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Development and Application of a Transferability Framework for Micro-consolidation Schemes in Urban Freight Transport

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Abstract

Many recent experiences in the field of urban freight consolidation, focus on bundling goods close to the reception point. We will refer to these as to micro-consolidation initiatives. In fact, whereas in a typical consolidation scheme, the bundling of goods takes place at a distribution centre outside of the delivery area, the micro-consolidation schemes consist of the setting-up of logistical platforms in the heart of urban areas where the goods are consolidated before the final delivery to the customer.
This paper aims to offer a closer view into different micro-consolidation initiatives by establishing state of the art and defining common typologies. Furthermore, this paper provides guidelines for the transferability of micro-consolidation measures - based on a study of more than 30 case studies across Europe and of current transferability methodologies developed under several EU projects. A common transferability framework was developed, providing the main dimensions of analysis as well as relevant attributes and indicators. This framework was applied in order to test the transferability potential of the Espace de Livraison de Proximité in Brussels and to select the optimal pilot site for its implementation.

Keywords: Urban freight transport; micro-consolidation; transferability of urban freight transport measures

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1. Introduction

Consolidation schemes are a popular measure in city logistics. The most common of them being the Urban Consolidation Centres (UCCs). However, many innovative experiences have been performed in the cities across the globe, offering a large panel of alternative consolidation schemes. In particular, many experiences have focused on downscaling the consolidation effort by bundling the goods not outside the urban area boundaries, as this is typically the case with UCCs, but much closer to the reception point. We will refer to these experiences as "micro-consolidation initiatives".

The analysis of 34 micro-consolidation initiatives in Europe has allowed us to outline a certain number of similarities between these schemes. Also, because they target similar market segments, share some common physical and operational characteristics and micro-consolidation initiatives also share some common implementation considerations they therefore have some common transferability issues.

This paper has therefore a double objective: on one hand, to define and establish a state of the art micro-consolidation initiatives and on the other hand, to study the transferability of such initiatives. This paper has three main parts. The first chapter provides a definition and details of micro-consolidation schemes, and establishes common typologies. The second chapter studies their transferability and presents a common transferability framework that was developed for these initiatives. The third chapter shows the application of this framework in order to test the transferability potential of the Espace de Livraison de Proximité in Brussels and to select the optimal pilot site for its implementation.

2. Micro-consolidation Initiatives: Definition, State of the Art and Common Typologies

Many recent experiences in the field of urban freight consolidation focus on bundling goods close to the reception point through the implementation of logistical platforms in the heart of urban areas.

There are several references to these types of consolidation initiatives in the literature. Verlinde, Macharis, & Witlox (2011) study alternative consolidation schemes and provide a first classification based on the nature of the measure (behavioural or physical), and a futher classification of physical measures that can be either a traditional urban consolidation centre or an alternative transhipment point. Regarding the traditional transhipment points, the same author mentions a certain number of experiences (such as vehicle reception points) that aim to downscale the scope of the consolidation and focus on a particular delivery area. Boudouin (2006) introduces a concept of Urban Logistics Spaces, which are facilities that should smooth the progress of the deliveries in urban areas by setting-up specific physical infrastructure (NB: the terminology used in this paper comes from the English version of the book "Urban logistics spaces – Methodological guide" published in 2012). The Urban Logistics Spaces are classified according to a spatial dimension, i.e. the size of the urban area that is served, and that can vary from one building or street to a whole city. Three of these Urban Logistics Spaces focus on small urban areas: vehicle reception points, goods reception points and urban logistics boxes. These solution are sometimes referred to as "last-mile" solutions, i.e. solutions used for the last leg of the delivery (e.g. in Conway, Fatisson, Eickemeyer, Cheng, & Peters, 2011), but we will avoid using this term since its definition is sometimes restricted to B2C home deliveries (e.g. in Allen, Thorne & Browne, 2007) and (Gevaers, Voorde, & Vanelslander, 2011). We prefer to use the term "micro-consolidation" that was introduced by Browne, Allen, & Leonardi (2011) to designate a small district consolidation centre in central London and that was further adopted by Conway, Fatisson, Eickemeyer, Cheng, & Peters (2011).

