



Barriers for Carriers to adopt fuel-saving technologies and measures

Mapping barriers relevant to road freight carriers



© Smart Freight Centre 2016. Barriers for Carriers to adopt fuel saving technologies and measures – mapping barriers relevant to road freight carriers

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SFC Authors

Sophie Punte, Executive Director
Floor Bollee, Manager Communication

SFC Team

Boyong Wang, Director Strategic Relations
Su Li, Office Manager and Project Coordinator SFC China

About Smart Freight Centre

Smart Freight Centre (SFC) is a global non-profit organization leading the way to a more efficient and environmentally sustainable global freight sector. SFC works with partners and existing initiatives to help businesses gain competitive advance from smarter freight and catalyze sector-wide action.

SFC focuses on three approaches:

- Define and drive business leadership and collaboration between the private sector, government and civil society (Smart Freight Leadership)
- Create and implement a universal and transparent way of calculating logistics emissions across the global supply chain through the Global Logistics Emissions Council (GLEC)
- Catalyze the sector-wide adoption of proven and cost-effective technologies and solutions starting with road freight through SFC's Smart Trucks Platform.

Contact

Smart Freight Centre
Vijzelstraat 68-78, 1017 HL, Amsterdam, Netherlands
P.O. Box 11772, 1001 GT, Amsterdam, Netherlands
Tel office: +31 6 4695 4405
www.smartfreightcentre.org
info@smartfreightcentre.org

Smart Freight Centre Beijing Office
Room 817, ULO Park
Wang Jing, Chaoyang district
Beijing, China
Tel office: +86 10 8476 6376

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1. Introduction

Road freight is growing exponentially, especially in developing countries. Road freight is also inefficient, represents two-thirds of global freight CO₂ emissions and a main contributor to local air pollution. Fuel costs money -- in many developing countries fuel bills are anywhere between 30 and 60% of operating costs. Driving empty trucks costs money – in countries like China and Thailand up to 40% of trucks are empty. Poor driving behavior costs money – the difference in fuel efficiency between the best and worst driver can be as high as 25%. Carriers have a choice of ample technologies and measures to improve fuel efficiency and reduce costs and emissions at the same time. Then why are so many carriers not do the smart thing and adopt these?

Smart Freight Centre (SFC) was established in 2013 as a global non-profit organization to make the global freight sector more efficient and environmentally sustainable. One of SFC's priorities is to remove barriers that prevent carriers from adopting fuel saving technologies and measures, especially those that are proven and market ready.

Opportunities for more efficient trucking exist in every market around the world. The urgency to act is in fast growing economies where freight grows most rapidly and is inefficient: China, India, Brazil, Mexico, South Africa and several more. SFC first focused on mapping the current freight situation in Asia and in particular China and India. The “State of Play – Green Freight in Asia” report (SFC, 2013) described the road freight sector, trucking developments, fuel and emissions, and touched on barriers and opportunities for green freight and technologies for trucks.

Now it is important to get a better understanding of what really stops carriers from investing in trucking efficiency. This paper aims to provide a framework of barriers based on existing barrier studies in the freight sector from around the world supplemented with SFC interviews with carriers and experience in working with Chinese carriers.

It does not provide rock solid conclusions on barriers backed by statistics. We wanted to know enough for us to start confidently with the next phase: design and roll out a Smart Trucks Platform that works bottom-up to help carriers that want to lead moving forward. We encourage all stakeholders to join our effort to help road freight carriers to adopt smart freight solutions: cargo owners, truck manufacturers, technology suppliers, industry associations, research institutes, governments, NGOs, foundations, development banks and institutions.

2. Barriers for carriers: an overview

SFC developed a map of barriers for carriers to adopting fuel saving and emission reducing technologies and measures as shown in Figure 1. The identification of these barriers draws from SFC's own work and other existing projects and studies (see references at the end of this report).

A distinction needs to be made between internal and external barriers. Internal barriers relate to obstacles within the company boundaries of a carrier and that are mostly within management's control. There are four categories of internal barriers: decision-making, management systems, finance, and awareness and capacity.

External barriers relate to outside factors and players over which a carrier has little or no influence. The four categories of external barriers are: market forces, institutions and policies, partners and programs, and technologies and measures.

