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SUMY: Urban Freight Delivery

MULTI-SIDED PLATFORMS IN EUROPE'S LOGISTICS SECTOR (Case 2)

RSM Erasmus

Introduction

In 2016, the European Commission launched the EU Horizon2020 Project SELIS (Towards a Shared European Logistics Intelligent Information Space) to accelerate digitalization of the logistics sector in Europe. Eight SELIS Living Labs (LLs) took place in different geographical settings all over Europe, including the Netherlands, Belgium, Greece, etc. During the project, supply chain visibility was one of the key strategies targeted by the LLs, also strongly related to other strategies like data reliability and quality. The overall aim of all the SELIS LLs was to contribute to the adoption of innovative business models by logistics communities and enabling the participation in a green, agile and collaborative European logistics and transportation system. In summer 2019, the project came to an end and it was time for the actors participating in the LLs to scale the multi-sided platforms launched within the project in a pilot base and implement them in their actual day-to-day business activities. How would the use of a multi-sided platform transform their business? What challenges would they encounter when implementing it? And how to improve the platform in order to make it most effective and maximize its long-term value?

Multi-sided Platforms

Multi-sided platforms (MSP) are "technologies, products or services, that create value primarily by enabling direct interactions between two or more distinct customer or participant groups"[1]. Platforms as such have existed for years; a shopping mall for example, works a platform, connecting consumers and traders. The difference of this era, which is dominated by the growth of information technology (IT), is that the need to own physical infrastructure and assets has been substantially reduced. IT makes developing and scaling up platforms much simpler and less expensive, allows nearly frictionless participation that strengthens network effects, enhancing thus the ability to capture, analyze, and exchange an enormous volume of data that increase the platform's value to all interested parties. Platform businesses like Uber and Airbnb, have grown tremendously, disrupting and revolutionizing their industries[3].

This case was written by Dr. Anastasia Roukouni under the supervision of Professor Rob Zuidwijk at the Rotterdam School of Management (RSM), Erasmus University. We wish to thank Hinde Boulbayem, founder and managing director of SUMY, and Carla Gatt and Tao Yue at the RSM Case Development Centre for their time and input.

This case is based on field research. It is written to provide material for class discussion rather than to illustrate either effective or ineffective handling of a management situation.

A digital platform matches supply and demand of physical goods, services and/or information provision. The position of the platform is in between the two markets as an independent player; the platform host is the "matchmaker". What the platform sells to its users is access. The role of the platform host can differ in intensity (**Exhibit 1**); they could just offer a platform for exchange or retain more control over the interactions and have an integrated payment system and customer service.

Platforms can vary a lot, but they all have an ecosystem with common structure and four main categories of players involved: owners, providers, producers and consumers (**Exhibit 2**). The platform owners have control over their intellectual property and the governance of the platform. Providers serve as the platforms' interface with users. Producers create their offerings, and consumers use those offerings[3].

Many digital platforms create economies of scale, as costs of enabling a transaction decline when the number of transactions increases. This scalability is a reason why digital platforms can cause a disruption to existing market; they can potentially grow fast. Multi-sided platforms are characterized by network effects (**Exhibit 3**) which should be taken into account when defining the relevant market, measuring market power and evaluating the anti-competitive effects as well as efficiencies in competition cases[2]. Network effects can be either positive (value-enhancing) or negative (value-diminishing)[2].

Exhibit 1. Types and examples of platform businesses[3]

