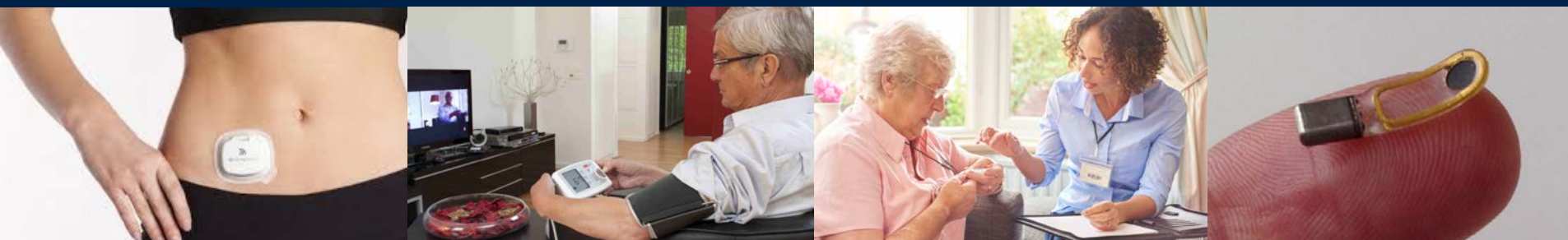




Why do so many technology programmes in health and social care fail?

Professor Trisha Greenhalgh

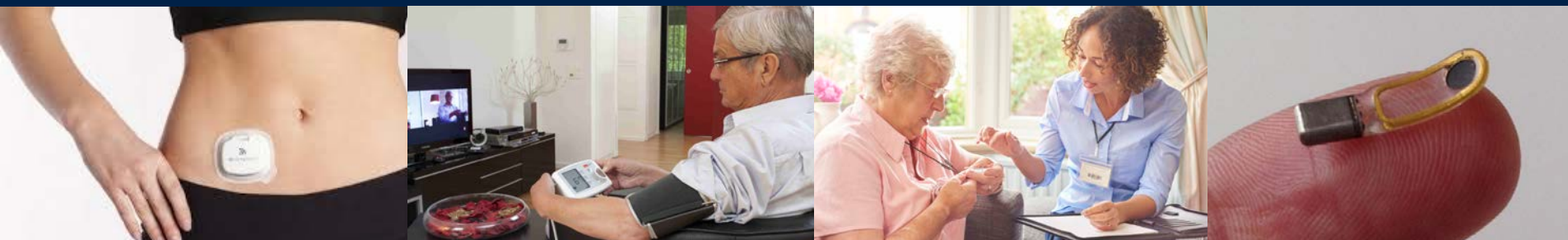
*Acknowledging input from co-researchers and funding
from Wellcome Trust and NIHR*





The **NASSS** framework

Health technology adoption, **n**on-adoption,
abandonment, and challenges to **s**cale-up,
spread and **s**ustainability



Objective: To explain why telehealth (and similar) programmes fail

Primary research:

6 diverse case studies
of technology-supported health
and social care programmes
Followed for 2.5-3 years so far

Secondary research:

Narrative systematic review

Draft framework covering 7 key domains

Peer review and testing on 10 new case studies

**Final NASSS (nonadoption, abandonment,
scale-up, spread, sustainability) framework**

**7. Continuous embedding
and adaptation
over time**

6. Wider system

**5. Health / care
organization(s)**

*implementation work,
adaptation, tinkering*

4. Adopter system

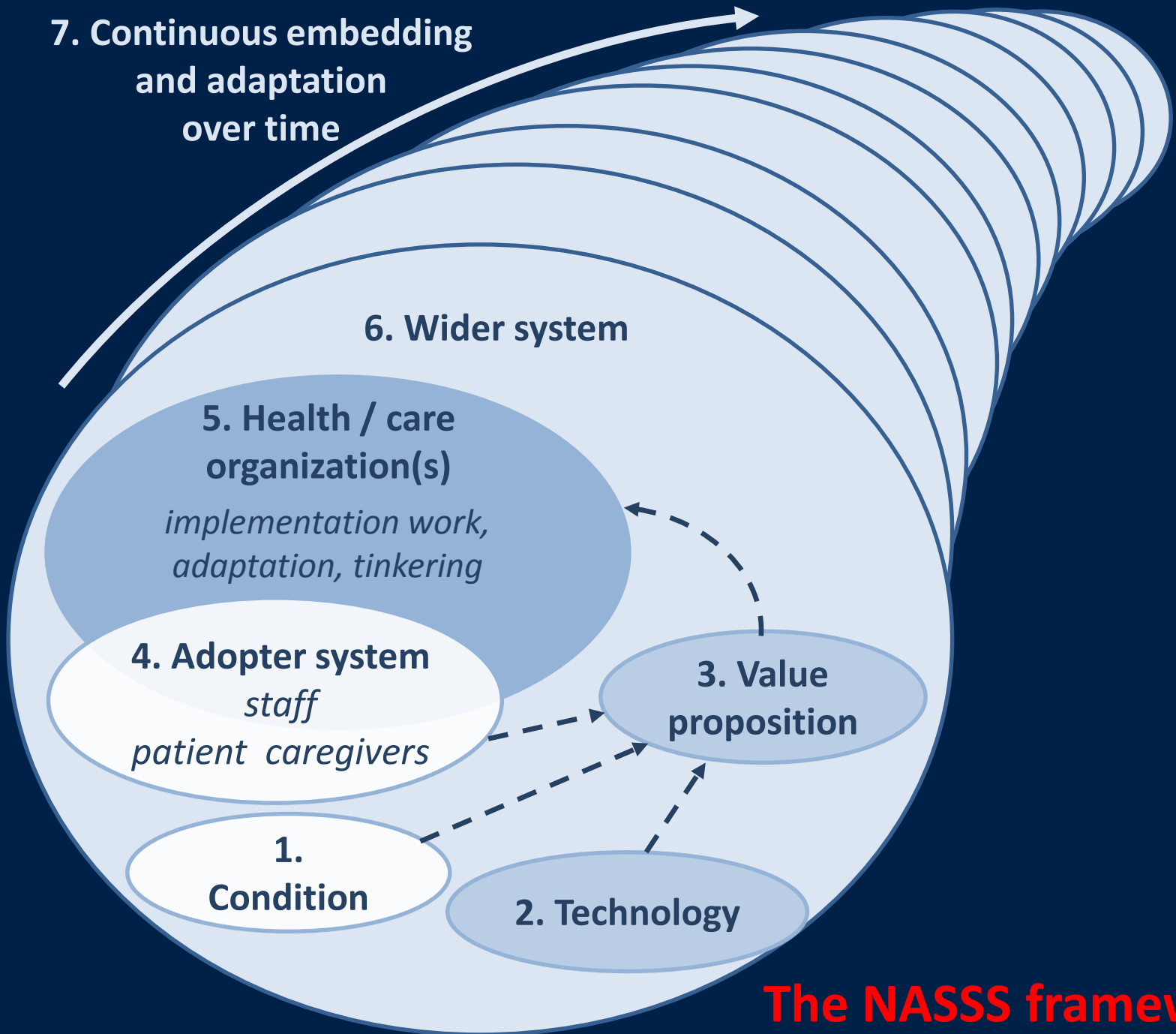
*staff
patient caregivers*

**3. Value
proposition**

**1.
Condition**

2. Technology

The NASSS framework



SIMPLE

Straightforward

Predictable

Few components

COMPLICATED

Multiple interacting

components or

issues

COMPLEX

Dynamic,

unpredictable, not

easily disaggregated

into constituent

components



COMPLEXITY can occur in various domains

- Clinical
- Technical
- Value-related
- People-related
- Organisational / inter-organisational
- Environmental

EACH OF THESE DOMAINS MAY HAVE ELEMENTS OF

Structural or logistical complexity (scale/ scope/ pace/ resources etc)

Socio-political complexity (stakeholder goals /conflicts of interest etc)

Emergent complexity (change over time / scope creep etc)

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1. CONDITION

1A Nature of condition or illness

1B Comorbidities 1C Socio-cultural factors

DOMAIN 1: The condition or illness

SIMPLE OR COMPLICATED

COMPLEX

THE CONDITION

Well-characterized, well-understood, predictable (=> standardised management)