In order to establish a definition and typologies of these micro-consolidation initiatives, authors have analysed 34 implementation cases in Europe. Examples include micro-consolidation centres (i.e. logistical platforms resembling a traditional UCC but focusing on a particular district, such as the micro-consolidation centre in London or the La Petite Reine logistical platform in Paris), vehicle reception points (i.e. a logistical facility where carriers can load and unload the goods destined to the neighbouring receivers, such as Espace de Livraison de Proximité in Bordeaux) or communal reception points (i.e. facilities where deliveries towards several receivers are consolidated, such as KIALA relays). Other than this consolidation aspect, many of these initiatives provide additional advantages to the carriers and receivers, such as reducing problems linked to the loading and unloading

of the goods (in the case of Espace Logistique de Proximité for example) or allowing unattended deliveries (in the case of urban logistics boxes for example).

Although these initiatives may appear to be different, we have been able to highlight some common characteristics, which has allowed us to define these "micro-consolidation" initiatives. First of all, micro-consolidation initiatives aim to reduce the total vehicle trips performed in an urban area (and particularly in most dense areas) by bundling the goods close to the reception point or at the reception point itself. Secondly, these initiatives involve a setting-up of the logistical facilities (i.e. additional transhipment points) in the heart of urban areas. Thirdly, micro-consolidation initiatives target the deliveries of small and light loads (i.e. parcels in opposition to pallets) that we can group under the common denomination of "urban light freight" such as defined by Tsolakis & Naudé (2008). A fourth common characteristic is that micro-consolidation initiatives use clean vehicles or soft transportation modes (e.g. on foot or by cargo-bikes) for the last leg of the delivery. Finally, micro-consolidation initiatives are generally privately owned and run by specialized transportation companies.

Several authors have studied the way to classify city logistics initiatives, but none have provided a specific typology of micro-consolidation initiatives. Among many examples of the classification of city logistics initiatives, we can mention a paper by Benjelloun, Crainic, & Bigras (2010) that suggests a taxonomy grid for city logistics projects that describes them according to three, increasingly more detailed levels and a paper by Browne, Allen, Nemoto, Patier, & Visser (2011) that classifies the measures according to the features of the freight transport that they are acting on (e.g. total vehicles kms / journeys by road, fuel consumption, noise, etc.).

The analysis of case studies has enabled us to define six common typologies for these micro-consolidation initiatives. The typologies were defined according to the type of logistical platforms in the place and logistical scheme used for their operation. The first three typologies were defined in the methodological framework of Urban Logistics Spaces by Boudouin (2006) and the last three groups refer to several innovative experiences recently performed in European cities.

The first typology is the vehicle reception points, which consists in the setting-up of a zone where carriers can load and unload the goods destined to the neighboring receivers. These type of devices have been successfully implemented in several French cities, such as Bordeaux, Rouen, Lyon, Clermont Ferrand and Montpellier under a common denomination Espace de Livraison de Proximité (ELP). In addition to its major goal, which is to reduce parking problems and better accommodate trucks, the setting-up of this type of device also reduces the vehicles-trips to be performed in the delivery area. Fig. 1 shows the function of this type of device used at the point (1). It is to be noted that the typology presented in Fig. 1 concerns the original publically owned concept of ELP – in fact, with the privatization of ELP operations in French cities, this concept has evolved into a slightly different typology, closer to the one described in point (5).

The second typology, ie. goods reception points consists in the setting-up of a new urban service where carriers can deliver their goods to a communal delivery point. This type of device can be used by private customers (e.g. KIALA relays in France that use convenience stores as pick-up points for internet shoppers) or by business customers (e.g. drop zones in Aalborg where goods are delivered to neighboring shops with longer opening hours). In addition to providing a new service and allowing off-hours deliveries, these devices also aim to reduce the total number of vehicles-trips to be performed in the delivery area by bundling goods at the reception point. Fig. 1 shows the functioning of these type of devices used at point (2).

The third type of urban logistics spaces are the urban logistics boxes, which follow a similar principle: bundling the goods at reception and enabling the deliveries in the absence of the receivers by the setting-up of automated locker-boxes where goods are delivered. These urban logistics boxes allow to the consolidation of deliveries towards several receivers into a single reception point, thus decreasing the total vehicles-trips in urban areas. This typology is again valid for both business and private customers. In Paris, automated locker boxes are used for the deliveries of spare parts for maintenance technicians within the Consignity initiative. Regarding the deliveries to private customers, automated locker boxes (sometimes denominated as "packstations") are used in Germany by DHL and by bpost (Belgian post operator) in Belgium for the delivery of letters and parcels in the absence of receivers. Fig. 1 shows the function of this type of device as used at point (3).

In addition to these classical Urban Logistics Spaces that have been previously defined and described in the literature, we have been able to identify three other innovative typologies that have been implemented in a series of recent initiatives across Europe.

