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Less fragmentation and more sustainability: How to supply nanostores in urban areas more efficiently?

Bram Kin[a,b]*

[a]*TNO – Sustainable Transport and Logistics, The Hague, The Netherlands*
[b]*VUB – MOBI (Mobility, Logistics and Automotive Technology Research Centre), Brussels, Belgium*

Abstract

The supply of small independent retailers, or nanostores, in urban areas is highly fragmented. Reducing this fragmentation potentially leads to reduced costs for last mile deliveries as well as lower transport-related externalities. Through case studies in different cities globally, including emerging economies, the potential of various possibilities to reduce fragmentation in supplying nanostores is studied. Different methodologies are applied. Results show that fragmentation can be reduced by considering the behaviour of manufacturers and storeowners as well as the feasibility of actual transport. The distinctive characteristics of an urban area that determine the feasibility are also discussed.

Keywords: Fragmentation, Nanostores, Bundling, Megacities, Stakeholders

1. Introduction

Some urban freight flows are simply more inefficient than others. If we want to reduce the negative externalities accounted for by urban freight transport (UFT) as well as minimize its costs, the most fragmented freight flows provide most potential. Fragmentation in last mile deliveries is characterized by small shipments delivered to a zillion addresses at a high frequency, possibly by multiple suppliers. In our cities, this fragmentation becomes visible in the proliferation of (smaller) inefficiently loaded freight vehicles. An underexposed freight flow is the supply of small, independent retailers, or 'nanostores', of which there are an estimated 50 million globally (Fransoo et al. 2017). The

* Corresponding author. Tel.: +316-152-102-14
E-mail address: bram.kin@tno.nl

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flow of fast moving consumer goods (FMCG) to nanostores is not extensively studied, but it is an important one to address because fragmentation is characteristic to its supply and a continued existence of these stores is expected.

Compared to modern retail (MR), the characteristics of nanostores make its logistics inefficient. Drop sizes (items per delivery) to nanostores are small because of the small size of these stores. Quantities are further driven down by the lack of a storage room in most nanostores. When a product is not on the shelf, it is mostly out-of-stock, which leads to continuous inventory replenishment (Kin et al. 2018a). In cities in emerging economies where a significant share of turnover is achieved via nanostores compared to MR, manufacturers often outsource sales and delivery processes to exclusive distributors (Garza Ramirez, 2011). These distributors visit stores at a high frequency to drive sales, which further reduces drop sizes. This potentially leads to multiple vehicles delivering a few items to a single store. In India, an estimated 60% of daily deliveries in urban areas are linked to independent retail (GIZ, 2016). In countries where most FMCG are sold through MR, independent retailers mostly pick up products at a wholesaler with their own vehicle (own account). In this case, vehicles are highly underutilized as a return trip is made for a single replenishment (Kin et al. 2018b).

This study addresses the reduction of fragmentation in the two dominant supply models for nanostores in urban areas: store deliveries by exclusive distributors and own account pickups by storeowners at a wholesaler. In both cases, there is an inherent lack of bundling. To reduce fragmentation, the potential of five alternatives to increase efficiency is studied. Reducing fragmentation potentially leads to lower costs for last mile deliveries as well as lower transport-related externalities. Whether these alternatives can successfully be implemented depends on the stakeholders involved in supplying nanostores (manufacturers as shippers and storeowners) as well as the actual feasibility of the alternative from a transportation perspective (for own account pickups and distributors). Feasibility furthermore depends on the local urban context in which the supply takes place. The research question of this study is: *What alternative supply models for the last mile are promising to decrease fragmentation in deliveries to nanostores and what aspects have to be taken into account?*

