



Revitalising wholesale markets for resilient food systems: a model-based approach to evaluate strategy interventions

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Meet the “RA(SC)₂ALs” @CIM – Centre for International Manufacturing

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Our food-related networks & projects



- Context:
 - Engaging stakeholders across the agri-food supply chain
 - UK Fresh Produce Wholesaling landscape – catalyst or declining sector?
 - Challenges and opportunities
- Informing development strategies through interventions-based research
 - Modelling the current state
 - Future state scenarios
- Preliminary findings
- Closure

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Engaging stakeholders across the agri-food supply chain



Food resilience workshop @ 29th Cambridge International Manufacturing Symposium

Agritech, trade & wholesaling



Drew Reynolds
senior executive
Dole UK



Eddie Price
Director, BWMC
Ltd/Technolink.



Vicky Cuthbert
Chief Product Supply
Chain Officer, Unilever.



Kerry Whiteside
Head, Science and Technology,
Samworth Brothers



Shardul Phadnis
President, The Lost Food Project;
Professor, Asia School of Business

Food processing & distribution

Consumers & food surplus

Technology & Innovation Policy



Mario Caccamo
CEO, NIAB



Annie Iakovaki
Innovation Lead, Digital
Catapult



Francesca Re Manning
Cambridge Global Food
Security



Andrew Carlin
Former Director, EIT Food

Engaging stakeholders – wholesale markets perspective



Eddie Price, co-director, Birmingham Wholesale Market

“I have been doing this for 15 years [...]

The average business does not know what goes on here, there are businesses that could use the market but do not know about us.

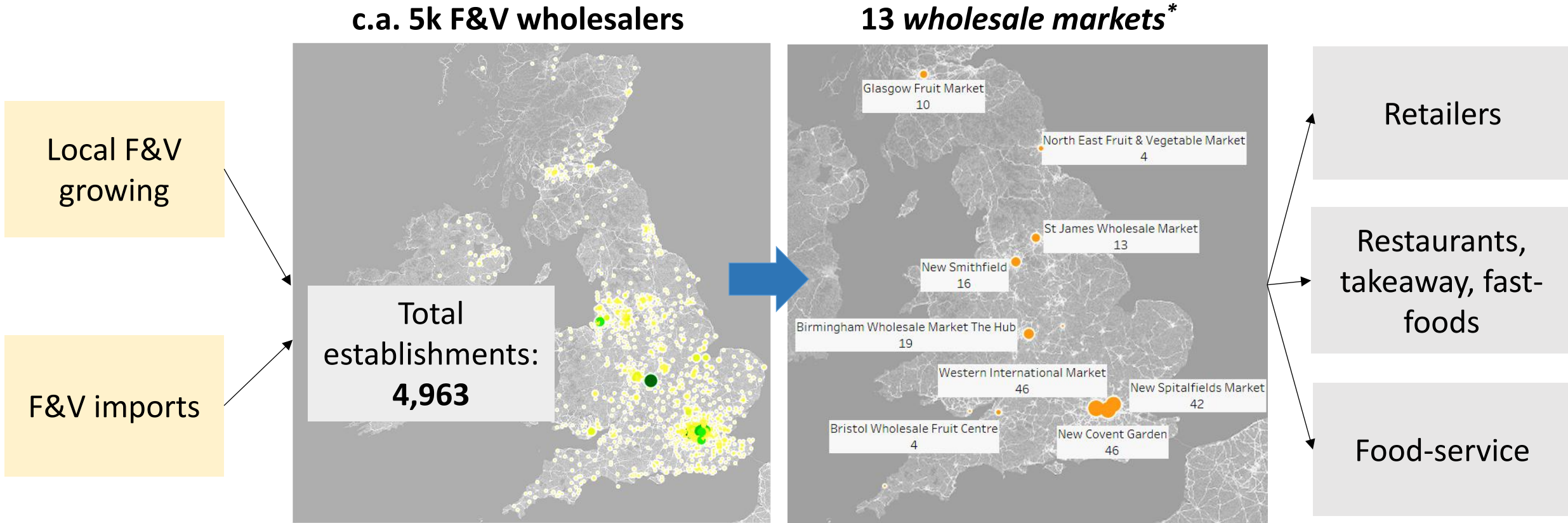
This is the World’s Pantry but hardly anybody knows the real story – it is incredible.”

Source: The Griffin Report: Wholesale Market boss on bringing the 'World's Pantry' into the digital age.

