The Transportation of Goods at the Heart of Throwing Down the Gauntlet of Algiers Smart City

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Abstract

At a time when freight transport remains one of the key aspects of the city's urbanism and contributes greatly to its economic development, its management remains a very complex task. And despite the growth of urban mobility experienced by Smart City projects, the reorganization of merchant flows in particular and urban logistics in general remain confined in the shadows; hence the challenge of integrating goods flow management into the core functions of Smart City's urban mobility. The incompleteness of the proposed projects in the freight transport sector for the future of the capital «Algiers Smart City» is a proof that the latter would be a weak link in the axis of sustainable and intelligent transport. In this article, we will develop the question of the integration of specialized and interconnected infrastructures in the management of freight flows in urban areas to ensure a smart urban delivery plan and integrate the notion of e-commerce in the Algerian economic market in order to limit the consequences of congestion in the city at the last kilometer.

Keyword: Freight transport; urban logistics; transport of goods; Smart City; smart delivery plan.

1. Introduction

It is only in the last two decades that urban freight transport has aroused the interest of researchers, institutions and the various economic actors in the city, contrary to urban mobility, which has been the focus of a large number of researchers and academics for more than fifty years13. Nevertheless, urban freight transport is an essential issue in urban planning; as it is an essential factor in the functioning of cities, it ensures satisfaction of the population's needs and guarantees commercial dynamism between the different regions of the city. A definition has been set in the *Laetitia Dablanc* thesis, which defined urban freight transport as "*the organisation, by or for professionals, of the*

13 Jean-louis, R., & Jesus, G.-F. (s.d.). *Ville et mobilité.* CNRS, Université de lyon.

movement of products within an urban territory"14. The Transport Economics Laboratory (LET) has also defined it as "*all displacements whose use is justified by a displacement of goods or materials in the city*"15 .

In particular, urban freight transport represents 20% of total automobile traffic and 20 to 30% of the occupation of the stationed road area16. However, urban freight transport also represents a source of problems for city inhabitants such as pollution with these different forms; air pollution, dirt and noise pollution, damage of roads, insecurity and even visual pollution caused by traffic jams and road congestion, which creates involuntary physical barriers; hence to the necessity to address the subject of urban logistics.

Daniel Boudouin and Christian Morel consider that "*urban logistics can and must contribute to improving the functioning of the city; this is the challenge of any approach looking to «improve the circulation of goods* "17.

Urban logistics can also be defined as "the art of freight transportation flows into, out of and through the city in the best possible conditions"18. Based on these two definitions and on what was mentioned at the beginning of this introduction, it is evident that good urban mobility cannot be achieved without focusing on the freight transport and addressing in a coherent approach the issue of urban logistics within the city, to ensure the successful development of other sustainable urban strategies in a smart city.

14 Dablanc, L. (1997, Mars 24). Entre police et service: l'action publique sur le transport de marchandise en ville le cas des métropoles de paris et new york. Paris.

15 Routhier, J.-l., Segalou, E., & Durand, S. (2001). *Mesurer l'impact du transport de marchandises en ville.* Jean-Louis Routhier, Erwan Segalou, Sandrine Durand: Direction de la Recherche et des Affaires Scientifiques et Techniques (DRAST, METL) et l'Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) dans le cadre du programme National « Marchandises en Ville », coordonné par le CERTU.

16 Patier, D. (2002). *la logistique dans la ville* (éd. Celse). Paris.

17 Boudouin, D., & Morel, C. (2002). *Logistique urbaine ; l'optimisation de la circulation des biens et services en ville* (éd. La Documentation Française). Paris: Programme National « Marchandises en Ville ».

18 Patier, D. (2002). *la logistique dans la ville* (éd. Celse). Paris.

Figure 13. Freight Transport in the city (Algérie patriotique janvier 17, 2018)

2. Urban logistics in the world

Urban logistics is the result of European research programmes initiated since 1993; it takes an important interest in the functioning and global development of the city, which has always remained a key place for sales and consummation exchanges.

Today, the consummation needs of urban residents are increasingly broad and the demand for goods is growing in the face of insufficient motorization in the city centre and the difficulty of displacement on the periphery. On this occasion, several cities around the world became aware of this new development, and took the necessary measures to evolve their distribution and delivery methods and thus took the bull of urban logistics by the horns.