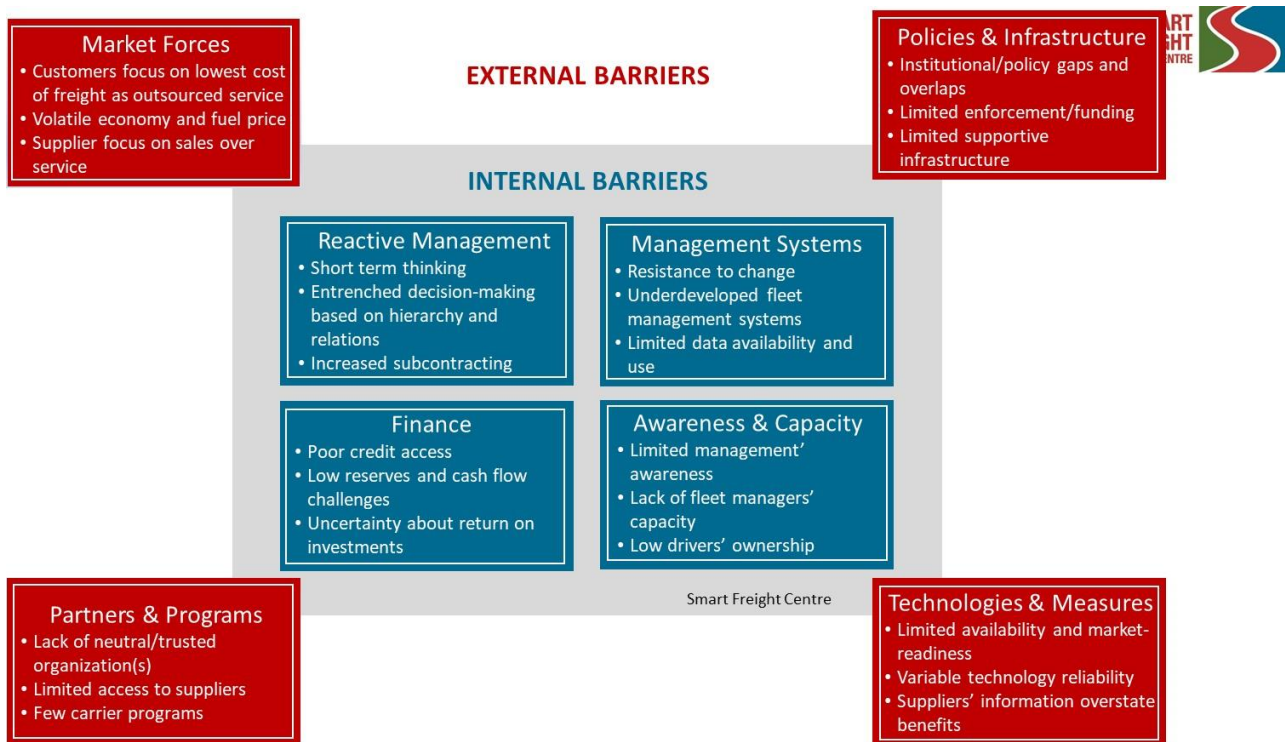


Figure 1. Map of barriers to at scale adoption of fuel-saving technologies and measures by road freight carriers

All these barriers are interconnected and often re-enforce each other. It is essential to understand relations between these barriers to get a holistic understanding of why carriers fail to adopt fuel-saving technologies and measures at scale. The most relevant connections are shown in Figure 2.

The road freight sector is first and foremost a commercial sector driven by market forces. It is therefore not surprising that the root cause of barriers identified lies in the freight market itself: an oversupply of carriers and trucks combined with high fragmentation leads to a cut-throat competitive market that puts carriers under an enormous pressure to survive. This in turn heavily influences a business decision making, the ability of carriers to finance technologies and measures and invest in management systems and internal capacity building. The other external barriers further weaken carriers' ability to become more fuel efficient.

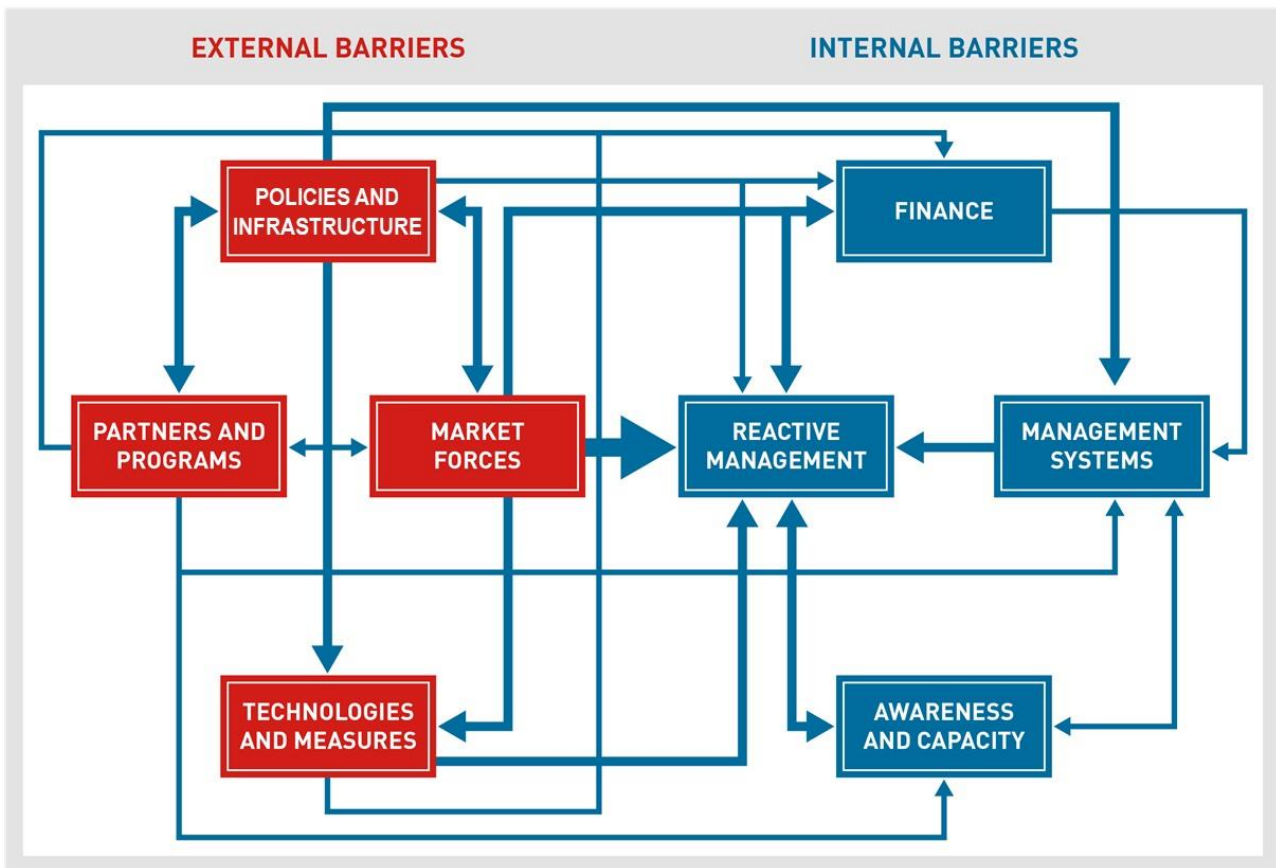


Figure 2. Most relevant relationships between barriers for carriers

It is important to focus on what barriers can be realistically addressed, in a concerted effort that looks at all identified barriers holistically, while involving carriers, their immediate partner and broader stakeholders.

First, while it is tempting to focus on market forces, this is not realistic. A better approach is to focus on barriers that carriers have more control over, such as management systems or awareness and capacity, or that partner NGOs and government agencies can address, such as policies, infrastructure and programs.