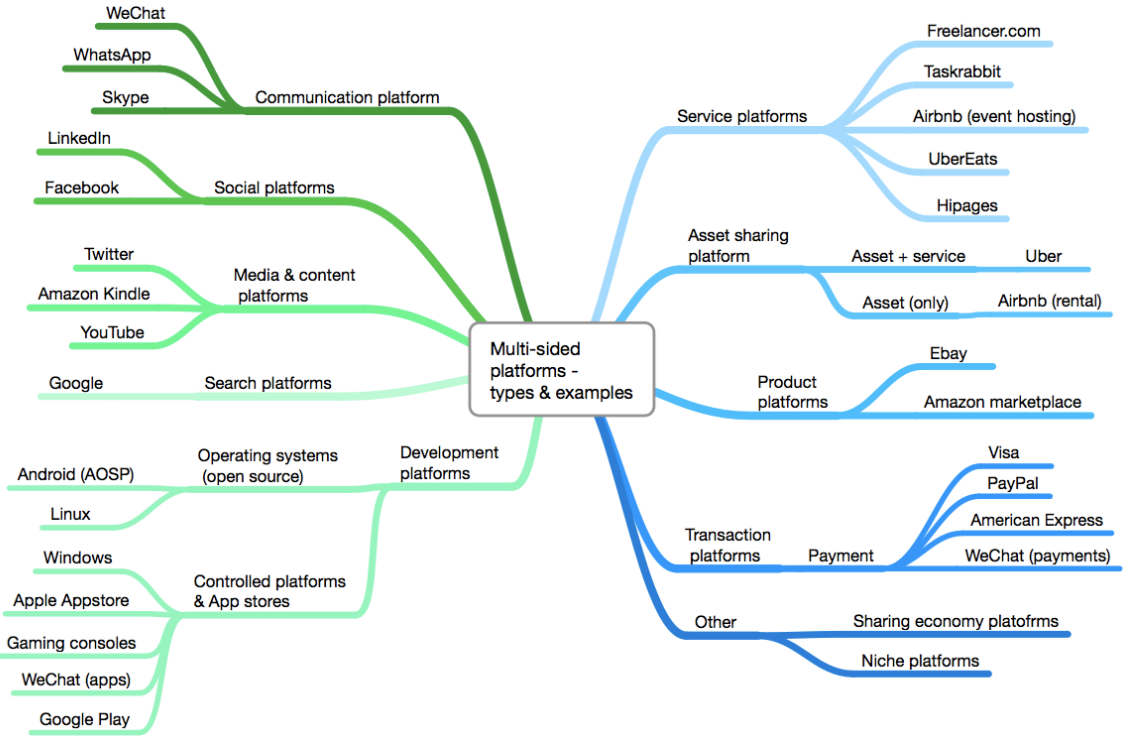


Exhibit 2. The players in a platform ecosystem[4]