Poorly characterised, unpredictable or high-risk

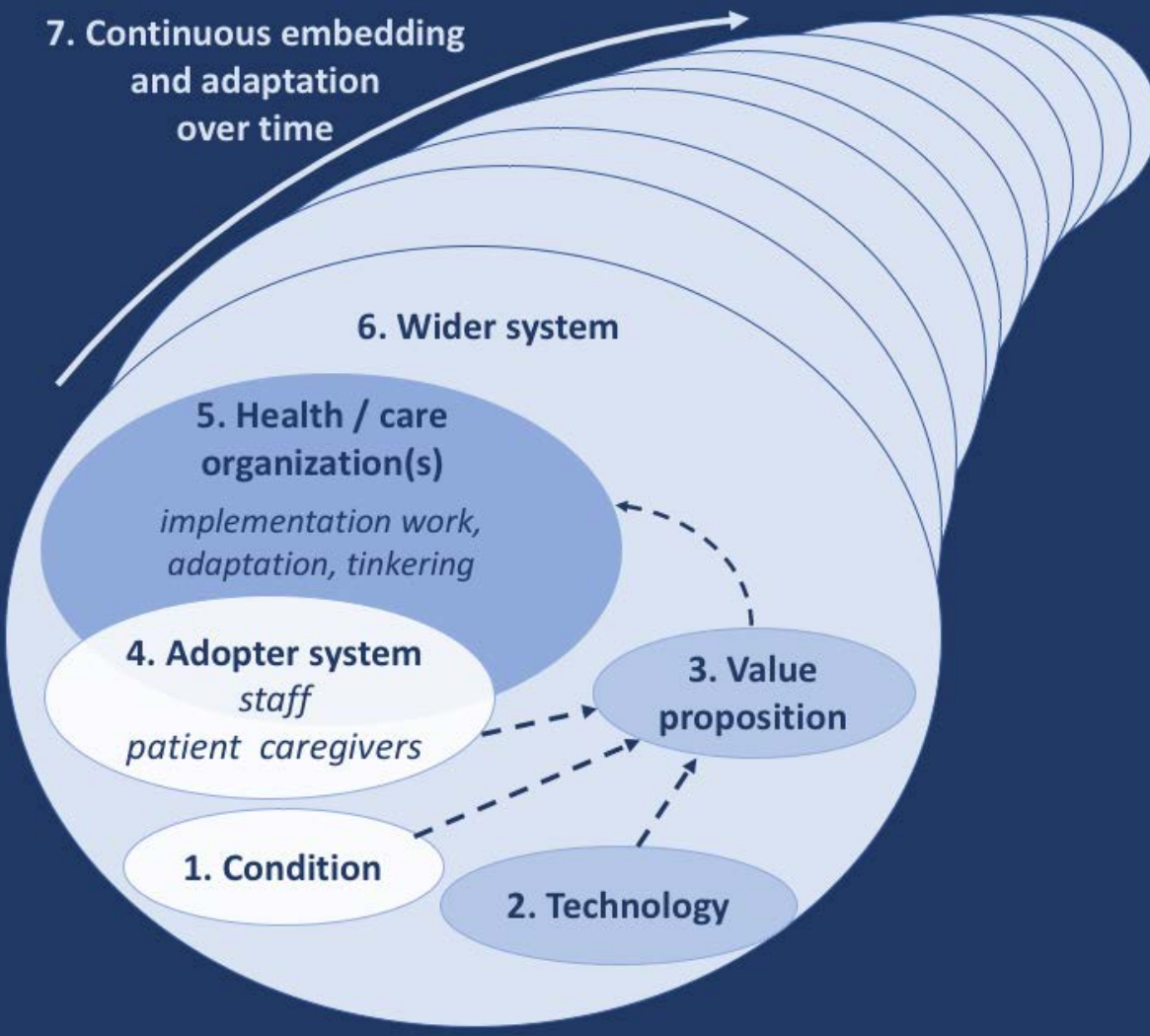
CO-MORBIDITIES / SOCIO-CULTURAL FACTORS

Unlikely to affect care significantly

Pose significant challenges to care planning & services



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TECHNOLOGY

2B Knowledge to use

2D Supply model

2A Material properties

2C Knowledge generated

2E Who owns the IP?

DOMAIN 2: The technology

SIMPLE OR COMPLICATED

COMPLEX

WHAT ARE THE TECHNOLOGY'S MATERIAL FEATURES?

Already installed or off-the-shelf; dependable; freestanding OR interoperable with current system

Not yet developed; inter-operability [will be] a headache

WHAT KNOWLEDGE IS NEEDED TO USE IT?

None or a simple set of instructions / IT support

Advanced training plus ongoing support

WHAT KIND OF KNOWLEDGE DOES IT BRING INTO PLAY?

Data generated directly measures [changes in] the condition

Questionable link between data and [change in] condition



DOMAIN 2: The technology

SIMPLE OR COMPLICATED

COMPLEX

WHAT IS THE TECHNOLOGY SUPPLY MODEL?

Generic, plug-and-play or COTS (customisable off-the-shelf); easily substituted

Requires significant reconfiguration of current system; hard to substitute

WHO OWNS THE IP GENERATED BY THE TECHNOLOGY?

Data remains on local system; its 'ownership' is unambiguous and agreed

Technology generates higher-order data e.g. algorithms, whose IP is contested



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3A Supply-side value (to developer)

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DOMAIN 3: The value proposition

SIMPLE OR COMPLICATED

COMPLEX

WHAT IS THE DEVELOPER'S BUSINESS CASE?
[SUPPLY-SIDE VALUE]

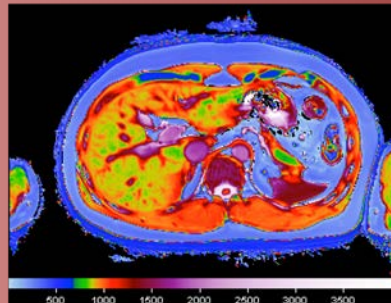
Business case is clear and rests on firm assumptions; strong chance of return on investment

Business case rests on questionable assumptions; significant risk to investors

WHAT IS THE TECHNOLOGY'S DESIRABILITY, EFFICACY, SAFETY AND COST-EFFECTIVENESS?
[DEMAND-SIDE VALUE]

Technology is known to be desirable for patients, safe and cost-effective

Patients may not want or need the technology, or it may be unsafe or unaffordable



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DOMAIN 4: The adopter system

SIMPLE OR COMPLICATED

COMPLEX

WHAT CHANGES ARE IMPLIED FOR STAFF?

No changes OR staff must learn new roles OR new staff be appointed

Threat to people's jobs, scope of practice or professional identity

WHAT IS EXPECTED OF THE PATIENT OR PRIMARY CARER?