<https://www.greaterbirminghamchambers.com/resource/the-griffin-report-wholesale-market-boss-on-bringing-the-world-s-pantry-into-the-digital-age.html>

UK fresh produce wholesaling - landscape

- Estimated establishments* for SIC 46310: wholesale of fruit and vegetables (F&V)
- Sector worth** : **£11bn**



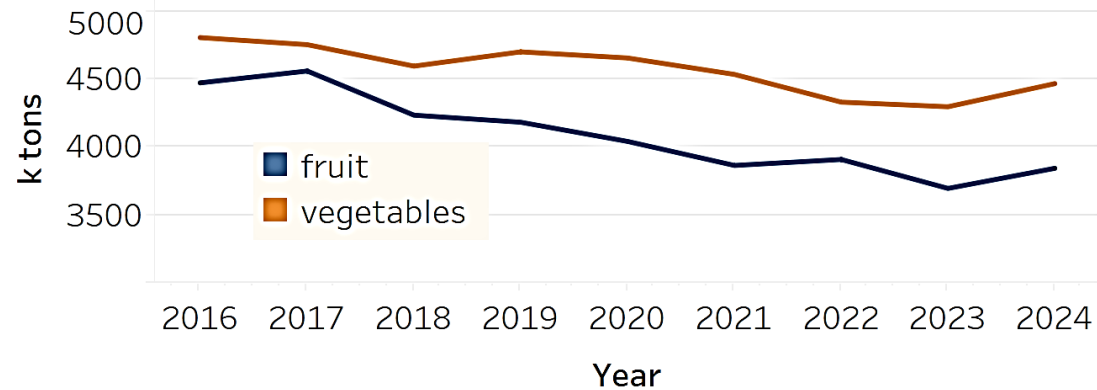
* Based on address reported in Companies House records (underestimates markets' tenants)

** Based on Lang, Jacob (2022): Fruit & Vegetable Wholesaling in the UK: IBISWorld, G46.310.

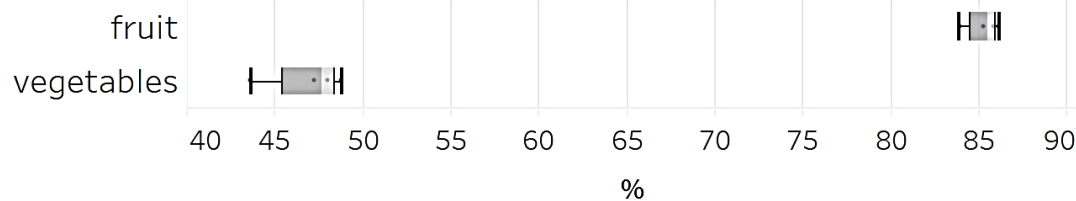
UK fresh produce wholesaling - catalyst or declining sector?

UK fresh produce availability

Total supply (production + import - export)



Incidence of imports on total supply (2020-24)

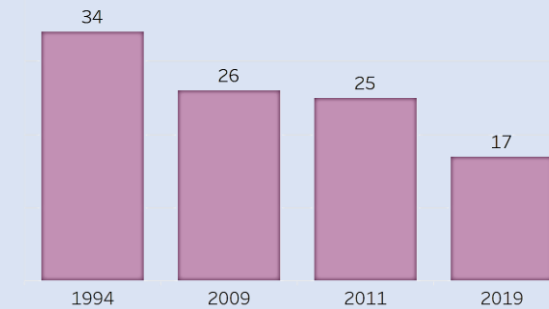


Raw data: DEFRA horticulture statistics

(<https://www.gov.uk/government/statistics/latest-horticulture-statistics/horticulture-statistics-2024>)

- Wholesale markets account for **~30%** of UK fresh produce sales^[1]
- The number of UK wholesale markets has halved over 25 years^[2]

Number of wholesale markets in the UK



- London's historical wholesale markets Smithfield and Billingsgate face permanent closure^[3]

[1] Source: NABMA-National Association of British Market Authorities

[2] Our analysis on multiple trade industry reports

[3] BBC: <https://www.bbc.co.uk/news/articles/cje050wz22qo>

Challenges and opportunities

Opportunities

- Provide a **capacity buffer** when high street chains are disrupted, improving food security^[1]
- **Growth opportunities** (~1.7% p.a.) driven by health consciousness and organic produce^[2]
- Offer **variety and choice** for growing diaspora^[3]
- Develop **synergies with “digital disruptors”** exploring new channels/business models^[3]
- **Reduce waste** (~30,000 t/year) and associated operating cost^[4]

Challenges

- **Supermarkets increasingly bypassing wholesalers** via direct relationships with growers, processors and “full-service” intermediaries^[2,5].
- **Declining market share** for wholesale markets in advanced economies^[5]
- **Decline in fresh produce consumption**. Only 17% of adults meet 'five-a-day' recommendation^[6]
- With traders' average **margins of ~4%**^[2], local authorities may consider alternative real-estate investment strategies

[1] Forrest, Paul. (2011). The Birmingham Wholesale fresh produce markets: The Essential Catalyst. Birmingham Wholesale Fresh Produce Association;
[2] Lang, Jacob (2022): Fruit & Vegetable Wholesaling in the UK: IBISWorld, G46.310; [3] based on preliminary interviews/field work; [4] NABMA- National Association of British Market Authorities; [5] 2025 City of London, Markets Food Study; [6] 2023 National Diet and Nutrition Survey.

