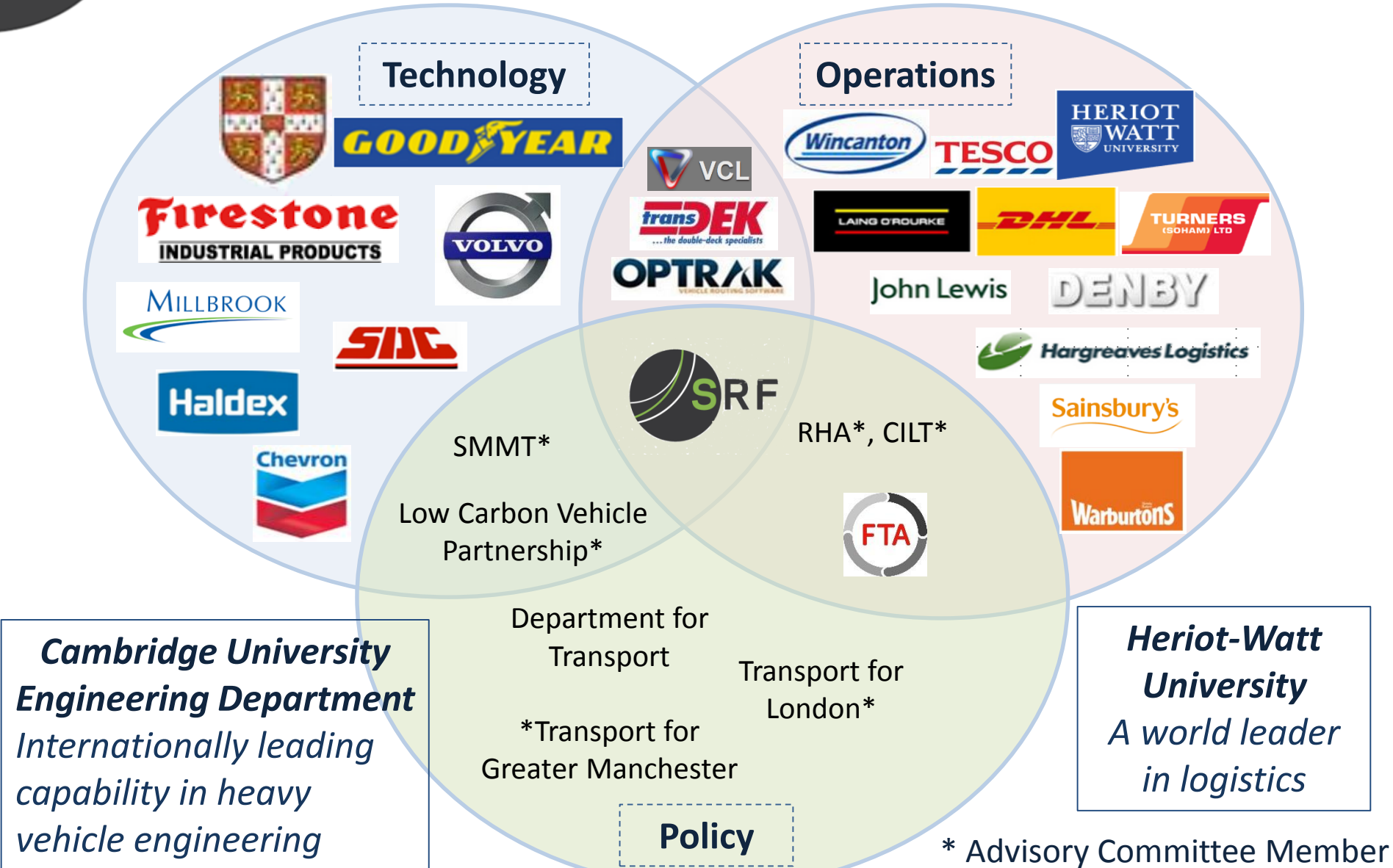




Clean Cold: a freight perspective

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A Unique Collaboration...



