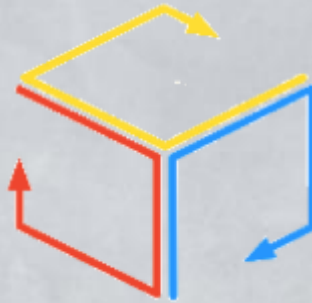


Developing and testing a methodology for acquiring the logistical characteristics of shopping malls in Budapest, for city logistical solutions



**Budapest University of
Technology and
Economics,**

**Department of Material
Handling and Logistics
Systems**



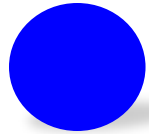
**Dr. Bóna Krisztián
Mészáros Bálint
Sárdi Dávid Lajos**

IEEE ICALT 2016

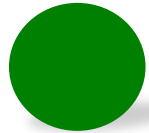
Agenda



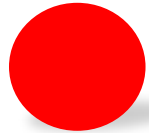
Issue at hand



Testing the methodology - results



Next steps

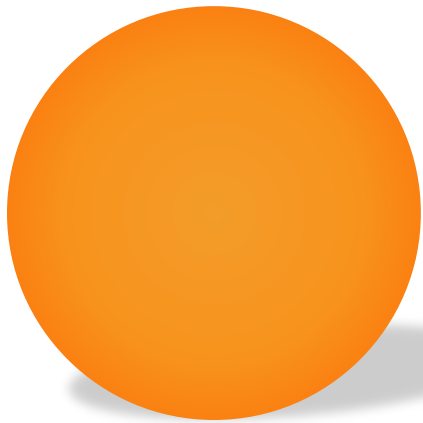


Conclusions



Continuing the research





Issue at hand



The issue at hand



Urban Freight

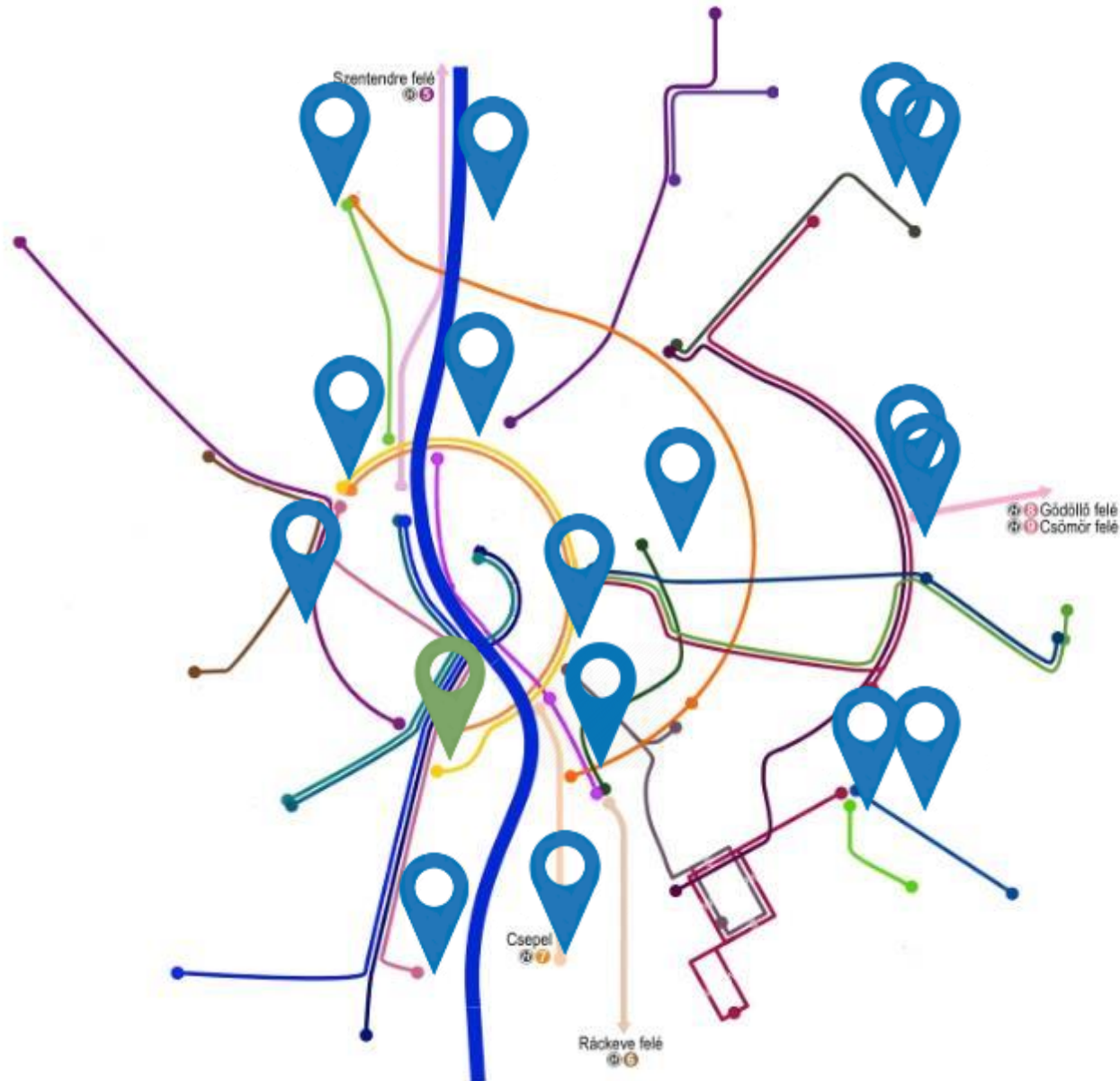
- Environmental pollution
- Noise pollution
- Damaging the infrastructure
- Congestion
- etc.

Shopping malls

- Many stores in a condensed space
- 10% of all retail outlets in Budapest
- Logistics processes on the backburner
- etc.

Great potential in consolidation!

Budapest



Possible solutions



Broadmead Freight Consolidation Scheme

- Vehicle movements reduced by 72%
- Air pollution reduction: CO₂: 11 t, NO_x: 1,75 t, PM10: 243 kg
- Improved reliability, 100% on time
- Retailer satisfaction: 94% would recommend



Dreams and aspirations



Foundation of such system



How much?

What kind?

From/to?

How often?

When?

In what?

etc.



No available data

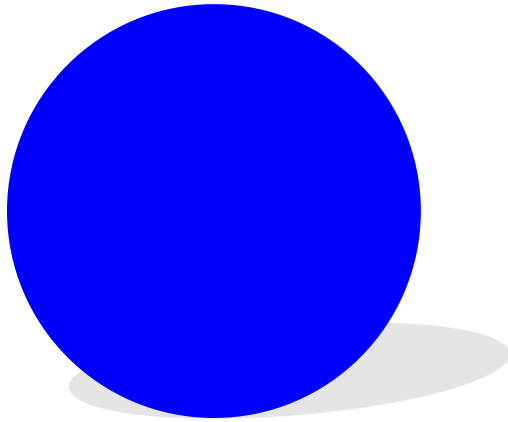


Status quo?