Second, addressing one barriers is not going to solve the problem. For example, without clear policies and technology standards, carriers don't have the guarantee that technologies meet minimum requirements, which in turn undermines their trust in technologies available on the market – so carriers won't invest. Unfortunately, technology standards alone will not be enough. Fleet managers need to be aware of what technologies are available and have the capacity to assess which technologies and suppliers are the best fit, otherwise they cannot convince management to invest in these. Even if fleet managers are capable, without good management systems they cannot get reliable data to build a business case that management will want to see. Even if these three barriers are overcome and management *wants* to purchase fuel-saving technologies, many are unable to come up with funds because of cash flow challenges.

Third, addressing barriers holistically also means that active collaboration is needed. For example, a green freight program can provide information on technologies and measures but will be more effective if backed by government and NGOs. Technology providers, industry associations, and academic institutions can provide fleet managers training, but this will be more effective if successful fleet managers are involved in training delivery.

In the next sections, the eight categories and individual barriers are described in more detail.

3. External Barriers

3.1 Market Forces

In the context of the freight sector, market forces relate to the economic factors affecting the price of, demand for, and availability of freight services. Demand by end-consumers drives the need for freight services and trickles down to carriers via shippers (i.e. companies selling goods), retailers, and intermediaries like logistics service providers and freight forwarders.

As shown in Figure 3, main barriers caused by market forces are that cargo-owners focus primarily on driving costs of freight down in a fragmented and over-saturated market, the economy and fuel price are volatile and suppliers focus more on sales than on what is best for carriers. As a consequence, carriers hesitate to make long-term investments, lack trust in their suppliers and customers, and/or are given the wrong advice about fuel-saving technologies and measures.

Market forces are very difficult to influence because it is entrenched in the wider economy and society, and transcends the freight and logistics sector. While it is extremely difficult to address these specific barriers, efforts can be made to soften the consequences that lead to reduced uptake of technologies and measures. Given that barriers related to market forces are so fundamental to carriers taking action, these barriers must always be kept in mind when designing solutions related to other barrier categories.

