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Evaluating complex interventions in international development



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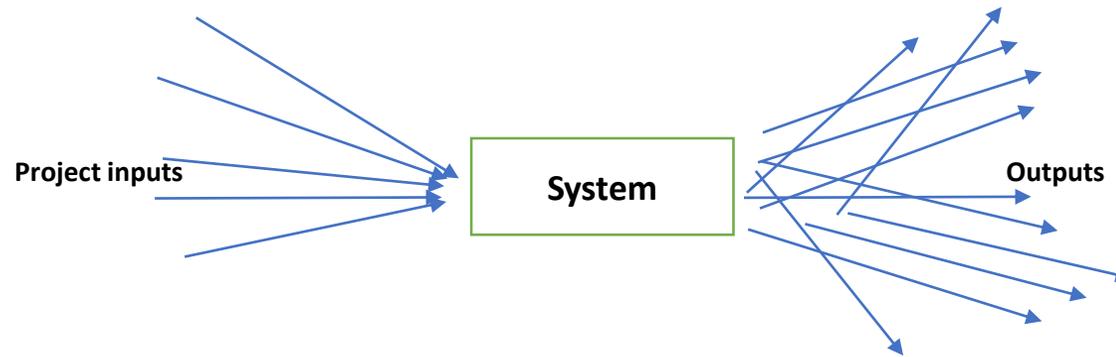
Zoom, 21/04/2021



Motivation

- Review of methods to evaluate complex interventions
- Part of CEDIL programme of work
- Contribution to the literature:
 - Focus on international development
 - Methods addressing causality
 - Mapping methods to projects

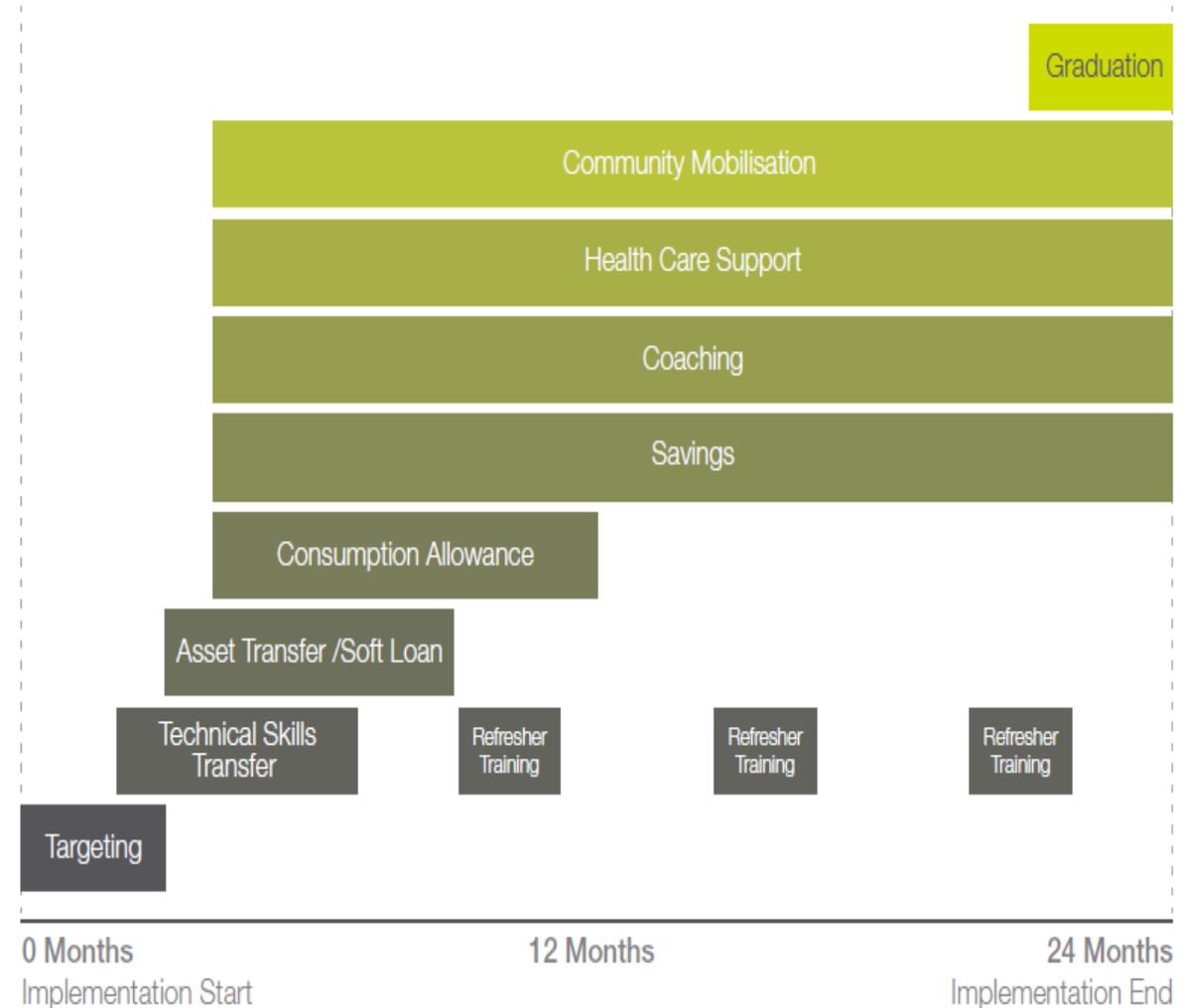
What are complex interventions?



