions, resting area, information for travellers, and shopping and dining function. There are now 1000 Michi-no- eki's in Japan. And there is the Machi-no- eki ; the human station. Machi- no – eki' s are not situated near roads, and attract also walkers, cyclists and public transport users. Also Machi-no- eki' s are planned.

Michi-no- eki

Machi-no-eki

Both types of station connect a specific area with the Japan broad transport networks. And both types are start and ending points for new forms of public transport. Hashimoto and Kato (2016) presented an exemplary demonstration project for the last miles mobility system with automated and connected vehicles in a dedicated zone. This is the main approach (Yoshida,2018) ;

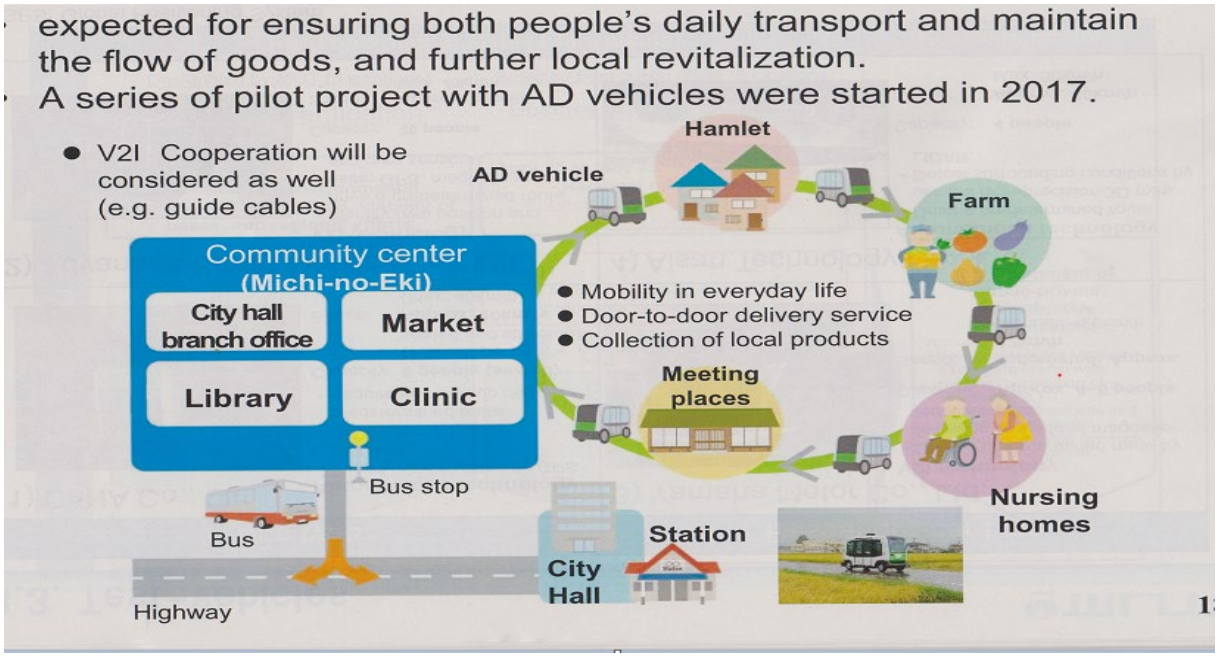


Service image

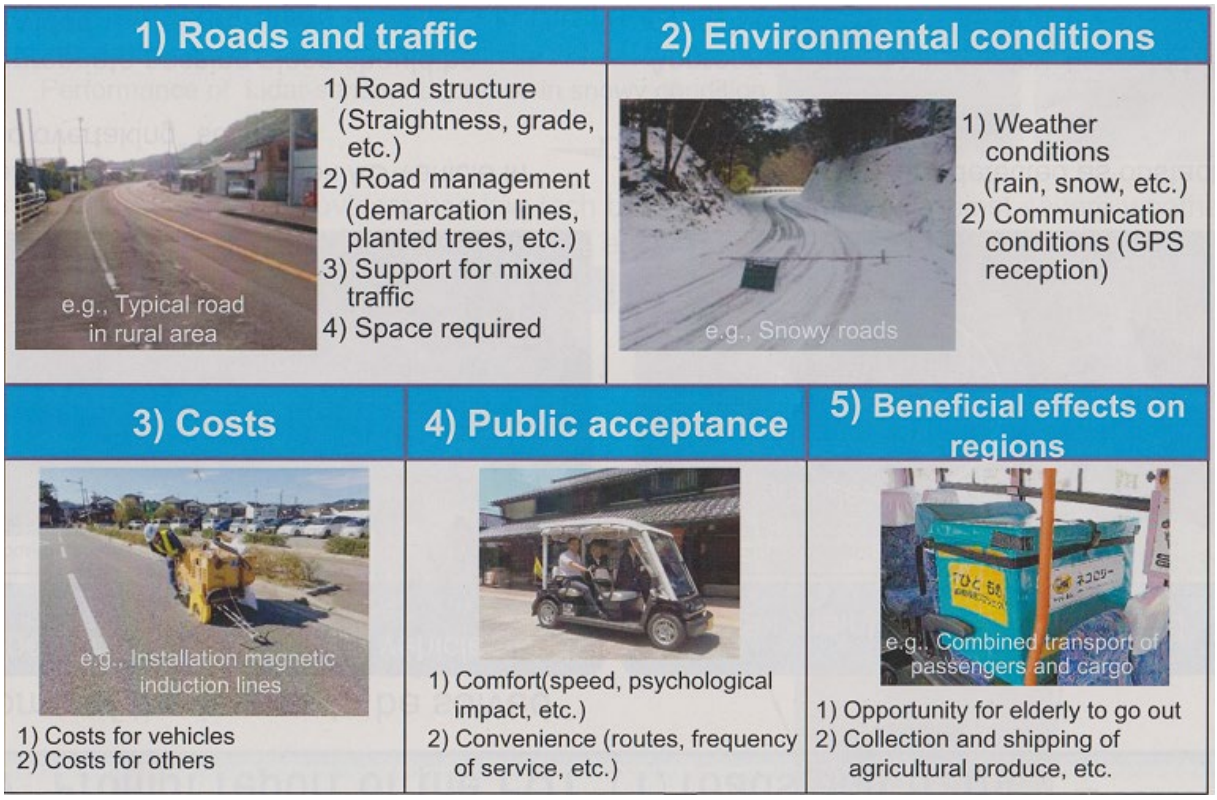
"Smart E Cart"

"Smart bus"

Automated people movers without drivers travel with low speed (15-20 km) in sparsely populated rural areas. People will be brought to machi or michi- no – eki' s where services are. For a broader range of services people can pick up busses at the no- eki' s (Yoshida, 2018).



