How can city logistic requirements be anticipated?

Lessons from the Bordeaux UGM surveys (1994, 2013)

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Statement

Comparing the 2 campaigns of Urban Goods Movements (UGM) surveys carried out in the Bordeaux conurbation 20 years apart (1994 – 2013, see (1)), we observed:

- a reduction in the number of movements generated per week per job (mvt/w/j): -9%
- changes in logistical practices:
  - ✓ more light vehicles: 52% to 70%
  - ✓ more professional transport: 38% to 53%).

→ **What is the impact of economic fabric evolution in these changes?**

Methodology

Various UGM surveys carried out all over the world underline the role of both establishment activity and size (i.e. no. of employees) in the generation of goods movements (Singapore (2), Lisbon (3)). In the french surveys, we adopt a 45 groups classification (ST45), which can be aggregated in 8 classes (ST8) or divided according to the establisment size into 115 classes (ST115). For both 2 surveys campaigns, the typology used is the same.

→ For each class of the typology, we applied to the 2013 establishments population the main UGM structure ratios observed in 1994. Then we compared it with the results of the 2013 survey.

Results

1. Are establishment activity and size still relevant to understand goods movements generation?

Variable	% variance explained	
	1994	2013
Activity (8 classes)	12.8%	12.1%
Activity (45 classes)	28.1%	19.2%
No of employees (8 classes)	8.7%	16.9%
Ring (3 classes)	0.2%	1.8%
Subcontractor (Y/N)		4.8%

20 years apart, activity and size remain the main explanatory factors of goods movements generation. But the number of employees is more significant today than in the mid 90s in a context of a decrease in the average size of establishments (from 8.5 to 7 employees).

2. Is the economic structure a sufficient information to anticipate UGM ?

Ratio	1994 Observed	2013 Observed	2013 Simulated		
			ST8	ST45	ST115
Average no of mvt/w/j	0.93	0.84	*0.84*	*0.88*	*0.88*
% Vans	52%	70%	*57%*	*61%*	*61%*
% Third party account	38%	53%	*38%*	*38%*	*44%*

The reduction in the number of mvt/w/j and, at a lesser extent, the growth in the use of light vehicles can be largely explained by changes in the economic structure. But a deeper analysis shows an evolution in the types of activities and in logistical practices.

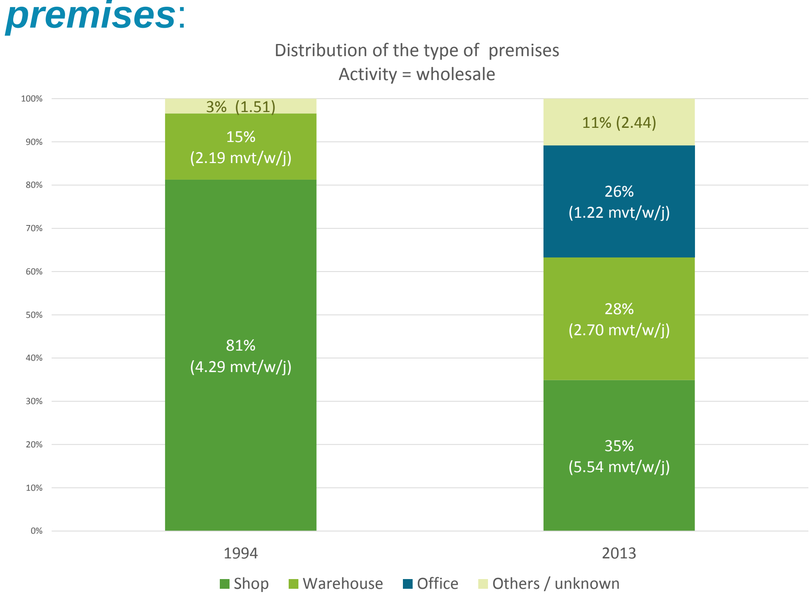
3. Wholesale, an activity marked with significant changes

1994: 2nd rank for the generation of goods movements (21%)
2013: 4th rank (14%)

This activity remains stable in terms of number of jobs, ***but*** shows a decrease in the average size of establishments (from 8 to 6.5).

Mostly located in the city of Bordeaux in the mid 90s (50% of the wholesale jobs), this activity moved to the outskirts.

An important fall down in the weekly number of UGM/jobs (mvt/w/j) : 3.73 ↘ 2.82 can be explained by a ***mutation of the nature of premises***:



Offices are probably exhibition areas, where customers may order products which are delivered directly from the factory or a distant platform.

The strong growth of both the use of light vehicles (39% to 60%) and of the professional transport (35% to 67%) can not only be explained by the changes in location and type of activity.

Conclusions

Evolution of the economic fabric is an important change driver, but in order to plan the future and to anticipate the changes in practices, additional variables (cost-effectiveness, accessibility, regulation…) must be taken into account in dedicated simulation platforms (4).

References

(1) Bonnafous, A., Patier, D., Routhier, J.-L., Toilier, F. (2015). French surveys of the delivery approach: from cross-section to diachronic analyses, *Transportation Research Procedia*, *12*, 489-499.
(2) Lee, Y.J., Blanco, E., d'Ambrosio, L., Zegras, Ch. (2015). Survey Design to Unravel Freight Transportation Demand of Establishments in Cities, ESD Working Paper Series, MIT-ESD. 27 p.
(3) Alho, A. R., de Abreu e Silva, J. (2014).The Development and Application of an Establishment-based Freight 2 Survey: revealing retail establishments' characteristics, goods 3 ordering and delivery processes for the city of Lisbon. *TRB 2014 Annual Meeting*. 14 p.
(4) Battaïa, G., Gardrat, M., Toilier, F., Le Van, E., Gérardin, B., Routhier, J. L., Serouge, M., Zuccarello, P. (2016). Simulating Logistic Innovation in a Growing Urban Environment. *Transportation Research Procedia*, *12*, 181-192.

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