INTELLIGENT AND SMART ACCESS – A WAY TO INCREASE THE BENEFITS AND EASE THE IMPLEMENTATION OF HIGH CAPACITY TRANSPORT (HCT)

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Abstract

The final report 2019 of the OECD/ITF working group on HCT pointed out Intelligent Access (IA) as one of the most important tools for regulatory compliance and for acceptance among policy makers, stakeholder, and citizens. Few countries had followed Australia.

Since 2019, the interest for HCT has accelerated, because 33% CO2 reduction by adding one more trailer. IA is often a prerequisite for HCT and by combining HCT Access Schemes with Compliance Assurance Schemes HCT is integrated with the entire traffic system.

Based on ITF Transport Outlook 2021 a radical decarbonisation reform is proposed. Maximal allowed CO2 emissions per tonkm is required and the saving from lower operating cost of a HCT vehicles is shared among the operator, the road owner, and the government.

Fast growing/developing countries could benefit from HCT with IA since infrastructure expansion is lagging, and accident rates are high. More infrastructure could be built for the same money, if the contractor stipulates HCT for vehicles moving masses as rocks and earth.

Keywords: HCT, High Capacity Transport, Intelligent Access, Smart Access, Access policies, climate change, CO2, decarbonisation, Corona pandemic, Performance Based Standards, Compliance, fast growing countries, developing countries

1. Introduction and background

The ITF/OECD working group on High Capacity Transport (HCT) started its work in February 2016 and delivered the final report three years later in May 2019: *High Capacity Transport: Towards Efficient, Safe and Sustainable Road Freight.* https://www.itf-oecd.org/high-capacity-transport

The working group was initiated in 2015 by Sweden with support from Australia. Participating funding countries included Australia, China, Denmark, Finland, Norway, and Sweden. Institutes and experts from France, New Zealand, South Africa, and the United Kingdom also actively contributed to the work.

The working group was chaired by Jerker Sjögren, senior consultant at Jesjo Konsult, and facilitated by Raimonds Aronietis and Tom Voege of the International Transport Forum (ITF) at OECD.

By HCT we mean allowing longer and/or heavier vehicles, than are currently allowed for general access on most highways, to operate on part of the road network. Other terms for the concept are HCV (High Capacity Vehicles) and HPV (High Productivity Vehicles). Such vehicles, depending on their overall length and maximum combination mass, are normally only allowed on certain parts of the road network and there are special requirements on both the vehicles and the operation thereof. There has been significant progress during the past few years regarding a wider acceptance of the idea of longer and heavier vehicles on dedicated roads. Several countries worldwide have introduced the HCT concept or are testing it.

The working group stated that the transport sector at that time was facing two extremely severe challenges:

- Transport demand increases faster than infrastructure capacity.
- Transport has very large impact on climate change.

The working group stated also that HCT can help the transport sector and society in general to tackle these challenges. Using vehicle combinations that take larger payloads is one of the most practical options available for accommodating an increase in transport demand and simultaneously contribute to decarbonising transport. They lower fuel consumption and thereby emissions per unit of cargo transported. HCT is probably the only measure that can be quickly implemented and to a relatively low cost.

2. Focus areas for review and analysis

The working group’s final report presents a broad, global picture of the use of HCT, looking at various types of transport operation and vehicle combinations, the trends in engineering and logistics, as well as the development of new regulatory frameworks, strategies, and road maps for HCT reforms in different countries.

The ongoing developments and discussions on the HCT concept cover a wide span of issues both on national and international levels. For this study, the working group decided to concentrate on following focus areas:

- Market and impact assessment (potential, business cases)
- HCT´s impact on modal shift

- Infrastructure (impact on roads and bridges, network access)
- Traffic safety
- Compliance (driver support, monitoring and enforcement, ITS, and telematics)
- Performance Based Standards (PBS)
- ITS as an enabler for the use of HCVs

Review and analysis on recently completed or ongoing research activities and pilots were carried out for these focus areas. Despite the potential benefits there is often opposition to the introduction of HCT reforms. Modal shift, road safety, and bridge structures are often perceived as important barriers to the introduction of HCT. Therefore, special attention was given to studies concerning potential risks in these areas.