2. Background: Nanostores

2.1. Continued existence of independent retail

Retail outlets that sell FMCG are very diverse, but essentially a distinction between two types can be made. On the one hand there are stores that belong to MR chains (e.g., WalMart, Carrefour). Wholesale and discount stores often also belong to larger companies. The other type, on the other hand, are independent retailers. Store formats might be even more diverse (convenience stores, kiosks, street vendors and open markets), but the distinctive feature is sole proprietorship. Different names are used for these stores; e.g., ‘traditional retail’, ‘mom and pop’, kirana (India), changarro (Mexico) and warung or took (Indonesia). Nanostores are generally small in size (<20 m^2), mostly operate with cash, have a small width of the product assortment, mostly lack a storage room, have a low degree of technological penetration in terms of order placement and have no logistics support with limited optimisation possibilities. This leads to relatively more vehicle movements compared to modern retail (Kin, 2018). The estimated fifty million nanostores worldwide are supplied multiple times per week (Fransoo et al. 2017).

Before MR outlets by (multinational) companies emerged, retail across countries was dominated by smaller (family-run) stores. In the second half of the twentieth century, MR started growing and expanding across North America and parts of Europe (Reardon et al. 2007). Over the years, MR has become dominant at the expense of nanostores in numerous countries. Despite the factors that explain this supermarketization (e.g., GDP growth, trade liberalization), predominantly traditional retail countries (>50% FMCG sales in nanostores) do not necessarily develop similarly to predominantly MR countries. There are various reasons indicating that nanostores continue to exist in large numbers. In different countries, particularly in Latin America, a flattening growth of MR is observed (Tandon et al. 2011). This is partly explained by diversity within countries. On the demand side, nanostores continue to have an added value for certain customers compared to MR. In poorer parts of cities, nanostores are more present because of proximity, the existence of informal credit, and their social and cultural role. MR outlets are often larger in size and located in central locations. In a lot of areas, public transport is not reliable, too expensive or it is too time-consuming to go a MR outlet. Customers therefore prefer small neighbourhood shops that are widely present in the densest parts of cities (Fransoo et al. 2017). Income inequality is asserted to cause discrepancies in retail landscapes between as well as within countries, and even within cities (Reinartz et al. 2011). Also on the supply side different factors account for a continued existence, particularly in emerging economies (Kin et al. 2017). For instance, in India, restrictions on FDI are brought forward as one of the barriers to an expansion of MR outlets (Ramakrishnan, 2010). Nanostores are easy to open and tailored to high density areas. In several cities, a store density of more than 1000/km^2 is not uncommon (Merchán et al., 2015). Overall, it thus seems that modern retail grows at the expense of traditional retail, but that in various countries a large proportion of nanostores are there to remain.

2.2. The last mile to nanostores – Supply models

In predominantly traditional retail countries in areas with a high store density, FMCG manufacturers often outsource supply to *exclusive distributors*. These distributors sell and deliver products on behalf of this particular manufacturer. Shipments to nanostores are already relatively small due to the size of these stores and the exclusive supply with products of a particular brand, further contributes to an enormous number of vehicle movements because it leads to multiple vehicles stopping in front of one store. Even though shipment sizes are generally small, nanostores are collectively responsible for a high proportion of sales. Despite the small shipments, exclusive supply is still affordable in areas with a high store density (Kin et al. 2018a). From the perspective of the manufacturers, the focus on these stores is not only motivated by the high collective sales, but also by the fierce competition to sell in this channel. If a product is not on the shelf, it is mostly out of stock due to the lack of storage room. A vacant space is easily taken by a competitor. This leads to continuous inventory replenishment. Manufacturers therefore want to maintain a certain degree of control over supply. To sell in this channel and control this process closely, manufacturers set requirements to the company that actually supplies the products. These requirements include high delivery frequencies and short order-to-delivery lead times. The role of the manufacturer in supply is of particular importance because the drive for sales has an impact on the efficiency of last mile deliveries.