The first typology is the micro-consolidation centres: which adopt a similar scheme to that of the classical urban consolidation centre - bundling the goods, combined with a fleet of non-polluting vehicles making rationalized rounds. However, in opposition to classical urban consolidation centres, micro-consolidation centres are set-up much closer to the delivery area and have a more limited spatial range, which is directly conditioned by the range of vehicles used for the last leg of the delivery (generally clean vehicles such as cargo-cycles or electrically-assisted trolleys). Furthermore, the bundling of goods usually takes place in a suburban depot from where a consolidated transport is performed towards the micro-consolidation centre. Examples include La Petite Reine and Chronopost in Paris or the Office-Depot micro-consolidation centre in London. Fig. 1 shows the functioning of this type of devices used at point (4).

Another innovative typology consists of bundling the goods in a suburban depot and performing consolidated transport to the city centre where a transshipment point (i.e. a vehicle reception point) is used for transferring goods to lighter and more adapted vehicles. This is for example the case of Cargohopper in Utrecht and the Freight Bus in Lyon. Fig. 1 shows the functionof this type of device as used at point (5).

The last identified typology consists of using a suburban depot in combination with a mobile logistical facility that is used to perform the consolidated transport of goods towards the urban area and that contains all the necessary equipment and vehicles for the last phase of the delivery. This is for example the case of the TNT Express initiative in Brussels that uses a “Mobile Depot” for the consolidated transport towards the city centre and from which cargocycles perform the last leg of the delivery, or the Vert Chez Vous initiative in Paris that uses a mobile barge on the Seine as a mobile depot and departing point for cargocycles. Fig. 1 shows the function of this type of device as used at point (6).

As shown in Fig. 1, the six typologies differ either according to the type of logistical platform (i.e. urban logistics space) used for the final consolidation of deliveries (a vehicle reception point, a goods reception point, a urban logistics box, a micro-consolidation centre or a mobile urban logistics space), or according to the upstream logistical process. All of the typologies, except for the first one concern the logistical flows managed by a single company.