METHODOLOGY





The methodology - testing and results



Structure of the methodology

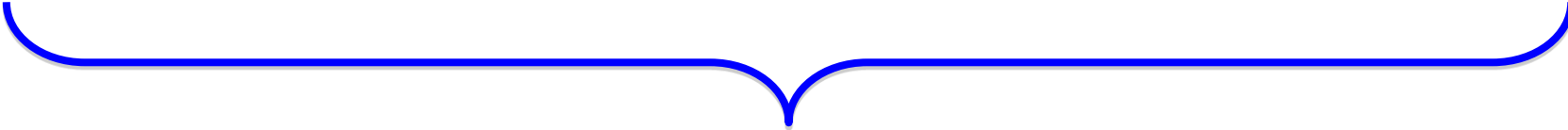


Exploratory research

- Field study
- Expert interview
- Bylaws

Descriptive research

- Questionnaire
- Evaluation
- Quantification



Standard research methodology!



Exploratory part



**Goods
receiving
areas**

**Goods
movement**

**Goods traffic
volume**

**Storage area
locations**

**Waste and
empties
management**

**Mall size,
store number**

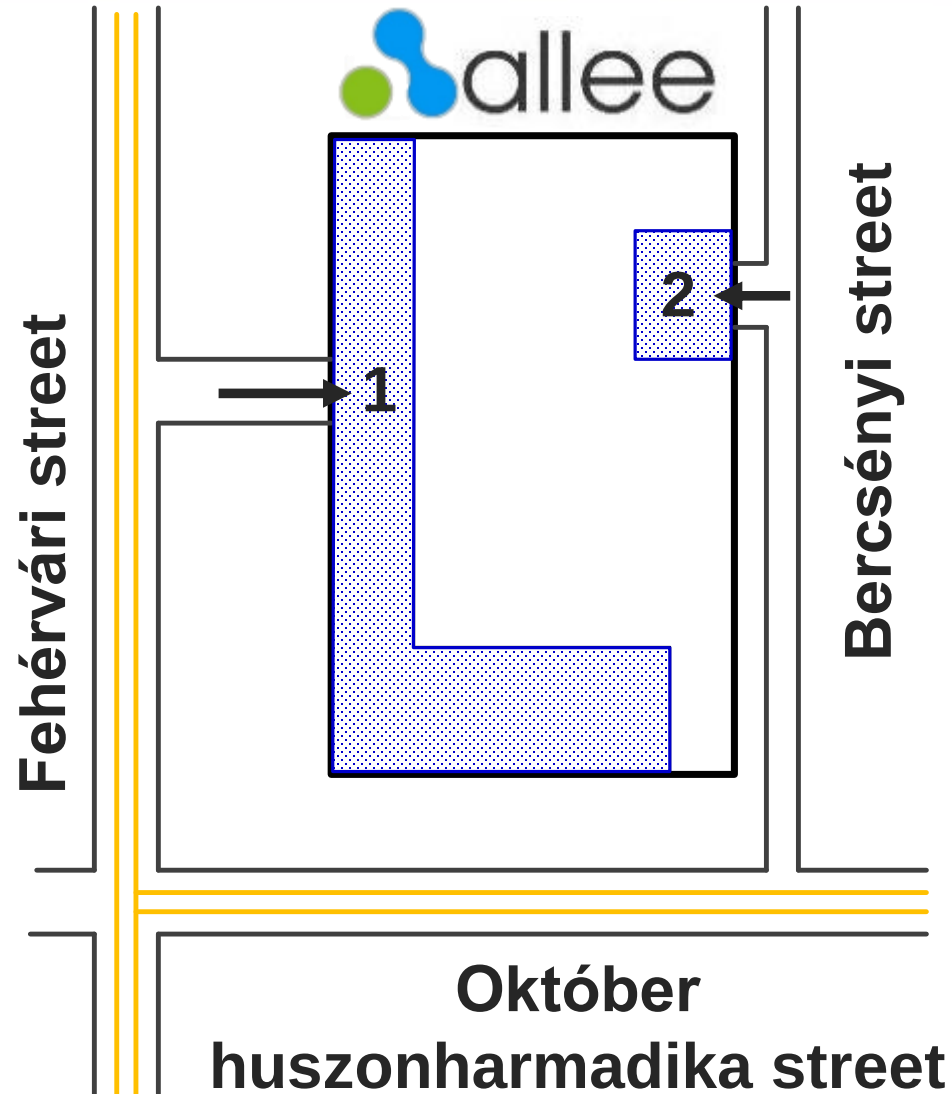
**Transport
connections**

**Limited
freight traffic
zones**

**Analysis of
bylaws**