3. Results – what we found in the ITF/ OECD study

Several countries have introduced HCVs or are considering implementation. Such vehicles can be designed to operate on existing roadways with limited or no additional infrastructure investment to accommodate them. They can contribute to improving the efficiency and safety of road transport operations and reduce transport costs and energy demand. Advances in information and communication technologies (ICT) ease the introduction of HCVs by allowing better support to operators and drivers and more comprehensive monitoring of vehicles and the operations of them enabling enforcement of the conditions of access to the road network.

Increased use of HCVs contributes to the decarbonising of transport. They have lower fuel consumption and emissions per unit (volume or weight) of cargo transported and reduce the number of trips required to move the same amount of freight. They also reduce costs. Other things equal, this may lead to lower prices for road transport which in its turn tend to result in additional freight demand, yet the effect is likely to offset only a small part of environmental gains. Where there is head-to-head competition, HCVs will enjoy a greater advantage over competing modes than standard trucks. However, positive impacts on rail freight have also been observed in intermodal markets, as HCVs can extend the reach of rail services and serve as backup when the train is full, goods arrive late, or the rail operation gets delayed. Additional research on intermodal freight, where trucks both at the ends and parallel are an essential component, is needed.

The impacts of HCVs on road transport infrastructure can be efficiently managed using three approaches. First, the vehicles can be designed using performance-based standards (PBS). This ensures their performance meets pre-defined characteristics suited for the existing or planned road infrastructure, most notably for bridges. Second, HCVs can be fitted with more axles than standard vehicles to ensure that road loading per axle is less than current norms. Third, the use of ICT can ensure high levels of operator support and monitoring to ensure regulatory compliance in the operation of these vehicles. This applies even in regions and countries where compliance is not the norm in the trucking industry.

The safety performance of both the HCVs themselves and the operation of them is significantly better than that of the conventional freight truck fleet, as revealed by the review of existing HCV programmes and data from Australia, Canada, South Africa, and several European countries. The improved performance of HCVs also depends on how they are managed. This includes training to improve driver skills, additional on-board safety systems, and limiting the operation of HCVs to certain routes, axel and gross weight allowances, and speed limits. As HCVs typically cost more to buy than standard trucks, operators have strong incentives to use them in an efficient and safe manner. Here we have concrete examples from for instance South Africa and South America.

Several policy options exist for allowing HCVs onto roads. They include PBS and flexible policies on size and weight. Australia and Canada provide examples for different approaches to PBS, which demonstrate the degree of flexibility that exists for delivering significantly improved road freight transport in terms of efficiency, safety, road space, and environmental performance.

In summary, most HCT reforms consist of the following four parts:

- Roads, bridges, and streets adapted for allowing specific HCT vehicles.
- Performance and technical specifications of these specific HCT vehicles
- Requirements on operating these specific HCT vehicles on this specific HCT road network.
- A comprehensive legal, institutional, and telematics framework for the above parts, including support to drivers and operators, monitoring of compliance, and sanctions for violations.

4. Recommendations in the ITF/OECD study

Based on the findings and analysis the ITF/OECD working group in the final report 2019 gave three concrete recommendations to countries and regions:

- *Use the potential of High Capacity Vehicles to increase transport efficiency, reduce traffic volumes, lower emissions, and achieve improved safety outcomes.*

High Capacity Vehicles provide an opportunity to improve transport efficiency by increasing the cargo capacity of the vehicle, carrying higher mass, volume, or both. Fewer truck trips are required per freight task, which reduces truck travel, lowers carbon dioxide and NOx emissions, cuts fuel use, reduce congestions, and lowers shipping costs.