In predominantly MR countries, there is no direct incentive for a manufacturer to develop strategies to get their products directly on the shelf as most sales are reached through supermarkets. Here, the existing nanostores owners mostly go to the wholesaler on own account. In case of *own account pickups*, the decision to replenish and subsequently the organisation of the transport of goods is determined by storeowners. Despite the relative low share of independent retailers in FMCG sales on a national level, it potentially generates numerous vehicle movements as a return ride is made for a single replenishment. In Belgium, for instance, the market share of independent retail is less than 5% (Nielsen, 2016). In terms of numbers, the presence of nanostores remains high. In Brussels alone, there are around 900 nanostores (Nesterova et al. 2016). Table 1 summarizes for both supply models the factors that enhance fragmentation.

Table 1. Main factors causing fragmentation in supply models to nanostores (Kin, 2018).

Own account replenishment (wholesale)	Store deliveries by exclusive distributors
Small stores generate small shipments	Small stores generate small shipments
Limited or lack of storage space leads to continuous inventory replenishment by the storeowner	Limited or lack of storage space leads to continuous inventory replenishment by suppliers
Irregular replenishment frequency because additional trips are made in case of low prices or promotions	High replenishment frequency by multiple suppliers because they try to get products on the shelf at the expense of competitors
A return trip with an own vehicle for a single replenishment	Limited cash leads to lower quantities sold and delivered
Inefficiencies due to separate items bought instead of case packs	Inefficiencies due to separate items sold and delivered instead of case packs

2.3. Alternatives

Logistically, this fragmentation boils down to vehicles that are potentially driving around with a low vehicle fill rate and/or very small deliveries to the final receiver. In other words, there is inefficient use of transportation capacity which is partly caused by a lack of bundling. This is not only caused by the characteristics of these stores but also by the stakeholders involved as the Table 2 shows.

Table 2. Characteristics of stakeholders involved in nanostore supply (Kin, 2018).

	Manufacturer	Distributor	Storeowner
Role	FMCG manufacturer: producing, shipping and selling products	Sales company and transport company	Receiving products or picking them up
Interests	High sales Satisfied customers	Financially and operationally feasible operations Satisfied customers	Convenient supply No out-of-stock
Constraint	Sales are preferred over efficient last mile logistics, leading to exclusive shipments	Increased complexity when delivering in urban areas	Little awareness of actual cost and societal impact

Improving the efficiency of deliveries can be done at different points in the supply chain and by different stakeholders. In total, five different alternatives to these two supply models are studied through various case studies. These alternatives concern some form of bundling and/or more efficient use of transportation capacity – either by supplying less frequently or by using more tailored vehicles. The alternatives to nanostores are identified in Macharis and Kin (2017) and depicted in Table 3.

Table 3. Alternatives that potentially reduce fragmentation (Kin, 2018).

Alternative	Description of usability for fragmented flows	Assumptions to reduce fragmentation
Joint shipments	Drop size and vehicle fill rate increase	Willingness by stakeholders involved to collaborate
Lower order/delivery frequency	Manufacturers and/or receivers ship/order less frequently, which potentially increases drop size	Willingness by stakeholders involved to collaborate; Availability storage room
Cross-dock with modal shift	Deal with logistics sprawl, small drop sizes and traffic limited areas by using tailored vehicles	Use of smaller vehicles allows increasing vehicle fill rate
Cross-dock with spare capacity	Use of excess capacity for small shipments to reduce inefficient deliveries and/or eliminate trips	Depot where transport entity can pick up products Should not be a dedicated trip Online platform and critical mass of users must be present
Urban consolidation centre	Shared use of a cross-dock and vehicles for final deliveries	Privately operated without reliance on subsidies Improved vehicle fill rate because of bundled shipments and/or a modal shift to tailored vehicles