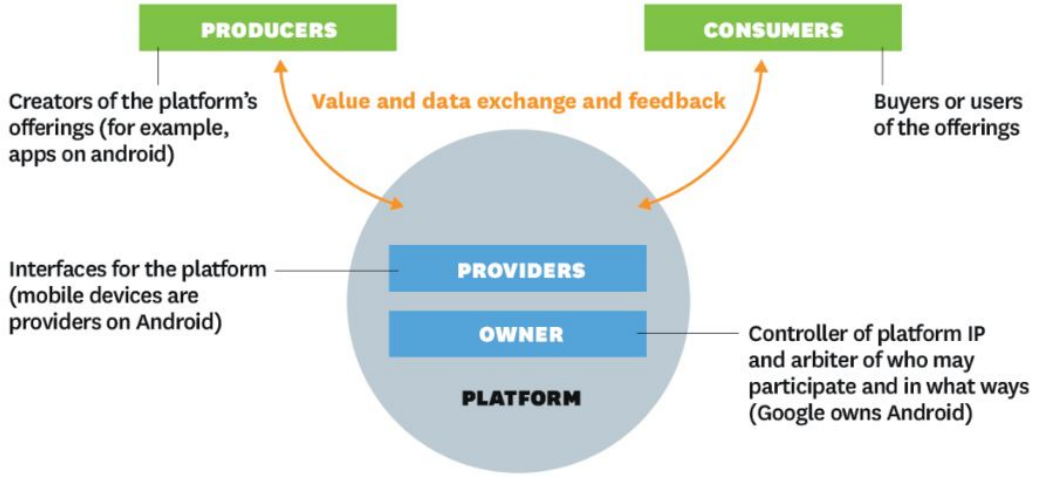
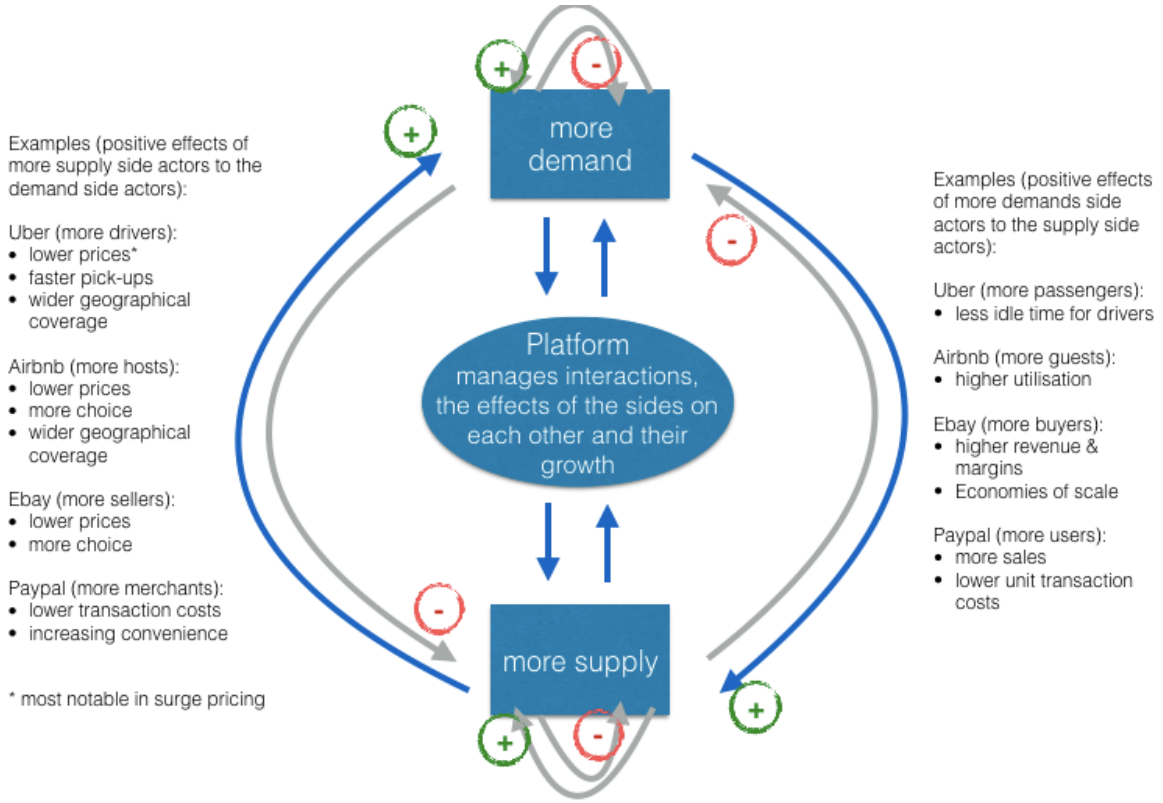


Exhibit 3. Potential network effects of multi-sided platforms[2]



SUMY

It was a busy autumn afternoon of 2019 in the centre of Brussels. The already congested roads of the city centre during peak hours were becoming even more crowded due to the light rain that was going on for hours. While this weather was typical for this time of the year, it still forced urban dwellers to choose the comfort of their private vehicle rather than public transport or biking to, and from, work. In addition to cars, many freight vans and tracks that made frequent stops for urban distribution, made the traffic situation even more difficult to handle.

Hinde Boulbayem looked out of the window of her office. She wondered if her vision of the company she had set up to relieve urban congestion by providing alternatives to the current system of urban deliveries was going to be successful. Boulbayem is the founder and managing director of SUMY (Sustainable Urban MobilitY & Logistics), a Logistics Service Provider (LSP) in the area of Brussels, which focuses on the delivery of fresh food and pharmaceutical products, aiming at the optimization of this transport with enhanced information sharing and increased level of collaboration with other local LSPs and shippers. SUMY's ultimate goal is to maximize load factors[1], improve quality of service and consequently reduce the environmental footprint of urban freight in Brussels.

A few years ago, SUMY introduced a multi-sided digital platform, where all individual Brussels-based stakeholders (e.g. shippers, service providers) would be enabled to communicate their demand (i.e. freight transport orders) and offer (i.e. available capacity) in order to execute collaborative planning, collect transport events and real-time traffic data, to monitor the transport progress and react to disturbances (e.g. rerouting, notifications). But in reality, the implementation of the platform proved to be more challenging than in theory.

Truck drivers were used to flexibility and they sometimes opposed the introduction of a track and trace system that aimed at optimizing routes and reducing emissions. The situation was even worse in cases where unions were involved: there the resistance to change was way more organized and powerful. Boulbayem remembered a recent extreme incident: a company bigger than SUMY tried to introduce a track and trace mechanism, but due to the existence of employee unions, the opposition was so strong that it even included life threats of the company owner. As a consequence, the company chose to stop the process.