Nothing OR very routine tasks e.g. log on, converse, enter data

Complex tasks e.g. make judgements, adjust treatment

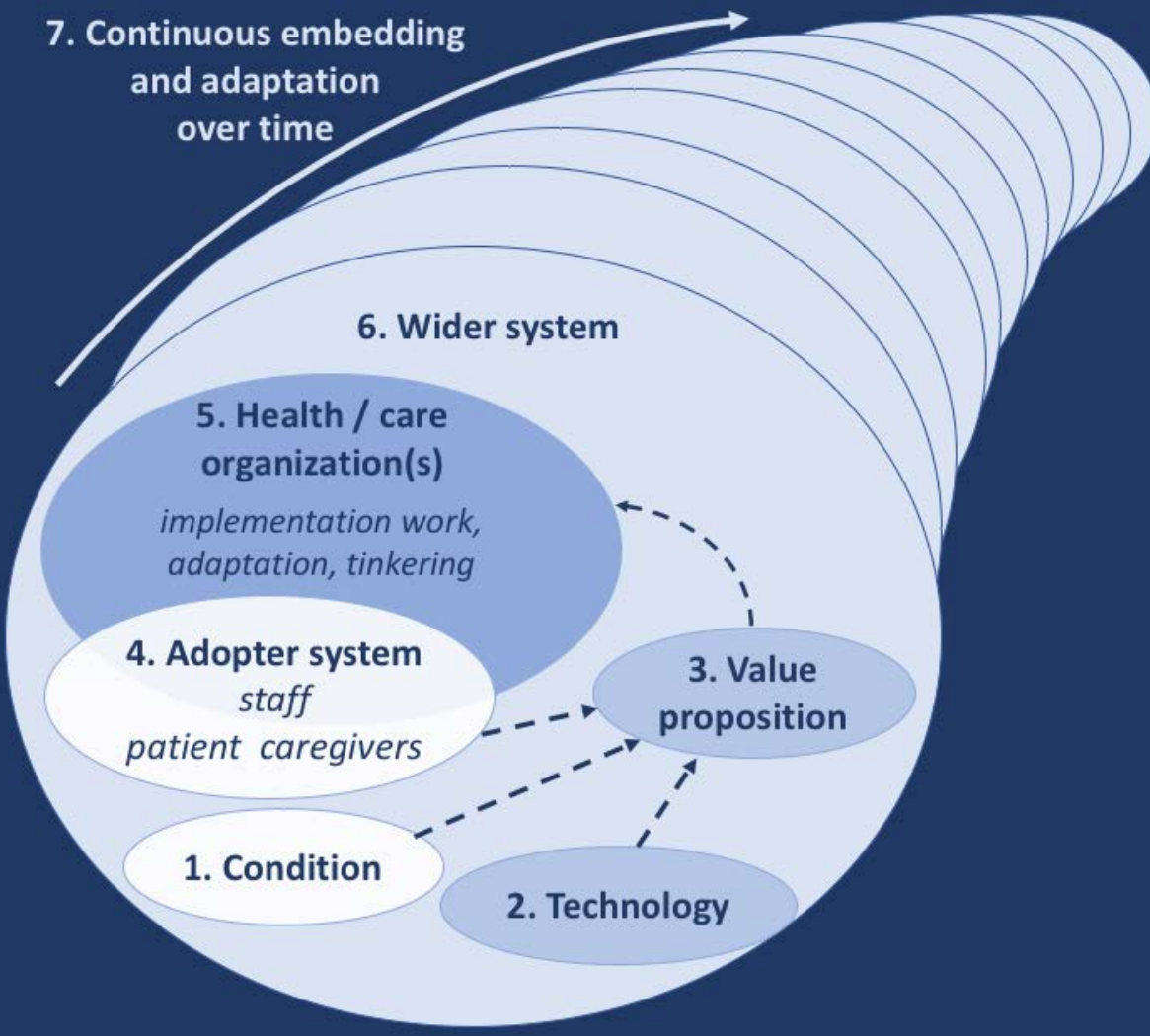
WHAT IS ASSUMED ABOUT THE WIDER CARE NETWORK?

No lay carer assumed

Network of lay carers is assumed



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5. ORGANISATION

5A Capacity to innovate

5B Readiness for this technology

5C Nature of adoption / funding
decision

5D Extent of change needed to
organisational routines

5E Work needed to implement
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DOMAIN 5: The organisation

SIMPLE OR COMPLICATED

WHAT IS ITS CAPACITY TO INNOVATE (IN ANYTHING)?

Well-led; flat hierarchies; good relationships; slack resources; risk-taking is encouraged

HOW READY IS IT FOR THIS TECHNOLOGY-SUPPORTED CHANGE?

High tension for change; good innovation-system fit; widespread support (or opponents lack power)

COMPLEX

Weak leadership; poor relations; rigid hierarchies; severe resource problems; risk-taking is punished

No tension for change; poor innovation-system fit; key opponents have wrecking power



DOMAIN 5: The organisation

SIMPLE OR COMPLICATED

COMPLEX

HOW EASY WILL THE FUNDING DECISION BE?