2.1 Paris

Urban logistics in Paris represents 1,600,000 movements in a week and consumes 15 to 25% of the city's road space. It represents 25% of total fuel consumption, 60% of particulate emissions and 26% of greenhouse gas emissions19. Under these conditions, a charter of good practices had been implemented in 2006 and signed by 47 partners. This charter proposed in particular to harmonise the goods regulations at the level of the Paris conurbation. Thus, we were also able to summarize the organizational model chosen by the French capital in three main areas:

- The outer ring road: large logistics platforms acting as an entry point.

19 (s.d.). Atelier parisien d'urbanisme (Apur).

- Denser suburban areas: consolidation centres (logistics hotels and freight terminals, etc.) for example, in 2018, Sogaris launched the Porte de la Chapelle logistics hotel to supply the city centre more efficiently.
- City centre: Smaller urban delivery centres, serving specific and small areas of the city...

2.2 Log Angeles

With its industrial vocation, its important economic development, a vehicle park of more than 8 million units, the important traffic generated by the flow of freight transport coming from its port, and its five airports... Los Angeles has all the necessary characteristics to adopt in turn a model of management of its flows, which is mainly based on the municipality and which can be summarized in these three points:

- The creation of lanes and radii reserved exclusively for delivery vehicles.
- The implementation of strict regulations to combat pollution generated by vehicles.
- Reward the efforts made by companies working to improve their logistics circuit.

2.3 London

London is at the centre of the international economy and is familiar with the spatial changes of metropolisation. As a result, it has taken steps to develop its own organisational model that has guaranteed the efficient management of its transport and delivery flows, mainly aimed at pricing access to the city centre, collaboration between carriers and consumers and the integration of company fleets as a softer alternative to delivery vehicles within company distribution areas.

❖ **Synthesis: Algiers, where is it?**

In Algiers, like all the other major cities in the world, urban mobility is at the heart of the reflections on the future of the city, while the question of urban logistics is still a little visible dimension. In this paper we have simply enriched the latter's literature with the set of reflections we have put forward in order to make an overview of urban logistics available to the parties concerned.

3. Algiers Smart City

Since this project was initiated in 2017, the wilaya of Algiers has turned its attention to the implementation of an information technology operating system in order to provide innovative solutions to the various urban planning problems for a future Eco metropole or smart city, with the ambition to gradually transform the capital by 2035, the Smart City project in Algiers aims to optimize city management, in order to improve the quality of life for its citizens. According to urban planning experts, these problems can be summarized in five categories, as follows:

- Traffic problems,
- Hygiene and comfort issues,

- Social and economic problems and finally
- Intellectual and spiritual problems.

From this classification, it can be clearly seen that traffic problems, which are increasing in mobility, are taking over from other axes.

Nevertheless, the solution to these problems would require the direct implication of the different stakeholders in the city, including, but not limited to, transport, energy, urban planning, water, security, health and logistics services, among others20.

Unfortunately, this project has raised many questions about its implementation, particularly in the context of the economic crisis.

4. Urban mobility and urban logistics

In a city that suffers from urban planning, urban mobility has not escaped the marginalization of urban problems. And despite the efforts and solutions implemented in the Blue Plan generated by the study of urban mobility in the Algiers urban area, which falls within the framework of the "Urban Mobility and Sustainable Development in the Mediterranean" programme, the problem of freight transport remains a very weak link that does not meet the needs of this poorly understood field.

At the time where the transport axis is one of the essential axes in the smart city project, and where its modernization is a concern of local authorities that are mainly reflected in the modernization of urban transport and road infrastructure; and despite the integration of the management of goods flows into the main functions of urban mobility in the smart city; the urban logistics in general remains in the background...". Promises will not be kept because of multiple technical, urban and economic causes, their inadequacy to the living conditions in large cities"21. This paper emphasizes the need to seek the reasons of the invisibility of this problem and the causes for this late involvement of the community in the consideration of urban freight transport, we are still wondering whether this delay and marginalization would be related to the specificity and complexity of this sector?

20 Alger ville intelligente, un projet "réaliste et réalisable", selon un expert international. (2018, Juin 27). *وكالة الأنباء الجزائرية*.

21 J.C., Z., & CH, N. (s.d.). *le transport urbain enjeu pour les villes.*

5. Management of goods flows in urban areas

5.1 flow of goods

Urban logistics flows are diverse and can be grouped into three main components: 22

- Inter-institutional flows corresponding to the delivery and removal of goods from economic establishments (40% of flows);
- Household consumption flows, illustrated by shopping trips and home deliveries (50% of flows);
- Urban management flows, which include construction site, waste, but also postal and moving flows... (10% of flows).