On 13 locations now field operational tests are held. And technical verification and business model verification are designated. These are the evaluation topics (Yoshida, 2018);



Please note that there are also pilots with drivers, and that for automated driving sometimes designated roads are constructed. The combination of use of new front- edge technology for explicit

societal goals (transport and accessibility for rural elderly who could not drive, or have lost the ability to drive) is interesting to follow.

CHAPTER 5 LAND USE AND MOBILITY, AND TRANSPORT POLICY FOR THE FUTURE

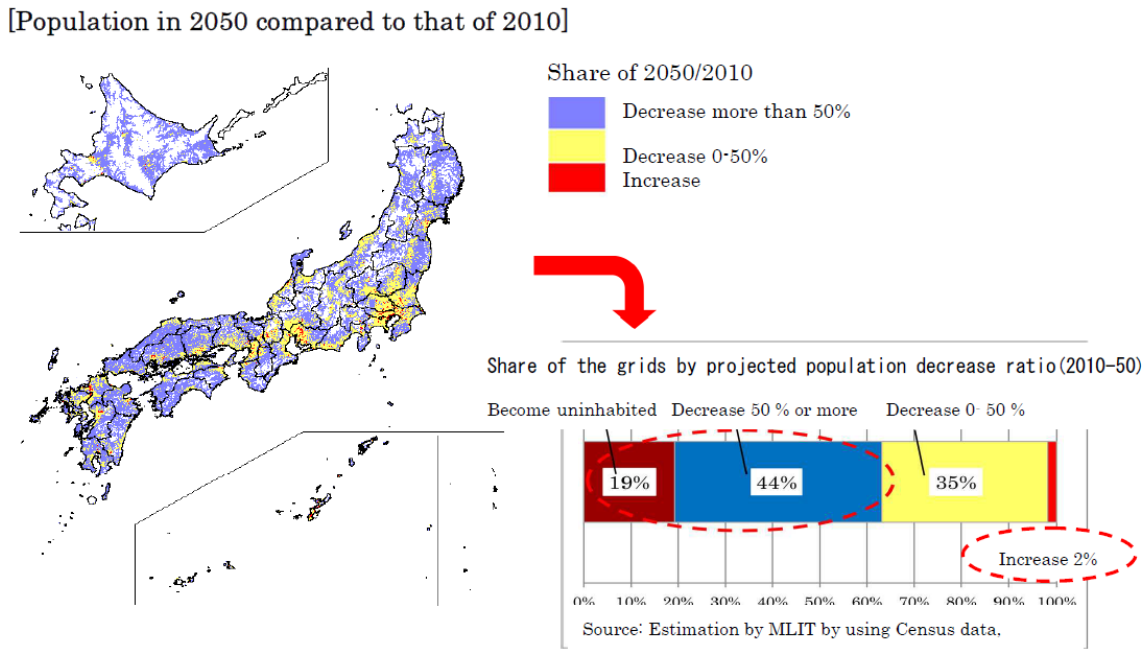
In this chapter the focus will be on newer concepts and on more generic policies. The start is for the spatial planning, and next the planning for sustainability in urban areas will be introduced.

The last element will be the new transport policy of Japan, based on the Transport Act.

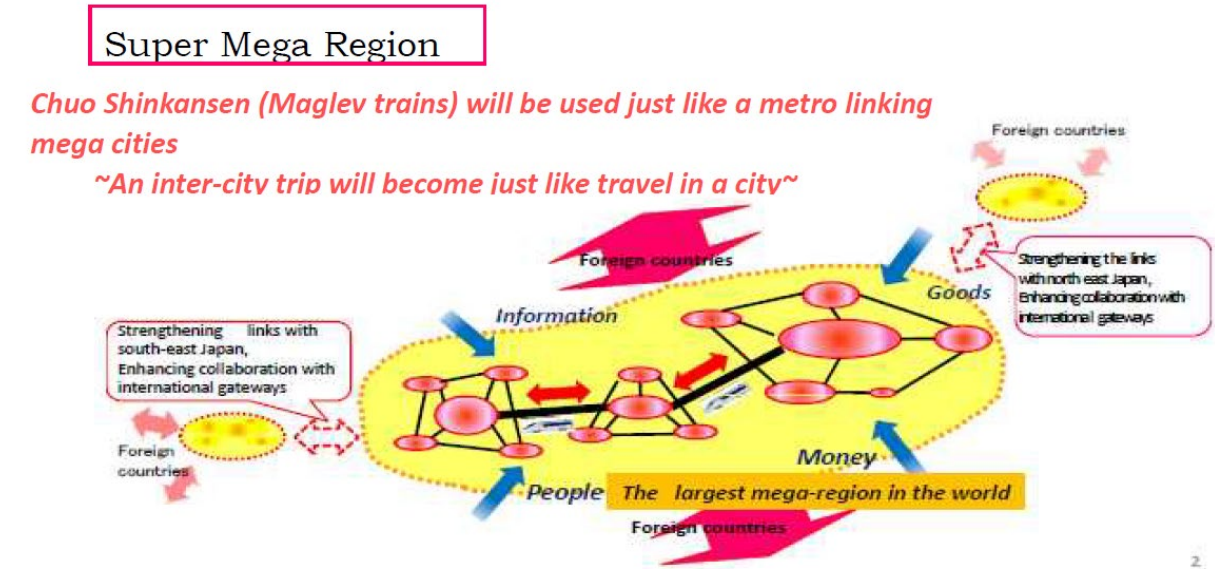
Spatial planning; Grand Design and National Strategy

The Japanese national government formulated in the last 60 years five CNDP's, Comprehensive National Development Plans (Ono, 2008). These plans are long- term physical and spatial plans which identify the ideal state of the Japanese territory on land use, natural and water resources, social infrastructures, industrial locations and tourism. In its core these plans are about the spread of population and resources over the territory of Japan and form a generic framework for spatial planning at the lower levels of governance with a focus on balanced development. The balanced development is not so easy to reach in Japan, as the major urban areas act as magnets for population and investments. A general line in all CNDP's has been to provide the other regions with conditions for economic growth, to create job opportunities in local labor markets, and to diminish excessive rural- urban migration. Recent challenges relate to depopulation, to aging of society and to creating welfare in a globalized world.

In 2015 the national government issued the National Spatial Strategy, in fact the 6th National Plan. This strategy is related to a Grand Design, issued in 2014, presenting a vision on national spatial development towards 2050. Core element in the Grand Design is the population prognosis.