Portfolio Management/Maximizing Impact

Data Collection &
Analysis

Logistics Systems
Living Lab

Vehicle
Technology

Reduce barriers

Increase impact

Implement

1. Real-time monitoring of road freight
 - On-vehicle
 - At logistics nodes
 - At roadside
 - Telematics providers
2. Logistics system simulation
3. Congestion prediction
4. Propose logistics interventions, simulate, measure & evaluate outcomes
 - Routing
 - Collaboration
 - Co-loading
 - Re-timing
 - ...

Impact: Corporate Strategy / Market Solutions / Policy-Regs / Future Research



Portfolio Management/Maximizing Impact

Reduce Barriers

Data Collection & Analysis

Logistics Systems Living Lab

Vehicle Technology

Logistics and system modelling

Logistics data collection

Alternative Energy Vectors

Asset utilizn + Logis infrastr

Rolling Resistance

Roadside data collection

Congestion modelling and mitigation

Integrated national freight and energy model

Increase Impact

Funding

- EPSRC
- SRF
- ETI
- Other

Higher-capacity vehicles

STARFISH III

Light-weighting

Mode Choice & Rebound

Aerodynamics

ETI

Human Factors, Driver Feedback

Construction logistics

Double-Deck Trailers

Urban logistics

Maximizing CNG Benefits

Future Mapping

Implement

Vehicle data coll & analysis

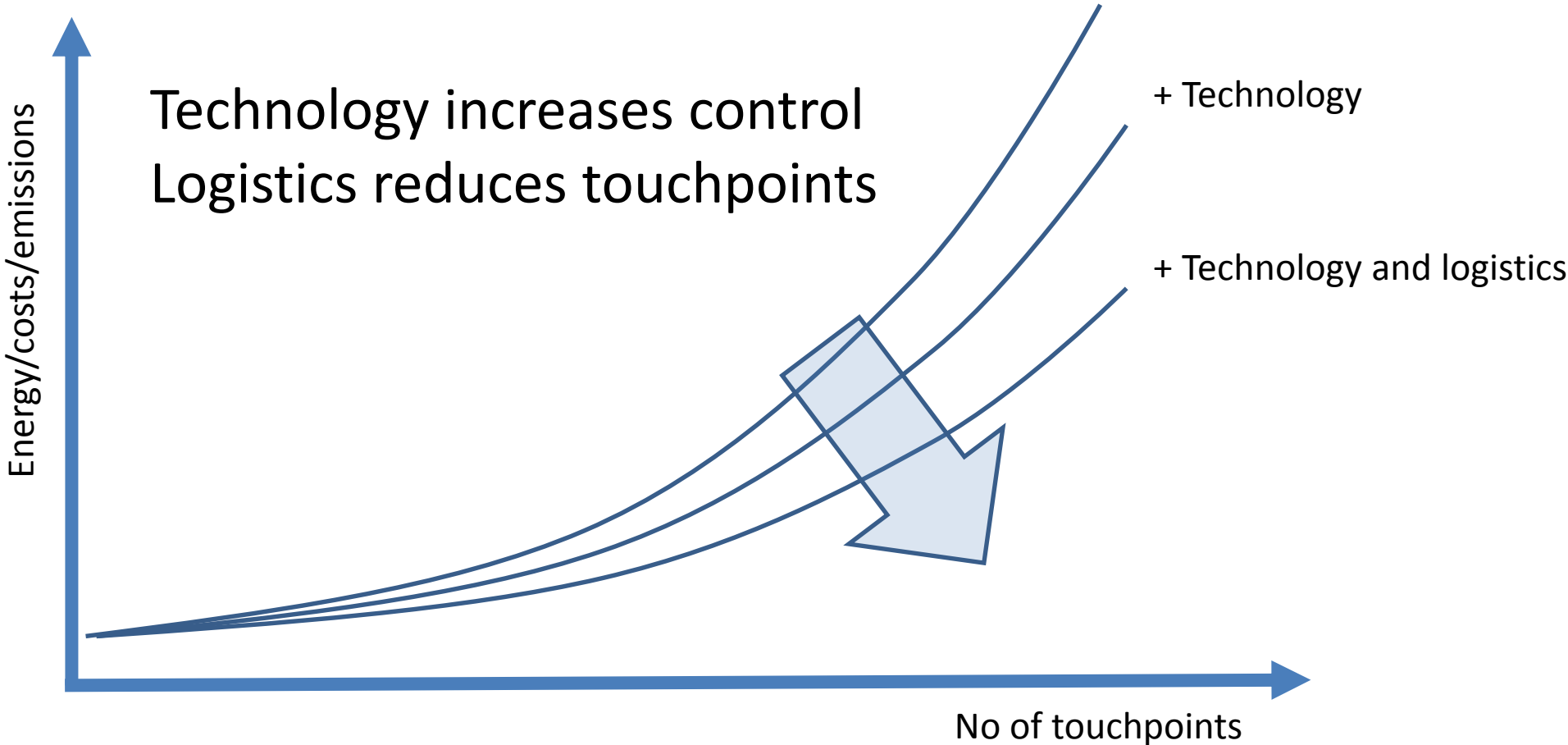
Decarb of freight ops

Vehicle param & simulate

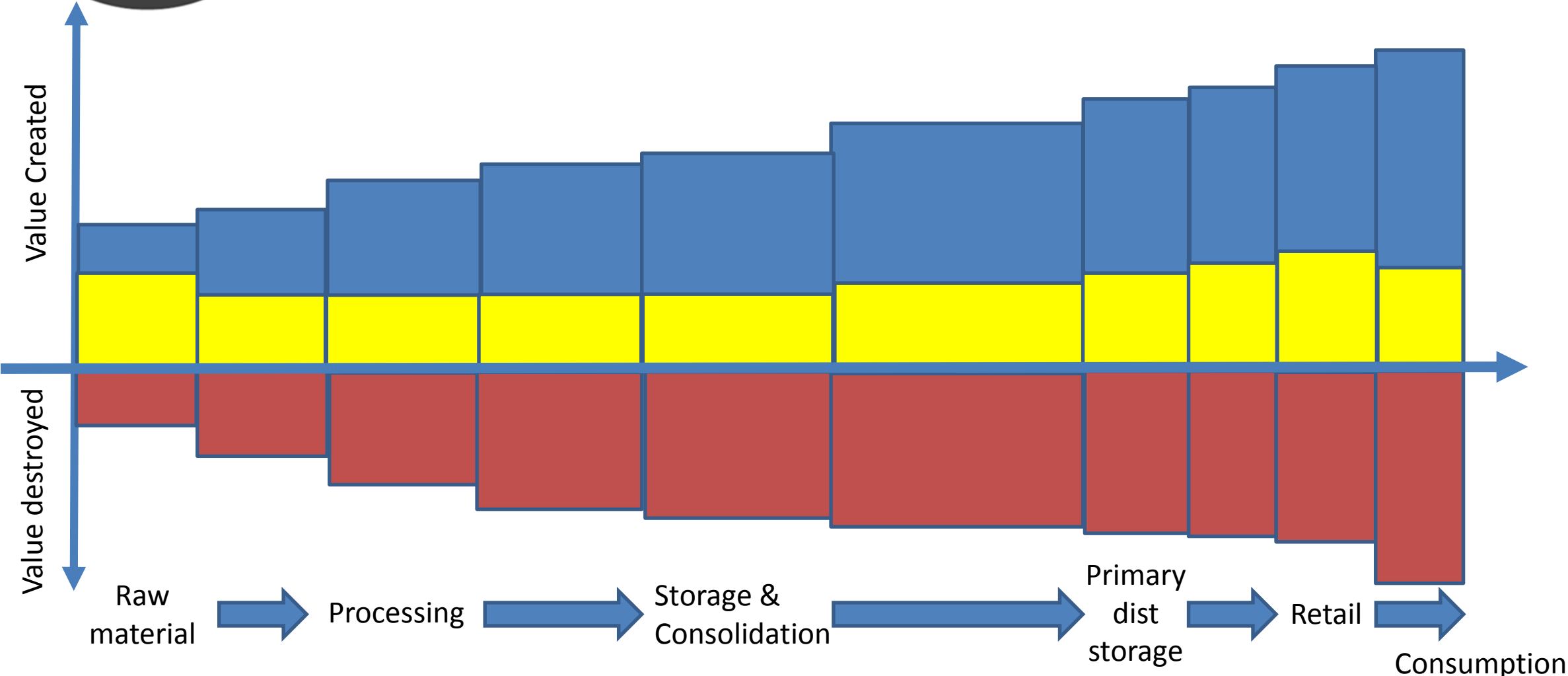
Corporate Strategy; Government Policy & Regulation