- Interventions with multiple interacting components
- Interactions generate complex outcomes: feedback loops, low equilibrium traps, tipping points

1. Multiple-components interventions

- Many activities
- Interactions and synergies
- Example: BRAC graduation from ultra-poverty programme



2. Portfolio interventions

- Multiple components across many countries or across sectors within a country
- Large-scale and long-term interventions
- Example: President's Malaria Initiative

PMI's 15th ANNIVERSARY

The U.S. President's Malaria Initiative was launched by President George W. Bush on June 30th, 2005.

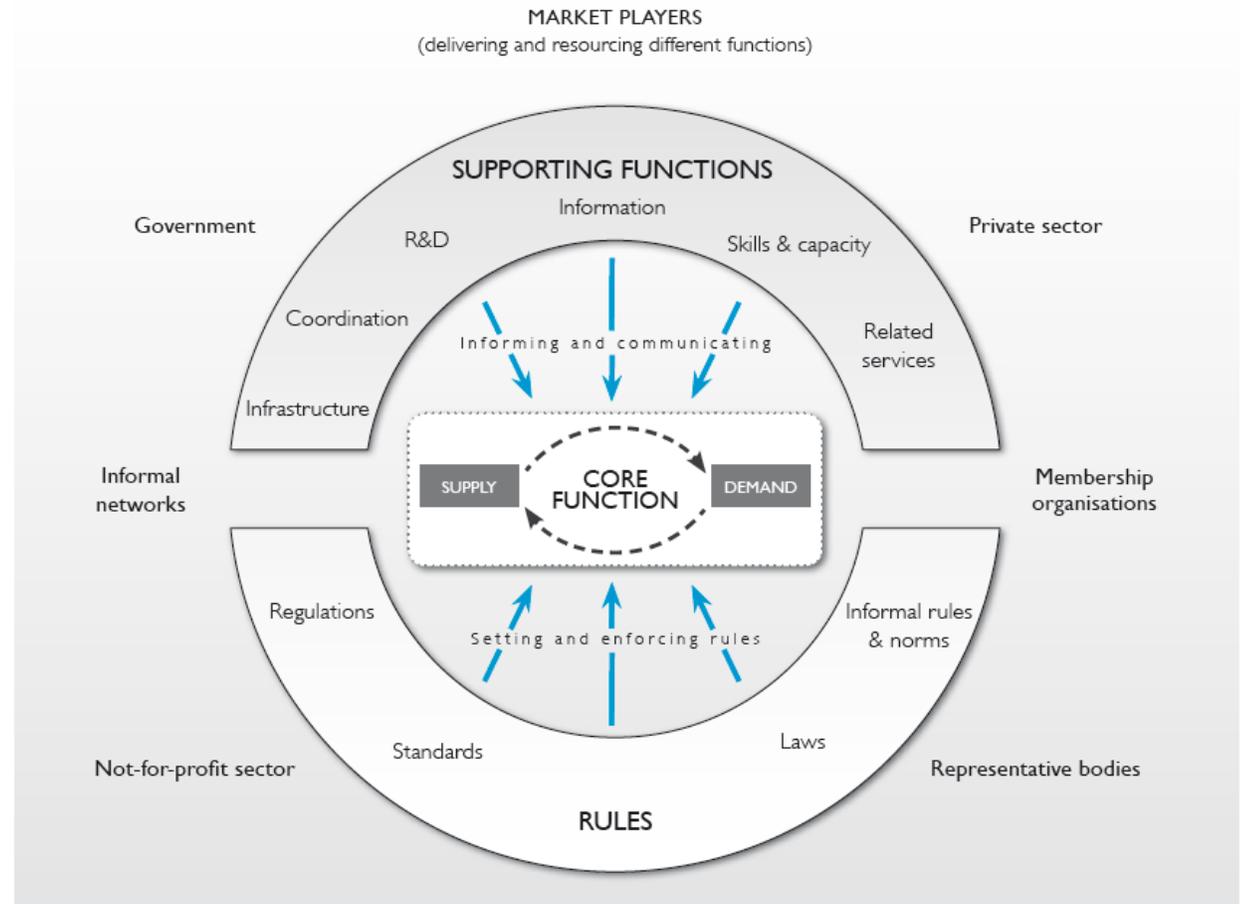
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3. System-level interventions