3. Research approach

This study comprises the main results of a PhD dissertation, which includes multiple case studies (see Kin, 2018). Whether alternatives are promising to decrease fragmentation in last mile deliveries to nanostores depends, first of all, on the stakeholders involved in supply to nanostores. Even though transportation companies – distributors in this context – are the visible 'pain' of our demand for goods as they are the ones driving around with their vehicles, such companies serve the interests of their customers (shippers and receivers). At the same time, they are the ones facing the complexity of the urban environment. The latter includes restrictive traffic measures, congestion and lack of unloading zones. The focus in the first two case studies is on the behaviour of manufacturers and storeowners, who largely determine the demand for goods and hence for transportation towards nanostores. More specifically the focus is on the preferences of those stakeholders. In case of the manufacturer, it is investigated to what extent manufacturers enhance fragmentation by putting specific requirements on distributors who sell and deliver on their behalf to nanostores. A survey to assess the importance of these requirements with supply chain managers of a globally operating manufacturing company was conducted in 32 countries in which nanostores comprise a major part of the retail landscape. To identify what drives the behaviour of storeowners, surveys are conducted in Brussels and Antwerp (own account pickups) and Jakarta (exclusive store deliveries). A certain alternative might be accepted by stakeholders, eventually it must also be feasible from a transportation perspective. Alternatives to current supply models that incorporate a cross-dock operation must be operationally (not affecting operations negatively and therefore service level towards customers) and financially feasible. Acceptance and feasibility depend on the context in which the supply takes place. Case studies in multiple cities are therefore conducted: a UCC in Antwerp (Kin et al. 2016), the utilization of spare transportation capacity in Brussels (Kin et al. 2018b) and the development of a model to calculate the costs of alternative set-ups which is applied on a megacity in an emerging economy (Kin et al. 2018a). Figure 1 depicts the research approach.

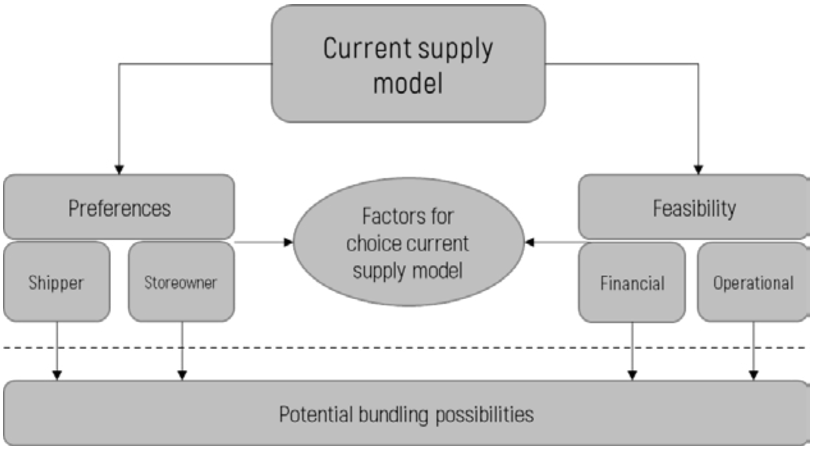

Fig. 1. Research approach.

4. Results

4.1. Behaviour of manufacturers and storeowners

A decent performance of a distributor is vital to sell and deliver products cost-efficiently. Specific requirements give a degree of control over the process. In total, 17 requirements that a shipper might demand from an exclusive distributor were identified. A survey with 142 respondents from a large FMCG manufacturer has been conducted in 32 countries. The four most important requirements across the surveyed countries relate to sales effectiveness and the presence of the manufacturer's products (on-shelf product availability, number of stores covered, trained sales and delivery personnel and frequency of a sales persons visit). Factor analysis shows that requirements related to the availability of the manufacturer's products and sales are the most important. Both are a proxy for sales effectiveness. The latent constructs, time (e.g., order to delivery lead time, delivery on date agreed) and service (e.g., online connectivity, cargo track & trace) are less important. Even though sending exclusive shipments to stores is affordable in high store density areas, specific requirements further intensify fragmentation in this channel (Kin et al. 2018a). Requirements grouped under time and sales hamper bundling, by affecting drop size (e.g., delivery frequency, lead time) and efficient routing (e.g., time windows).

Results of the survey in Jakarta show that 85% of storeowners who receive deliveries from exclusive distributors are satisfied with the current supply. Hence, multiple distributors delivering to their store is not considered to be a problem. In total, 14 delivery preferences are identified of which 'undamaged products', 'delivery at the store', and 'pricing and promotions' are preferred the most. In Belgium, most storeowners conduct own account pickups with their vehicle, but this trip for a single replenishment is not considered to be a cost. Visits to the wholesaler are made in case of out-of-stock situations and during promotions.