- Creating a supra mega region Tokyo-Nagoya-Osaka



- High grade linking of cities, creating for more interactions between cities
- Creating small stations in rural areas as key for service delivery and regional innovation

Concentrating basic services delivery hubs supporting life, including daily shopping and medical services at former elementary schools, or town halls.

Sustaining regions by the networks of transport and information

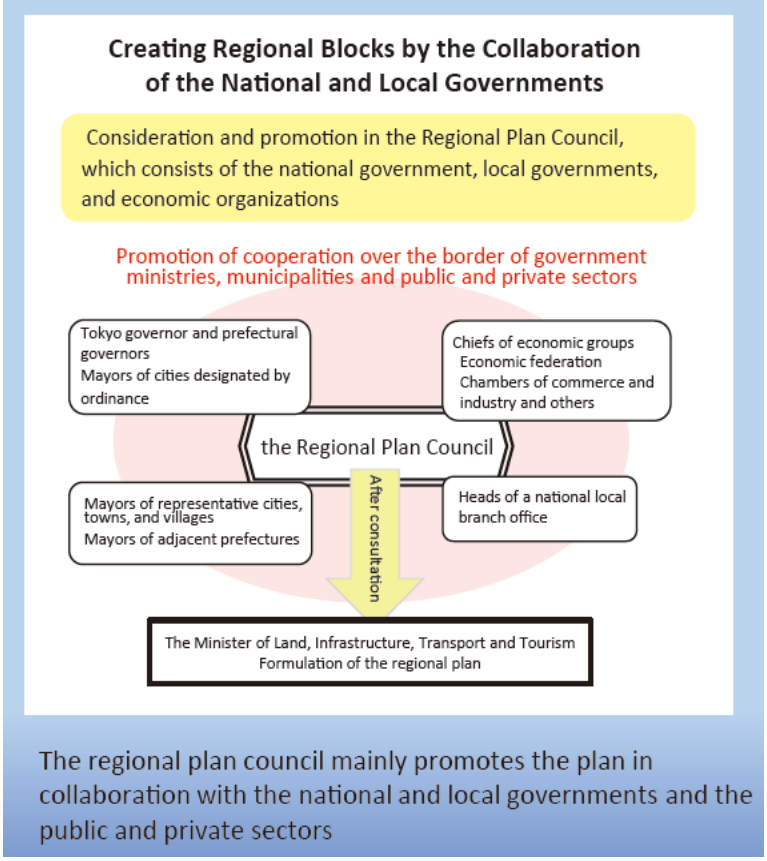
Creating new employments in collaboration with the existing "roadside stations", as centres of regional innovation, or diverse actors producing local specialties by bridging primary, secondary and tertiary industries, the "sixth industries", and promoting locally based renewable energy generation.

In the National Spatial Strategy (2015) this Design is translated for the first period and three interactions are seen as central; between urban and rural areas (with focus on promoting people 's flow from urban to rural), between rural cities (sharing roles in maintaining high levels services in a declining population), and between the large metropolitan areas (developing a super- mega- region triggering innovation). And in the National Strategy the theme of compactness is introduced. Decision makers in Japan fear the situation that with population decline the population density decreases, creating problems with service provision, accessibility, and far more car dependence and car travel. Third important element is to correct the excess concentration in Tokyo, jointly with keeping its position as an economic and innovation powerhouse.

Interesting to note is an extra strategy, that is non- spatial and is related to increasing the levels of women and aged in the labor market (Kaneko and Kiuchi, 2017). This is called ; "reconstruction of communities to live both children and elderly people" and can be seen as a community building approach that needs implementation. It is relevant that this theme is included as ; *"In order to build a society where people can fully demonstrate their capabilities irrespective of gender, we must realize a society where women can actively participate. Compared with Western countries, Japan sees a higher percentage of women quitting jobs on the occasion of childbirth and a lower employment rate for women with children. To allow women to realize their hopes to advance their careers even after childbirth, we will seek to realize a society of women's active participation, enabling women to work*

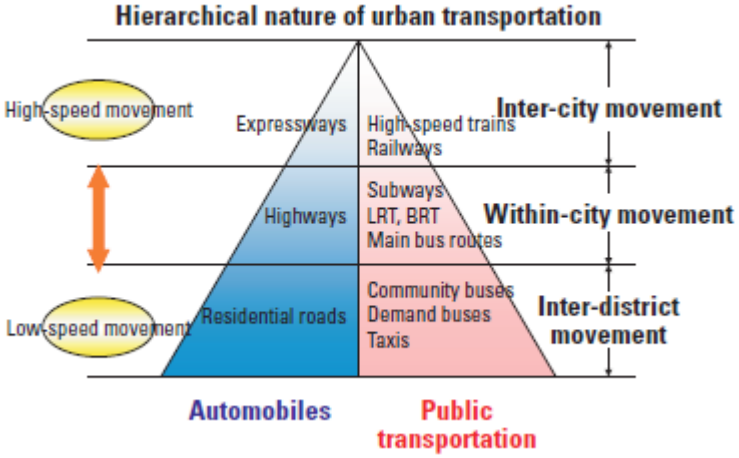
easily and bear and raise children while working. From the perspective of national spatial development, therefore, we will attempt to build communities where residences are close to workplaces and childcare facilities or communities that support childrearing. We will also seek to promote telework to improve the employment environment. In addition, it is important to encourage women to start up business. Women's implementation of work styles to harmonize their work with childrearing can be expected to hope among young people ".

How is implementation of this National Spatial Strategy foreseen? In the spatial planning line, there will be 8 regional plans created, and this works via interaction. The process is clarified in a note from MLIT.



For each of the blocks a number of vision points are presented as a starting point for these regional plans. For example for the Kinki Area (Osaka-Kyoto-Kobe) the base is interaction through history and innovation, and a strategy on infrastructures is presented.

Mobility and transport should be supportive for the Grand Design and the National Spatial Strategy. Morimoto (2016) clarifies how this could work, and introduces four themes ; compact cities, transit-oriented development, traffic management and transport assessment and next generation transport systems. For this last topic he presents a hierarchical system for urban transportation, striking balances between automobiles and public transport.