Table 9. **Components of urban freight transport (Source: transport economics laboratory / realisation: Marc SEROUGE, 2013)**

percentage in vehicle-km	components of urban freight transport
40%	Inter-institutional flows 
50%	Household consumption flows 
10%	Urban management flows 

5.2 Specialized and interconnected infrastructures

The modernisation of freight transport and the improvement of logistics processes are decisive issues for the development of cities that would like to adopt the characteristics of Smart City; this undoubtedly involves the involvement of infrastructures related to the freight transport that facilitates commercial exchanges in urban areas.

In addition to their necessity in the management of goods flows, these infrastructures ensure the economic development of the city, contribute to the attractiveness of the activities, and contribute in

22 La logistique urbaine ou l'art d'organiser les flux de marchandises en milieu urbain. (2016, Oct). *AUCAME*(86).

particular to the quality of the urban living environment, and their establishment in the city would today be one of the strategic elements of a spatial planning policy.

By definition, infrastructures represent delimited areas where the different operators carry out the entire process of commercial activities; there are some of them: logistics site, logistics centre, entrepot and logistics platform.

a) **The logistics pole**

"Spontaneous or assisted, it results from the grouping in a metropolitan region, such as the Lille conurbation, on different sites and in different areas of logistics activities. The result is a phenomenon of spatial concentration called polarization. »23

b) The logistics site

"A place where only one operator exploits. The location of logistics sites is linked to three factors: the function of the service provider, the demand of industrial and commercial customers and the offer, the site itself.

- First factor: the need to optimise the volume and quality of local and long-distance traffic.
- 2nd factor: the site must be located in or near a huge potential market; the centrality of the location must be verified.
- 3rd factor: the site itself must be located within an area well served by ground transport in order to be able to play the card of their complementarity.

Nevertheless, with the supply chain, a logistics site is now part of a network of sites where it can occupy an international, national, regional or even local rank”24.

c) The logistics centre

It is defined as a set of "combined transport nodal points to which are added a more or less significant number of logistics services targeted on the customer's production. These nodes generate a concentration of transport flows, particularly at the interface between long-distance and local or regional traffic, and allow logistics services to create added value in a differentiated form. » 25

23 Damien, M.-M. (2001). *transport et logistique.* Paris: Edition Dunod.

24 Damien, M.-M. (2001). *transport et logistique.* Paris: Edition Dunod.

25 Damien, M.-M. (2001). *transport et logistique.* Paris: Edition Dunod.

d) The logistics platform

It is an "area reserved for transport activities or transport and logistics activities. There are different types of them:

- Monomodal, intermodal, multimodal, multimodal or plurimodal platform
- Port platform (e. g. Antwerp, Rotterdam, Duisburg Ruhrort
- Airport platform
- Platform dedicated to a company
- Warehousing platform with or without bonded warehouse
- Logistics area (for example: Arras)
- Artisanal zone where logistics transport activities are scattered among the most diverse activities (example: Taverny). They are found on the outskirts of medium-sized cities".26

e) Entrepot

"A superstructure built in a port, airport or logistics platform or in the proximity of a company to store goods temporarily in order to transport them in a timely manner to their final destination. »27