Testing in Allee



Allee



Questionnaire



**Properties of
the stores**

**Properties of
freight traffic**

**Storage
areas**

**Inverse
logistics**

**IT
background**

E-commerce

**Willingness
to participate**

Testing in Allee



159 stores total



149 included in research



140 contacted



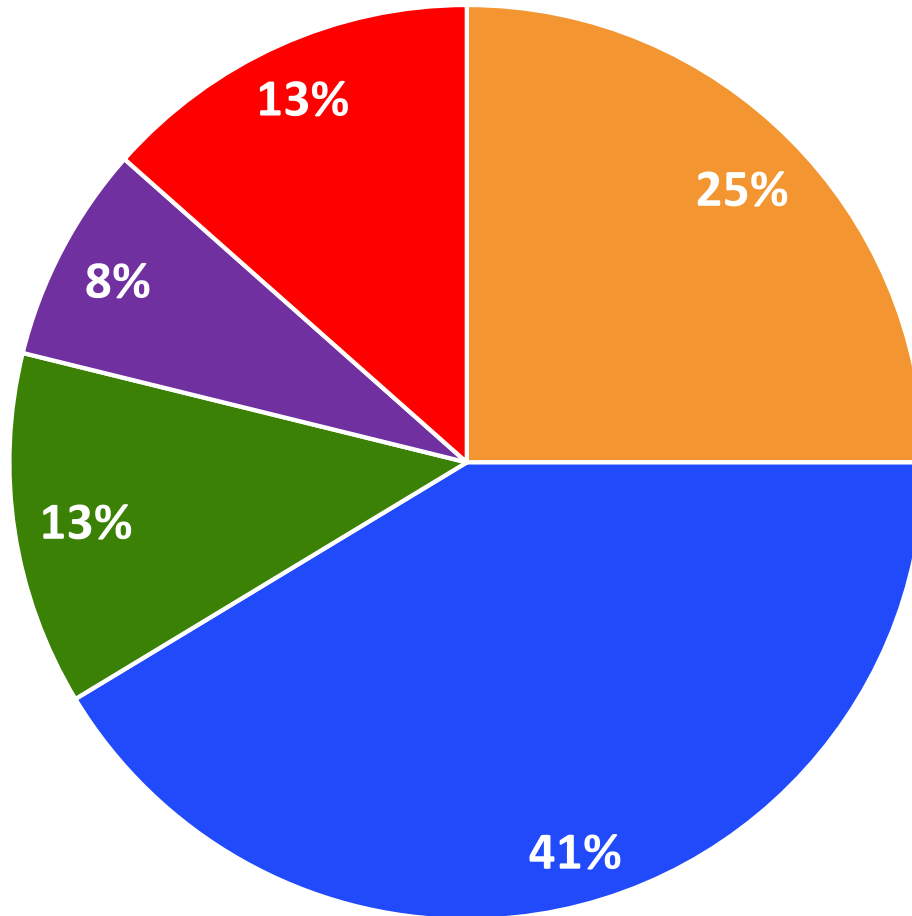
105 answered



75% response rate

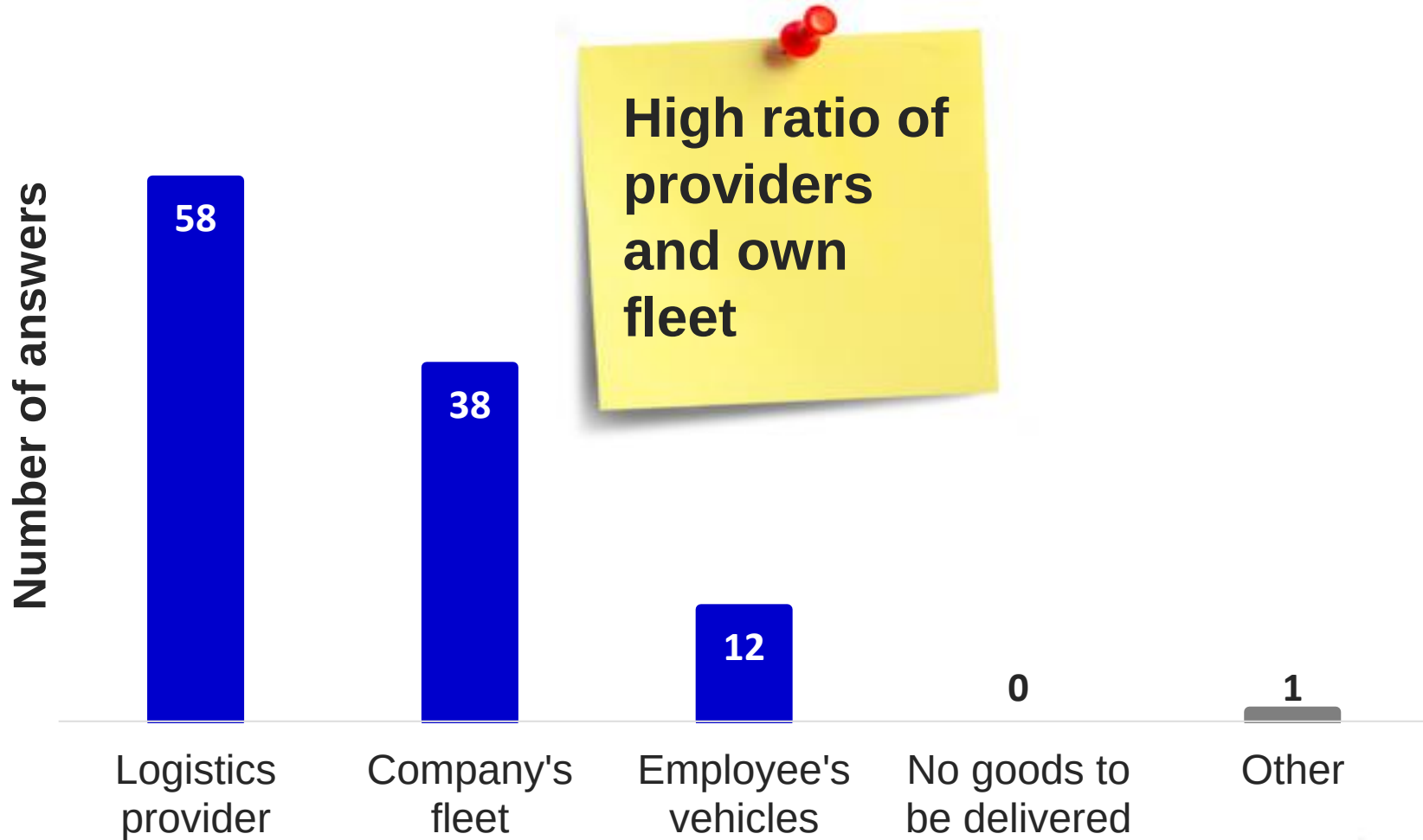


How many stores are in malls?

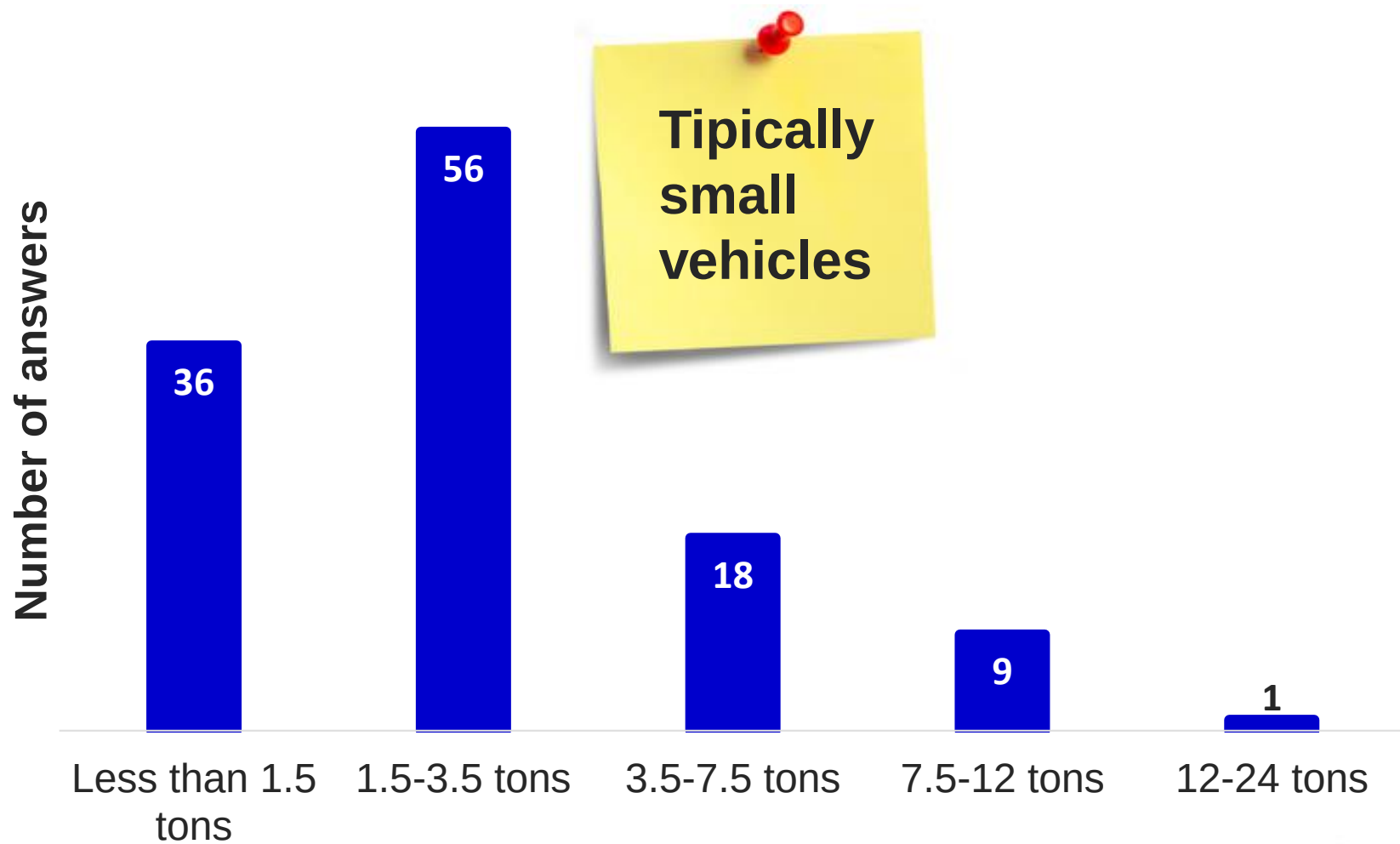


- All of them
- Most of them
- Around half of them
- Less than half of them
- This is the only store