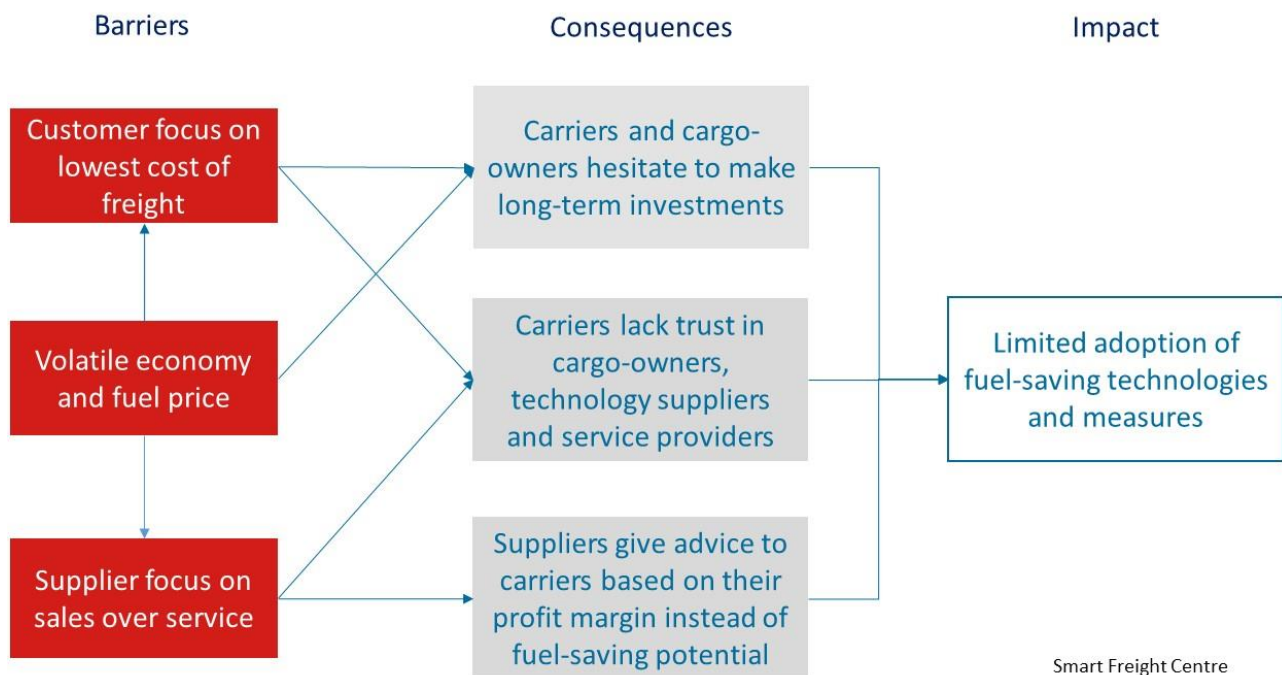


Figure 3. Market force barriers and consequences for road freight carriers

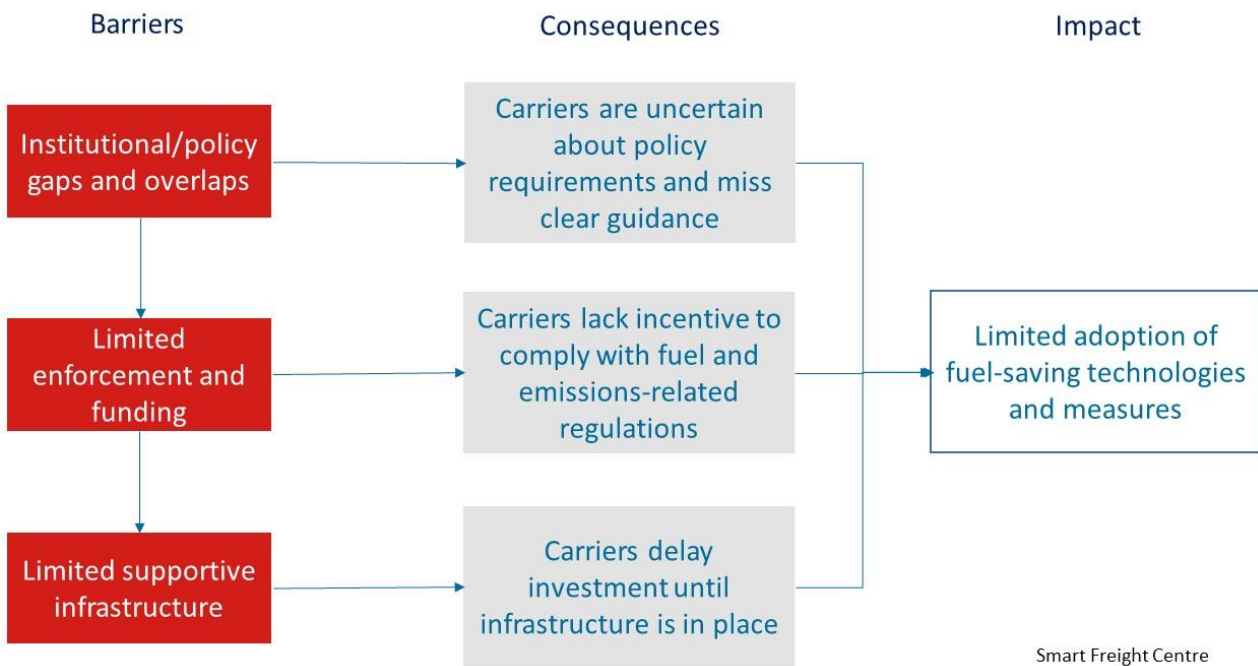
3.2 Policies and Infrastructure

The “policies and infrastructure” barrier relates to the overarching institutional and policy framework, which lies at the base of the broader role of government covering planning, infrastructure, legislation, regulation, standards; financing and other incentives; and strategic support specific. Government agencies and affiliated organizations at the national, provincial and local levels all have a role to play in policies that affect carriers.

Main barriers shown in Figure 4 are institutional and policy gaps and overlaps, limited policy enforcement and funding allocation towards policy and infrastructure implementation, and limited supportive infrastructure. As a

consequence, carriers are faced with mixed policy messages coming from government and are less incentivized to comply with regulations. Moreover, a minimum quality of technologies on the market is not always guaranteed and carriers miss clear guidance on technologies and measures they consider adopting. Lacking supportive infrastructure, such as intermodal connections or charging points for electric trucks, will delay investments by carriers.

Policy and infrastructure barriers can be addressed but only under certain conditions. First, government agencies must support changes and work closely with industry and other stakeholders to ensure feasibility on the ground. Second, success is only achieved if the institutional, policy and implementation barriers are addressed in parallel, which is complex. Third, change needs to be followed through from the national to the provincial and local levels, which is a challenge also faced with other policies and plans.



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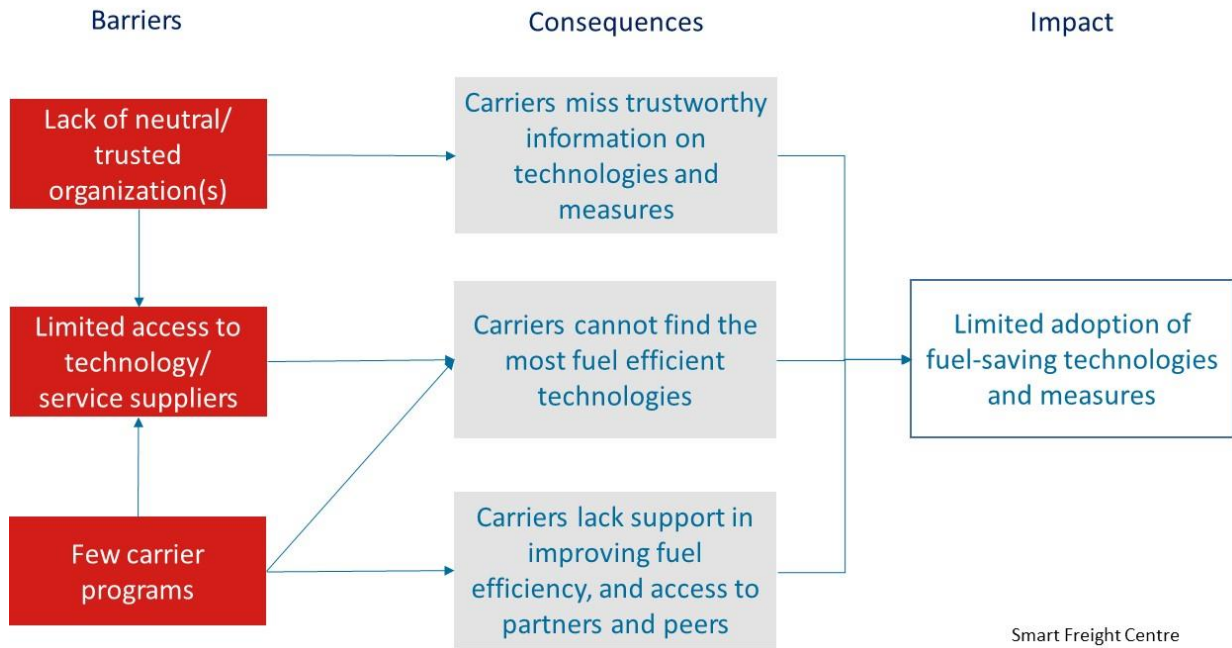
Figure 4. Policies and infrastructure barriers and consequences for road freight carriers

3.3 Partners and Programs

Carriers need many partners to help them adopt fuel-saving technologies and measures: industry associations, OEMs, technology and service providers, customers and subcontractors, NGOs, research/academic institutes, and governments. In this context of this study, “programs” relate to organized programs, platforms and projects with a direct or indirect impact on carriers. These can range from broad climate or energy programs with freight as one of many sectors, to green freight programs or platforms that specifically focus on improving efficiency and reducing emissions from freight, to pilot projects to test specific technologies or measures.