- *Use well-monitored trials to introduce High Capacity Vehicles on a limited, dedicated road network.*

The most effective way to introduce HCVs is through trials coupled with a well-structured, independent evaluation. Investing in reliable data provides an objective means of assessing the value of HCT to policy objectives. Good data also provides a way to determine whether modifications to access conditions for HCVs are required. This approach delivers the objective evidence policy makers require for determining whether to deploy HCVs on a continuous basis, and weigh advantages in relation to global, national, regional, and local interests. Some level of data collection activity should continue after completion of the trial period to provide policy makers with objective data to support future decisions.

- *Configure High Capacity Vehicles for the specific application and dedicated road network in which they will be operated.*

HCVs are not a one-size-fits-all solution. They are sophisticated vehicles designed to optimise freight transport. To ensure HCVs provide full societal value they should be configured to provide maximum benefit for specific task and road network in which they will be operated.

Coupled with ICT solutions, driver and operator support, and compliance with the specific regulations of a given road network can be improved. ICT can also help building trust at the local community and road owners - ensuring that HCVs can be allowed with confidence on infrastructure, including bridges, designed to prevailing specifications.

5. Developments after the ITF/OECD study

The transport sector is currently facing three major challenges. The two challenges identified by the ITF working group in 2019 are still there. A new challenge occurred in Spring 2020 – the corona pandemic – with expected substantial long-term impact on global trade and transport:

- Transport demand increases faster than infrastructure capacity.

According to the OECD/ITF forecast trade and freight traffic levels will continue to grow in all countries. Freight transport demand across all modes, and especially land-based transport, is expected to increase by a factor of three by 2050. Most growth is expected in Africa with a factor of five, Asia and South America with a factor of three, where transport infrastructure is poor and funding for new infrastructure limited. Increasing the capacity to accommodate that growth by investment in new infrastructure alone will not be possible. (ITF Transport Outlook 2017). Experiences from both Australia and Finland show that transport work in tonkm can be increased without increasing the number of vehicles on the roads measured as vehiclekm. Hence, a smarter use of the limited infrastructure is called for to avoid costly congestions.

- Transport has large impact on climate change.

Scientific literature and government reports make it clear that climate change is accelerating. Reaching the ambitious COP21 objectives agreed in Paris depends largely on the deployment of cost-efficient, high-performance technological and non-technological solutions to reduce CO2 emissions. Truck transport is the largest contributor of CO2 emissions from freight within the transport sector. In the European Union, heavy-duty vehicles are responsible for about 5% of total CO2 emissions of which roughly 50% is generated by regional delivery and long-haul transport.

- The reopening after the Corona pandemic puts new requirements on transport.

The Corona pandemic resulted from Spring 2020 in lock down, economic recession and great decrease in global transport. The lock down to mitigate the pandemic also caused almost empty streets with very little traffic. This made people and policy makers realizing the negative impacts of motor vehicles in cities on space requirements, harmful emissions, noise, safety, and not only on climate change. Sidewalks were widened to enable social distance, some traffic lanes were reserved for bicycles, zero emission zones and traffic free zones expanded, and for instance in Europe new policy instruments as Urban Vehicle Access Regulations (UVAR) (Ricci, A. et al 2017) and Sustainable Mobility Plans (SUMP) were becoming more prevalent. The EU-commission now urges for including the freight dimension to a larger extent. (ReVeAL, 2021 and ELTIS, 2021) All these to make cities more liveable. These changes are here to stay and since the first and/or last mile and sometimes the whole HCT trip is in urban areas, HCT reforms must adapt.

HCT can help the transport sector and society in general to tackle all these challenges. Using vehicle combinations that takes larger payloads is one of the most practical options for accommodating an increase in transport demand and simultaneously contribute to decarbonising transport and making cities more liveable.

HCT is probably the only measure that can be quickly implemented of all the ones proposed for decarbonisation of road freight. Much of the existing prime movers and trailers can be modified and recertified to be combined with dollies or links into HCT vehicle combinations that can take larger payloads. Preferably, the internal combustions engines of the prime movers are converted for using non fossil fuels, as biogas from waste and diesel made from rest products from the forest industry. To switch to new types of power sources as electrical engines combined with batteries or fuel cells with hydrogen tanks require much more time and cost and is very difficult to retrofit. However, electric power units should be required for new trucks.