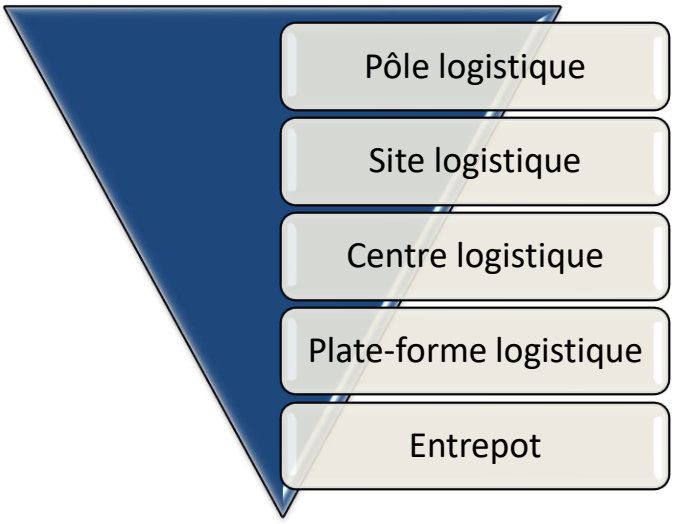

Figure 14. Typology of logistics infrastructures

26 Damien, M.-M. (2001). *transport et logistique.* Paris: Edition Dunod.

27 Damien, M.-M. (2001). *transport et logistique.* Paris: Edition Dunod.

❖ **Synthesis:**

In Algeria, the strong evolution and improvement of transport infrastructure in terms of road condition and quality (80% of roads in acceptable condition) reflects the State's desire to provide the country with efficient infrastructure that meets the increased demand for roads in economic life, Despite these efforts, Algeria suffers from a certain dysfunction in logistics, marked mainly by the lack of specialized logistics infrastructures, as well as by the weaknesses and non-conformity of existing ones with international standards, which constitutes a very weak link for the country's economy, among others. In reference to the 2016 edition of the Logistics Performance Index published on 28 June by the World Bank, which covers 160 countries, Algeria would be ranked 75th after having been downgraded by 42 places.

Hence, the need to implement reforms and invest in this infrastructure in order to facilitate freight transport and promote modern and more efficient services. Which is why "the public authorities have initiated a spatial planning plan for 2030 which contains a number of measures to expand and modernize existing infrastructure through improved logistics in order to reduce costs and improve delivery times, despite the country's land crisis" (Mr. Benmeradi)

6. E-Commerce: more than a trend, it's a logistics issue

The emergence of new forms of sales has an impact not only on the mobility practices of households but also on the number of flows linked to household consumption.

E-commerce makes extensive use of home delivery. However, these deliveries are expensive (not least because of the frequent absence of customers who are reluctant to pay the actual price. According to a 2013 Ifop/Generix survey, 44% of French people consider delivery costs excessive and 83% of French people have already abandoned an online purchase because of prohibitive delivery costs. Deliveries must therefore, be organized in such a way as to reduce their cost (Augereau et al., 2009).

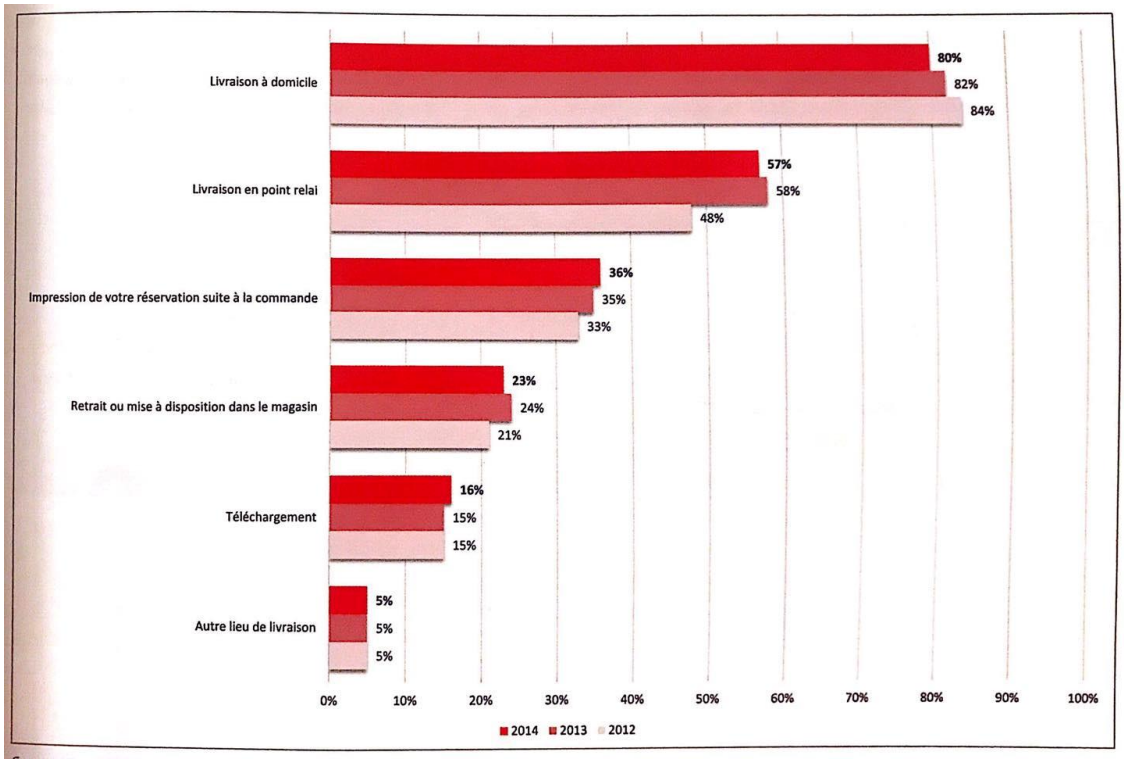

Figure 15. **Delivery method chosen by the buyers (Fevad, 2014)**

Despite its very timid beginnings, electronic commerce in Algeria is now beginning to grow. We cannot deny the positive impact of this significant increase in e-commerce on the consumer market and in particular, on the country's economic development, but fears for the future of urban logistics delivery and flow should be emphasised.