As shown in Figure 5, carriers, especially smaller ones, often don’t have access to a wide range of technology suppliers and service providers. They could look for help, but miss neutral and trusted organizations they can contact or programs they can join. As a result, carriers struggle to find the right solutions or trustworthy information about these. Plus, program support is missing to improve fuel efficiency and find peers and partners to work with.

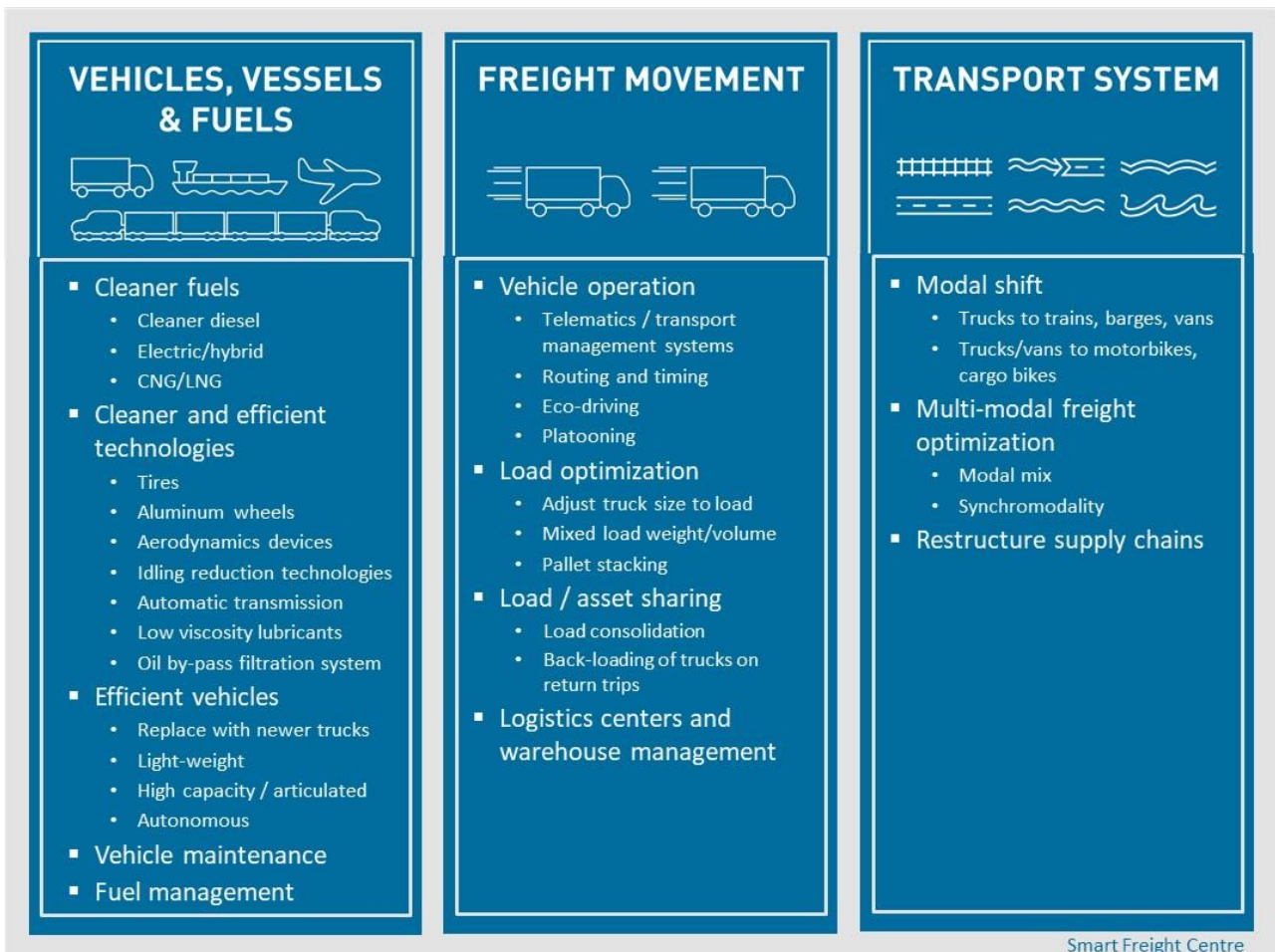
The right programs and partners can have a game-changing effect on not only addressing direct barriers but can also trigger change for ALL other internal and external barriers for carriers (see Figure 2 earlier). For this to work it is essential that neutral/trusted organizations and partners are selected carefully and programs are designed to meet the needs of carriers and with all barriers types in mind.



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Figure 5. Partners and programs barriers and consequences for road freight carriers

3.4 Technologies and Measures



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Figure 6. Technologies and measures relevant to road freight carriers

To significantly reduce emissions from freight, a mix of solutions is needed covering solutions for vehicles and fuels, fleet movement and the transport system. Solutions relevant to road freight are listed in Figure 6. It is acknowledged that carriers do not have an equal say in all technologies and measures that carriers. For example, a carrier can more easily adopt aerodynamics devices than restructure supply chains. In efforts to help carriers directly to address barriers, greater attention is needed for technologies and measures that they can decide on themselves.

Figure 7 shows that main barriers relate to the availability, market readiness, quality and reliability of technologies and measures, in combination with suppliers overstating benefits of adopting these. This poses the risk that carriers do not trust technologies recommended by suppliers, focus on wrong technologies and measures, and are discouraged because of disappointing results.

It is noted that all these consequences relate to decision-making especially of carrier management, and therefore it is critical that something is done about this. These technologies and measures barriers can be best addressed by sound policies, institutional frameworks and supporting programs, all of which should involve a mix of government, private sector and civil society partners.