- Multiple components to change the “system”, food, education, health etc.
- Example: Making Markets Work for the Poor

Figure 4
Stylised view of the market system



Review of complexity-sensitive methods

- Methods that address causality and complexity
- Sources:
 - 3ie repository of impact evaluations
 - Systematic reviews
 - Google search
 - Specialised journals
- Inclusion criteria:
 - Low and middle income country
 - Complex development intervention

Intervention	Selected methods	Studies found
Multiple components	Factorial designs	27
	Adaptive trials	2
	Qualitative comparative analysis	8
Portfolio interventions	Synthetic controls	8
System-level interventions	Agent-based modelling	11
	System dynamics	8

Factorial experiments

Assess the impact of single components and their interactions

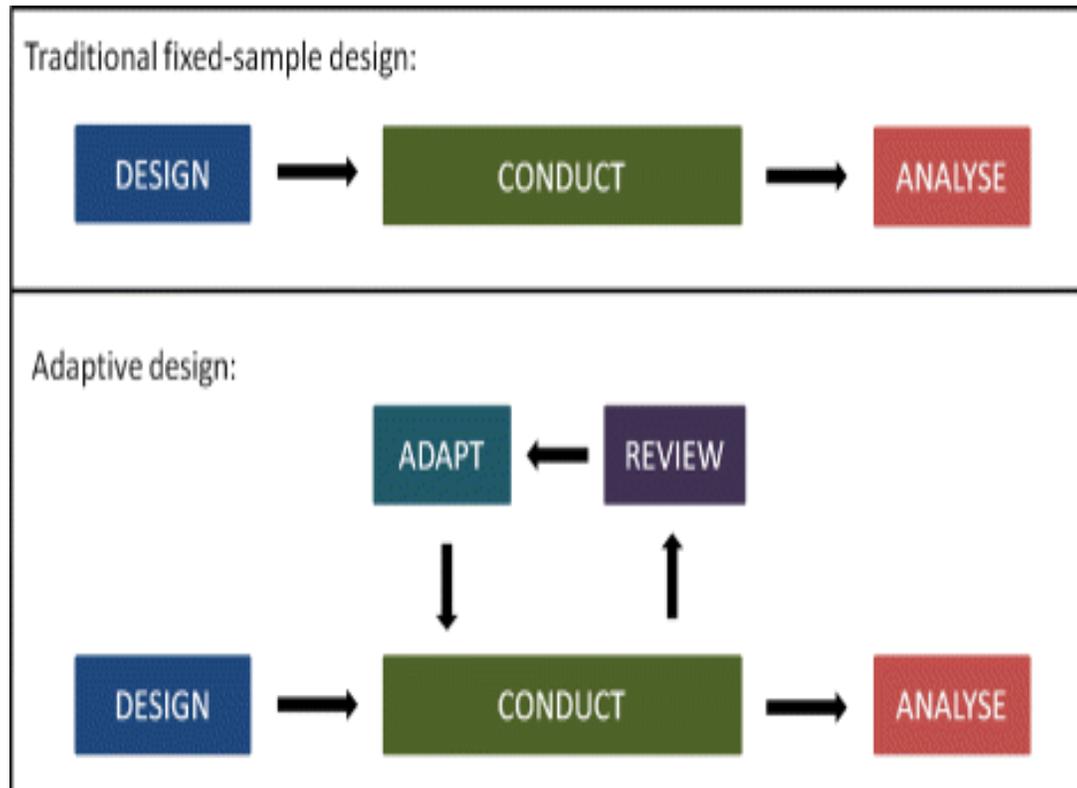
Example of a 2X2 factorial



- We found 26 2-by-2 factorial trials: **only 1/3 found significant interactions**
- **Only 1 true factorial** (parenting interventions in Eastern Europe):
 - 8 combinations of interventions (parenting session; parenting engagement component; and facilitator supervision component)
 - Goal is identifying promising interventions
 - The experiment is part of the project design

Adaptive trials

Experiments that change (sample sizes, treatment groups, hypotheses) depending on early results



- **Only 2 studies:**

- Labour market intervention in Jordan (cash transfer, coaching, planning support)
- Agricultural extension in India (6 different ways of reaching farmers by phone)