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Intervention-based research* for strategy development

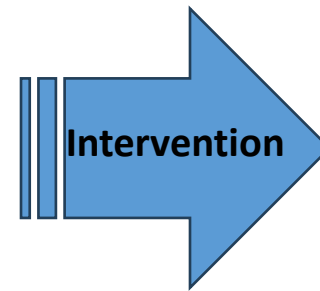
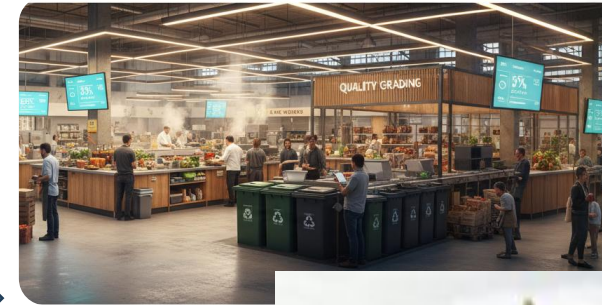
- Issue identification and intervention ideation
- Model development and data collection
- *Process insights and strategy play*

- Explore design propositions
- Enable empirically based theory development
- Emphasise pragmatic validity

Current state (S)

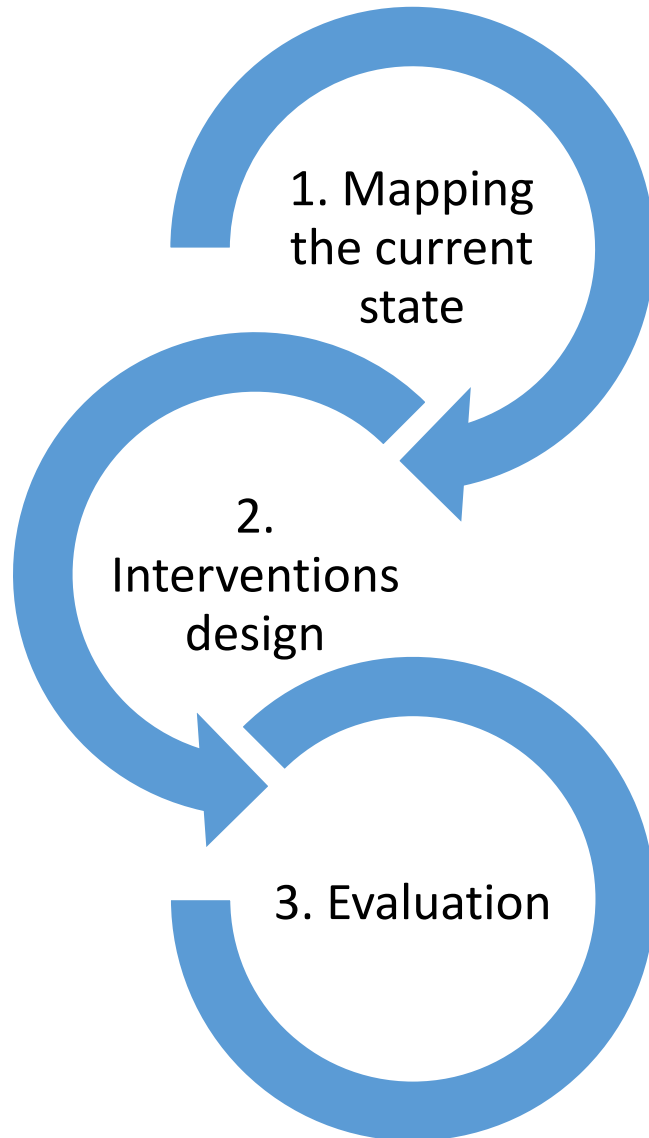


Future state scenario S'



*Based on: Oliva, R. Intervention as a research strategy. J Oper Manag. 2019; 65: 710–724. <https://doi.org/10.1002/joom.1065>;

Proposed approach - development strategy interventions



- Wholesale market ecosystem map development
- Workshops, interviews and stakeholder engagement
- Novel conceptualisations: physical/digital B2B platform lens
- Formulation of supply/demand-side intervention scenarios (e.g., food surplus; on-site complementors; waste management)
- System Dynamics modelling and collaborative group model building with primary stakeholders;
- Model-based evaluations as precursor to Interventions Based Research (IBR) in OM