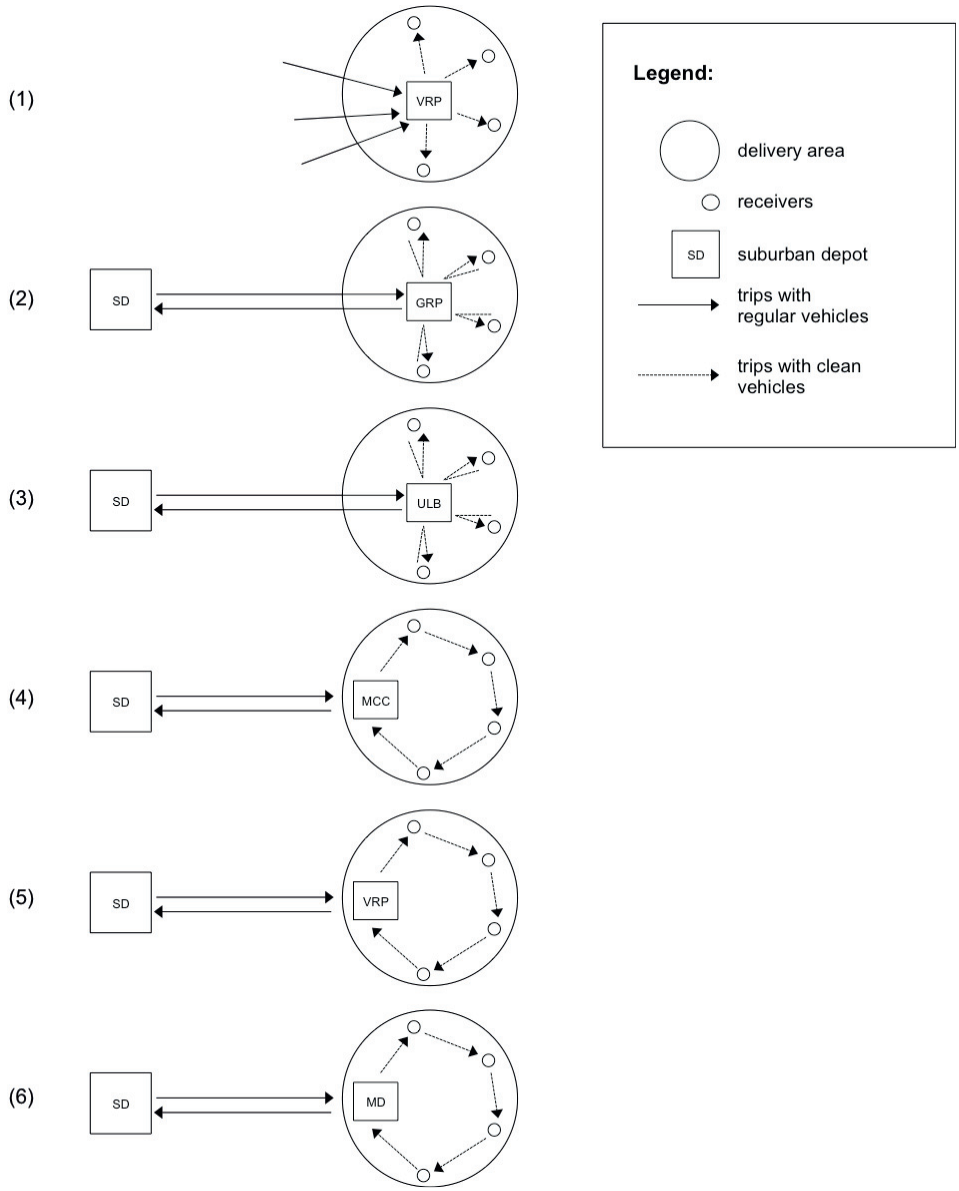

Fig. 1. Typology of micro-consolidation schemes

3. Transferability of Micro-consolidation Initiatives

Transferability of successful urban freight measures has been a major issue in the EU-funded research in recent years. The rationale is simple: replicating successful experiences from one city to another allows leveraging knowledge and efforts developed in the original environment. However, successful replication of experiences requires a transferability analysis, i.e. highlighting which are the conditions in which the original initiative was implemented and assuring the same conditions in the new environment.

Several EU projects analyse the transferability of urban freight initiatives. The SUGAR project analyses 44 urban freight measures and identifies the requirements for their transferability, by analysing the implementation details (implementation steps and timing, resources and infrastructure needed, human resources, primary target groups, actors involved, etc.) and supporting mechanisms (awareness/information campaigns, partnerships/key stakeholders, other policies, etc.). Within the CIVITAS program, a general transferability framework has been developed (and formalized by Macario & Marques, 2008): it suggests a list of steps to follow for the successful transfer of experiences: (1) Diagnosis of the problems; (2) Characterisation of the city; (3) Analysis of the city context and implications of problems identified; (4) Look around for similar contexts; (5) Selecting examples of source urban contexts; (6) Identify measures with potential for transferring; (7) Packaging & Dimensioning the measures for transferring; (8) Ex-ante assessment of measures to transfer; (9) Identify need for adjustment; (10) Implement measures and steer results. The TURBLOG project pushes further this analysis by considering transferability as a match between the characteristics of the urban freight measures and the environment in which it is implemented. For this, the project uses the concept of Logistic Profiles, which consists of three series of indicators: (1) City area features (Commercial density, Homogeneity, Logistic accessibility, Restriction applied); (2) Product characteristics (Easiness of handling, Special conditions), and (3) Agent profile/deliveries profile (Urgency of deliveries, Frequency of deliveries, Amounts to be delivered, Planned deliveries).

On one hand, these general approaches have been developed for urban freight measures of all types. On the other hand, since each urban freight solution is distinctive, each measure will have different transferability issues. However, since micro-consolidation initiatives share some common characteristics, it was our attempt to construct a common transferability framework for micro-consolidation initiatives through a refinement of the previous frameworks to these specific cases.

For the construction of this transferability framework, we have therefore used a combined approach. On one hand a top-down approach by looking at general transferability frameworks in the literature and analysing how they apply to the micro-consolidation initiatives, and on the other hand, analysing the transferability issues based on the analysis of case studies. For the construction of the transferability framework for micro-consolidation initiatives, we have therefore built on the work that has been previously done within EU projects, in particular by looking at the interactions between a certain logistic solution and the environment in which it will be implemented. Based on the analysis of micro-consolidation initiatives, we have derived and adapted the general transferability frameworks to the case of the micro-consolidation of goods, by listing the most relevant areas of analysis and the most relevant attributes and indicators.

