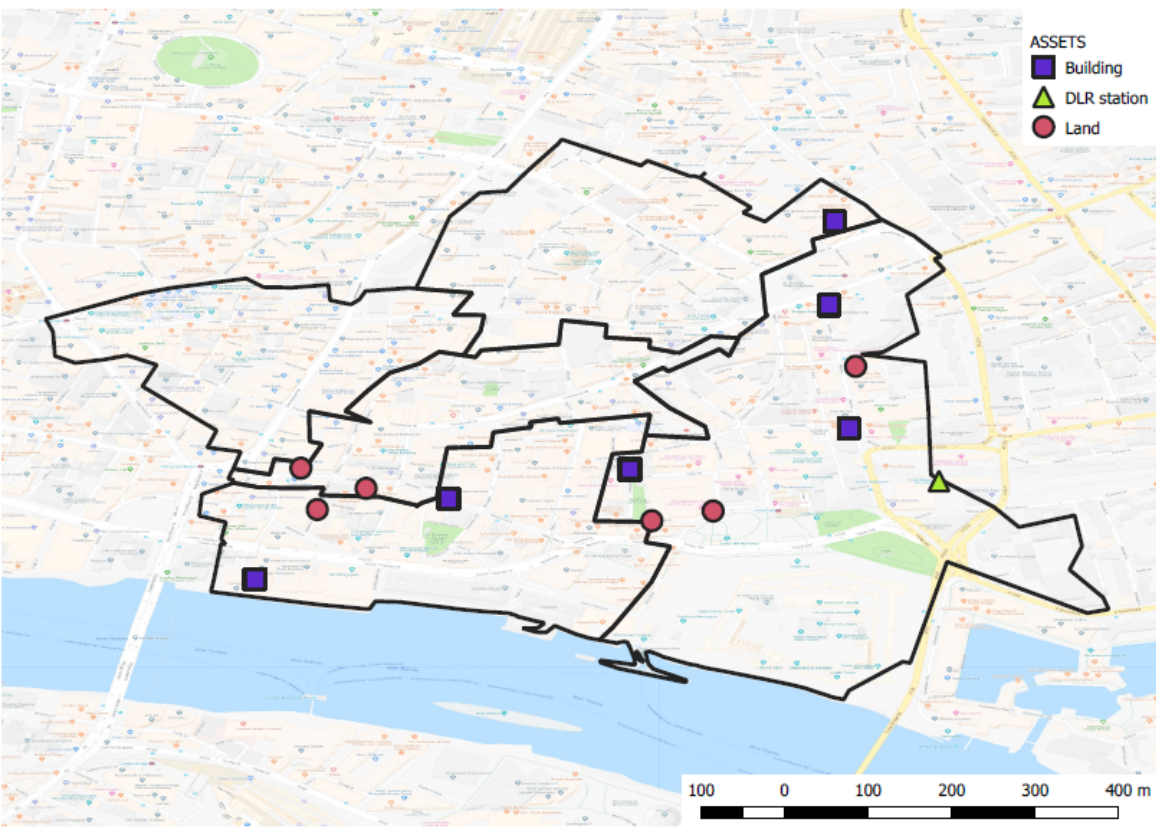


Collaborative working and game theory applications

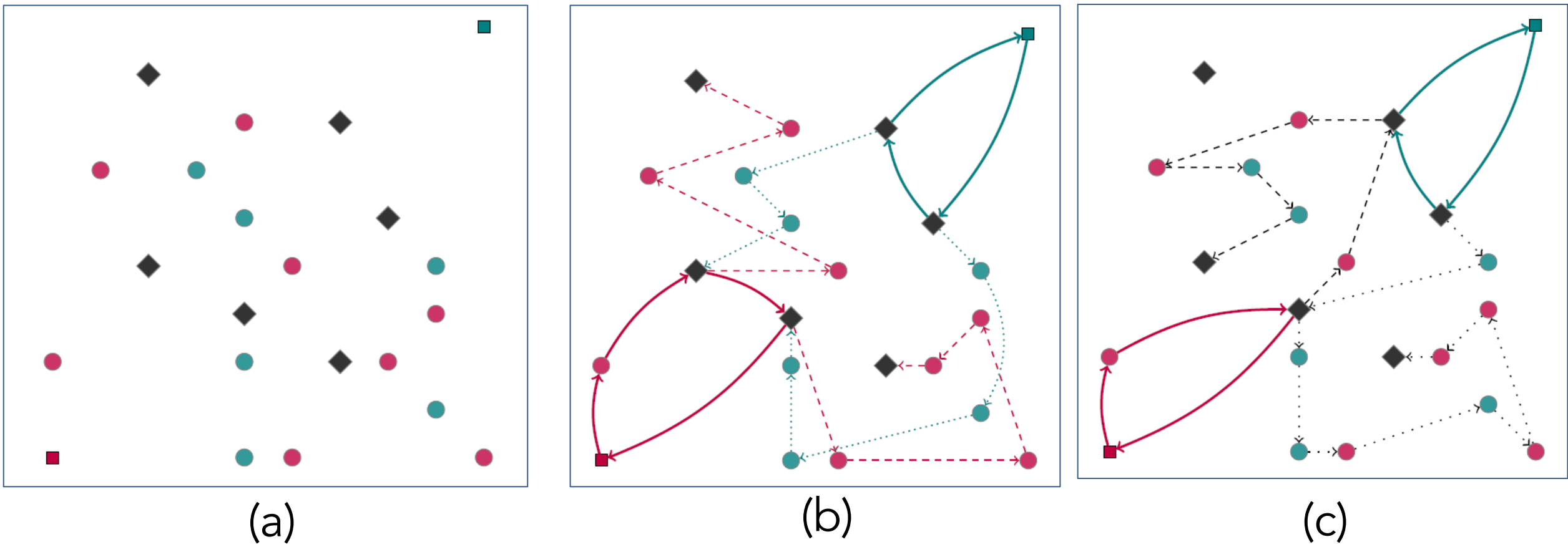
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Distribution of potential micro-consolidation points in the EC3 area of London

Collaborative working for parcel carriers:

- Collaborative working through shared use of resources (e.g. third-party micro-consolidation points to serve as handover locations between drivers and porters/cargo cyclists)
- Benefits in terms of reduced overall operating cost (time or distance)
- Successful collaboration requires:
 - Well-specified and organised operational model
 - Integration of information flows and IT systems
 - No risk to brand image, data confidentiality for individual carriers
 - Information sharing



Game Theory looks at apportioning the costs across the collaborating partners in a **fair** way.

Fairness is achieved by ensuring that no one is worse off by collaborating and sharing resources

Figure (a) above shows a set of deliveries to be made to a number of locations indicated by the coloured circles. Each carrier operates from its respective depot, shown by the squares at the top right and bottom left corners. Figures (b) and (c) show how our envisaged collaborative business model may operate between two carriers. In particular, the rounds shown in Figure (b) assume a shared use of micro-consolidation points (indicated by diamonds) by two carriers, but each carrier uses its own portering resource. Figure (c) shows an alternative business model, in which the use of micro-consolidation points and a portering service is shared between the two carriers.

Potential savings from different carriers working together