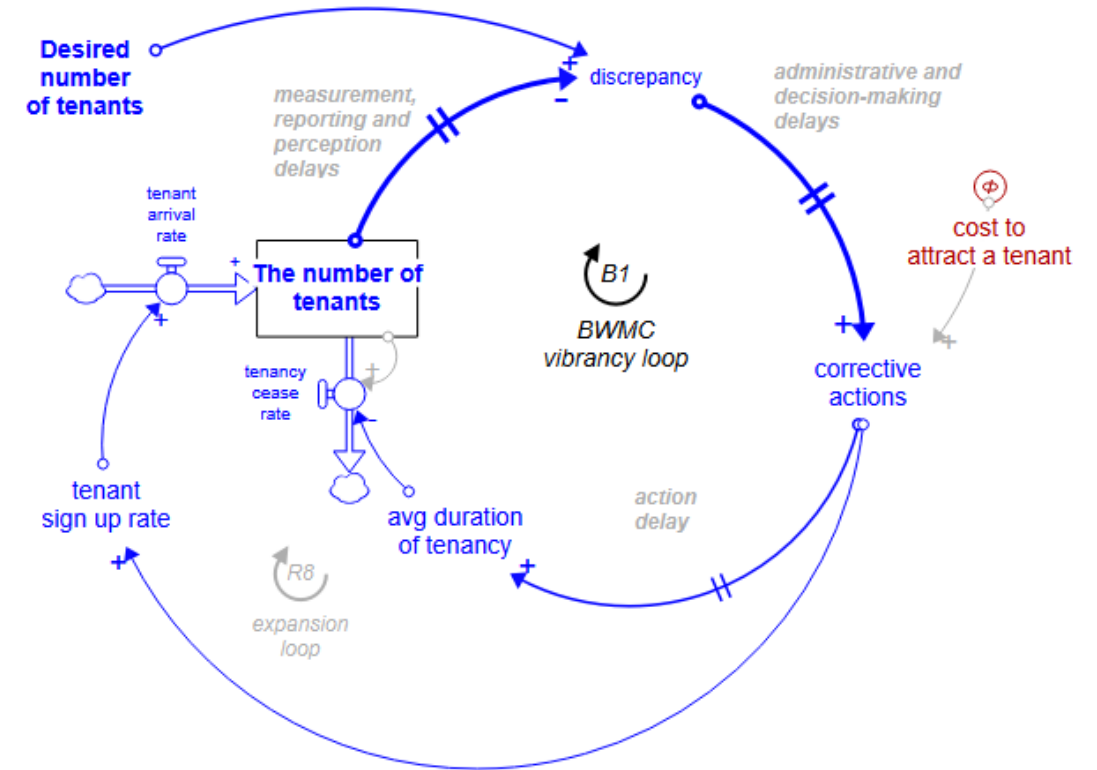


Modelling the current state: anchoring tenants

—WM management’s goal seeking behaviour to promote trader’s participation



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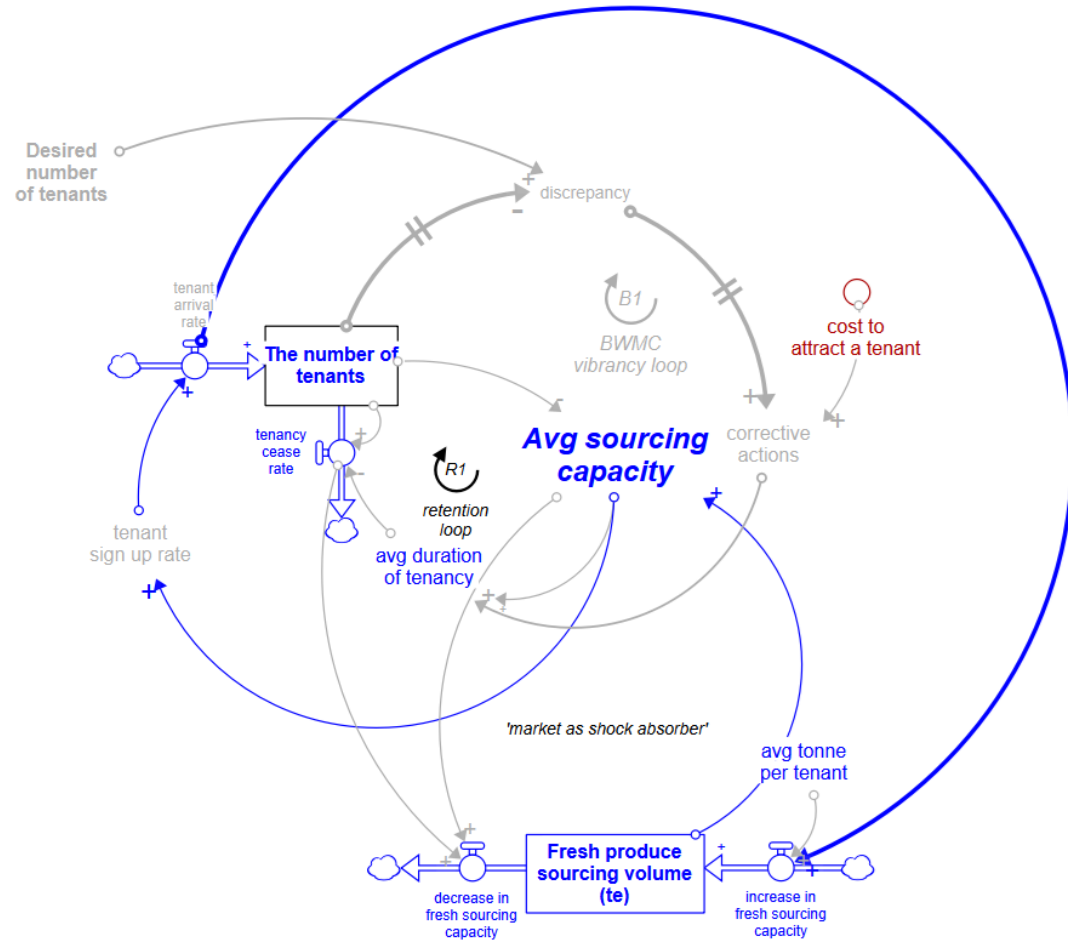
- Management’s desired occupancy goals
- Available drivers to attract and retain tenants in a “vibrant market”
- WM’s positioning as a “platform” for income growth