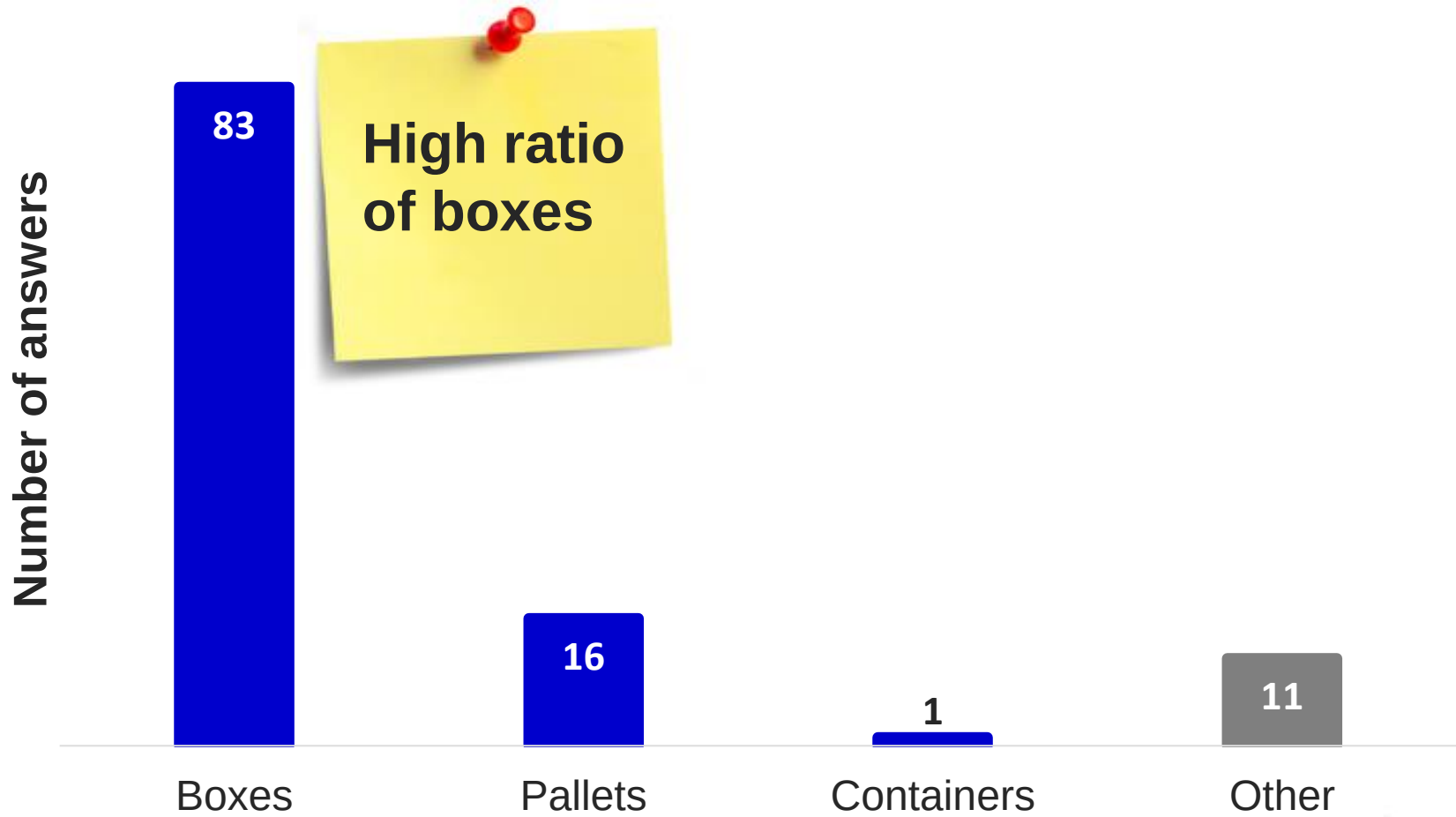
Inbound shipments done with



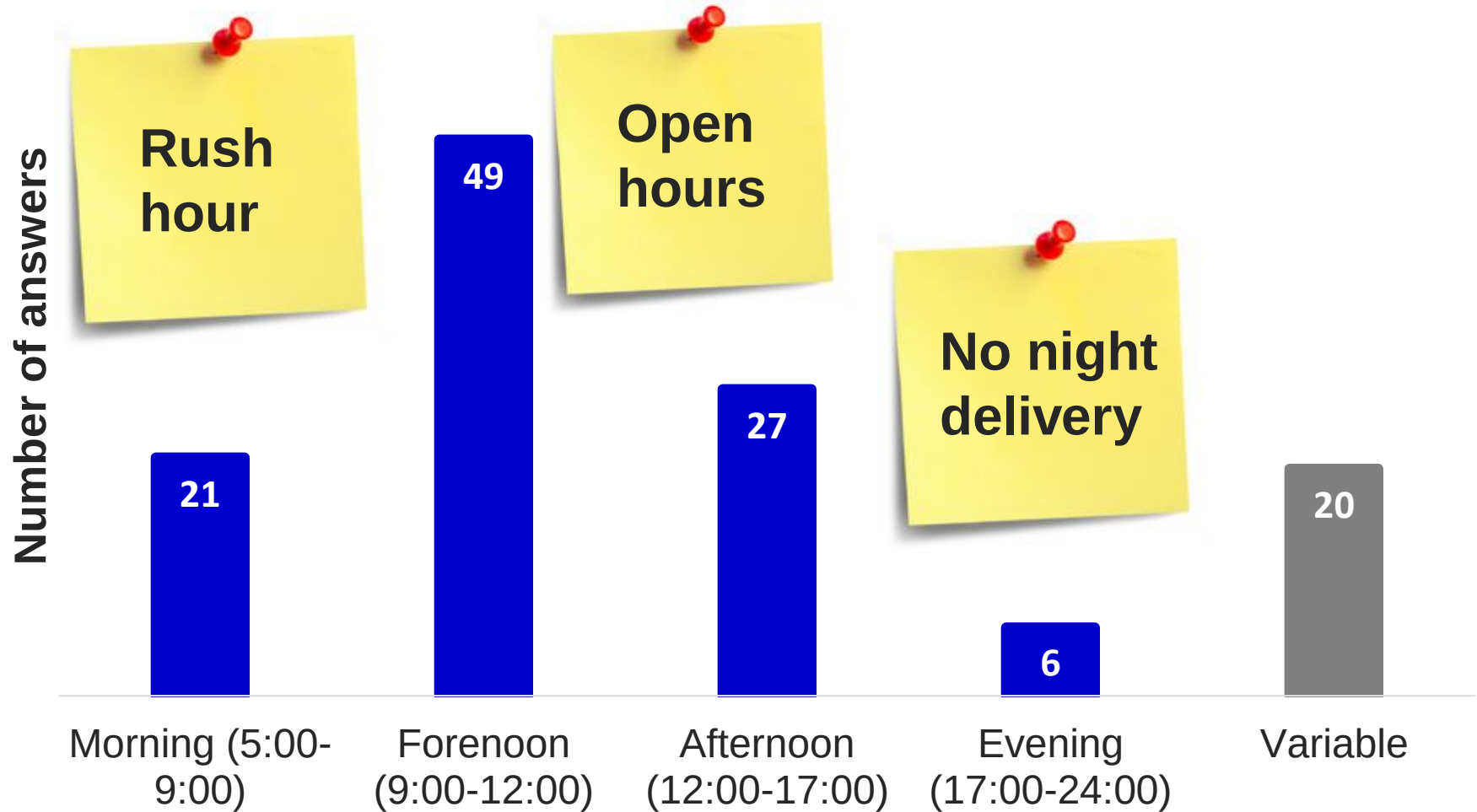
Vehicles by size