4. Transferability Framework for Micro-consolidation Measures

We have constructed a common transferability framework for the micro-consolidation initiatives that compares the characteristics of a specific initiative and the environment in which it was implemented with the specificities of a target environment in order to find the best fit. This framework can be used to test the transferability potential of a certain micro-consolidation measure into a new environment and consequently to determine the most appropriate initiative for a specific city area (for example, when choosing between a set of alternatives in order to solve delivery problems in a specific city area) and to determine which city areas are best suited for the implementation of a certain best practice (for example, when choosing a pilot site for the implementation of a certain initiative). Finally, the transferability framework can also be used in a more pro-active way. By highlighting gaps that exist between the original and the target setting, it helps to formulate the set of necessary actions to be implemented in the target environment in order to ensure the success of a certain initiative (for example, introducing a new regulation in the target city area in order to ensure the success of a certain initiative).

A starting point for the application of the transferability framework is to choose a specific micro-consolidation initiative, define its range (i.e. the city area served by the micro-consolidation initiative) and define the target city area, which should be of the same/similar size as the original area served by the micro-consolidation initiative.

Fig. 2 presents this framework, which contains three dimensions of the analysis. The first one assessing the relevance of the micro-consolidation initiative for a particular city area. The second one assessing the suitability of the micro-consolidation initiative with regards to the characteristics of the original and the target city area, and the

third one assessing the feasibility of the implementation given the original and target implementation setting and context.

We will now describe in more detail each dimension of the analysis, providing the major areas of the analysis in each dimension and examples of associated indicators.

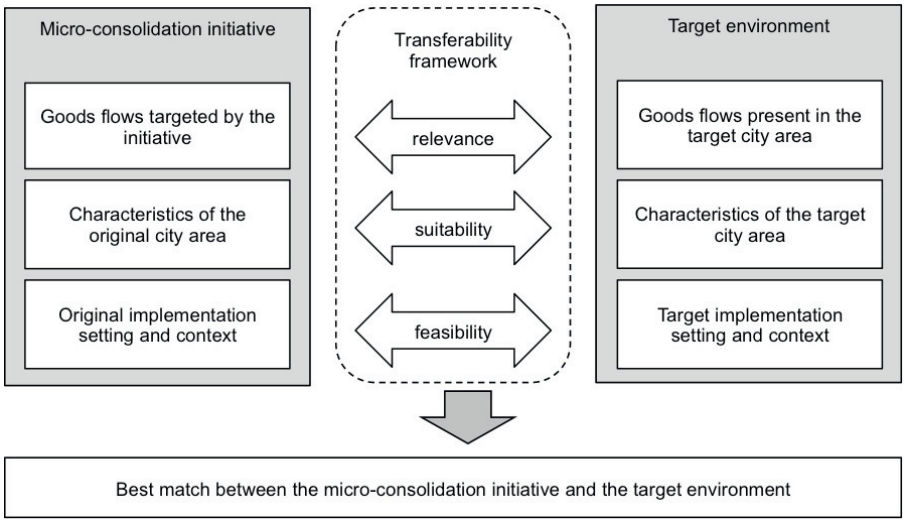

Fig. 2. Framework for the transferability of micro-consolidation initiatives

4.1. Relevance

Regarding the relevance of the micro-consolidation initiative, we will assess how useful it is to implement such initiatives in the target city area. We will study on one hand which are the goods flows that are targeted by a specific initiative (e.g. delivery of office supplies, postal deliveries, deliveries to independent retailers, etc.) and on the other hand, which are the goods flows that are most present in the target city area, in order to ensure that there is a sufficient demand for such an initiative. The following attributes have been defined to test the relevance:

4.1.1. Market need for the micro-consolidation initiative

This market need can be assessed using several different indicators, such as the total volume of goods being transported, the total number of deliveries, the total number of users, etc., in the original and the target city area, and all relevant market segments targeted by the micro-consolidation initiative.

4.2. Suitability

Regarding the suitability of the micro-consolidation initiatives, we will compare the characteristics of the original area in which it was implemented with the characteristics of the target area. We have found the following attributes to have the highest impact on the successful implementation and transferability of the micro-consolidation initiative:

4.2.1. Accessibility of the area

Most of the initiatives considered are interesting only in environments with poor logistical accessibility (i.e. significant congestion problems) that impede the smooth functioning of deliveries and create a need for specific measures that aim to increase their efficiency. In some specific cases (e.g. Cargohopper in Utrecht), these

accessibility problems are enhanced by the physical characteristics of the environment (e.g. narrow streets that are not easily accessible by trucks).

4.2.2. Loading and unloading infrastructure in the area

The easiness with which carriers can load and unload the goods in the area will also influence the success of the micro-consolidation initiatives. Typically, these will be successful in areas with problematic loading/unloading facilities (e.g. not enough loading bays, high occupancy rate of the street parking, etc.). In this setting, the use of facilities that allow consolidating several deliveries (e.g. vehicle or goods reception point) or the use of smaller vehicles that are not subject to parking problems (e.g. cargocycles) can present a significant advantage to the users of the micro-consolidation initiative.