Modelling the current state: fresh produce

—More tenants might not ensure fresh produce; need for co-flows model



- Should the infrastructure remain exclusively a “WM”?
- Should the current offer be extended with complimentary products/services?

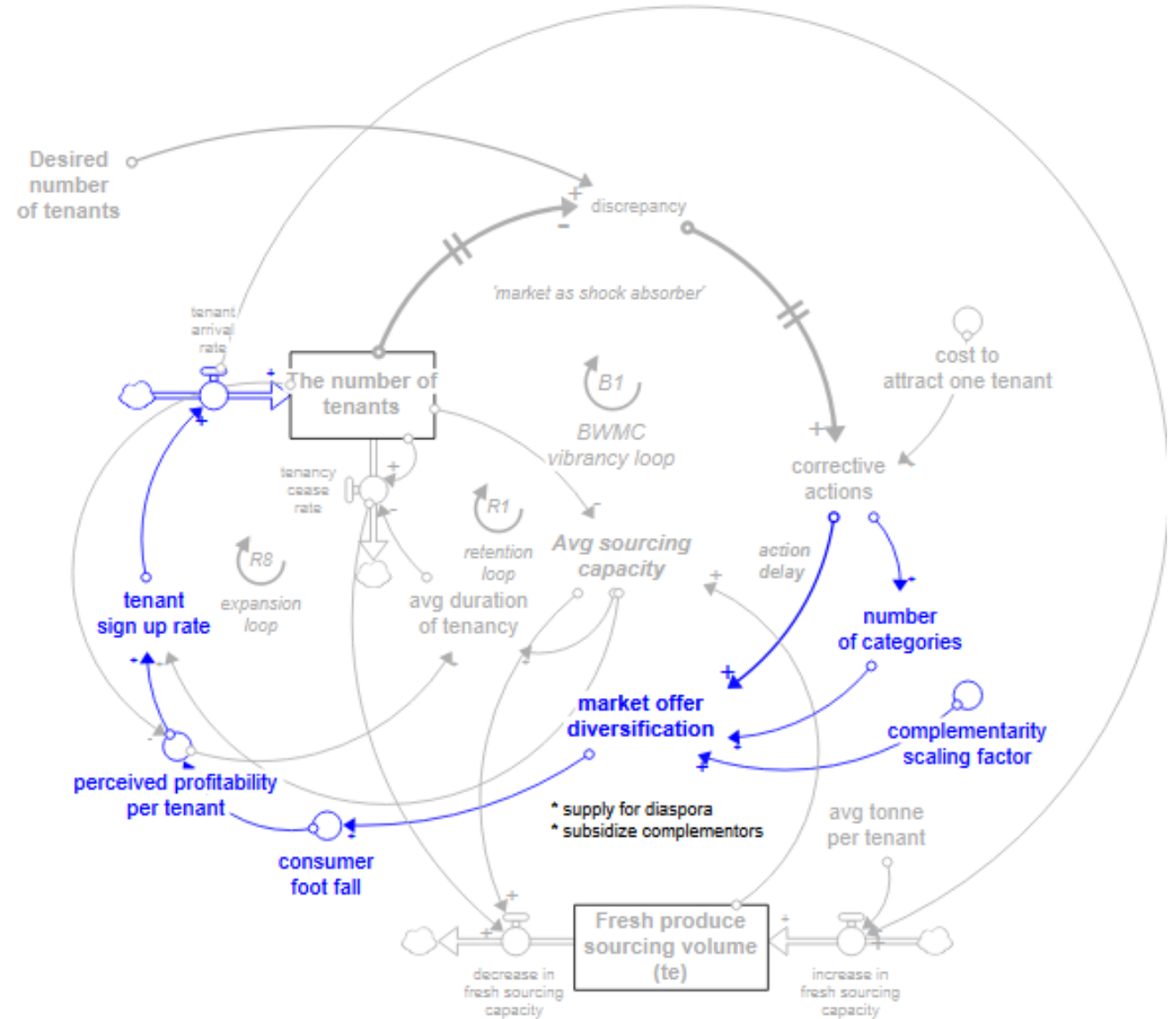


Modelling the *future* state: diversification

- Growing customer segments include diaspora population
- Need to respond to new market demand (e.g., spice market to complement fresh produce)
- The goal is to identify priority customers and compete with local supermarket chains



Image by [sh ahn](#) from [Pixabay](#)