- Both carry out selection of subjects into most effective treatments

- **Underutilised approach**

Qualitative comparative analysis

Multi-causality: QCA considers the impact of configurations of activities

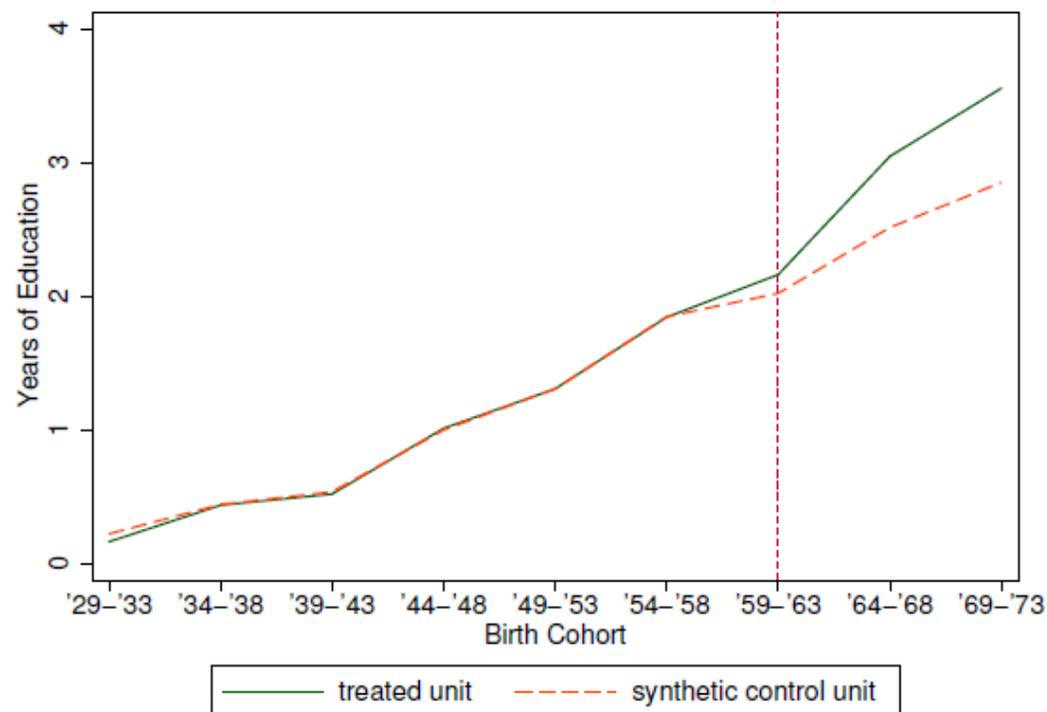


- Large literature: 8 studies found
- Most studies investigate interaction between the project and the context rather than between project components