6. Intelligent and Smart Access

One of the chapters in the ITF report is about regulations and enabling technologies for HCVs with a focus on access, driver support, monitoring, compliance, and enforcement.

When introducing HCT as an efficient and sustainable solution for freight transport it is crucial to selectively match vehicle access to the infrastructure, monitor their weights and routes as well as compliance with regulations. In a paper presented at HVTT13 “Compliance Mechanisms for HPVs” the authors gave an overview of various mechanisms that are used in different countries to promote compliance with existing regulations. (Moore, Regehr and Rempel, 2014).

Like the regulations themselves, compliance mechanisms have evolved over time. Traditionally, most countries have employed on-road enforcement methods, though technologies are playing an increasingly prominent role in enforcement programmes, e.g., tachographs for sleep and rest time compliance. One of the most interesting is the satellite-based route compliance that started to be implemented in Australia for heavy vehicles around 2009, the Intelligent Access Program (IAP). As part of the Australian National Telematics Framework, HCT uses applications which provide high levels of assurance that the right truck is on the right road (IAP), at the right time, within the permitted speed (Intelligent Speed Compliance), and with the right mass (On-Board Mass Monitoring).

In Sweden, a similar approach and system including On-Board Mass Monitoring called ITK (Intelligent Access and Control) was developed and tested in a pilot 2017-2018 but placed in mothballs for the time being. The reason was, since the EU regulation 96/53 prevents a nation to require On-Board Mass Monitoring on foreign vehicles, the Swedish operators could not accept that only they were monitored for overloads and not their foreign competitors. However, ITK is now intended to be used in two pilots. One called HCT-city, regarding transport of earth, gravel, and rocks for large construction projects in urban areas, e.g., building tunnels for rails and roads. The other called Digi-Disp, regarding permits for exemptions from access regulations for vehicles carrying undividable goods, e.g., parts for buildings, wind power turbines or heavy mobile cranes.

In the final report the ITF working group pointed out IAP as one of the most important concept and tools for compliance. And, for the process of awareness and acceptance among politicians, policy makers, and people in common to make sure that you have the right truck on the right road at the right time! The working group recognised that so far only a few countries were following the example from Australia and TCA using IAP as an enabler for a bigger and faster breakthrough for HCT.

But things have changed! Since the ITF study was completed in Spring 2019, there has been a continued growing interest for HCT in Europe and other regions and countries triggered by the obvious potential for CO2 reduction. And simultaneous the reduction of congestion, road wear, accidents, and costs. And by that the interest in Intelligent and Smart Access is also beginning to increase rapidly. In May 2019, a workshop was held at the ITF Summit in Leipzig based on the two actual ITF working groups and reports: the working group on HCT and the PELRA project. (ITF 2018. "Policies to Extend the Life of Road Assets", ITF Research Reports, OECD Publishing, Paris). The aim was to demonstrate and discuss how intelligent access policies and HCT could at the same time promote both a reduction in CO2 emissions and more efficient maintenance of the road infrastructure.

With Intelligent Access solutions the introduction and implementation of HCT can be well tailored and integrated with the entire traffic system. Examples in this regard is the RTD-project AEROFLEX (www.aeroflex-project.eu) and ongoing studies in the Netherlands and some other countries.

In AEROFLEX project partners and members of the sounding board have been active to develop a concept for a European IAP. In AEROFLEX IAP stands for Intelligent Access Policies compared with the Australian IAP which stands for Intelligent Access Program. What AEROFLEX has obtained in close collaboration with important European and international actors as ACEA, ALICE-ETP, CEDR, and IRU will be presented in another paper to HVTT16.

What is also very interesting is the continuing development in Australia within TCA and their partners, which includes a stronger focus on transport in cities and new applications. Which means that the importance of IAP for the entire transport system has continued to grow. More on that can be seen at the TCA website. https://tca.gov.au/service-offering/intelligent-access-program

In addition, other geofencing applications in cities are considered and proposed: preventing vehicles from entering pedestrian zones, controlled access to environmentally sensitive zones.