Modelling the *future* state: complementary services

Complementary on-site services

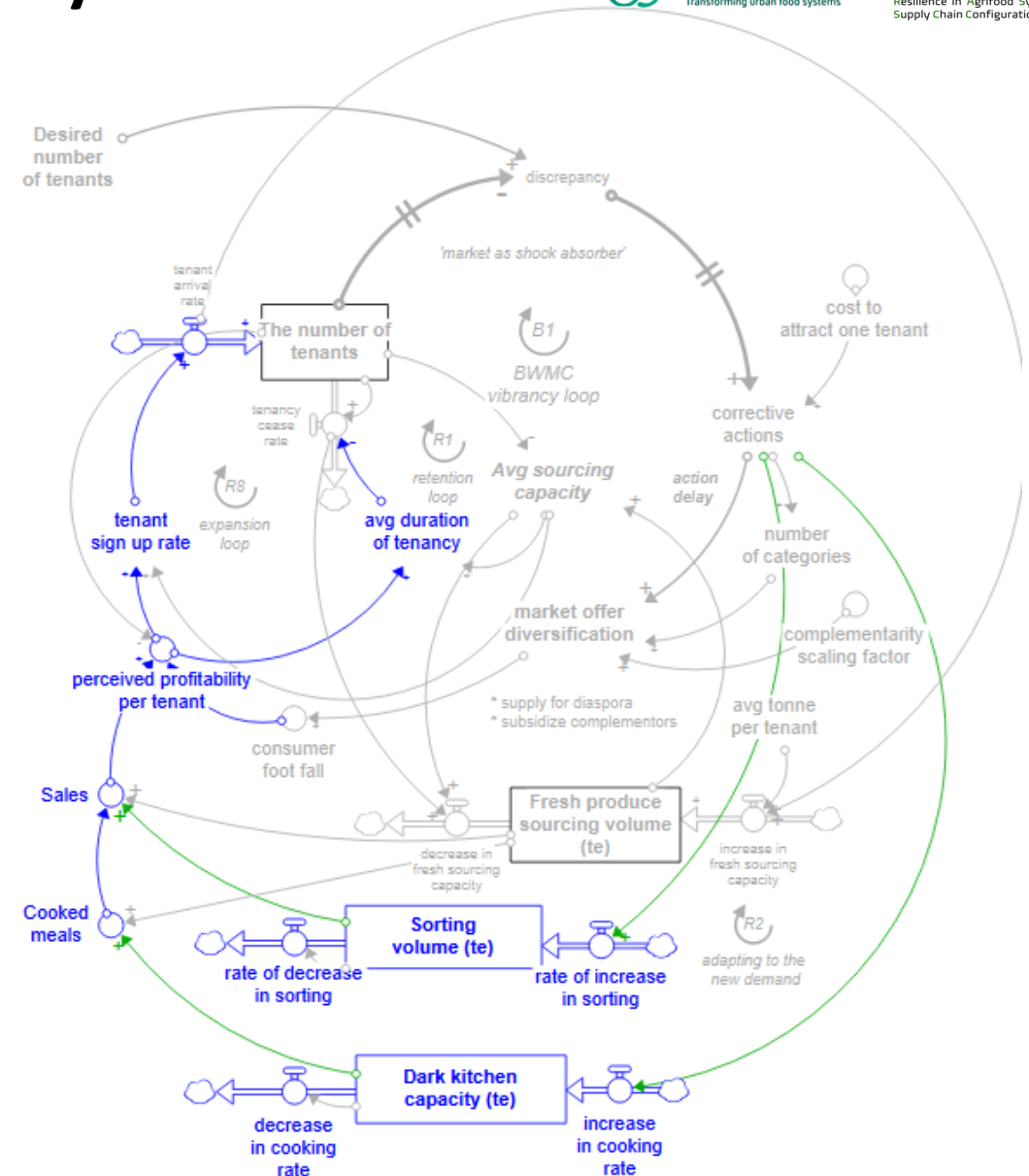
- Sorting, packaging, and delivery
- Processing, and selling fresh products as B2B catering services

Explore channels creation opportunities with “digital disruptors” e.g., dark kitchens

- B2B digital/physical platforms lens
- *To be presented @TUKFS Annual Conference*