4.2.3. Access restrictions

In many cases, the access restrictions and regulations in the city area support the business case of the best practice by providing a relative advantage to the vehicles used in the latter. For example, the presence of a pedestrian zone, a Low Emission Zone, or a zone with time or weight restrictions will positively influence the success of micro-consolidation initiatives using transportation means that are allowed in those zones (e.g. electrically-assisted trolleys are allowed in the pedestrian zone or cargocycles are allowed in the weight restriction zone).

4.2.4. Transport network for the vehicles from the micro-consolidation initiative

In many best practice initiatives, dedicated infrastructure for vehicles operating within the micro-consolidation initiative (e.g. bicycle lanes or bus lanes accessible for cargocycles) provides them with an advantage over other vehicles, therefore increasing the efficiency of the operations and supporting the business case of the micro-consolidation initiative.

4.3. Feasibility

Regarding the feasibility of the micro-consolidation initiative, we will first analyse the original setting in which it was implemented as well as the economic and institutional context of the initiative. We will then study the current implementation conditions in the target environment. In opposition to the two previous dimensions of the analysis, the analysis of this dimension can be used in a much more proactive way, i.e. not only to assess the current situation in the original and target environment, but to provide directions about the conditions that should be created for the successful transfer of the best practices (e.g. which are the stakeholders that should be involved, which type of financial instruments should be used, etc.). We will use the following attributes to test the feasibility of the micro-consolidation initiative, regarding its economic and institutional context:

4.3.1. Actors, partnerships and key supporting stakeholders

The success of best practices greatly depends on the key actors leading the project and the level of involvement from the key private and institutional stakeholders. This attribute will therefore assess the level of involvement from relevant organizations in the setting-up of the micro-consolidation initiative.

4.3.2. Incentive programmes/financial instruments

Many micro-consolidation initiatives are dependent on financial support from institutional actors. Often, this is due to the fact that the setting up of logistical facilities in the heart of urban areas often involves high real estate costs. The public authorities can provide incentives by renting public space at a logistical cost for example.

4.3.3. Acceptability and awareness/information campaigns

Awareness and information campaigns are often necessary in order to guarantee the acceptance of the solutions developed. In particular, the acceptance by the political actors and local business owners or inhabitants is crucial.

4.3.4. Link with other policies

The success of the micro-consolidation initiative will also depend on its integration in larger urban mobility or urban development plans.

Table 2 shows the different dimensions and attributes for the transferability study of micro-consolidation initiatives and provides some examples of indicators that can be used to assess the different attributes.

Table 1. List of relevant dimensions, attributes and example indicators for the transferability of micro-consolidation initiatives

Dimensions	Attributes	Example of indicators
Relevance	Market need for the micro-consolidation initiative	• Daily/weekly volume of deliveries (per market segment) • Daily/weekly number of deliveries (per market segment) • Number of business units • Number of retailers • Total retail space
Suitability	Accessibility of the area	• Level of saturation of the roads • Average speed of traffic • Minimum speed of traffic during the day
	Loading and unloading infrastructure	• Occupancy rate of the street parking (during specific hours) • Existence of loading bays (y/n) • Occupancy rate of loading bays
	Access restrictions	• Share of pedestrian streets • LEZ (yes/no) • Access restrictions based on weight (yes/no or % of streets) • Access restrictions based on environmental standards (yes/no or % of streets) • Delivery hours restrictions (yes/no or % of streets)
	Transport network for the vehicles from the best practice	• Number of km of bicycle lanes • Number of km of bus lanes • Number of km pedestrian streets • % of pedestrian streets • Space left for pedestrians on the road (%)
Feasibility	Actors, partnership and key supporting stakeholders	• Existence of a dedicated project team (yes/no) • Involvement from institutional actors (yes/no) • Involvement from representatives of shopkeepers (yes/no) • Involvement from representatives of carriers (yes/no)
	Incentive programmes/financial instruments	• Level of public funding available • Public infrastructure provided (yes/no)
	Acceptability and awareness/information campaigns	• Acceptability of the concept (% of retailers in favor) • Existence of an awareness and information campaign
	Link with other policies	• Project part of a larger redevelopment project (yes/no)

5. Application of the Transferability Framework to Brussels

We will illustrate the application of the transferability framework by considering the implementation of one specific measure: Espace de Livraison de Proximité in Brussels. In fact, in their strategic urban distribution plan, Brussels Capital Regional Authorities have highlighted this best practice as especially relevant to the city

distribution problems in Brussels. However, Brussels has many neighbourhoods with delivery and traffic problems and selecting a pilot site for the implementation of such initiative is quite challenging. We will therefore use this transferability framework to assess how likely the implementation of the ELP is to succeed in Brussels on one hand and to choose the best neighbourhood for the implementation of it on the other hand. The results of this analysis have not been implemented, but we have chosen to include them in order to demonstrate how this theoretical framework can be applied in practice.