Boulbayem was aware that it was really difficult to persuade the actors involved to change the way they are used to do business. She wondered how they could achieve this mind-

[1] Load Factor: The load factor is the ratio of the average load to total vehicle freight capacity (vans, lorries, train wagons, ships), expressed in terms of vehicle kilometres. Empty running is excluded from the calculation. Empty running is calculated as the percentage of total vehicle-kilometres which are run empty. Load factors and empty running are both expressed as percentages. Source: https://www.eea.europa.eu/data-and-maps/indicators/load-factors-for-freight-transport

shift and how the multi-sided platform could be optimally used to eventually maximize the benefits of all actors involved and help the transition of cities to a more sustainable and resilient future.

Urban Freight Transport Industry

It is undisputable that urban freight distribution is an essential part of modern cities, with continuously increasing importance. The majority of goods that are consumed in cities are produced in areas outside them and then are being transferred to them. The transport process that takes place within the city boundaries until the products reach their final destination is often called the "last mile" in the supply chain. In most cities, trucks remain the main transport mode for this last mile, as they are often considered the most suitable option within the complex urban network. Nevertheless, the use of trucks is responsible for considerable impact on the environment, such as the emission of CO_2, NO_X, particulates (PM_{10}, $PM_{2.5}$, PM_1), as well as noise and visual pollution. Parking requirements for delivery vehicles and ensuring traffic safety for all road users is also an issue that requires particular attention. Urban freight delivery has effects that can be felt on a global level, such as greenhouse gas (GHG) emissions, and others that are mostly perceived on a local level. The last mile can cause serious problems for the environment, customers/citizens and logistics service providers. The promotion and implementation of alternative and sustainable strategies and the provision of environmental-friendly solutions should hence be a crucial component of urban transport planning[5].

Approximately 10-15% of the kilometres travelled within cities is made by urban freight itineraries and 6% of all transport related GHG emissions is estimated to be caused by urban freight. The amount of urban land that is used for logistics activities is usually between 3% and 5% and about the same amount of the total labor force of cities is occupied in the sector. Most of the vehicle kilometres travelled are due to imported goods (40 – 50%) and about a quarter is caused by transport of exported goods, while the rest is related to transport that has both "legs" in the city[5]. In Brussels area in particular, these percentages are even higher; 10% of the traffic is associated with freight transport, but over 30% of the pollution is caused by it.

Some of the observed negative impacts of urban freight transport include the following[6]:

Economic impacts

- Increased traffic congestion which leads to
  - Time losses and inefficiencies for the person or company doing the transport
  - Unreliable deliveries for the receiver
- Use of resources
- Cost of governmental regulation and planning of urban freight transport

Social impacts

- Health impacts
  - Local air pollution
  - Traffic accidents
  - Noise nuisance
- Contribution to traffic congestion
- Damage to buildings and infrastructure
  - Vibration
  - Traffic accidents
  - Damage to the road surface because of the weight of goods vehicles
- Other quality of life issues
  - Loss of greenfield sites and open spaces in urban areas as a result of transport
  - Infrastructure developments
  - Visual intrusion
  - Physical hindrance
  - Stench
  - Vibration