Image by MYCCF from Pixabay

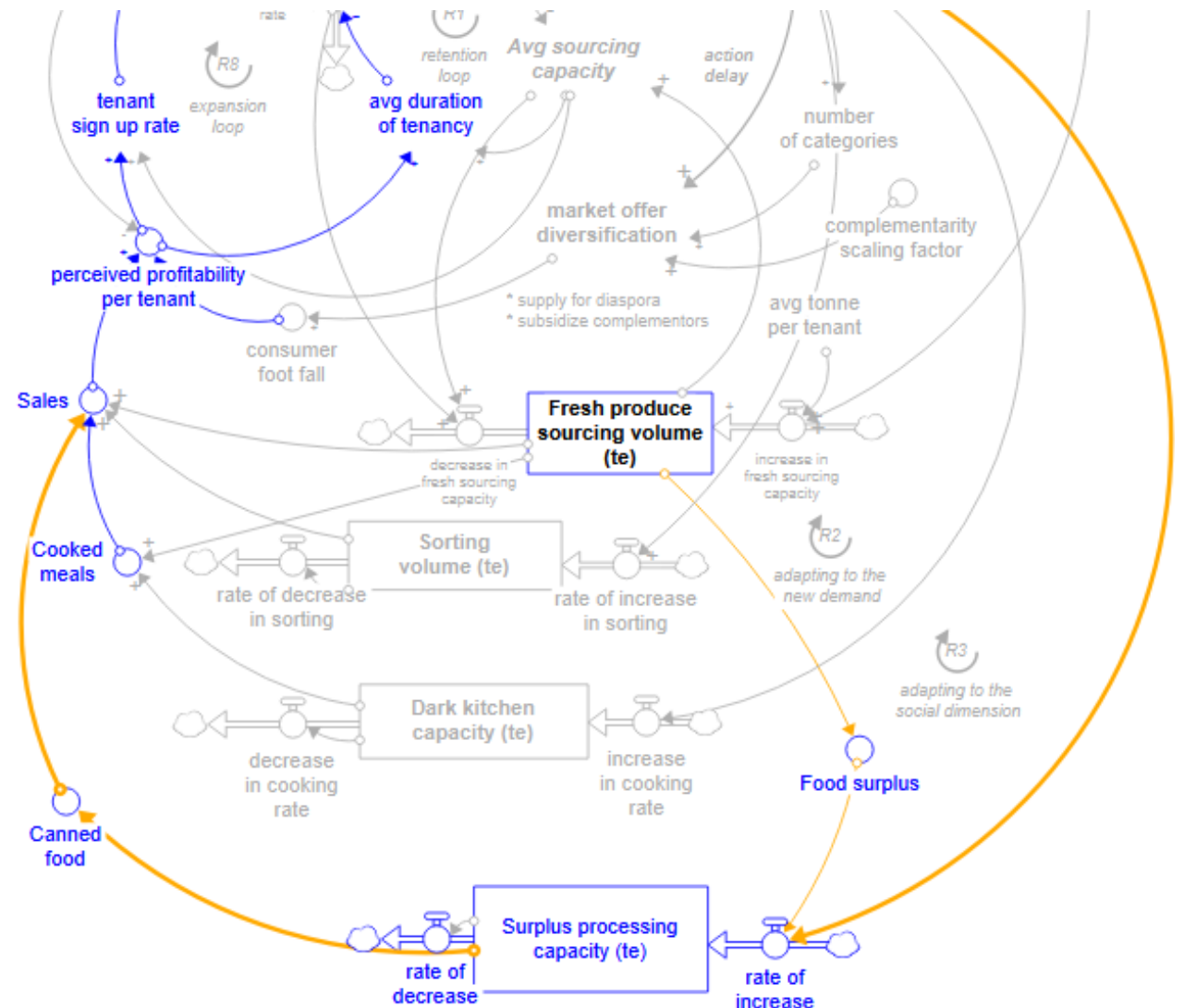


Modelling the *future* state: food surplus

- The growing volumes of fresh produce inevitably increase the volumes of potential waste
- Sorting, and processing surplus food into frozen and canned food may produce an additional revenue streams