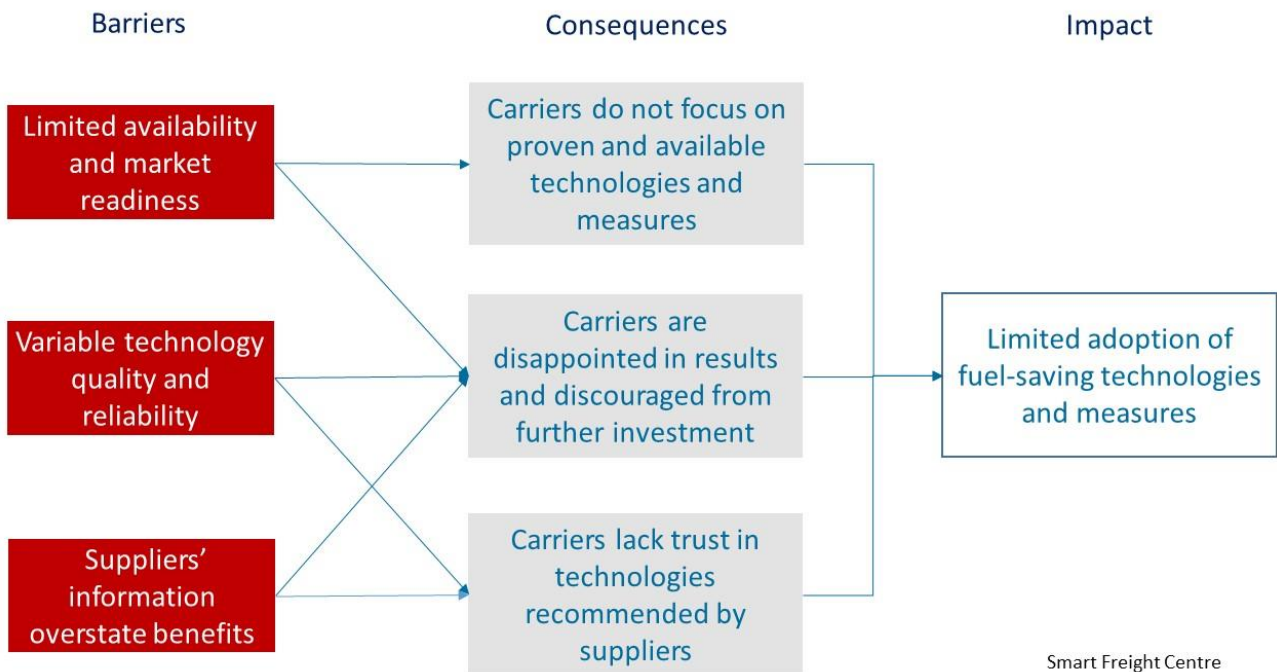


Figure 7. Technologies and measures barriers and consequences for road freight carriers

4. Internal Barriers

4.1 Reactive Management

Reactive management in this study relate to reactive decision-making made by carriers, in particular senior management and middle management, including fleet managers. This covers a wide range of decisions that can have a direct or indirect relation to fuel efficiency and emissions. Examples are budgeting, selecting contractors, purchasing equipment, and staff training and development.

As shown in Figure 8, the main barrier is a short-term thinking mentality of carriers and businesses in general, which amplifies entrenched decision-making based on hierarchy and relations and the tendency to maximize subcontracting. This leads to carriers prioritizing costs and ignoring fuel efficiency when purchasing equipment

and selecting contractors. Furthermore, carriers have limited influence on subcontractors' decisions and operational practices relevant to fuel efficiency, and thus the technologies and measures they adopt.

Reactive management is the most significant internal barrier, yet very difficult to overcome because it requires a change in behavior. Equally important is that the root cause of current management practices and decisions lies in market pressures that reinforces short-term thinking. More practical may be an indirect approach that focuses on other barriers, such as management systems, awareness and capacity and technologies and measures.

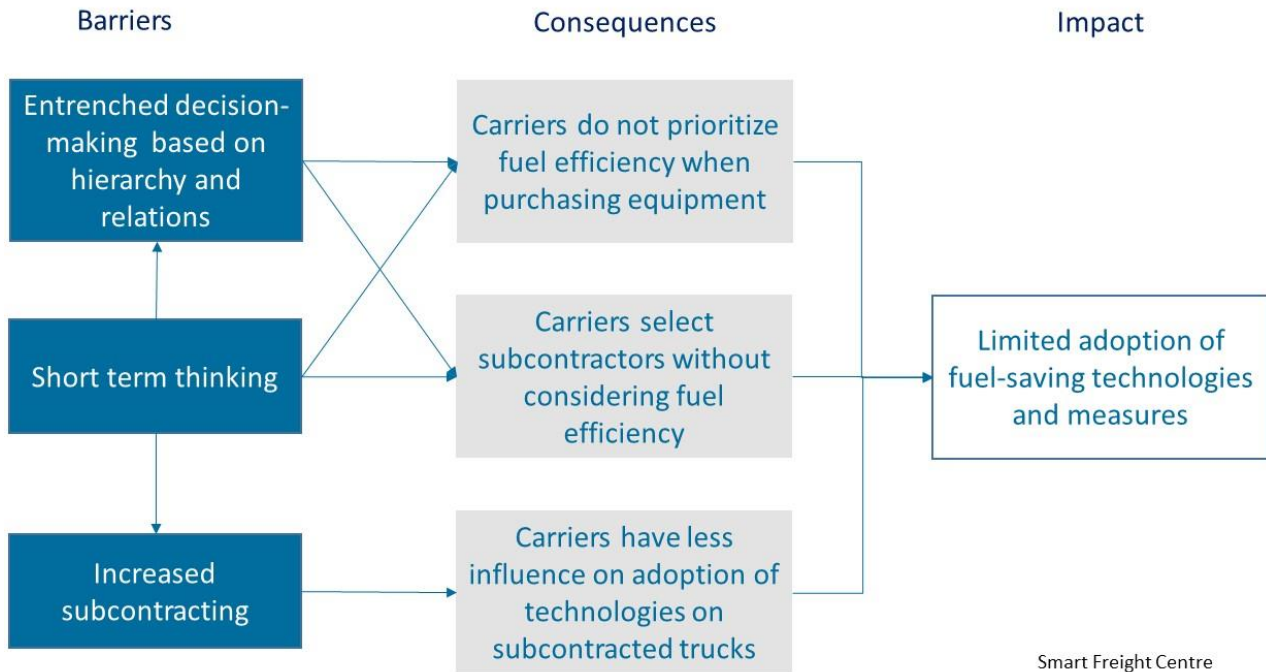


Figure 8. Reactive management barriers and consequences for road freight carriers

4.2 Management Systems

Management systems cover all policies, processes and procedures that carriers need to ensure that the organization and its operations run smoothly. Management systems are important to various aspects of fuel efficiency, such as data, trucks maintenance, equipment (e.g. tires), fuel, and drivers.