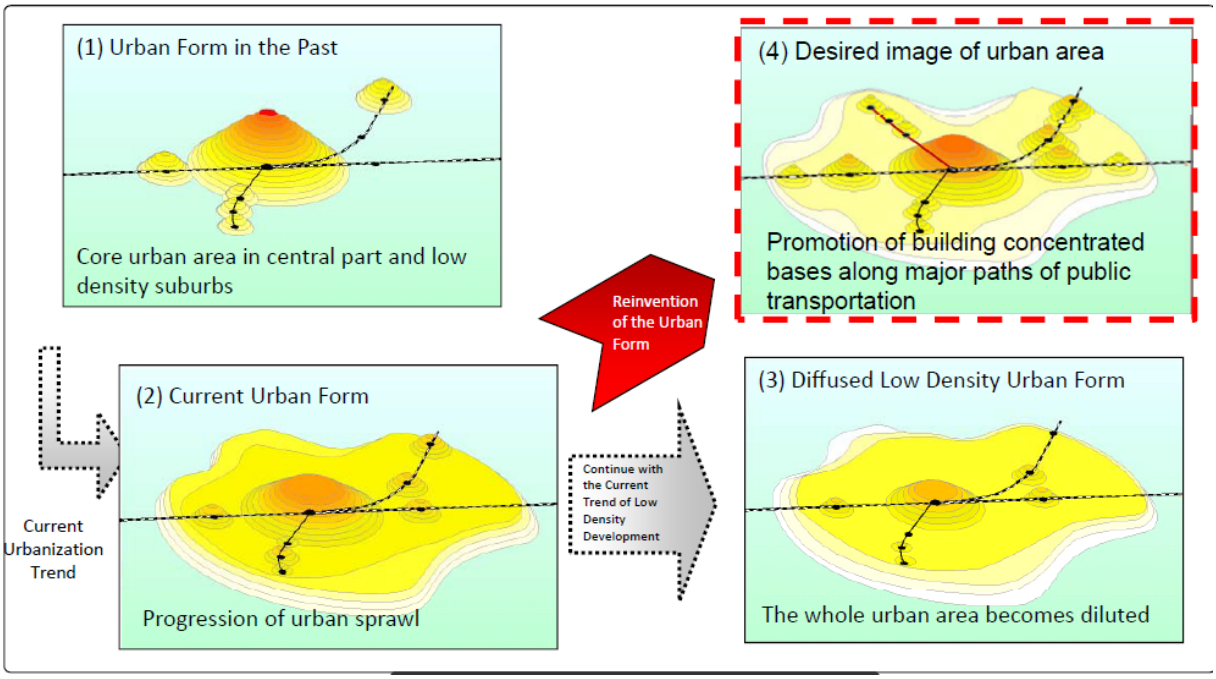


Striving for compactness

Approaching a depopulating society in Japan the realization of compact cities is considered necessary. This realization has two objectives; keeping costs of services acceptable and keeping accessibility at normal levels, and creating more sustainable cities. For this last objective other words are often used, such as Eco Towns (Foundation, 2017), or Low Carbon Cities (Onashi and Kobayashi,eds, 2011).

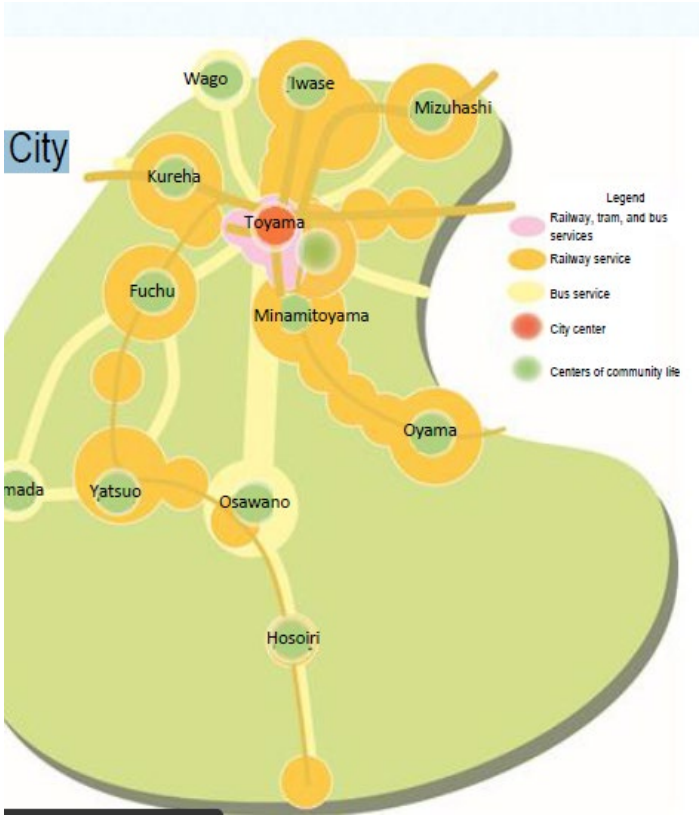
Starting with compact cities, their main objective is to keep costs of maintenance and delivering services low, in a situation could increase with the decrease of population densities. To give a few examples; public transport will decrease with lower populations that can be reached within a certain time frames, and large scale housing complexes could face a lack of occupants. Japan has now already many empty houses, figures for 2008 (MIAC, 2008) are 57,6 mln. houses of which are empty 7,6 mln. (is more than 13 %). City centers in the regional cities are also facing problems, not only from declining numbers of customers, but also because commercial facilities tend to relocate in old factory sites and in suburbs.

On paper , the strategy is rather simple, and is about building concentrated bases along major

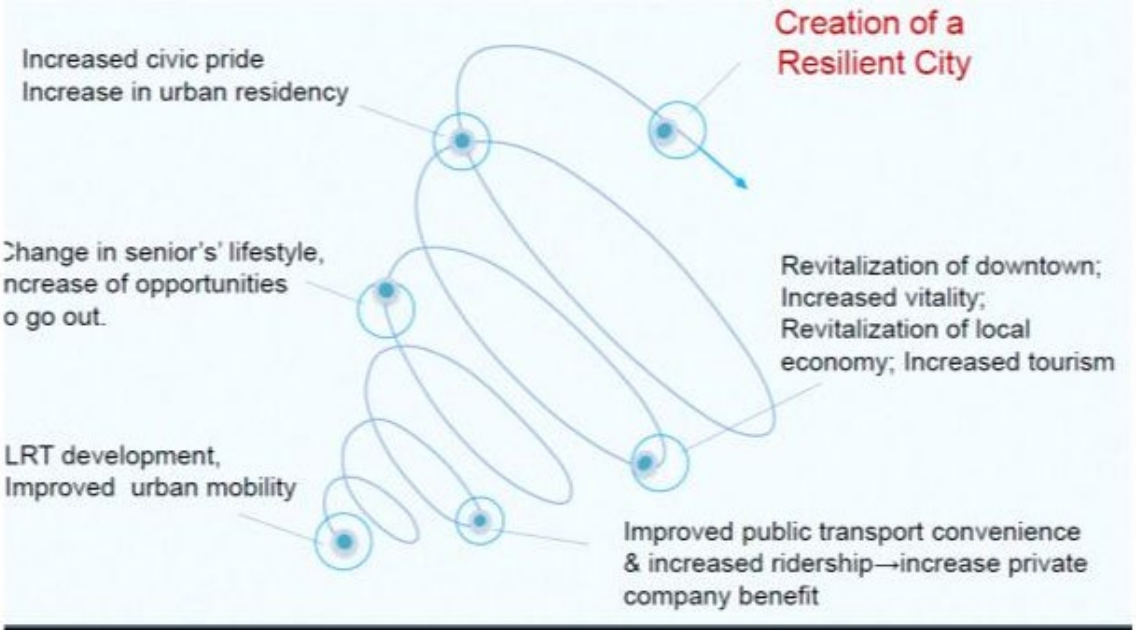


paths of public transport. But is reality it mains restructuring of housing stock, removing old premises, and trying to convince households to relocate. Many investments will be needed.