Synthetic controls

Simple comparison of adjusted trends in project and control areas

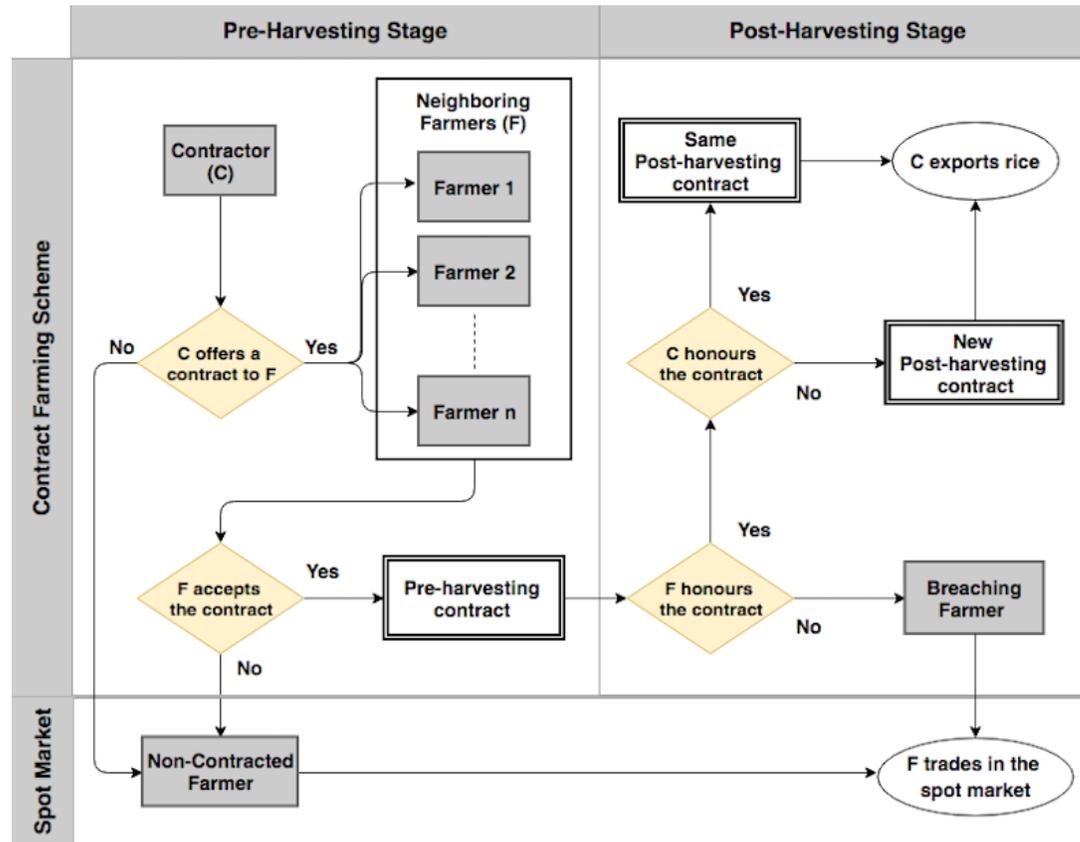
Example: impact of malaria intervention on schooling in Uganda



- Easy to apply when data are available: 8 studies found
- Only applies to long-term projects having large effects such as portfolio interventions