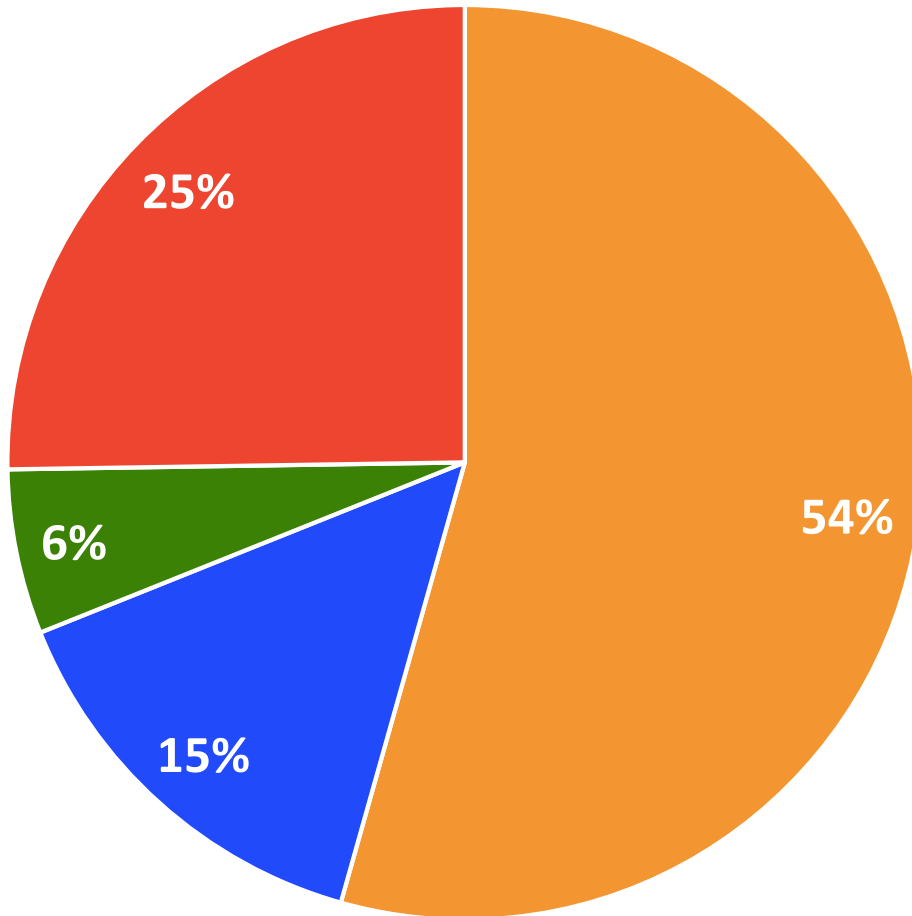
Delivery units



Delivery intervals



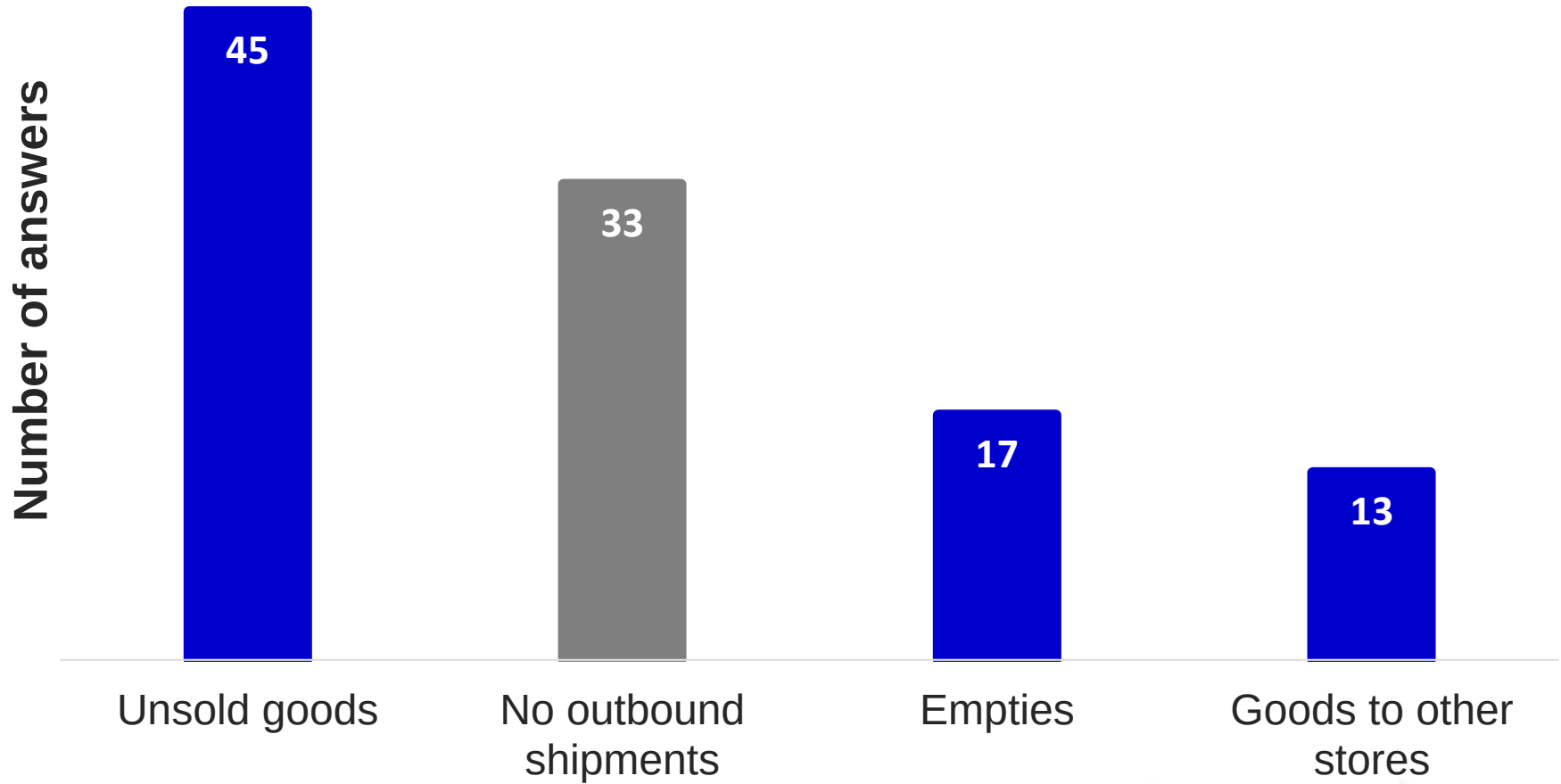
Where are the storage areas?