One organisation OR existing partnership; adequate funds; anticipated cost-neutral or savings; no new infrastructure

Many organisations, not yet in partnership; funding model depends on cross-system savings

IMPLICATIONS FOR TEAM ROUTINES

None or minor

Significant disruptive changes needed

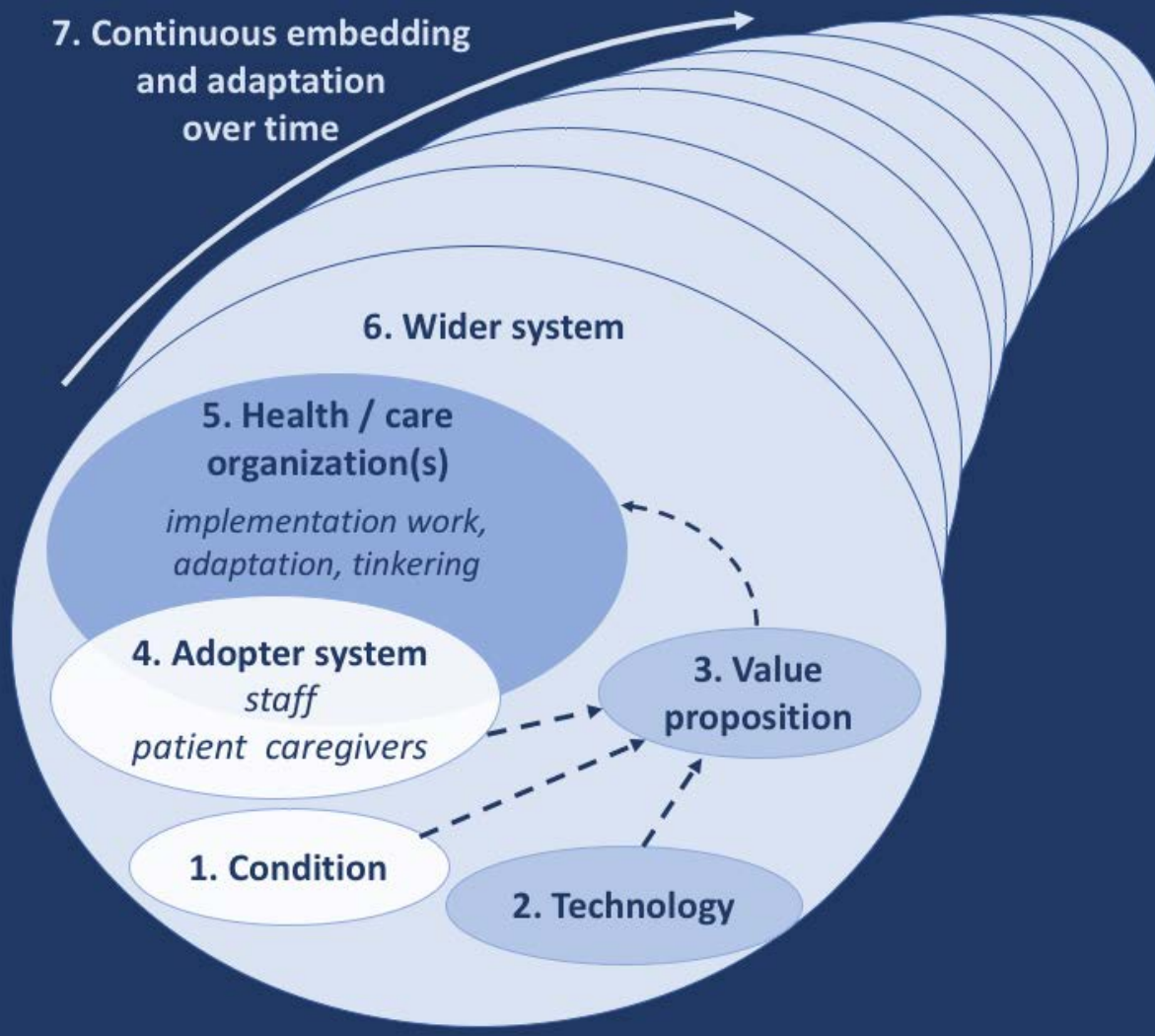
WHAT WORK IS NEEDED TO IMPLEMENT?

Shared vision already exists; few measures needed to develop and evaluate new practices

Significant work needed to build shared vision and implement it



7. Continuous embedding and adaptation over time



- 6. WIDER SYSTEM e.g.
- 6A Political / policy context
- 6B Regulatory / legal issues
- 6C Professional bodies
- 6D Socio-cultural context

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- TECHNOLOGY
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- 2D Supply model