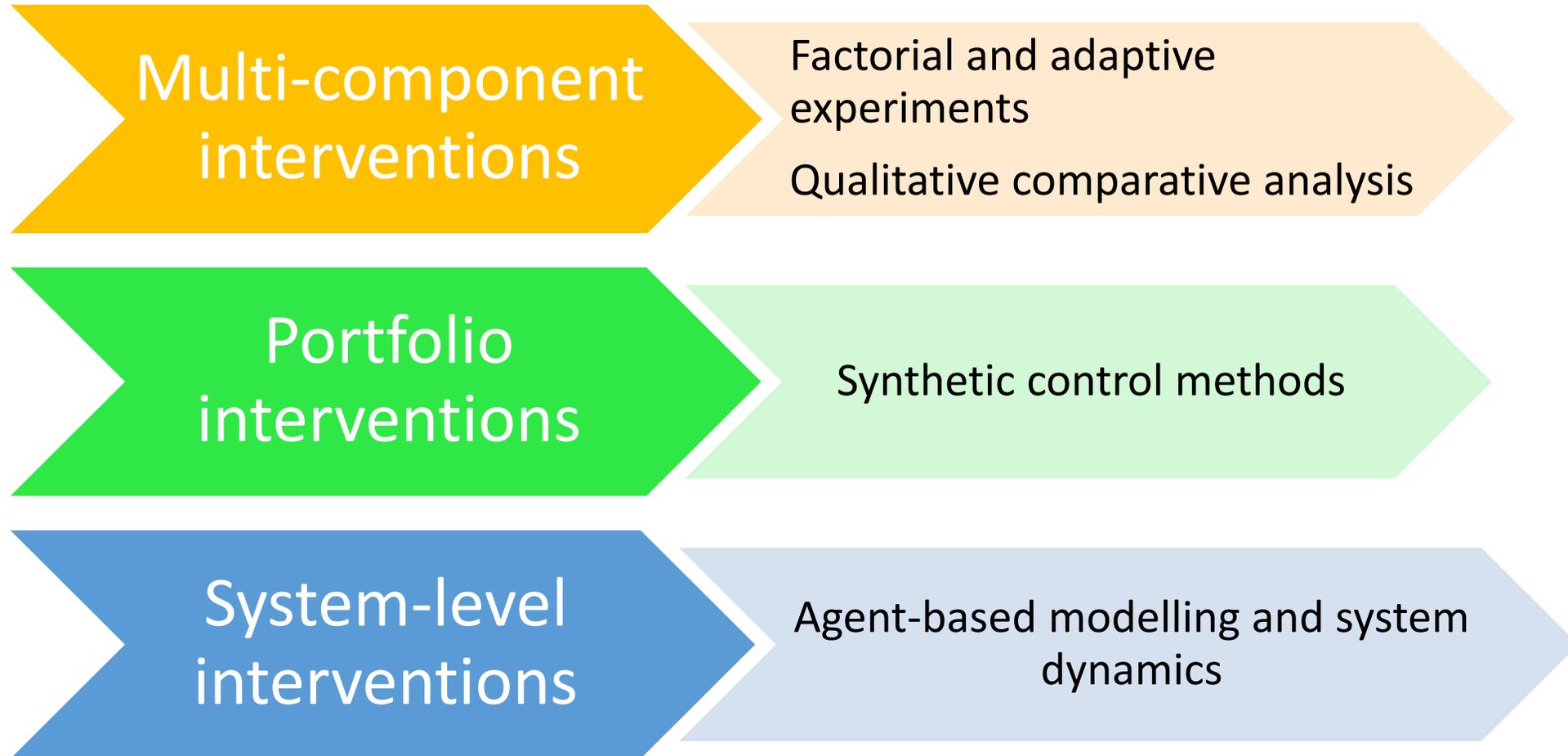
Agent-based modelling and system dynamics