Japan has a showcase on compact cities, and this the only hype I noticed in Japan. The city is Toyama, a middle sized city of 400.000 inhabitants (Mori, 2014, PWC, 2016) The population density of this very car oriented city was very low, and population is declining rapidly. A new and very active mayor concluded a complete urban redevelopment strategy, called “dumplings and skewers”. Dumplings are the central hub areas, and the local hub areas. Dumpling are connected by Light Rail Transit and modern busses. Huge investments were made, and there is (new for Japan) a transportation discount program for senior residents. Ridership on public transport increased in the last decade, as are population densities, with population shifts back to the center. Great investments were needed, but Toyoma is moving in the wished direction.



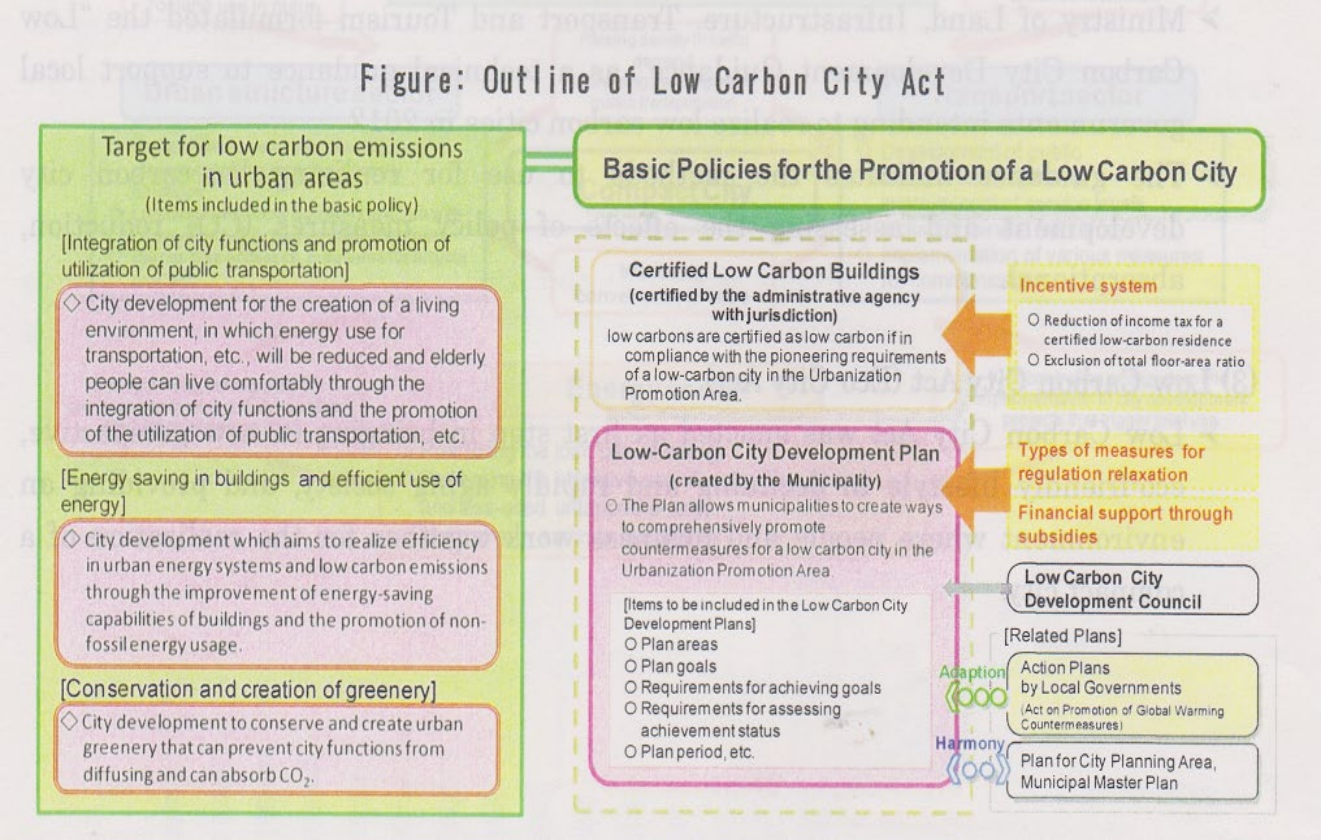
This the spiral that is expected.



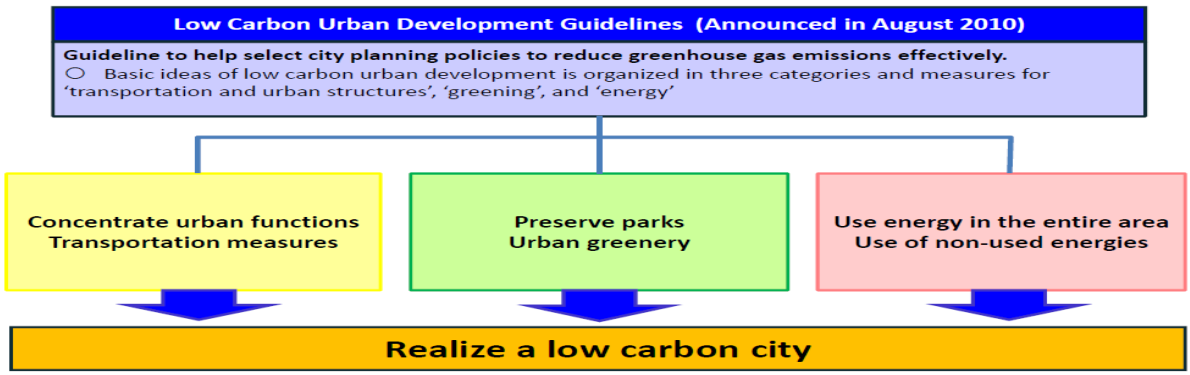
However, the fact that Toyoma is always presented marks the possibility, but also the difficulty, in creating compact cities. This is not about concepts, but also about investments and reluctance to

move, as systematic shrinkage is not popular. Relocation of population accompanied by coercive force and voluntary incentives takes time and effort. The processes of relocation of residents followed by depopulation of the area is a key process, with only minor past experience (Kaneko and Kiuchi, w.y.).