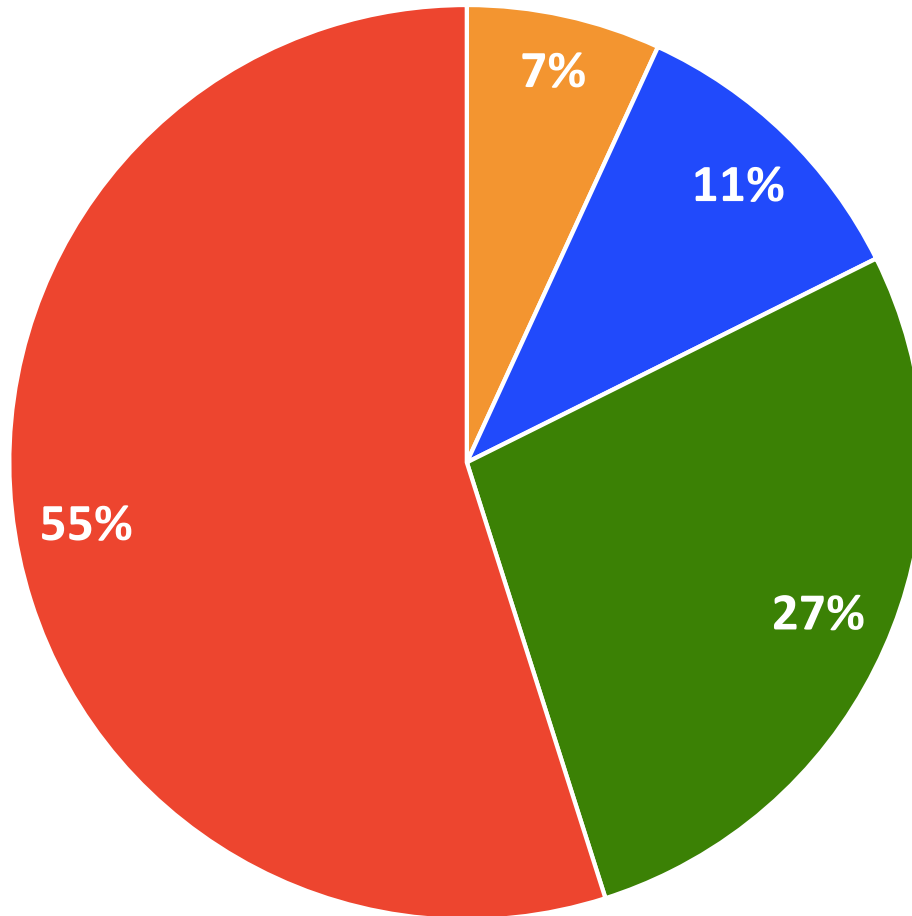
- In the store
- In the mall
- Both
- No storage area