4.2. Feasibility of alternatives

Various forms alternatives involve a physical intervention in the supply chain. Rather than transportation in one haul from the distribution centre (DC) to the receiver, a cross-dock facility is added from where the last mile in the urban area is conducted. The use of an UCC in Antwerp shows that kilometres driven reduced by 22% and different types of emissions by more than 35%. However, the business volume to have a financially sustainable UCC, is 4.5 times the current volume. Although this is substantial, the break-even volume is most likely lower for several reasons; more volume potentially increases stop density and therefore more efficient routing, drop sizes likely increase and value-added services are planned which account for additional income. The size of the delivery area, current congestion levels and restrictions provide a high potential to reach this business volume in Antwerp (Kin et al. 2016). The use of spare transportation capacity of a service-driven company to supply nanostores, as tested in a pilot in Brussels, had a low uptake. Nonetheless, simulations in seven bundling scenarios have been done with an agent-based model, SYnchronization Model for Belgian Inland Transport (SYMBIT) (Kin et al. 2018b). Even though this alternative is operationally feasible, there is a maximum threshold of nanostore orders that can be added to the spare capacity of the service-driven company. When using one service-driven company, a limited number of store orders can be moved to vehicles with a minimal increase in kilometres travelled and lead time. Kilometres travelled can be reduced when deliveries, to both customers of service-driven companies and stores, are conducted from a DC that is located within or very close to the delivery area.

The development of a cost-model shows the costs of different supply chain compositions for the last mile to nanostores. The model is validated with real data on nanostore supply in a megacity in an emerging economy. Costs are calculated for a direct exclusive supply, the use of a cross-dock with a modal shift and for joint shipments with a UCC as a cross-dock. In the case study, stop density is 100 stores per km^2 and average replenishment frequency per store is three per month. Distances between the DC and the delivery area are short. This makes the current direct supply by an exclusive distributor from its depot the most cost-efficient. Under those circumstances, the use of a cross-dock to tranship goods to a smaller vehicle is more expensive; transport costs slightly decrease, but are not offset by the additional costs of the depot. Costs in a shared cross-dock are slightly less, but are higher than those for direct exclusive shipments. Sensitivity analyses show that low drop sizes (because of a lower demand or higher replenishment frequency) lead to a lower vehicle fill rate, which makes the use of smaller vehicles cheaper. Smaller vehicles such as motorbikes and regular bikes in turn require an additional cross-dock. If distances between the DC and the delivery area increase, the UCC, followed by the cross-dock outperform direct supply. The results are summarized in Figure 2.

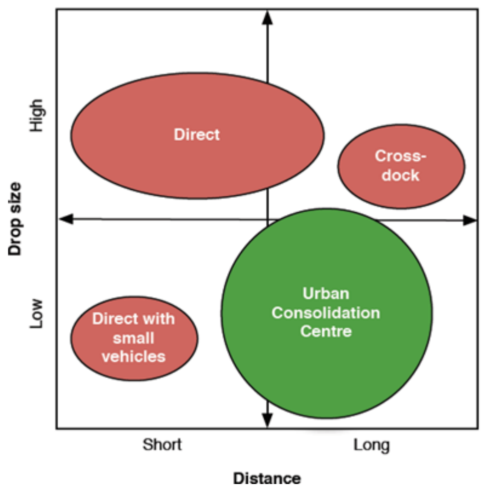

Fig. 2. Distribution models for last mile logistics for replenishing nanostores in a megacity (Kin et al. 2018a).