The other objective for compact cities is related to sustainability, or to smaller to decreasing CO2 emissions. Makido, Dhakal and Yamagata (2012) did research on the relationship between urban form and CO2 emissions and published evidence from 50 Japanese cities. Less fragmented and more compact cities produce less CO2 than sprawling cities, and less complex cities produce less CO2 than more complex cities. Thus, the best CO2 performance is reached by somewhat smaller, denser cities. These are also target cities for the Low Carbon Cities approach.



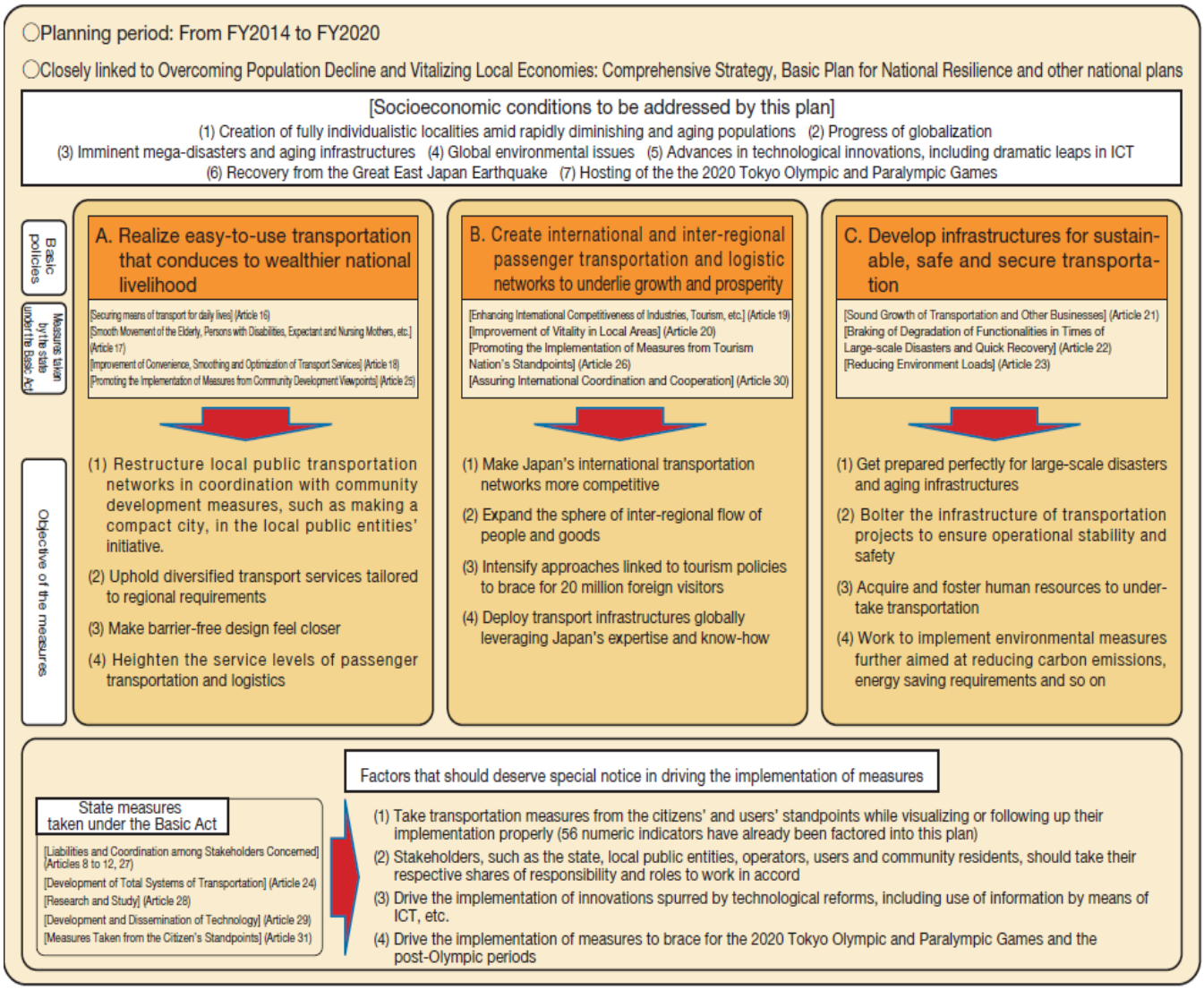
This act sees upon urban energy systems, low carbon building, and preserving greenery, and municipal plans for low- carbon city development can get financial support (Foundation, 2017,42).



Whereas the Low Carbon City is meant for the three objectives of green and energy, the Eco Model Cities program is broader in scope. Next to CO2 emissions the selection criteria are related to handling environmental, ultra- aging and unique regional issues. There are now 23 of this type of cities. In this program there are many cities that are situated in the Fukushima disaster area. Although especially this program could be seen as related, Japan has as yet no Smart City strategy on its own.

Transport policy of Japan

Japan decided in 2013 on a Basic Act on Transport Policy. This Act has five key policy areas. These five areas have been comprised to three pillars in the First Basic Plan on Transport Policy, based on the Act, and published in 2014 (Ministry of Land, Infrastructure, Transport and Tourism Japan,2014). Two pillars are almost the same as in all other countries; establishing international and interregional passenger and freight systems as a basis of growth and prosperity, and creating safe and sustainable transport. But the third pillar (pillar A) is the interesting one, as it is about the creation of easy to use transportation which contributes to the rich lives of citizens.