Figure 9 shows that most carriers resist change which contributes to underdeveloped fleet management (and broader management) systems. Related to underdeveloped systems is that data are often not available and reliable, or are not used within the organization. Carriers are therefore less open to consider, and less proactive and able to identify opportunities fuel efficiency and track results.

Management systems are important because they affect other internal barriers by informing decisions, tracking finances, and increasing the awareness and capacity of management and staff. In addition, carriers can improve management systems largely by themselves, build on what already exists, and quickly generate results that justify their further development. Developing management systems thus provides an outright opportunity to catalyze change within carriers that leads to greater adoption of fuel-saving technologies and measures.

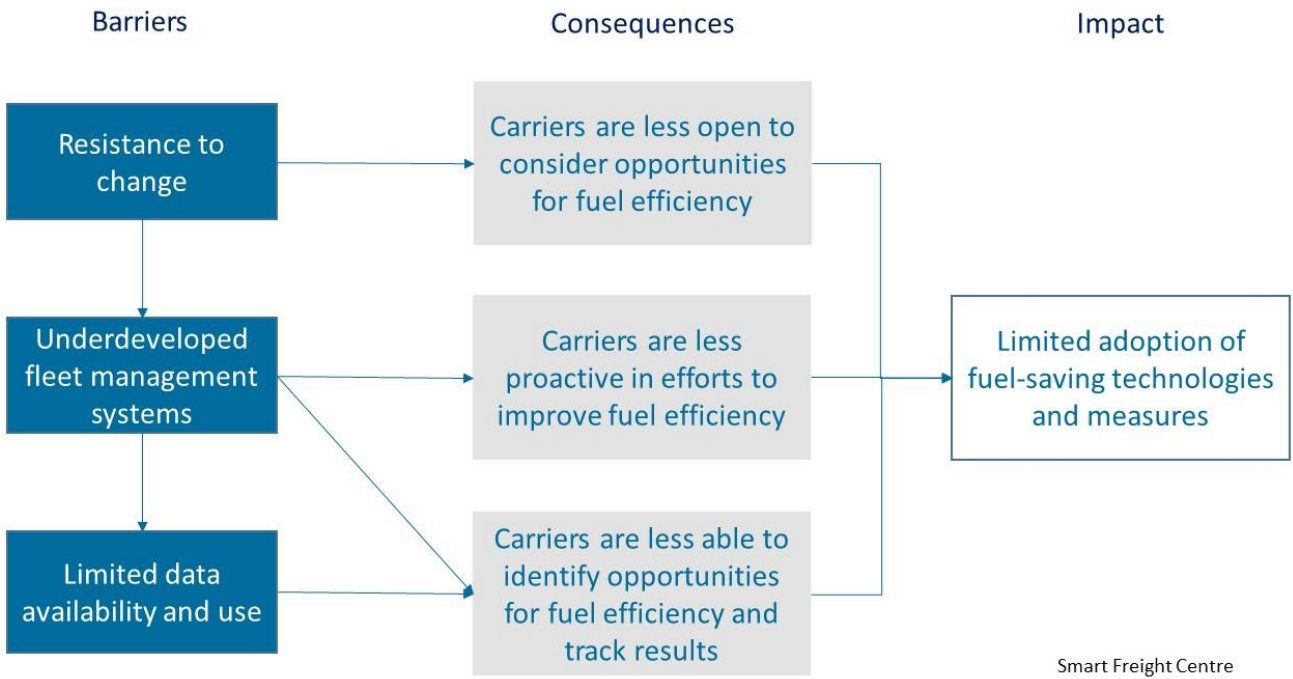


Figure 9. Management system barriers and consequences for road freight carriers

4.3 Finance

In this study, finance relates to the overall financial health of a carrier thus covering reserves, cash flow, debts, credit ratings and other financial factors. A carrier’s financial situation is heavily influenced by market forces and management strategy and decision-making.