5.1. Approach and methodology

The first step consists in defining the scope of the analysis, i.e. identify the original and the target city areas. The ELP was initially implemented in the Bordeaux City centre, in a commercial area. The spatial range of the ELP varies from a 100 m radius circle to a 400 m radius circle (i.e. from 0,03 to 0,5 square kilometres) depending on the usage of handling tools. For this analysis, we will consider a surface of 0,5 square kilometres that corresponds to 2 IRIS (smallest administrative geographical unit in France) units in Bordeaux. As for the potential target city areas, we will use the administrative subdivision of Brussels Capital Region in 145 neighbourhoods and choose from 26 neighbourhoods that have commercial centres. The average size (0,63 square kilometres) of these neighbourhoods is comparable to the original city area.

The first step of the analysis consists in testing the relevance of the micro-consolidation initiative to the target city areas. The economic and environmental evaluation of the ELP in 2004 performed by Gerardin Conseil (2004) identifies that the major users of the ELP are the transportation companies servicing the local shops and businesses in the neighbourhood where the ELP was implemented. There are in total 535 shops and businesses in the area of the analysis. No further information is available regarding the type of end-users. For testing the relevance of the ELP initiative, we will therefore look at the total number of businesses in the target area.

The second step of the analysis consists of testing the suitability of the micro-consolidation initiative to the target city areas. Regarding this area, the success of the ELP in Bordeaux was to a great extent conditioned by the existing difficulties to perform deliveries. In fact, the area in which the ELP was implemented has a large pedestrian zone and a historical centre with narrow roads. Moreover, the ELP was initially implemented during the building of a new tramway network, which made goods deliveries difficult in some neighbourhoods. The ELP zone is in the pedestrian zone of the Bordeaux city centre where the deliveries are not authorized except between 7:00 and 10:00. Since the ELP area is in the pedestrian zone, the final leg of the delivery is made on foot using special handling tools. For testing the suitability of the initiative, we will therefore look at the accessibility of the area (through the level of road saturation), the easiness of parking (through the occupancy rate of street parking), the presence of access restrictions (through the presence of pedestrian streets or other access restrictions), and the network of pedestrian roads (though the presence of pedestrian streets and the place left for pedestrians on the road).

The final step of the analysis consists in comparing the economic and institutional context of the original and target environments. Regarding this dimension, the success of the ELP experiment in Bordeaux is greatly due to the presence of key stakeholders, such as the Bordeaux Chamber of Commerce, Bordeaux metropolitan authority, carrier's organizations and an association of shopkeepers. Regarding the financing of the experiment, the public financing was 90% in 2003, 40-45% in 2004, 10-15% in 2005. Also, the project was a part of a major urban redevelopment project. For comparing the economic and institutional context of the original and target environments, since there are no differences between the target environments, we will look at the overall context of the future of the ELP. We will analyse the existence of a project team, the actors, partnerships and key supporting stakeholders (through the involvement from institutional actors, representatives of shopkeepers and carriers), the planned incentive programmes (thought the planned level of public financing) and the planned awareness campaigns, and its links to the other policies (through the existence of larger redevelopment project)

Table 2 shows the list of dimensions, attributes and indicators that were selected for testing the transferability of the ELP initiative in Brussels.

Table 2: List of dimensions, attributes and indicators selected for testing the transferability of the ELP initiative in Brussels

Dimensions	Attributes	Example of indicators
Relevance	Market need for the micro-consolidation initiative	• Total number of business units
Suitability	Accessibility of the area	• Level of road saturation
	Loading and unloading infrastructure	• Occupancy rate of street parking (10h30-12h00)
	Access restrictions	• Presence of pedestrian streets (many/few/none)
		• Presence of other access restrictions (yes/no)
	Transport network for the vehicles from the best practice	• Presence of pedestrian streets (many/few/none)
		• Place left for pedestrians on the road (%)
Feasibility	Partnership and key supporting stakeholders	• Existence of a dedicated project team (yes/no)
		• Involvement from institutional actors (yes/no)
		• Involvement from representatives of shopkeepers (yes/no)
		• Involvement from representatives of carriers (yes/no)
	Incentive programmes/financial instruments	• Level of public financing (%)
	Acceptability and awareness/information campaigns	• Existence of awareness campaigns (yes/no)
	Link with other policies	• Project part of a larger redevelopment project (yes/no)