Models including interactions between agents and feedback loops



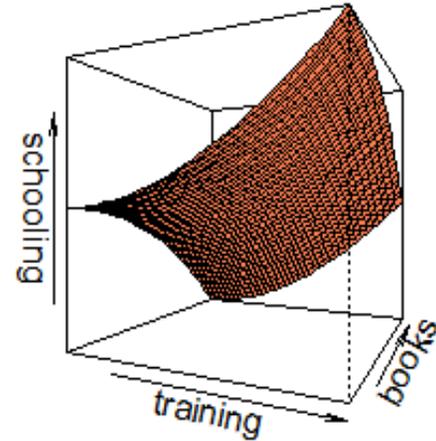
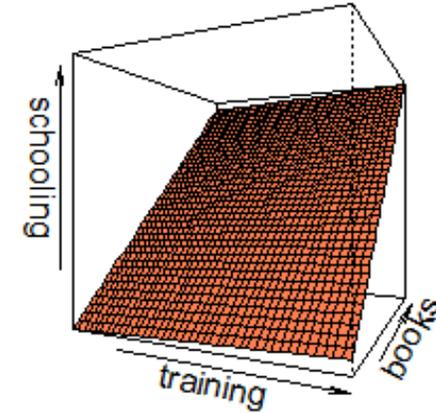
- Widely used: 11 ABM and 8 SD studies
- Suffers the instability built in the models:
 - Limited predictive power
 - Lack of robustness
- Weak policy recommendations

Matching methods to projects

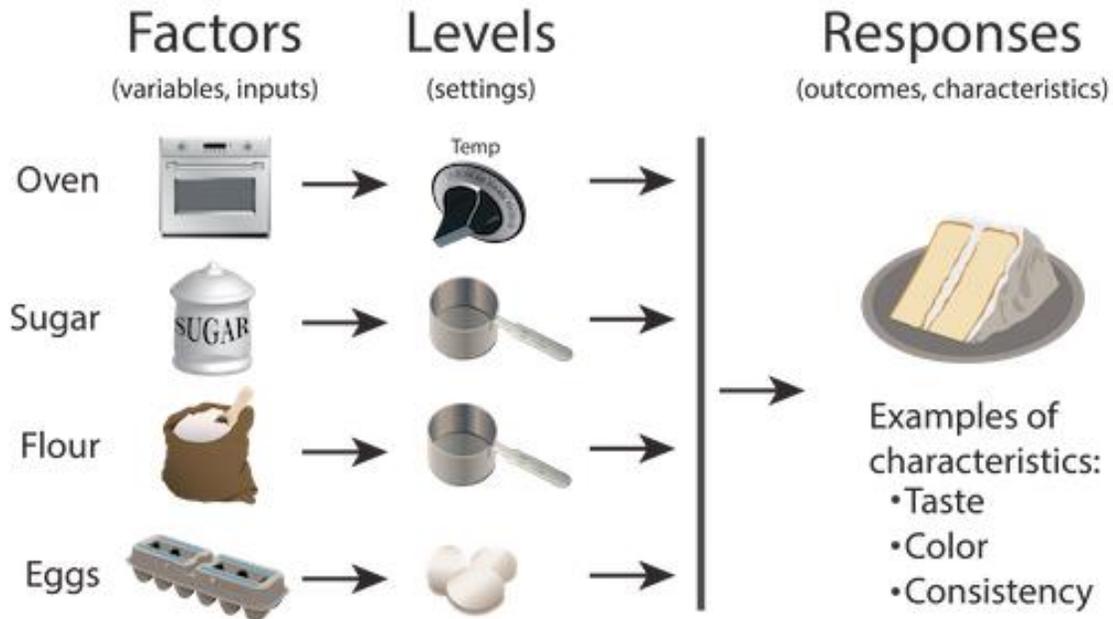


Outcomes are not always complex

- Interaction effects are often not significant
- Some impacts are linear
- Even in highly complex systems impacts are well approximated by linear effects if the time horizon is short and impacts of interventions are small