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DOMAIN 6: The wider system

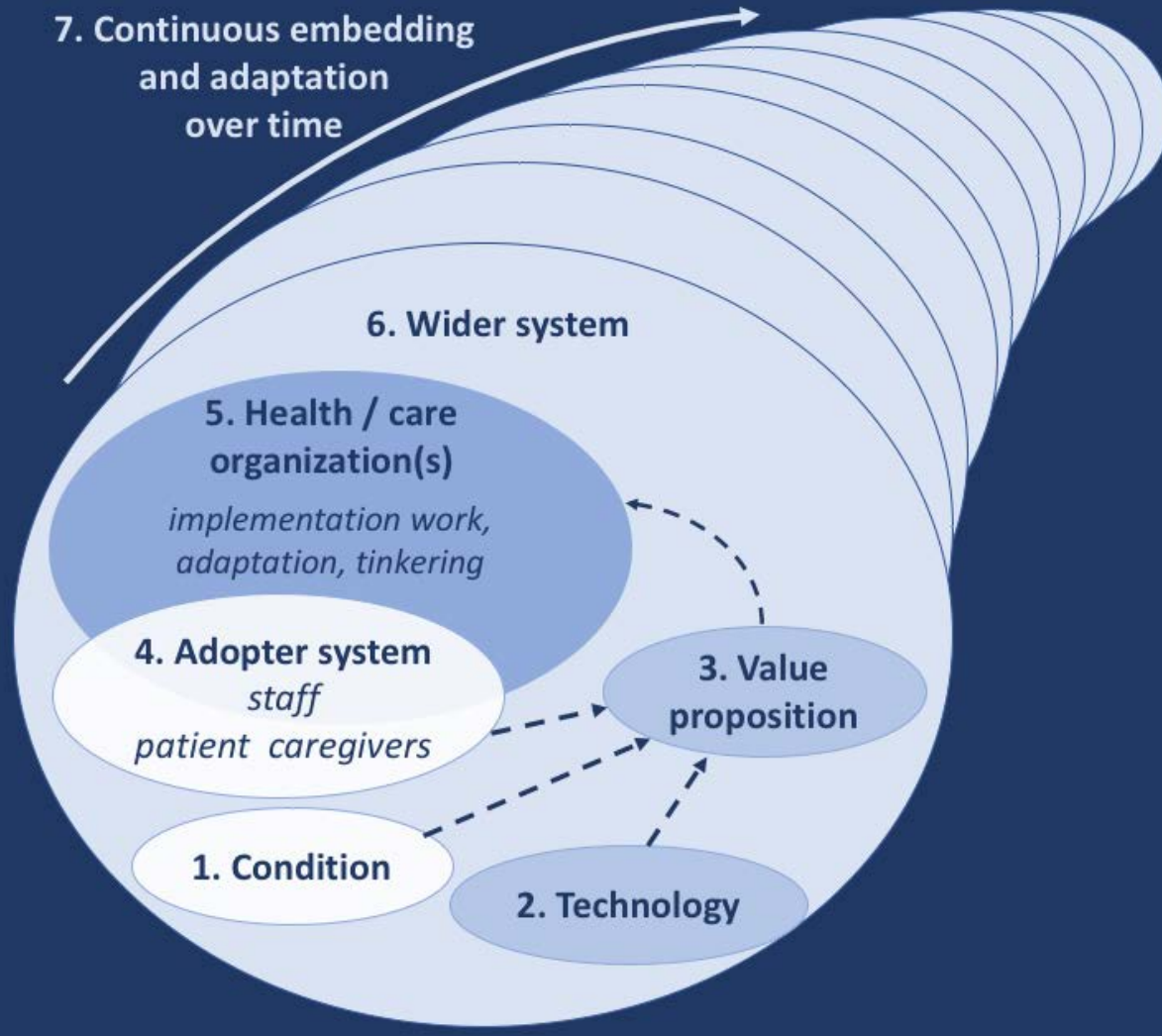
	SIMPLE OR COMPLICATED	COMPLEX
POLITICAL AND POLICY CONTEXT	Current or potential policy push	Political opposition
REGULATORY OR LEGAL HURDLES	None or easily surmountable	Many, no easy way through
PROFESSIONAL BODIES	Positive or open to discussion	Opposed
CITIZENS / LAY PUBLIC	Positive or open to discussion	Opposed



7. EMBEDDING AND ADAPTATION OVER TIME

7A Scope for adaptation over time 7B Organisational resilience

7. Continuous embedding
and adaptation
over time



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DOMAIN 7: Embedding and adapting over time

SIMPLE OR COMPLICATED

COMPLEX

HOW MUCH SCOPE IS THERE TO ADAPT / CO-EVOLVE TECHNOLOGIES AND SERVICES?

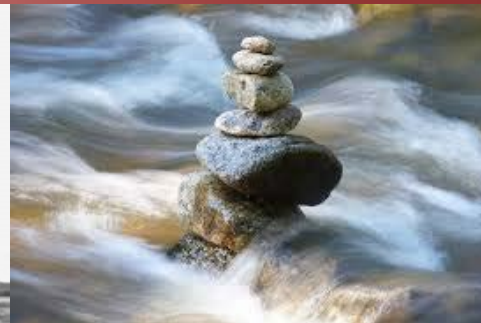
Considerable scope, built into programme design

Significant barriers to further adaptation

HOW RESILIENT IS THE ORGANISATION FOR ADAPTING TO CRITICAL EVENTS?