The following subchapters 6.1 to 6.3 are based on Asp, Ohnell, Sjögren, Wandel. 2020.

6.1 HCT Access Schemes

In the Swedish road map for HCT (Asp 2019) the following access schemes for HCT are proposed:

A. New road class: on a limited appointed road network for a specific class of HCT vehicles. E.g., BK4 (bearing capacity class 4) for 74 tons/25.25 m in Sweden. Finland does not yet have different bearing capacity classes, but Norway and Australia have more than the four bearing capacity classes in Sweden.

B. Permanent permit: specific type of HCT vehicles on specific dedicated roads for very long time. E.g., PBS certified vehicles, and transport of ore from mines.

C. Time limited permit: Specific vehicle individuals on specified roads during a limited time. E.g., for research purpose, temporary construction site, forest harvesting every 50 years, and waiting for the road or bridge to be strengthened.

D. Situation adapted permanent permit or restriction: Dynamically adjusted to changed conditions. E.g., reduced maximum axel load when wet road body, increase load when frozen, automatically shift from diesel to electric power train when entering environmental zones, reduced speed over vulnerable infrastructure; at road works; and in pedestrian zones.

E. Permit for one specific trip. E.g., non-divisible goods, heavy mobile cranes, and detour if accident or road works.

6.2 Compliance Assurance Schemes

Most vehicles have GPS and internet connection via mobile network installed from the factory and the others can easily be retrofitted. Australia introduced IAP (Intelligent Access Program) 2003 for school busses in Tasmania and 2009 for HCV (TCA 2020), Estonia started experimenting with VELUB 2010 (Tönts 2018), and Sweden has developed and tested prototypes of ITK (Intelligent Access Control) for HCV and geofencing for busses and lately also trucks in pilots. All these systems are based on already installed fleet-management systems, where authorities get access to data for compliance checking.

In Australia, the monitoring schemes (TCA 2020) offered within their National Telematics Framework are classified into three assurance levels (TCA 2018). In Asp, Ohnell, Sjögren, Wandel. 2020 the following scheme for compliance assurance was proposed:

1. Self-regulation schemes, e.g., the Road Transport Management System (RTMS) in South Africa
2. Roadside control with sanctions with higher frequency for HCT vehicles than for others
3. Driver support & warning, e.g., geofencing with on-board load indicators
4. Report position and weight data without IDs only for statistical purposes, e.g., RIM in Australia, VELUB in Estonia, and the statistic version of the proposed system ITK in Sweden. TCA assurance level 1.
5. Report position and weight data with IDs. Independent audit of operators with high-risk scores are performed where the collected data is combined with other data sources: E.g., TMA in Australia and tachograph audits in EU. TCA assurance level 2.
6. Independent certification of onboard equipment and oversight of telematics provider with 100% audit using non-compliance reporting afterwards where the data is valid in court, e.g., IAP in Australia. TCA assurance level 3.
7. The speed of the vehicle is reduced, or the vehicle is forced to stop when dangerous violation of access rules occurs.

#2 is the most common one but very labor intensive, expensive, and vulnerable for bribes.

#3-7 are often called Intelligent or Smart Access Schemes.

6.3 Combining a HCT Access Scheme with a Compliance Assurance Scheme

All HCT reforms and access schemes have so far mandated some extra means for compliance assurance to avoid accidents and road damages. This is illustrated in Table 1 below:

Table 1 – Combinations of HCT Access Schemes and Compliance Assurance Schemes

Compliance\Access	A	B	C	D	E
1		a			
2					
3					
4			b		
5					
6					
7					c

Some examples:

a. PBS (B) permits in South Africa requires RTMS (#1)
b. Temporal permit (C) to take more loads when moving earth and rocks when building the subway under Sydney in Australia requires RIM (#4). Treiber and Bark 2018 show a potential to improve productivity and reduce CO2 by 50% by using HCT for transport of soil and stone at construction sites. This will be tested in a demonstration project using HCT for mowing masses in urban areas (C) requiring ITK Statistics (#4).
c. Stopping a vehicle (#7) entering a pedestrian zone (E) or even a sidewalk was demonstrated in Stockholm in 2018 as a policy response to the terrorist attack killing five the year before. Now that active speed control system, an application of geofencing, is used for busses to allow them to drive with reduced speed over a vulnerable bridge in Gothenburg and in several other use cases.