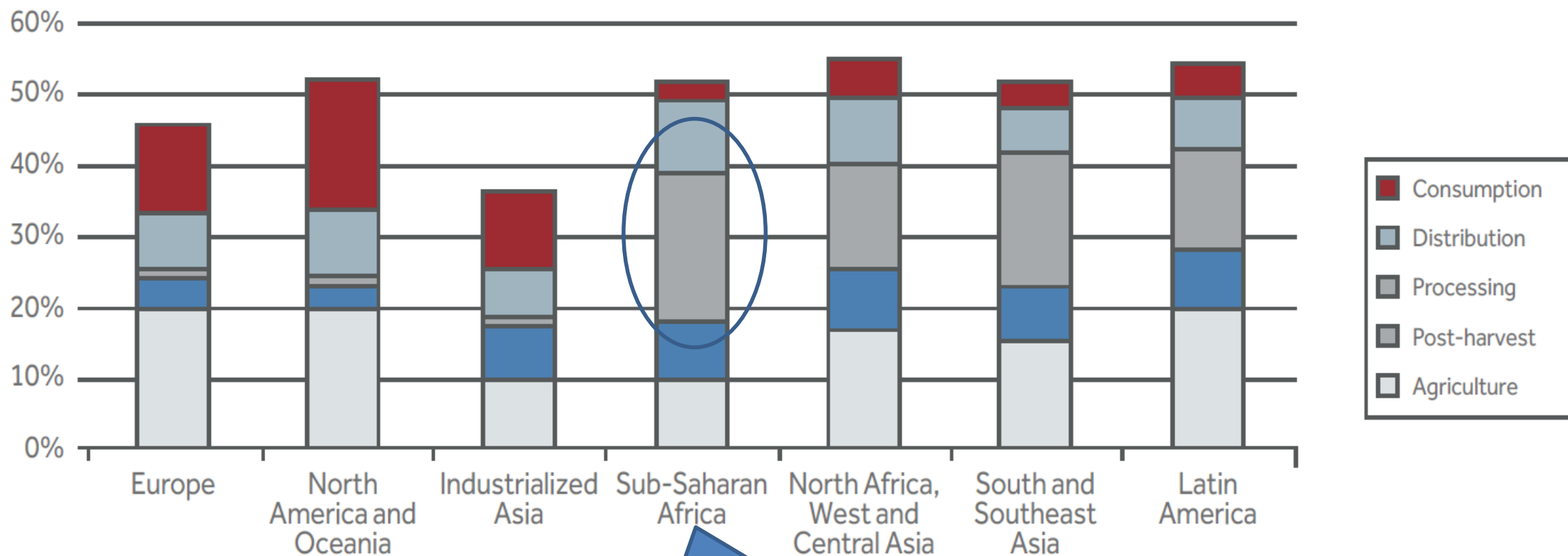
Impact: Corporate Strategy / Market Solutions / Policy-Regs / Future Research

Cold Chain, Technology and Logistics



Cold value map





Approximately double the opportunity for value retention as that for Europe

Source: NUTFRUIT, 2017



Opportunity

- 1.3 Billion tons of food grown is wasted each year
- 25 - 50% of vaccines go to waste
 - Need to be maintained at temperatures between 2-8°C
- 20% food loss attributed to lack of cold chain
- Only 20% of food requiring refrigeration is refrigerated



An Action Plan

- **Collect Data**
 - Origins, destinations, transport, temp requirements, vehicles, warehouses, cool sources and points of demand etc
- **Model the alternative system**
 - Combination of novel logistics, disruptive business models, and technology
- **Use Living labs to demonstrate technology/logistics solutions**
 - Prioritise solutions that deliver the greatest “whole system” benefits at the lowest cost



Thank you

Dr Phil Greening