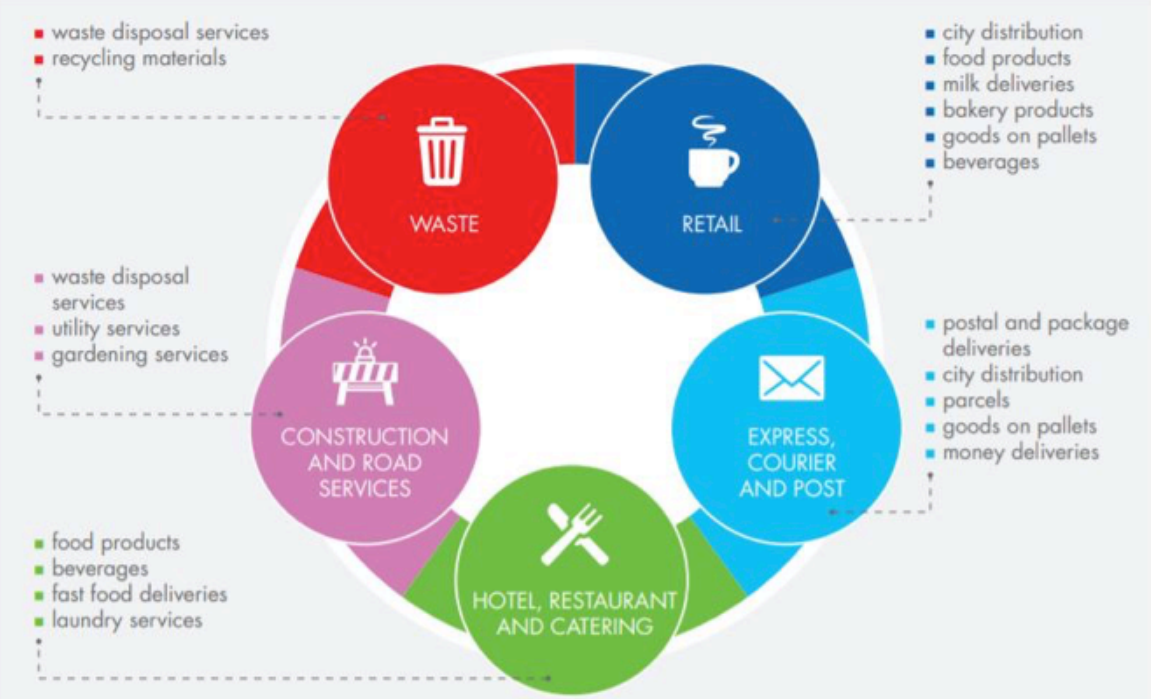
Environmental impacts

- Emission of global pollutants contributing to global climate change (e.g. CO_2)
- Emission of local pollutants (e.g. carbon monoxide (CO), nitrogen oxides (NOx), particular matter (PM) and volatile organic compounds (VOCs)
- Use of non-renewable resources
  - Fossil-fuel
  - Aggregates
  - Land
- Waste products such as tyres, oil and other materials
- The loss of wildlife habitats and associated threat to wild species

The market sector share of urban freight transport is presented in **Exhibit 4**.

In 2016, the Brussels-Capital Region began the preparation of its third Sustainable Urban Mobility Plan (SUMP) in which freight has been a topic of special attention. The objective was making the metropolitan area a model of efficient and innovative urban distribution. In applying a comprehensive planning approach, from situation assessment to measure selection and monitoring, Brussels succeeded in distinguishing itself at the European level as it received the 5th EU Sustainable Urban Mobility Planning Award, on the theme of urban freight. Moreover, in addition to Brussels, other Belgian cities such as Antwerp have implemented low emission zones (LEZ) that ban certain older types of vehicle engines. The LEZ in Brussels becomes progressively stricter with the goal to completely ban diesel vehicles by 2030 and gasoline vehicles short after that.[7]

Exhibit 4. Market sector of urban freight transport[1,8]



Actors in the City Logistics Industry

Urban freight transport is characterized by the presence of many stakeholders, as a large number of flows and activities intersect in urban cores. The classification of actors that follows is based on the CIVITAS Policy note "Smart choices for cities: Making urban freight logistics more sustainable" (2015)[5]

Supply Chain

The supply chain actors are responsible for sending, carrying and receiving goods and they can be analysed further to the following three sub-categories:

Shippers: manufacturers, wholesalers, retailers, etc. Shippers are often not located in the city; they are responsible for sending the goods to other companies or individuals and they often do not think they have major responsibility regarding issues created by urban freight delivery. Their objective is to maximise their quality of service and reliability while keeping the costs low. In many cases, they hire transport operators to carry out the urban freight delivery.

Transport operators: freight carriers, couriers, etc. Transport operators usually aim at minimising their costs by maximising the efficiency of their pick-up and delivery tours and they are expected to provide a high level of service at a low cost. Sometimes they have to face certain restrictions that are set by other stakeholders, such as the opening hours of stores or the existence of designated time windows to make the deliveries. Transport operators are often active in a geographically larger area than the city.