5. Conclusion

The continued existence of nanostores in various countries highly impacts the efficiency of deliveries to retailers in the last mile, and related to that, the impact of UFT. Fragmentation is caused by the interaction between store characteristics and stakeholder behaviour in a complex physical environment. This becomes apparent in the supply models for nanostores in cities. There are no one-size-fits-all solutions. When looking at both the supply with exclusive distributors and by own account pickups, the first conclusion is that these are actually in place because it serves the interests of manufacturers and storeowners the most, while these are also feasible from a transportation perspective. The choice for exclusive supply is motivated by the characterisation of the retail landscape; i.e., a major share of sales for manufacturers is reached through nanostores. This changes when modern retail expands ('supermarketization'), whereas the impact of online retailing is more uncertain. It is clearly observed that more people are gaining access to the internet and online retailing. This potentially changes how nanostores are supplied and the way they do business. In China, for instance, storeowners start buying and selling online (business-to-business-to-consumer (B2B2C); Fransoo et al. 2017). Herewith, they come to function as small hubs.

In areas where own account pickups are currently dominant, fragmentation can be reduced the most when trips for a single replenishment are replaced by store deliveries with a multiple drop roundtrip (assuming that a storeowner uses a motorised vehicle). A slight change in behaviour can entail a shift to another way of supplying stores; ordering online instead of at a wholesale outlet immediately leads to store deliveries. As an alternative to exclusive store deliveries, a major difference is made when exclusive shipments become bundled shipments. This can be done by collaboration between manufacturers and/or their distributors, which is not very probable given the competition to get products on the shelf. Another way to do this is to sell exclusively but deliver jointly. Given that exclusive distributors are used as long as sales in nanostores are high and the transport is feasible, improvements can be made by providing credit. Cash is a considerable constraint in this channel as it limits order sizes and herewith the size of the shipment. Order sizes potentially increase if credit is provided.

In any supply model, the feasibility of the actual transport must be taken into account. Direct exclusive supply is affordable in various studied areas, otherwise it would be relinquished. Sprawl and drop size, not stop density, have the highest impact on costs per item. A change to a multi-echelon network with a modal shift or shared use of a UCC becomes more interesting once distances start to increase (i.e., logistics sprawl; Dablanc and Rakotonarivo, 2010), while small drop sizes must be delivered. The effect of sprawl on transportation costs is enforced by congestion as this increases non-value added time and affects the vehicle fill rate. To cope with restrictions on certain vehicle types, the use of cleaner vehicles such as (cargo)bikes and electric vehicles becomes more interesting. Financially, the trade-off between an additional transshipment point and direct supply, also depends on the costs of real estate (for a depot) and labour costs (for handling). Due to the increasing real estate costs in urban areas, the shared use of a depot becomes more appealing.

Table 4 summarizes the aspects that determine nanostore supply and herewith the potential for an alternative supply model. Next to the behaviour of manufacturers and storeowners, aspects on the feasibility of transport determine whether the use of an additional hub and alternative transport modes are cost-efficient. Overall, tailored strategies within cities are expected to grow; i.e., presales with subsequent deliveries by a small truck in one part and in more traffic-restricted areas an onboard sales strategy with a zero emission vehicle. Eventually, most gains for store deliveries can be reached by bundling the shipments of various suppliers. Ordering less frequently has a lower probability as an alternative because most nanostores lack a storage room. The use of spare capacity affects service level and is therefore rather a complementary replenishment source than a full-fledged alternative. A solution would be the use of non-exclusive distributors or wholesalers conducting store deliveries. The applicability of a lot of alternatives depends on the interplay between transportation aspects and stakeholders. For instance, the number of stores might be the same, but drop size for distributors potentially decreases when storeowners additionally start ordering online. If a storeowner who currently picks up products on own account, is willing to order and pay online, this enables store deliveries. The way these store deliveries are subsequently conducted – with or without a cross-dock, with or without a clean vehicle – does not matter that much for a storeowner. The use of multi-echelon networks – either shared (UCC) or with a simple cross-dock to a tailored vehicle – is promising.

Table 4. Aspects that determine nanostore supply.