Sense-making, reflection and adaptive action are ongoing and encouraged

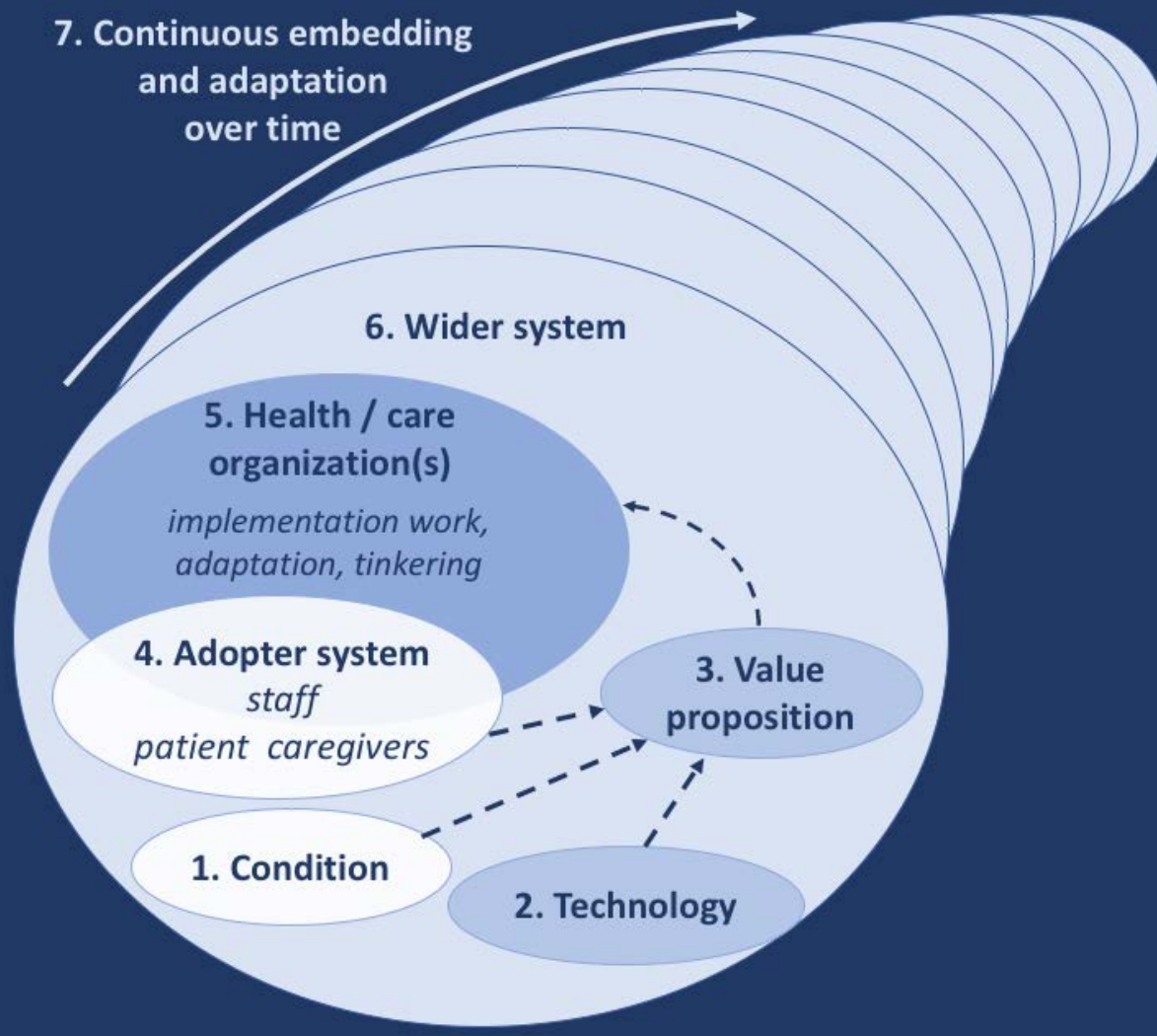
Implementation model is rigid and inflexible; no reflection / adaptation allowed



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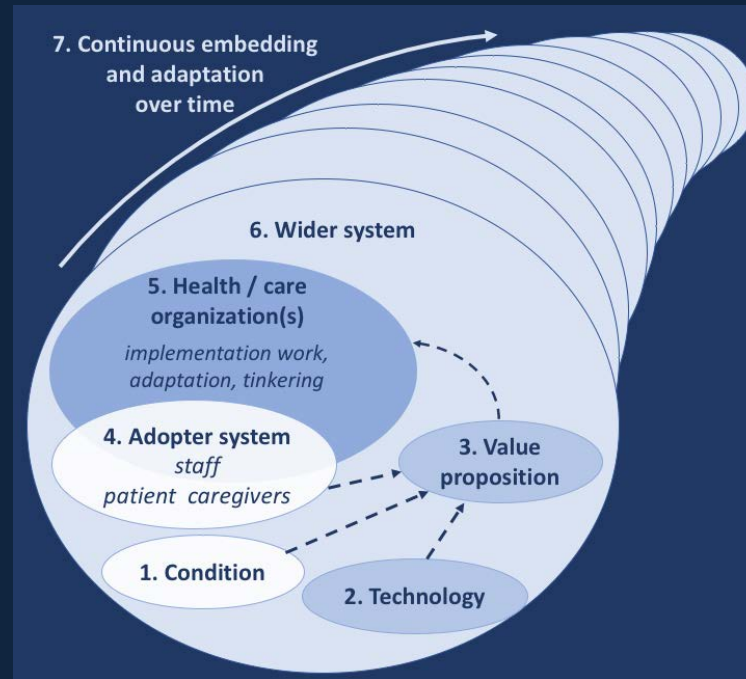
2D Supply model