5.2. Results

The analysis of the economic and institutional environment in which the ELP project will be run has led us to the conclusion that there are generally favourable conditions for the implementation of the ELP in Brussels. In fact, all of the indicators in this dimension of the analysis have met a positive assessment. A dedicated project team is planned. Regarding the necessary actors, partnerships and key supporting stakeholders, all types of key stakeholders are present. The institutional actors are represented through the regional transport and land use planning authorities. Shopkeepers are represented through the shopkeepers representation (Comeos and Atrium) and the regional Chamber of Commerce (BECI) and carriers are represented through professional organizations (UCM, UNIZO). Public funding is planned for the pilot project and the project is also a part of a larger redevelopment project for the distribution of goods in Brussels.

Regarding the best choice of the pilot site for the implementation of such an initiative, we have compared 26 neighbourhoods with commercial centres. Based on the number of business units (varying from 122 and 790), we have constructed a shortlist of 9 neighbourhoods with more than 400 businesses (in comparison to Bordeaux where there are 535). The second step is the comparison of the characteristics of each neighbourhood. Table 3 gives a list of indicators for each commercial district.

Table 3: Suitability indicators for 9 most relevant commercial districts in Brussels

Neighbourhood	Surface (square km)	Number of business units	Level of road saturation (%)	Place left for pedestrians on the road (%)	Presence of pedestrian streets	Presence of other access restrictions	Occupancy rate of street parking (10h30-12h00) (%)
GRAND PLACE	0,3809	790	56,62	48,44	many	none	83,01
PORTE DE HAL	0,5325	771	52,94	42,51	none	none	81,83
MATONGE	0,4781	593	44,98	45,96	none	none	86,77
SAINT-JOSSE CENTRE	0,6084	568	59,75	40,41	few	none	83,64
BEGUINAGE - DIXMUDE	0,3749	476	50,21	37,38	none	none	80,16
FLAGEY - MALIBRAN	0,6437	466	81,73	37,23	none	none	87,87
MOLENBEEK HISTORIQUE	0,7077	451	42,07	41,28	none	none	62,25
MARTYRS	0,3799	436	69,63	43,69	many	none	81,68
MAROLLES	0,6386	418	86,12	46,34	none	none	83,14

The indicators that seem to be critical for this analysis are the level of road saturation, the occupancy rate of street parking, and the presence of pedestrian streets. The analysis of these indicators suggests that the most suitable neighbourhood for the implementation of the ELP in Brussels is Martyrs, because it is the only neighbourhood that combines a high level of road saturation, a high occupancy rate of street parking, and a presence of pedestrian streets.

6. Conclusion

Urban freight transport and more particularly, the last leg of the deliveries, is becoming more and more fragmented. In fact, as evidence from French cities show, if the total tonnage of urban freight generated by people has remained stable, the number of shipments has doubled between 1988 and 2004 (Zunder, 2011). Moreover, parcel, courier and express transport services are one of the fastest growing transport businesses in cities (MDS Transmodal Limited, 2012). This results in more numerous, smaller deliveries. Micro-consolidation initiatives target precisely these type of market segments and depart from the evidence that a large part of urban deliveries have small weight and volume and can therefore be consolidated and transported using smaller, more adapted vehicles or using soft transportation modes. Combined with the increasing sustainability concerns, both from institutional and private actors, it is therefore reasonable to suppose that these initiatives will gain additional importance over the years.

Many different experiences in the field of micro-consolidation have been performed in cities across Europe. Learning from these foreign experiences and replicating them in local conditions remains one of the major challenges for both private and institutional actors, making the transferability a key issue in the urban freight transport research.

In the present paper, authors study common characteristics of these micro-consolidation initiatives and suggest a framework for their transferability to other urban areas. As illustrated in the example of the ELP project in Brussels, this framework can be used as a starting point for identifying transferability considerations linked to an implementation of a certain micro-consolidation initiative in a new urban area. This framework suggests the main dimensions of analysis and defines relevant attributes, however, the choice of precise indicators is to a greater extent conditioned by the availability of data regarding the features of each micro-consolidation initiative and the availability of data regarding the original and target environment.

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