For the total plan 93 key performance indicators have been developed, of which 11 relate to this pillar;

Target	Intent	Performance indicators
Reconstruct the regional transport networks under local governments' initiatives, coordinating with town planning policies	Vitalize local public transport services under coordination with relevant measures to create active and unique communities, taking into account population decrease, super-aging, and reliance on automobiles.	Regional public transport network plans： 100 plans On-demand transport services ： 311 municipalities (2013) 700 municipalities
Encourage deployment of various transport services taking into account local circumstances	Provide new transport services with convenience, comfort, and efficiency responding to changing society with population decrease and super-aging	Proportion of light rail vehicle ： about 25% (2013) to 35% Community cycle： 54 municipalities (2013) to 100 municipalities
Make barrier-free transport more familiar	Realize the smooth transportation in the super-aging community and the society where all can participate in, considering Tokyo 2020 Olympic and Paralympic games.	Accessible bus ： 44% (2013) to about 70% No gap on major railway stations： 83% (2013) to almost 100% Platform doors ： 583 stations (2013) to about 800 stations Indicators
Further raise the service levels for passenger transport and logistics	Improve worldwide leading field in transporting people & goods to help realize the rich lives of the citizens	Prefectures where interoperable transport smart cards not available： 12 prefectures (2013) to 0 ・Number of lines with bus location system： 11,684 lines (2014) to 17,000 lines

There is also a relation with the National Infrastructure Plan, that was enhanced in 2015. This Plan has been developed in coordination with the National Spatial Strategy and the Basic Plan on Transport Policy.

This all is a rather rich framework, not to be found in other OECD countries. However, Shibayama (2017) presents a caveat to too much optimism, as Japan's transport policy is still too much single mode oriented, and most criteria are relatively easy to be met.

Japan's transport policy takes a route to inclusiveness. In this respect, in an article the transport situation of elderly in Australia and Japan was compared (Somenahalli et. al, 2016).

Ageing issues are seen in Japan as opportunities rather than as burden, creating platforms and bringing resources and technologies. It is seen as important , and conditioned by law, to build barrier-free passenger and traffic facilities, vehicles, homes and public facilities. To cite ; "another important difference in Japan's public transport's policy is that the developments are planned as social infrastructure responsive to the ageing society and not just to increase competition with car usage". Social inclusion related to transport is high on the agenda and it should be reminded that the roots for this state of art are long standing. Japan has never introduced neo- liberal ideologies, but remained to its own social policy, in which the family and solidarity related to location have important roles.

CHAPTER 6 THE INSTITUTIONAL SETTING OF MOBILITY POLICY

This chapter is shorter and less fact- based than the other chapters of this report. It contains a number of insights that I obtained on how Japanese (mobility) policy in relation to society functions.

Planning Culture

Japan definitely is a planning culture. The future and its challenges are never far away. Making plans and programs is seen as normal. There is spatial planning, transport planning, planning for decline and for decreasing population. For almost all themes mentioned in this report there are objectives, targets, laws, procedures, guidelines, programs formulated. It looks as if societal challenge cannot be met without doing all this useful work.

Culture of deliberation and consulting

Policies from governments and companies seem to be developed in joint efforts. I did not notice fights between public and private organisations in the domains I studied. Many colleagues I spoke were in some way involved in advisory units, boards or dialogue platforms for the themes they studied or researched. I had the idea that in Japan creating common narratives is considered important, immediately from the start of a theme.

Governments are there to endorse, follow and structure

Which means that other stakeholders are leading. I felt that within urban regions the role of railway companies was very important. And I noticed the great influence of car companies and car related networks in designing and defining global warming policies. Also important are joint structures, with public and private interests combined.

Policy formulation is immediately from its start technical oriented

When a policy has to be defined, or a new policy designed, from the start the dialogue is near to the available research and knowledge. Designing policy on the basis of hypes, expectations and nice sounding but not elaborated concepts looks non- Japanese. I noticed a lack of consulting companies and start-ups, often motors of forms of hype oriented policy making.

Technology development is from the start related to societal challenges

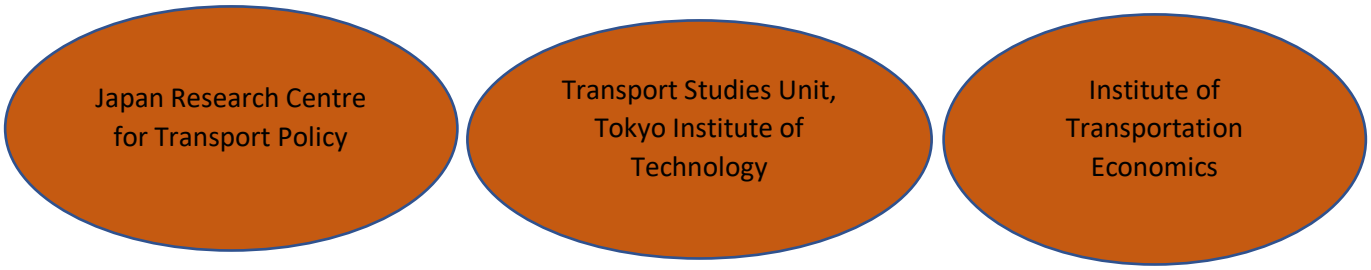
Whereas in many OECD countries technology development seems to be a stand -alone activity, at best leading via forms of high- level tinkering to patents and customer products, or related to enterprise and private party interests, in Japan I noted the vision that technology should be from its start helpful and supportive in reaching the common good defined in societal goals such as social inclusion, or helping the aging population.

A network of knowledge institutes related to policy design and implementation exists

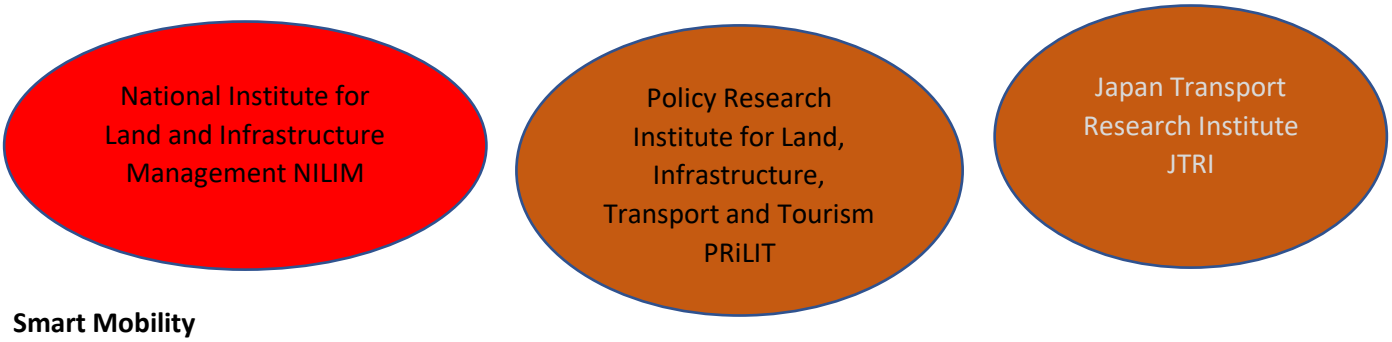
There is a well - defined structure of knowledge institutes and universities related to the policy formulation. Often these institutes do function as think thanks from the government, or are related to government funding. In a figure ;