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THE NASSS HYPOTHESIS

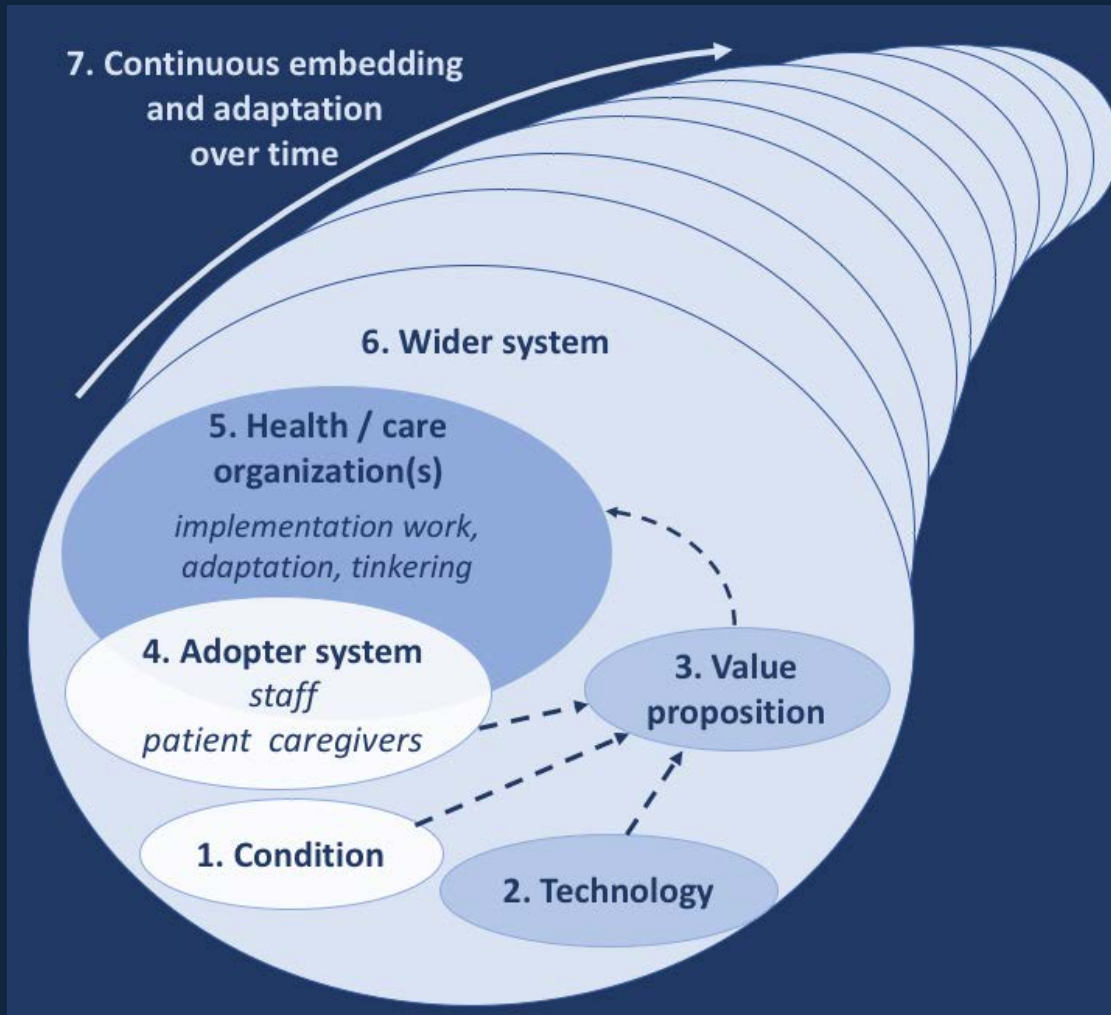


A technology-supported programme will be readily adopted, spread and sustained if all domains are 'simple'

If several domains are 'complicated', the programme will be difficult, expensive and slow (but not impossible) to implement and sustain

If several domains are 'complex', it will be almost impossible to achieve sustained and widespread adoption of the programme

WHAT TO DO WITH THE NASSS FRAMEWORK?



1. Inform technology design

2. Reject technology 'solutions' that have limited chance of success

3. Explain past failures

4. Use NASSS Complexity Assessment Tool to identify, understand, reduce and manage complexity in new and emerging programs

5. YOUR IDEA HERE

We have begun to work with policymakers, design consultancies and technology companies in UK, Australia, Italy & Canada to apply the NASSS framework

IN PROGRESS: USING NASSS TO MANAGE COMPLEXITY

IDENTIFY AND UNDERSTAND COMPLEXITY

- Apply NASSS complexity assessment tool
- Tease out uncertainties and interdependencies (e.g. via narrative)

REDUCE COMPLEXITY WHERE POSSIBBLE

- Limit scale / scope / interdependencies / pace (extend timescale)

‘RUN WITH’ COMPLEXITY e.g.

- Strengthen programme leadership
- Co-develop and sustain a clear and compelling vision
- Develop individuals and support their adaptive actions
- Provide slack resources
- Create incentives (but leave the detail to front-line people)
- Build relationships and manage stakeholder conflict
- Control programme growth (e.g. minimise scope creep)
- Improve policy or regulatory context



THANK YOU FOR YOUR ATTENTION

Professor Trisha Greenhalgh



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