Receivers: shopkeepers, offices, construction sites, residents, etc. Receivers are situated in the urban areas and they are the endpoint of the logistics chain. Shipments are usually organised and paid for by the shipper, and therefore, for the receivers, the transport price is included within the price of the ordered goods. The receivers have an important impact on freight transport, often without even realizing it, by selecting specific time windows for the delivery for instance. The receivers are often the only supply chain actors located within the boundaries of the city, and thus they can be better aware of local issues, comparing to transport operators and shippers who are usually active across a larger geographical area.

Resource supply

There are three different resource supply stakeholders: infrastructure providers, infrastructure operators (managers), and landowners. These stakeholders and their investments determine in a large degree the possibilities for urban freight transport.

Public Authorities

Moreover, public authorities determine policies which also have an impact on urban freight transport possibilities. The local government, the national government, and for some issues even the European Commission (e.g. setting EURO-standards for truck engines) is involved.

Local authorities: Ensuring that the city has an efficient transport system and enhancing accessibility is a critical part of the agenda of local authorities. They also aim at reducing congestion and the negative impact of traffic on the environment and increasing road safety; overall, they are interested in creating and maintaining an attractive city as a whole. For that reason, they attempt to resolve potential conflicts between supply chain actors and citizens.

National authorities: Urban freight transport is usually considered a local matter, and therefore the involvement of national government can be quite limited. Nevertheless, the interests of national authorities, such as reducing congestion and externalities at a national or regional level, can influence local authority policies.

Impactees

Finally, there is a group of actors who are affected by urban freight transport, but who do not directly influence or affect it (indirectly, the local authorities can act on behalf of

them, as they are individuals who vote in the local elections); this group is called impactees and it includes:

Other traffic participants: This group comprises vulnerable road users (cyclists and pedestrians) that share the same infrastructure as urban freight transport vehicles, as well as drivers and passengers of private vehicles that are sometimes hindered by double-parked trucks involved in loading and unloading at the kerbside or on the streets of the city.

City residents and city users: This group includes the individuals who live, work, shop or spend leisure time in the city. They experience the negative consequences of urban freight transport such as noise and/or visual pollution, decreased air quality etc.

Visitors/tourists: This group is affected by urban freight transport to a more limited degree as they spend less time in it comparing to the residents, although the existence of a large number of trucks in the centre can deteriorate the city's image in terms of urban space quality. An attractive city, which people from other areas express interest to visit can also be beneficial for the commercial life of the city, and hence, minimising the nuisance caused by urban freight transport is important.

Other stakeholders can be the providers of vehicles, information technologies (IT) support systems, and other means that enable supply chain actors and public authorities to fulfil their roles. It is worth mentioning that people who suffer the negative impacts of urban freight transport are also often the ones benefit from it as they can be the final customers of the products and services delivered (e.g. retail, Hotels, Restaurants and Cafés - Ho.Re.Ca., etc.)[5].

The SUMY Digital Platform – Opportunities Created

The digital platform introduced by SUMY, aimed at steadily increase the usage of available capacity of the different vehicles out on delivery within the context of a complex, short distance urban distribution environment. The ultimate objective was that improving Urban logistics service providers' (LSP's) load factor would consequently lead in decreasing the environmental impact (such as CO_2 emissions), but was also expected to decrease operational costs and increase the overall productivity of the collaborators. Furthermore, the platform aimed to enhance supply chain visibility through collaborative information sharing and seamless integration of multiple sources.

The digital platform was tested with two main customers; Färm and Pharma Belgium - Belmedis (PhB-B)[9].

- Färm is one of the leading co-operative organic health food markets operating in and around the area of Brussels. It represented, in 2019, 7 shops and aimed to

grow bigger and reach, through its collaborations, 20% of the market in the forthcoming years. With more than 4.000 products in each of their shops, delivered through 260 suppliers, more than 100 deliveries per week are required. All these deliveries are organised independently; nevertheless, Färm aims at reducing the number of deliveries to the minimum possible level, through the promotion of collaboration among their suppliers, in order to optimize the transportation of products to shops that are located in the same region. Färm strongly believes that by merging a number of deliveries, the total duration of delivery can improve, leading to a cost-efficient solution which will be at the same time positive for the environment.