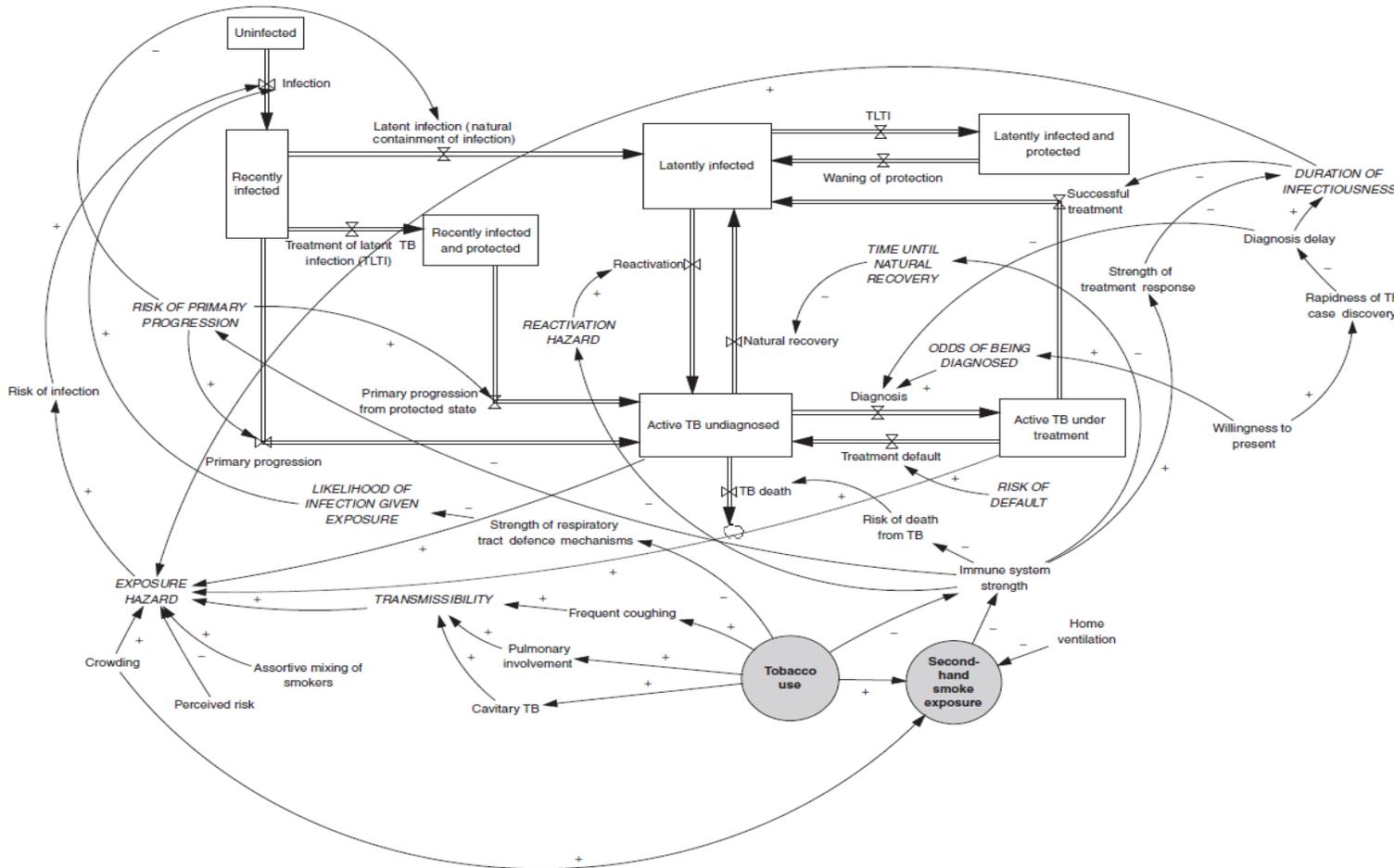


Experimenting at design stage



- There should be more experiments at the design stage of complex interventions
- Factorial and adaptive trials are examples of experimental methods to optimise projects

Balancing complexity and prediction in models



- Simple models make wrong predictions but too complex models make no prediction at all
- Model complexity should be balanced against: sensitivity of the results, ability to make predictions, and decision-making needs

THANK YOU



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