Sustainability

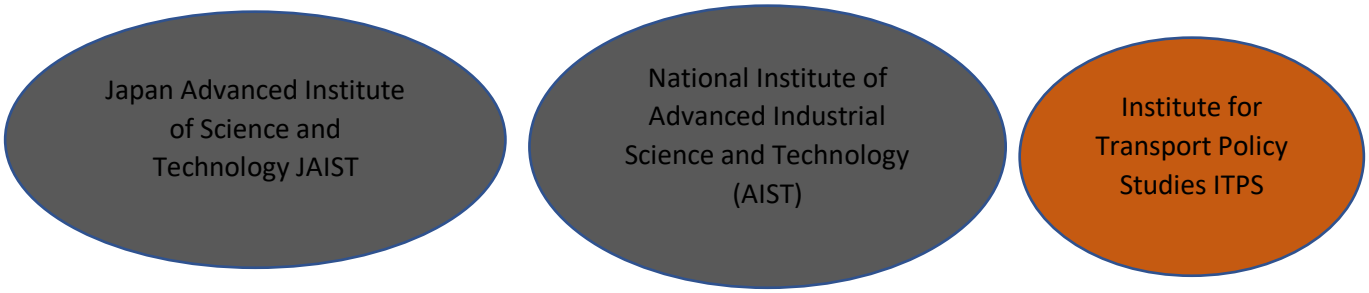
Transport research and policy



Urban Planning and Mobility



Smart Mobility



Accepting the full price of mobility

Japanese households consider paying the full price for rail service or for road use (with tolls) as normal. They do not see the provision of public transport or roads as a government responsibility. Part of their payments return to them via their employers. This situation blocks solutions that need forms of subsidy in mobility.

Low support for neo- liberalism and Anglo Saxon style solutions

Japan sees society not as existing from lonely particles. In Japan “there is such a thing as society”, to contra- quote Margaret Thatcher. Tradition and inclusion of all people is a motor for policies. Efficiency is not a prime objective, clever organisation is.

Trying to remain as independent as possible

I get the idea that part of the Japanese strategy on vehicles and CO2 finds its rationale in trying to remain as independent as possible from foreign companies and foreign countries. On energy this is a long standing culture (Chrisstoffels, 2007)

“Be good and tell it” is not very Japanese

It did strike me how far advanced Japan is in its formulation and implementation of working policies for transport and mobility, whereas there seems to be no felt need or strong wish to communicate on this performance with professionals from other OECD countries. A lot of important reports and research results are only available in Japanese.

Hierarchy and even more experience are cherished

Japan misses the new and rather strange idea that “science is also only an opinion”. I saw no development in the direction of “alternative facts”. And I noticed that younger, less experienced researchers and policy people look up towards their peers. Blunt and well communicated radical insights do not receive an enthusiastic reception.

All in all, I really like policy formulation Japanese style. I think a lot can be learned here. And I consider the Dutch style of policy making, often related to joint effort and consensus building as nearer to the Japanese style than most styles in other OECD countries. However, the Dutch preference for explicit debate is unlike the more introvert Japanese start.

CHAPTER 7 LEARNING FROM JAPAN

Research on the implementation of sustainable mobility and smart mobility in the richer OECD countries brought me on the road to Japan. I was struck by the performance of Japan, and even more by the lack of attention for this performance among researchers from other countries. Most transport researchers in the world work from rather undefined Anglo-Saxon frameworks, mostly based on (implicit) neo liberal insights. Chinese researchers publish much in English, so they are taken into account, but most dominating researchers tend to forget research published in other language areas, and thus tend to forget experiences, practices and performances in for example France, Germany and Japan. I consider this a real abuse, and I brought in much German and French research in my new book *Inclusive Transport* (to be published end of august 2018 with Elsevier), and I wanted to visit Japan.

What was the specific performance of Japan, that I noticed in the literature? Four elements ;

- The best performance on decreasing CO2 emissions from mobility and transport
- The best performance for public transport in the modal split in the richer OECD world
- The societal embeddedness of transport and mobility policies
- An elaborate network of institutes and professionals working on smart and sustainable mobility.

After my visit I must state ; I have not been disappointed. Yes, on some topics the picture is not as successful as expected, and I came across real mobility problems of Japan B, the other part of Japan, even less well known to most mobility researchers. But Japan is a country where much can be learned.

In this final chapter I will present ***five areas for learning***. For me personally, this was the first introduction, and from now on I will remain very attentive on Japan's performance in mobility and transport themes.

1. ***Creating urban areas with high shares in public transport (above 30 %)***

In Europe we want higher shares of PT in modal splits. And we make plans, have stimulation programmes. I would advise ; visit Japan. Japan A is the "real life " for bringing public transport and its related institutions and companies in the first position.

2. ***Elaborated and well balanced policies on vehicles, renewal, and global warming***

Japan does not like hypes. But Japan wants to reach the global warming objectives of Paris, and is fully committed to create the best routes towards these objectives. That means ; working on a complete package of renewable energy, electric vehicles, great increase in fuel efficiency, fuel cell technologies, not choosing only one route to follow. Governments and industry create common grounds and common narratives. I put my cards on Japan, and not on our Dutch approach, too much focussing on electric driving only.

3. ***Smart mobility for societal goals***

Smart mobility is not seen primarily from a technological perspective. On ITS, on research for automated driving, on field operational tests not technology is leading but the function of all new elements in reaching societal goals such as more safety for the aging population, better accessibility of rural areas, or social inclusion.

4. ***Planning for decline***

Japan will be the first country experiencing huge population decline. Japan is at this moment busy with creating objectives, planning, visioning for coping with decline. How to create a thriving and flourishing society when the population is decreasing. Japan will be experienced when European countries will start with population decrease. Especially for the Netherlands, in the next three decades the population will remain around 18 million inhabitants, which will lead to decreasing populations in many areas. There is a lot to learn here. What will work, what will fail? Is for example systematic shrinkage possible?

5. ***Creating a functioning network of institutes and professionals***

It looked as if in Japan the leading people in smart mobility and sustainable mobility work in and from the same framework, and work on the same narratives. Discourses are more technical and less based on wishes and nice sounding ideas than in the Netherlands. And the distance between ideas and implementation seems smaller in Japan. Japan also has a planning culture, but planning leads In Japan to action and important investments, and not to new reports and only smaller pilots. Japan lacks the intermediate world of consultants, with are often more busy with their own portfolio than with creating magnitude. And smart mobility and sustainable mobility now need magnitude, in behavioural change, and in investments. The time for discussing concepts is over!

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