- Pharma Belgium - Belmedis (PhB-B) is a wholesaler of pharmaceutical products. With a market share of more than 30%, it is one of the most important players on the Belgian market of pharmaceutical products' distribution. Having 8 branches in Belgium, PhB-B organises the distribution of pharmaceutical and cosmetic products to about 4000 customers through up to 3 deliveries per day. Deliveries are made both by PhB-B contracted drivers as well as by subcontractors. They wish to track their vehicles and be able to reroute them if necessary. In addition, PhB-B explored the possibility of organising shared deliveries to increase the visibility of own data and improve the information flow between stakeholders both internally and externally.

In one of the latest meetings she had with the SUMY team, Boulbayem talked to them about the important opportunities that, according to her opinion, were created by the introduction of the digital platform. She said "we have now sufficient proof that the digital platform does allow a much more efficient collaboration with our partners and it has helped us improve our public image – urban LSPs are now considered more environment friendly, therefore they tend to be preferred transport service providers, from environmentally sensitive shippers and customers. This is expected to result in an increase of transport demand, especially after the full implementation of the solution. Several of our current clients have told us clearly that they made the choice of working with us because we have this sustainable and ecological public image".

She continued, supporting the view that if they use and develop further the multi-sided digital platform, they will be able to effectively and seamlessly facilitate the collaboration among the involved stakeholders, and it is expected that this will have positive and direct impact on their visibility, which they currently struggle to follow, and therefore increase both the user as well as the end customer satisfaction. As a result, she claimed that this could accelerate the adoption of the digital platform solution to a wider audience and greater extent.

The Way Forward – Remaining Challenges for SUMY

Although the introduction of the multi-sided digital platform is associated with the aforementioned many opportunities, there is still a number of remaining challenges to be addressed, and Boulbayem knew that well. How can the platform be used to reveal many new synergies in the delivery map and help exploit them to make the services more efficient and productive, in line also with the suggestions of the SUMP of the city of Brussels (see Introduction)?

- The mental shift was still an essential factor for the platform to succeed. To persuade users to actually use the platform implies raising awareness about the potential benefits that will be created for them (such as e.g. for drivers: time savings, less frustration while driving due to reduced congestion, creating a healthier city for themselves and their families etc.) A way to do that could be to improve user experience on the platform, by accommodating management of massive data and allowing efficient filtering of irrelevant information. The platform could include and integrate more collaborative and open data; this way, with an easy to use and stable platform, the user base would be more engaged and clearly see the added value the platform could bring to their day to day. Furthermore, being able to efficiently monitor the number of parcels per delivery round would allow for more efficient planning. These data can also be shared with clients to increase awareness on their own parcels' status. Close and real-time monitoring of the delivery progress can also have positive impact on strategic planning of more efficient routes, and help activating re-routing in case of unexpected events.

- In urban logistics, the financial cost is often only related to the direct cost to LSPs. Nevertheless, there are several negative externalities, in addition to CO_2 that should be considered, such as noise pollution or traffic congestion, which have an additional cost for the cities. Ideally, the platform will be able in the future to calculate this external cost with the aim of reducing it in parallel to the financial cost. Based on this cost allocator, a service for less profitable delivery points could also be designed that could provide a basis for decision making for adjusting the transport price or outsourcing those delivery points. The platform could also be enriched with statistical traffic information, and track not only CO_2, but also NOx emissions. Also, the platform could be used to reduce empty runs of trucks in the urban environment.

SUMY would like to be in the forefront of tackling these challenges and finding efficient solutions, in order to establish its position in the market and develop even further, delivering the vision of a zero-emissions urban freight environment for Brussels. One of the most promising alternative fuels is hydrogen, at the moment however (2019) the technology was not there yet.

Conclusion

Thinking about these challenges, Boulbayem realized that in order for the SUMY platform to follow a successful path ahead, action needed to be taken. Therefore, she decided to call the rest of the SUMY team on a meeting under the objective of deciding the most efficient strategy to move forward.

Furthermore, she decided to explore an idea that might be considered "crazy" by many of her colleagues: merging the over 9000 carriers and transport providers that existed in Belgium[10] by using the multi-sided platform.

Boulbayem was convinced that it would be hugely beneficial for the future of urban logistics to promote the merging of the carriers and transport providers because having a reduced number of organizations involved could lead to reduced complexity. She believed that the multi-sided platform could be a great means to achieve this as it demanded the integration of different systems and extensive collaboration. She was going to ask from the SUMY team to help her search creative ways to achieve this ambitious vision for Brussels, so the way can be opened for the rest of the country as well.

Endnotes

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