Types of outbound shipments



E-commerce



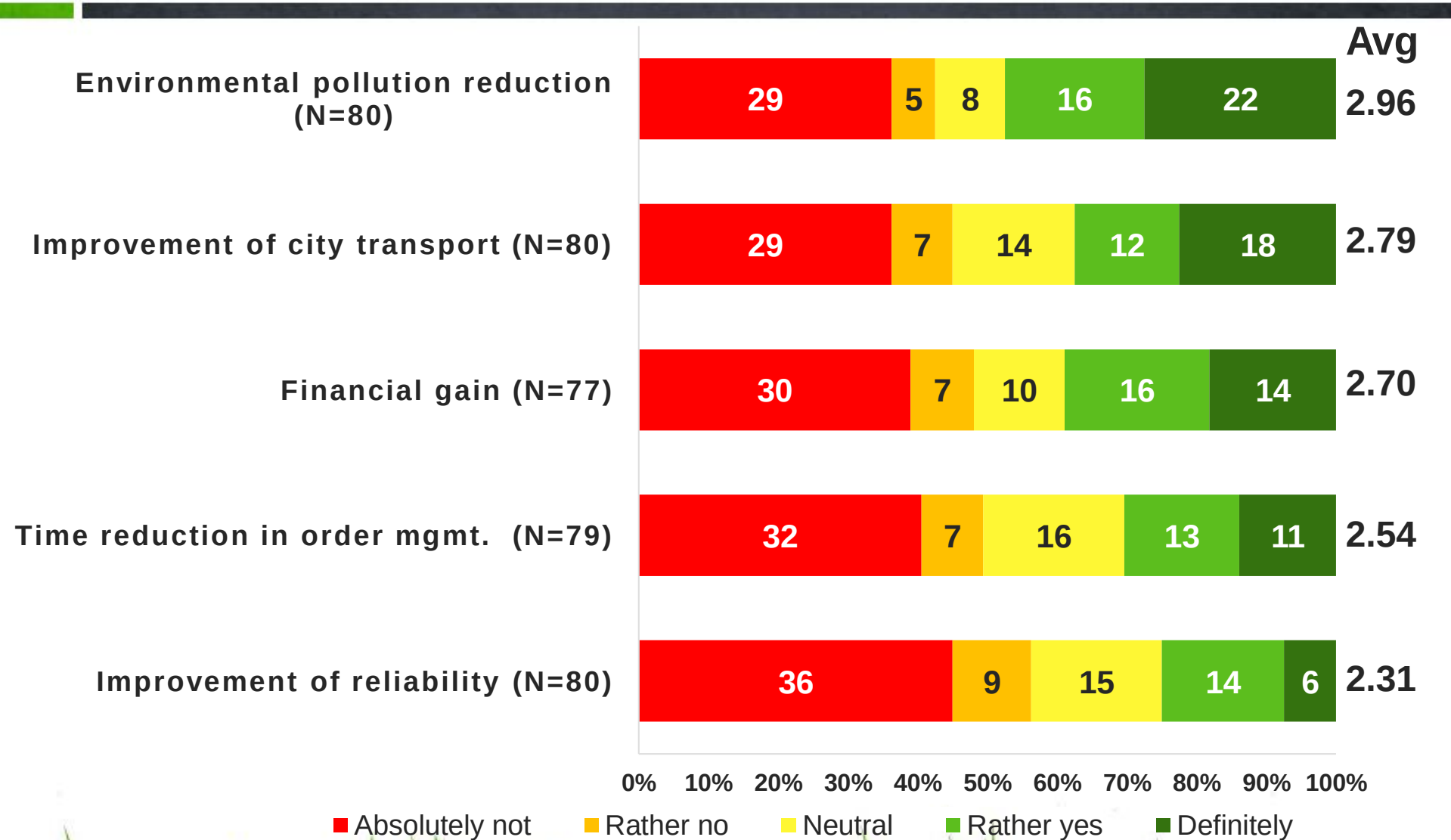
■ Pick-up in store

■ Home delivery

■ Both

■ No e-commerce

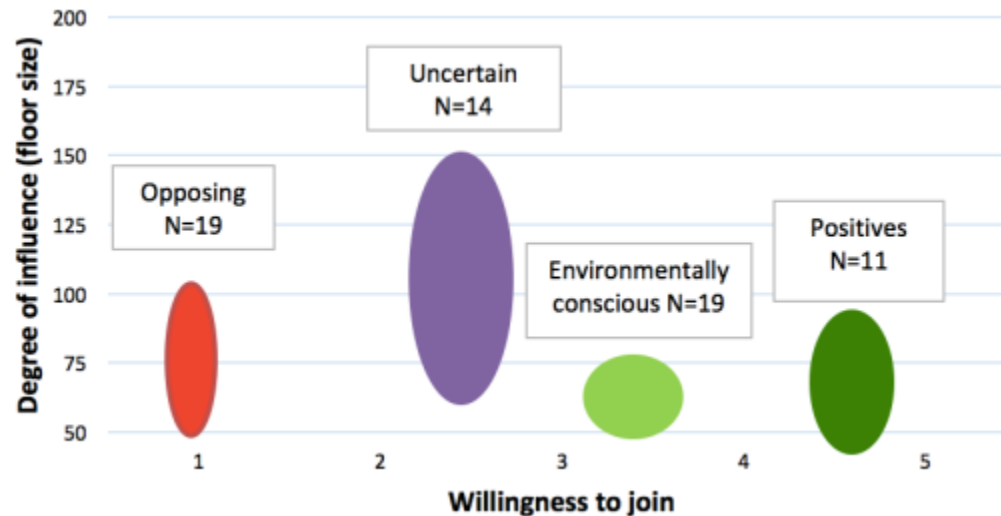
Would you participate if...?



Cluster analysis



Name of cluster		Environmentally conscious	Uncertain	Positive	Opposing
N		23	14	12	27
Potential Outcomes of the Delivery Scheme	Improved reliability of inbound deliveries	2.61	2.57	4.25	1.00
	Financial gain	3.52	2.86	4.58	1.00
	Environmental protection	4.22	2.43	5.00	1.00
	Enhancement of the city's transportation in general	3.91	2.36	4.83	1.00
	Decreasing the time spent on order processing	3.22	2.43	4.83	1.00





Significant relationship

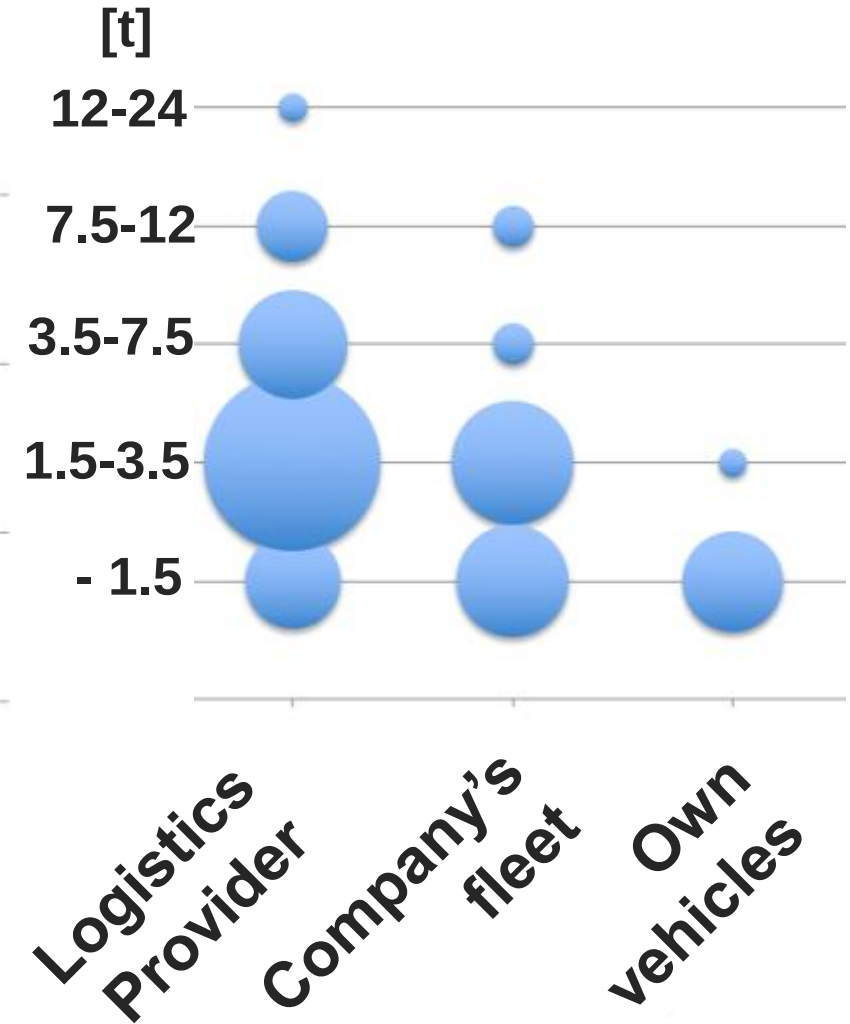
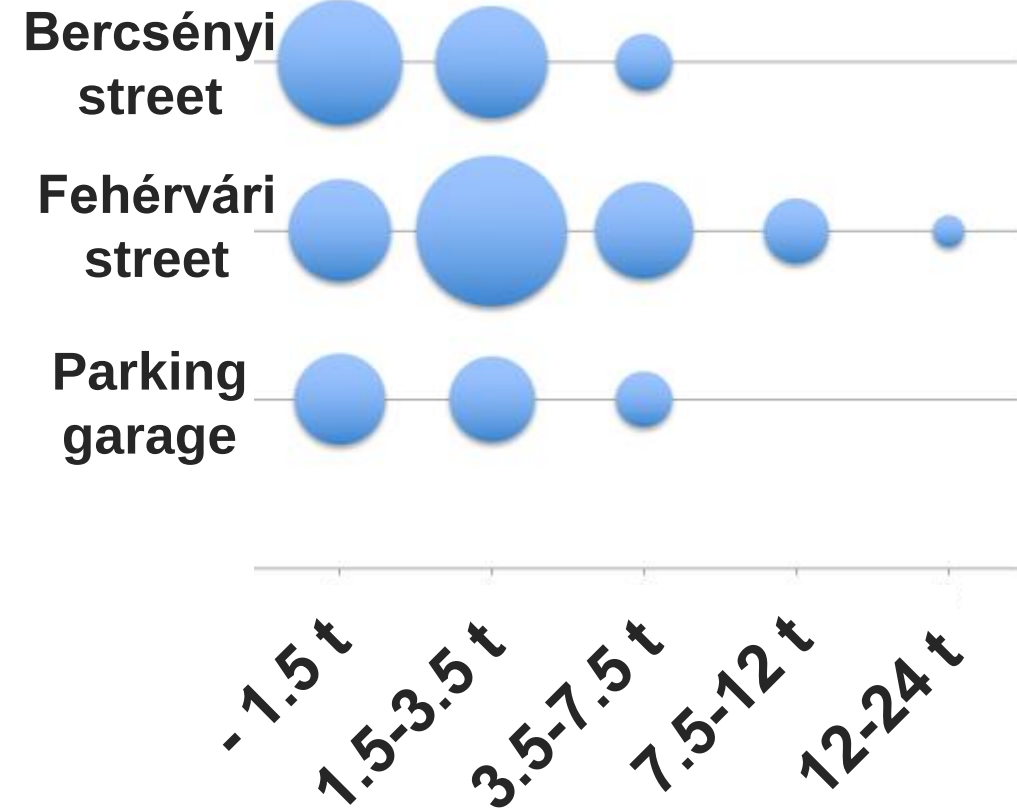
- **Bigger store → more frequent deliveries**
- **Type of store → existence of storage areas**