7. Amended recommendations

Earlier in this paper three concrete recommendations from the ITF working group based on their findings and analysis on how to introduce and implement HCT in a good way were presented.

Based on what is new since the ITF/OECD report was published, as written in chapter 6 in this paper, the following additional recommendations can be given:

7.1 Reforms including HCT and Intelligent Access to mitigate climate change and lack of infrastructure capacity.

As seen above, to allow HCT vehicles leads to less energy consumption per tonkm. If fossil fuel is used to power the truck, the reduction is direct, and if batteries or hydrogen are used the reduction is indirect and of less magnitude compared to using conventional trucks. Experience clearly shows that it is often necessary to include Intelligent Access in the HCT reforms to avoid blockage by some key stakeholders.

But HCT based reforms is not enough and not the only one of many strategies proposed to reduce the emission of greenhouse gases from road freight. Shift from road to the cleaner modes rail and water is very popular by policy makers, but very difficult to implement. However, a few pilots have shown that HCT can enable that desired modal shift by clever risk sharing business models that support both sequential and parallel combi transport. (Berling, Eng-Larsson, 2017)

More and more cities are implementing low emission and low noise zones as part of Urban Vehicle Access Regulations (UVAR) (Ricci, 2017). Many routes with HCVs start or end in urban areas and has hence to adapt to this new type of regulations. For example, in Stockholm a successful pilot has demonstrated how a hybrid diesel/battery truck is allowed to enter such zone at night by switching from its diesel to its electric engine.

Freight transport is responsible for about 9-10% of global CO2 emissions and 65% of these freight emissions come from road freight. Freight CO2 emissions will rise 22% from 2015 to 2050 with current policies. Radical new policies supporting innovation to accelerate the technological breakthroughs are needed to decarbonise transport (ITF, 2021). Main takeaways:

- **Scale up ready-to-adopt freight decarbonization measures quickly.** Many measures rely on existing technology and can be implemented soon.
- **Align price incentives with freight decarbonization ambitions.** Few carriers will invest in low-carbon vehicles if they must pay more than for conventional fleets or fuels.
- To reach climate targets, **freight transport must achieve the transition to low-or zero-carbon energy sources.** Covid-19 stimulus packages could play a critical role.

Based on these recommendations, a radical and new decarbonization reform that is based on the HCT- concept could be drafted. It includes a maximal allowed CO2 emissions per tonkm in the performance and technical specifications of the HCT vehicles even for driving on highways and not only in urban areas. For instance, to allow EMS2 (one prime mover with two trailers) in dedicated corridors cross Europe only if low emissions. Several studies show that CO2 and cost is about 30% less compared to the standard work horse in Europe (one prime mover with one trailer).

These cost saving could be shared among the stake holders. For example, the operator keeps 10% to compensate for the extra cost to buy and operate the low emission vehicle, the road owner gets 10% to finance the necessary adaption of the infrastructure including electric and/or hydrogen infrastructure, and the government gets 10% to compensate for less taxes from fossil fuels and for subsidies to shift from road to rail and water transport. As an extra benefit for the road owner, an EMS2 vehicle uses 40% less road space, which means less time lost due to congestions and enables postponement of investment in new road capacity. All this can be achieved at no cost to the taxpayers and all stakeholders will gain something on such reform, which reduces blockages and barrier for its introduction.

Such bundling of CO2 strategies with Intelligent Access and HCT in the same reform package has a very high potential to accelerate a shift away from OEMs producing internal combustion engines and vehicle operators from using fossil fuels and stimulate innovations. This decarbonization measure can quickly be scaled up after a few short pilots to find the proper mix of policy instruments, their parameters for different contexts, and evolution over time.