E-Logistics defined as "the art of grouping and forwarding online orders (generally mono-packages) to urban Internet users, once these orders are present within the city perimeter. » is an invisible dimension of e-commerce that can be a response to the fears we have mentioned. But one question has aroused our interest in this research: are we indeed moving, because of the development of e-commerce and very rapid urban growth in urban areas, towards a repositioning of large distribution areas on the city periphery and a new space practice in order to reorganize freight transport flows and reduce its impacts on our cities.

7. Issues at stake

From this research we were able to assume several issues at the city level. These challenges show that the development of a good urban logistics model could "*be a real tool to support decision-making and the management of sustainable infrastructure projects that will help shape the territories and cities of tomorrow for the benefit of all*" (Patrick Nossent, President of Certivéa, CERTIVEA - CERWAY - ALLIANCe HQE-GBC).

The first one is part of the socio-environmental context involving the reduction of congestion and noise pollution, the improvement of accessibility while making the city more attractive and healthy, then in an economic context the challenge would be to focus on the trend of e-commerce and the evolution of the mobility of goods and people, as well as the management of traffic between the latter two.

7.1 Social issues

Social issues concern different stakeholders: delivery drivers, urban road users, city residents and the community in general.

Delivery in town is subject to high subcontracting rates and sometimes to significant fraud, particularly in Algiers. Improving the conditions for the movement of goods in urban areas and thus one of the political objectives of urban freight transport.

Another social objective is to improve the travel conditions of citizens in the city centre of Algiers and to develop their attractiveness within it.

As a result, the introduction of e-commerce in large and small markets could provide a new service, home delivery, which in turn addresses the needs of population density in the city and related traffic problems.

7.2 Environmental issues

The actors concerned are the inhabitants of the city, the transporters and always the community.

The inhabitants of the city, who are mainly transients, are directly exposed to the nuisances generated by the freight transport in the city: noise, odours or physical barriers, and the effects on the health of the citizen.

Therefore, emission level and energy efficiency requirements for delivery should be established and revised.

7.3 Economic issues

These issues refer to several actors, namely consumers, shippers and carriers.

At a time when consumers, whether private individuals or companies, rely primarily on the availability of goods, shippers on their part are seeking to meet the demand of the market while taking into account the cost and quality of the services they offer to their customers. Transporters remain the urban link between the two main players and requires the profitability of their activity. This profitability refers to the efficiency of order picking and delivery operations. This is why urban freight transport is considered as an important sector, but unfortunately it has little margin and is therefore fragile. The improvement of the conditions of its activity must be examined with care.

8. Conclusion

All the points we have put forward in our paper helped us deduce that urban logistics is a complex field that requires the implementation of a freight transport's management system with feedback based on criteria specific to each city, namely: the size of the urban unit, the density and characteristics of the road network.

Moreover, because the challenges of urban freight transport do not arise with the same urgency in all cities or conurbations, as seen in the examples cited, it is up to the Algerian community to identify the priority objectives on which it wishes to focus its action.

We also should mention that the relationship between transport, logistics development and spatial planning does not only focus on the location of transport infrastructure and activities. Because, between the strategic implementation at different scales of these specialized infrastructures, the implementation of a freight transport flow management model that is thoughtful and appropriate to the different contexts of the city, and the improvement of the economic development plan in the interconnected market of the city; there is another community commitment to "the concrete understanding of the challenge of urban logistics and the control of the spatial circulation of freight transport flows with the functioning of the city and the urban morphology" .

In addition to this, it would be necessary to remember that the development of a local policy on urban logistics requires taking into account the flows of private consumption and integrating new practices linked to new sales methods, namely e-commerce.

All this implies a diagnosis that will be used in the future to complete the analysis established in this paper by carrying out a factual inventory based on the accessible data of the goods system in Algiers.

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