To quantify the potential benefits of collaboration, we test various collaborative scenarios between three carriers, each of which is either large (L, delivering between 285 and 300 items to between 160 and 180 unique locations a day) or small (S, delivering between 100 and 120 items to between 90 and 100 unique locations a day). The tables below compare the total daily costs and the number of porters required between two cases, one that assumes each carrier to run its operations independently (shown under *No collaboration*), and the other which assumes a fully shared use of resources including micro-consolidation points and porters (shown under *Full collaboration*).

The scenarios tested assume the collaboration of three large (LLL), two large and one small (LLS), one large and two small (LSS), and three small (SSS) carriers.

Configuration	Daily Total Cost (£)			Configuration	Porters required		
	No collaboration	Full collaboration	Cost Savings (%)		No collaboration	Full collaboration	Reduction (%)
LLL	497.03	405.96	18.32	LLL	9	6	33.33
LLS	427.39	370.33	13.35	LLS	8	6	25.00
LSS	395.40	345.92	12.51	LSS	8	6	25.00
SSS	326.46	256.45	21.45	SSS	7	4	42.86

Reframing competition: Co-opetition across the sector

Could the sector survive increasing costs of operations, particularly in the case where the demand for online shopping continues to grow?

- Option 1: Cease trading/ Be absorbed
- Option 2: Pass costs onto customers
- Option 3: Co-opetition

Co-opetition refers to collaboration between business competitors, in the hope of mutually beneficial results.

Share your thoughts on post-it notes about:

- which aspects of the process could be shared?
- which aspects of the process cannot be shared?

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UK funding agency:



Engineering and Physical Sciences Research Council