7.2 The benefits of HCT reforms in fast growing and/or developing countries are expected to be much larger than for high income countries

OECD (ITF 2019) predicts that land freight transport may increase 5 times in Africa and 3 times in Asia until 2050 to enable the economic growth expectations. However, it is unlikely that investments in new transport capacity will increase at the same rate. Hence, it is necessary to implement reforms and regulations that encourage and enables smarter use of the limited and often vulnerable infrastructure. Post-Covid green recovery plans have recently been presented in China, India, and South Africa. Investments in infrastructure is often part of these plans.

The reasons for larger benefits for developing countries of HCT reforms compared to high income countries are:

- More vulnerable and more congested roads
- Smaller average truck size
- Lower technical standard of the current fleet
- Inefficient and often corrupt law enforcement
- Much lower regulatory compliance
- Considerably higher accident rates

Despite these expected advantages, there are few reports from deployment of HCT in Africa and Asia, except South Africa (Nordengen 2018).

When investing in new roads and simultaneous deploy HCT with Intelligent Access, these investments will result in climate smart solutions and more road capacity for the same money of two reasons:

- In the building phase, up to the double amount of earth and rocks could be moved for the same cost compared with current praxis, and
- When using the road, up to half the road space is required for the same job in tonkm, since up to the double load on each HCT vehicle is possible compared to the reference vehicle.

8. Conclusions and next steps

The purpose of the ITF/OECD study was to examine the international landscape regarding High Capacity Transport with a focus on longer and or heavier road transport vehicles than the ones allowed for general access. Several countries have introduced HCVs with policies that simultaneously promote improved road freight productivity and safety. It is no longer enough to focus on productivity alone. Experience has shown that with well-crafted policy instruments, HCVs can also bring significant benefits to society, including reduced fuel use resulting in less carbon emissions per unit cargo transported, reduced stress to infrastructure, and with a manageable and affordable infrastructure reinforcement programme for the routes, i.e., the dedicated road network.

Hopefully, the study and report from the ITF/OECD working group on HCT will continue to encourage HCT policy actions. The insight for the members of the working group is that HCT is no longer an "if-question". Now the question is "how". How can we implement HCT in a smart way well integrated with the entire transport system and as future proof as possible?

As is written in this paper it has been a rapidly growing interest in Intelligent Access as a powerful tool for implementation of HCT. Both to increase the benefits of HCT reforms and to make it easier to create a fruitful and necessary dialogue with politicians, policy makers and citizens to ensure trust. Here it is important not to forget that Intelligent Access is a rather new policy instrument that can be used for many types of policies - UVAR, IAP, Geofencing etc – but still not well known.

HCT with Intelligent Access means differentiated, dynamic, and intelligent access to roads based on e.g., weight, length, load type, engine, noise, fuel, emissions, time, speed, place, road condition and weather. The telematic set up can preferable also be used for differentiated road charging schemes for even better use of the limited road capacity and generate finance for maintenance and capacity expansion. In this way ultimately all road sections can be used to their maximum capacity without causing premature brake down of the road body, increased accidents, or increase in taxes. By that a better matching of load – vehicle - road can be obtained.

A new initiative – a call to form a consortium to deploy HCT and Intelligent Access in Fast Growing and Developing countries was first presented at the 7th International Workshop on Sustainable Road Freight Transport in October 2020. The background is in line with subchapter 7.2 above. This initiative will be further presented and discussed at a special workshop in connection with HVTT16.

Altogether we are now in a situation where Intelligent Access is promising to become a game changer. But still more research, pilots, innovative development of new legislative frameworks, and increased international collaboration are needed. Standardisation is one big issue; ownership of data is another. That is why the discussions at HVTT16 will be important to discover which bodies and alliances that can be used to support this new momentum and development. The HVTT16 conference will be an excellent opportunity and arena for discussions on increased international collaboration on these new Intelligent Access Policy Avenues.

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