Manufacturers	Storeowners	Feasibility of transport
Characterisation of the retail landscape determines the choice for a direct or indirect supply model	The most convenient and cheapest way to supply while preventing out-of-stock situations	Logistics sprawl and the trade-off between transportation and depot costs
The evolution of the retail landscape in a particular area; maintaining exclusive supply or relinquishing this because most sales are reached through MR	Whether they are located in a predominantly MR area or not, which determines if they are supplied by distributors or must do it themselves	Density urban area, available infrastructure and motorisation level of the population, that together determine the congestion level
Developments in online retailing mean that supply models must be revised	Adaptation to online retailing practices and a subsequent change in purchasing behaviour	Available space for unloading, determined by density and urban planning
	In case of own account pickups, whether it is feasible to use an own vehicle	Traffic restrictions in cities
		Drop size, determined by volume demanded and replenishment frequency

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References

Dablanc, L. and Rakotonarivo, D. (2010). The impacts of logistics sprawl: How does the location of parcel transport terminals affect the energy efficiency of goods’ movements in Paris and what can we do about it? Procedia – Social and Behavioral Sciences, 2(3), 6087-6096.

Fransoo, J.C., Blanco, E. E. and Meijía-Argueta, C. (2017). “Reaching 50 Million Nanostores: Retail Distribution in Emerging Megacities.” CreateSpace Independent Publishing Platform.

Garza Ramirez, J. (2011). Distribution Strategies in Emerging Markets: Case Studies in Latin America. Massachusetts Institute of Technology.

GIZ (2016). Urban Freight and Logistics: The state of practices in India.

Kin, B. (2018). The Fragmented Last Mile to Nanostores in Cities – A Stakeholder-based Search for a Panacea. Vrije Universiteit Brussel.

Kin, B., Ambra, T., Verlinde, S. and Macharis, C. (2018b). Tackling Fragmented Last Mile Deliveries to Nanostores by Utilizing Spare Transportation Capacity – A Simulation Study. Sustainability, 10(653), 1-15.

Kin, B., Spoor, J., Verlinde, S., Macharis., C. and Van Woensel, T. (2018a). Modelling alternative distribution set-ups for fragmented last mile transport: Towards more efficient and sustainable urban freight transport. Case Studies on Transport Policy, 6(1), 125-132.

Kin, B., Verlinde, S., van Lier, T. and Macharis, C. (2016). Is there life after subsidy for an urban consolidation centre? An investigation of the total costs and benefits of a privately-operated concept. Transportation Research Procedia, 12, 357-369.

Kin, B., Verlinde, S. and Macharis, C. (2017). Sustainable urban freight transport in megacities in emerging economies. Sustainable Cities and Society, 32, 31-41.

Macharis, C. and Kin, B. (2017). The 4 A’s of sustainable city distribution: Innovative solutions and challenges ahead. International Journal of Sustainable Transportation, 11(2), 59-71.

Merchán, D., Blanco, E., & Bateman, A. (2015). Urban metrics for urban logistics: building an atlas for urban freight policy makers. In 14th International Conference on Computers in Urban Planning and Urban Management.

Nesterova, N., Quak, H. and Hopman, M. (2016). Deliverable 3.2. CITYLAB Local Living Lab roadmaps.

Nielsen (2016). Nielsen Grocery Universe 2016 – Belgium.

Ramakrishnan, K. (2010). The competitive response of small, independent retailers to organized retail: Study in an emerging economy. Journal of Retailing and Consumer Services, 17(4), 251-258.

Reardon, T., Henson, S. and Berdegué, J. (2007). ‘Proactive fast-tracking’ diffusion of supermarkets in developing countries: Implications for market institutions and trade. Journal of Economic Geography, 7(4), 399-431.

Reinartz, W., Dellaert, B., Krafft, M., Kumar, V. and Varadarajan, R. (2011). Retailing innovations in a globalizing retail market environment. Journal of Retailing, 87(1), 53-66.

Tandon, S., Landes, M. R. and Woolverton, A. (2011). The expansion of modern grocery retailing and trade in developing countries. ERR-122.