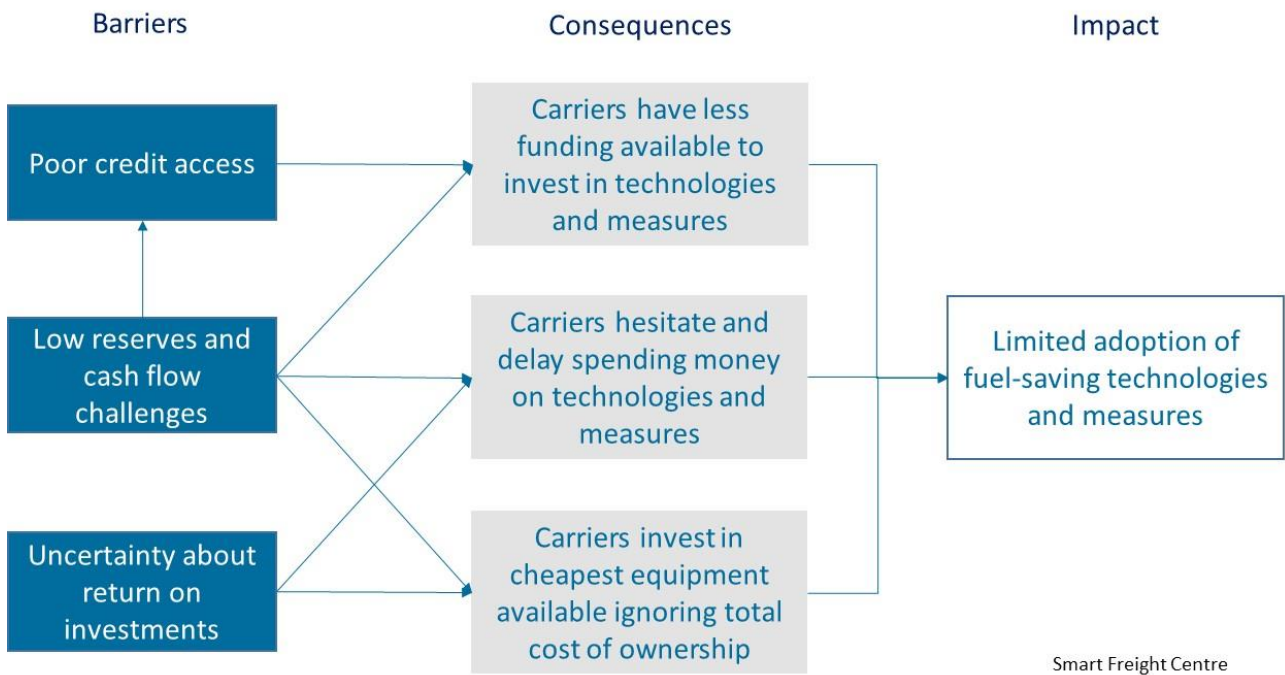


Figure 10. Finance barriers and consequences for road freight carriers

Figure 10 shows that carriers find themselves in a vicious cycle of poor financial health: carriers have poor credit ratings and are unable to solve this because of continuous low reserves and cash flow challenges as

they try to stay afloat. They are also uncertain about return on investments of technologies, which is linked to technology quality and reliability. Carriers thus lack funding, hesitate or delay investing, and resort to buying the cheapest equipment. Faced with slim margins, the slightest mistake can threaten a carriers' survival.

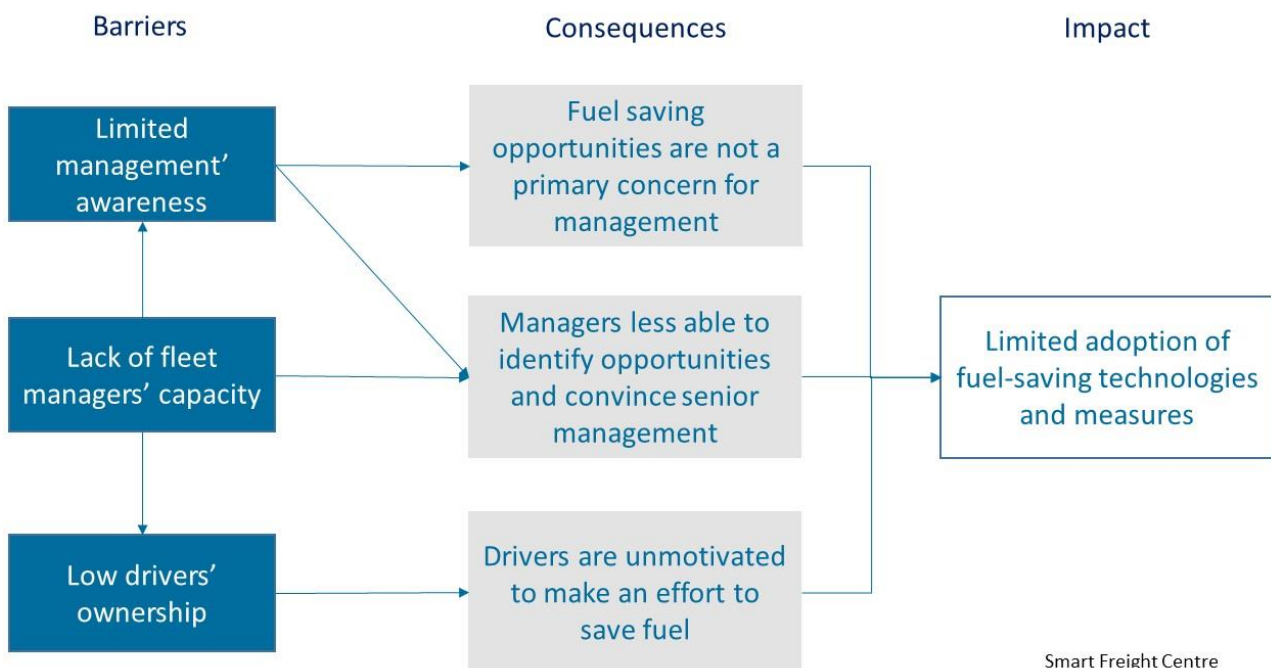
Management is responsible for the financial health of the organization and it is therefore not desirable, if at all possible, to influence this. However, opportunities do exist to help carriers overcome the investment barrier of specific fuel-saving technologies and measures. For example, technology suppliers could offer carriers "try before you pay" options or allow them to pay in installments. Programs and trusted partners could provide cost-benefit information for technologies and measures to increase carrier confidence to invest, ideally supported by actual cases from peer carriers.

4.4 Awareness and Capacity

In this study, awareness relates to the knowledge or perception of fuel efficiency by carrier management, fleet managers and drivers. Capacity on the other hand refers to the skills and ability to improve fuel efficiency through, for example, knowing what questions to ask technology suppliers, building a business case to convince management to invest, or strengthening management systems to prove that fuel efficiency leads to cost reductions.

Figure 11 shows that while carriers are aware that fuel is one of the largest operational costs, awareness of the potential of to improve fuel efficiency is generally lacking, especially with management. Although fleet managers are usually more aware, they lack capacity to improve fuel efficiency. Finally, drivers only care about fuel efficiency when it directly affects them financially, which is not helped by subcontracting practices of most carriers. As a result, management does not prioritize fuel efficiency, fleet managers are unequipped to improve fuel efficiency or convince management of opportunities, and drivers don't put efforts into fuel savings that benefit the carrier.

"Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." This proverb definitely applies to carriers – by raising awareness and increasing capacity, carriers can themselves identify and implement fuel saving solutions and thus take control of reducing fuel costs and emissions. The potential to improve awareness and capacity is significant and should thus be a main focus of especially programs and management systems.



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Figure 11. Awareness and capacity barriers and consequences for road freight carriers

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P.O. Box 11772 | 1001 GT Amsterdam | Netherlands
Tel office: +31 646 95 44 05 | Email: info@smartfreightcentre.org
www.smartfreightcentre.org