Stock Image by Microsoft365

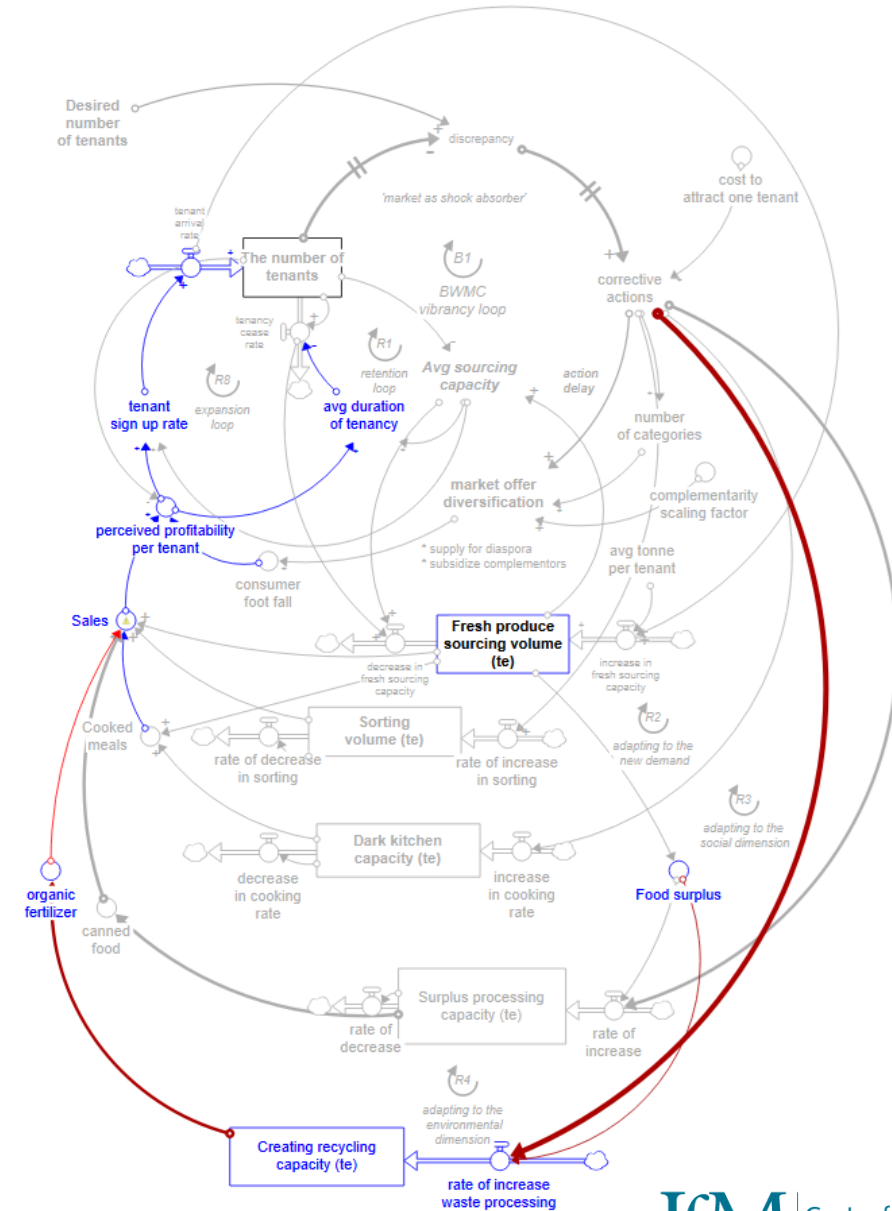


Modelling the *future* state: Packaging waste management

- Tenants incur operating costs and penalties for waste management
- On-site sorting and processing capabilities underutilised
- Optimisation opportunities may introduce behavioural change and enable untapped revenue streams



Image by [Nathan Copley](#) from [Pixabay](#)



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Preliminary findings and insights

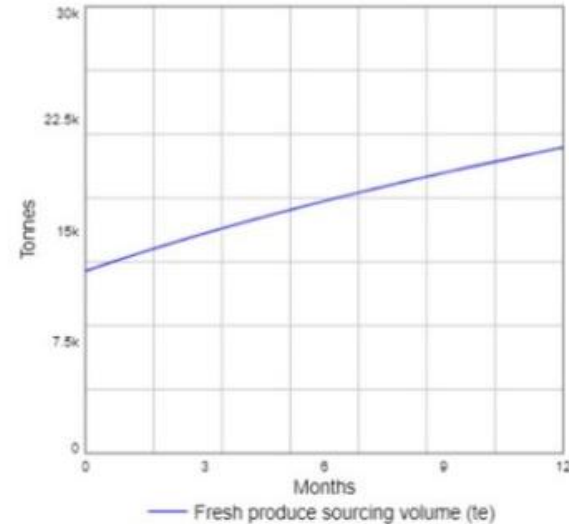
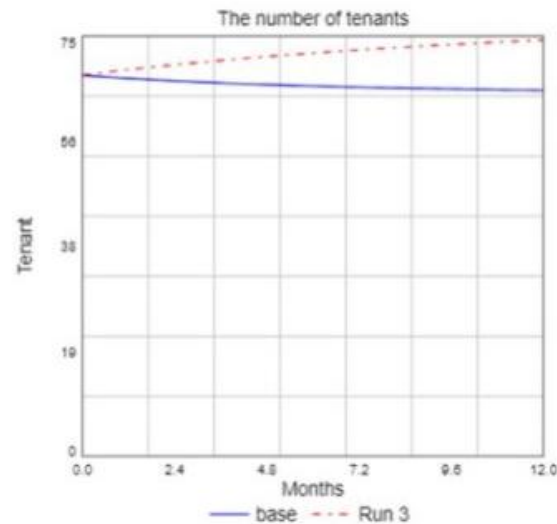
- Our models replicate the dynamics of the market and demonstrate sensitivities around key economic indicators (e.g. margins)
 - e.g., main balancing loop identified relating throughput and tenant retention
 - margins below 3% critically affect participation
- Response sensitivity to new intervention scenarios
 - Co-flow models testing impact of activity expansion (e.g. new services) on fresh produce throughput
 - Highlight future potential to absorb demand shocks in the case of supply disruptions
 - Explore opportunities to improve tenants' waste management
- We are contributing to wholesale market strategy development as part of an ongoing co-creation activity

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Future work interactive approach to scenario evaluation

- Further developments include a prototype "flight simulator" for strategy planning
- Interactive tools facilitate the evaluation of strategy adoption pathways

Developing scenario for wholesale market strategy



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The number of tenants
after 5 years