No significant relationship

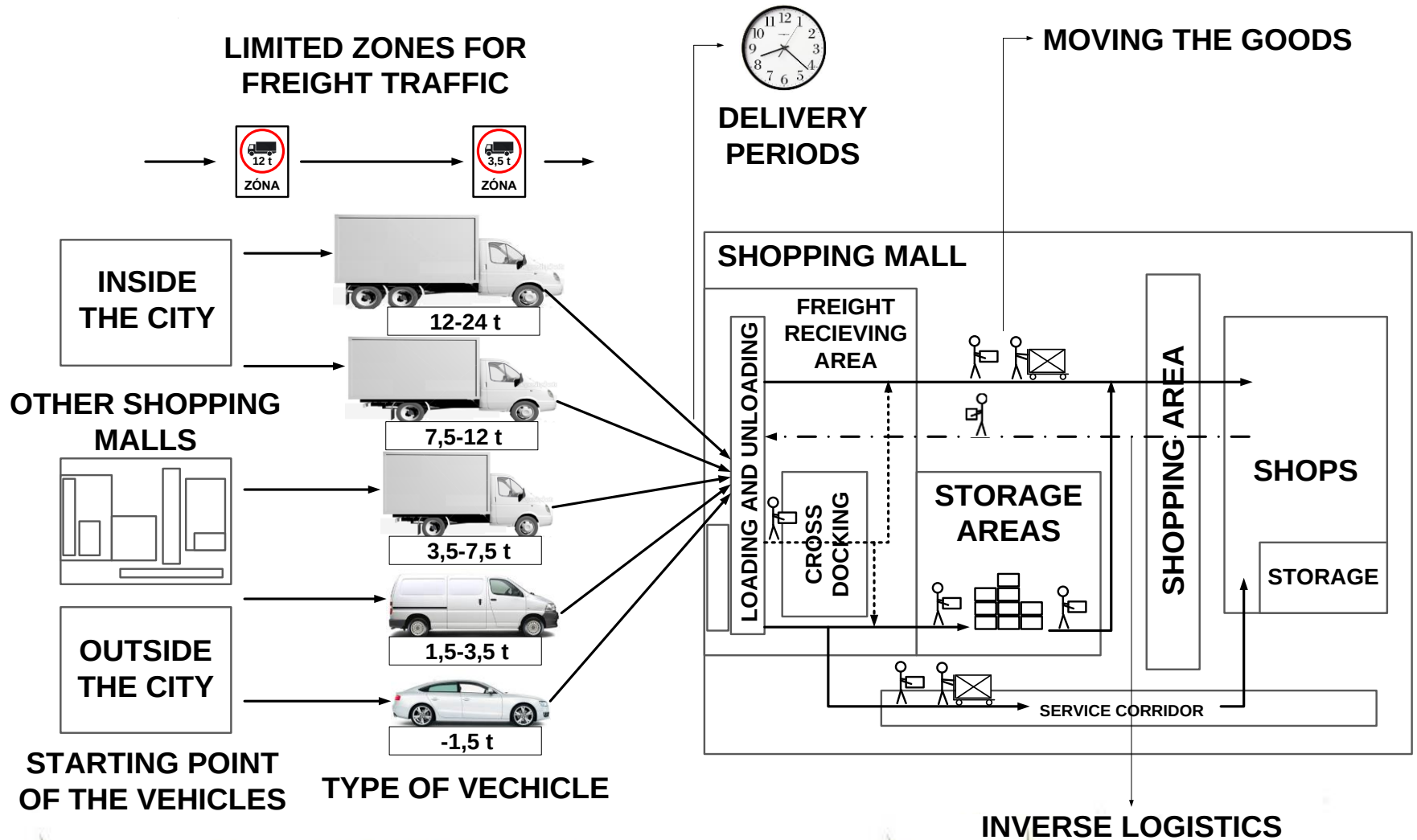
- **Between storage size and frequency of deliveries**
- **Between storage size and inventory turnover**

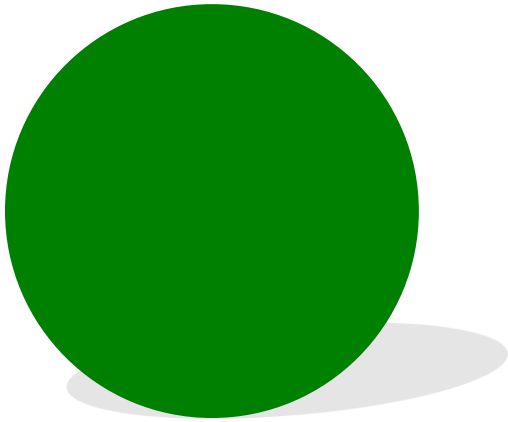


Correlation - visualized



Suggested visualization





Next steps



Next steps



**Identifying
stakeholders**

Communication

Funding

**Mode of
transport**

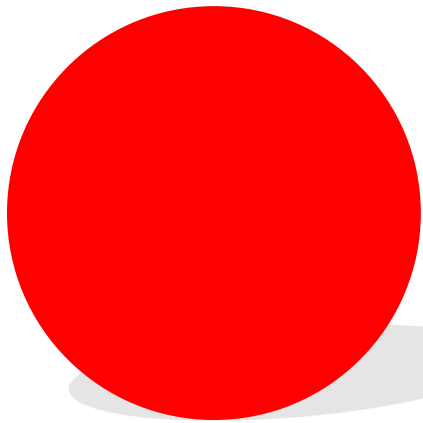
**Consolidation
centers**

Infrastructure

IT system

Workforce

**Vehicles &
Schedules**



Conclusion



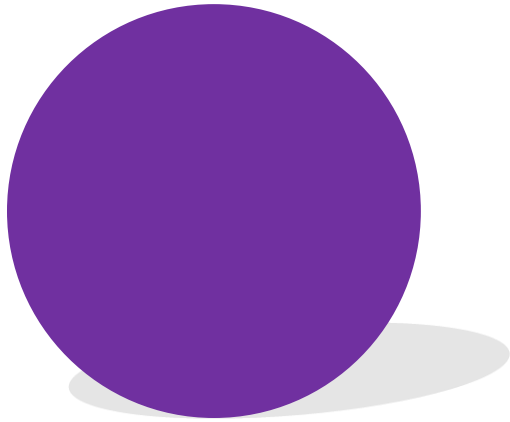


**Standard
methodology**



Foundation of a joint delivery system





Continuing our research





Goods receiving areas

- Multi-moment
- Traffic count

Cycle logistics

- Additional questions

Deliveries between shops

- Additional questions

E-commerce

- Additional questions



Researching Corvin Plaza



**Smaller
shopping
mall**

**Inner city
location**

80 stores

Shopping malls in line

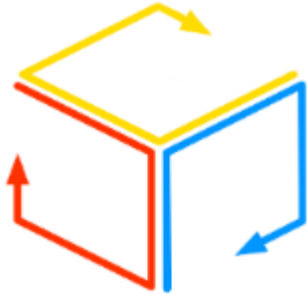


**Aréna
Pláza**

West End

MOM Park

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**Budapest University of
Technology and Economics**

Department of Material Handling and
Logistics Systems

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