Webinar Series on Soft Systems Methodology (SSM)

Session 1: Introduction to Soft Systems Methodology

Session 2: Applications of SSM in Public Health

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28th January 2026, 10:30-12:30

Cranfield University

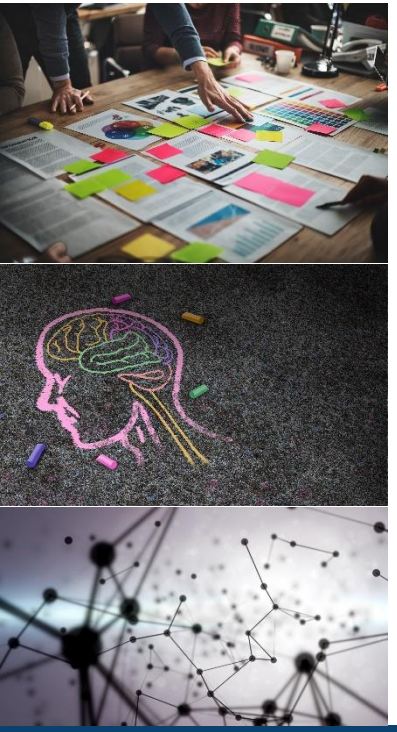
COMPLEX SYSTEMS AND NETWORK SCIENCE FOR PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES
A WHO COLLABORATING CENTRE FOR RESEARCH AND TRAINING

GroundsWell
Transforming our cities from the ground up

UKPRP Prevention Research Partnership
Joint action for a healthier, fairer future

Session Aim

The purpose of this session is to introduce you to Soft Systems Methodology (SSM). We will provide an overview of SSM, the type of problems SSM can help you address and provide a practical approach of applying SSM in practice. In the following session next week, we will walk through several real world examples where SSM has been used in practice across public health and other domains.



Who is it for?

- Researchers, students and practitioners working in complex environments who are interested in applying systems thinking to public health contexts.
- Public health professionals working in complex, multi-stakeholder environments.
- Community partners and practitioners engaged in health-systems improvement.
- Anyone curious about using systems approaches to support reflective inquiry.

1. Introduction and why SSM

2. The SSM Approach

The Complex, Wicked Problem Space

We live in a world that is increasingly complex:

- There may be parts of the world that we don't know of or are uncertain about.
- There may be many different elements (people, things, AI…) of different types, sizes and influence that are purposively going about the world.
- These elements have different, often conflicting, worldviews, each that are valid in their own context.
- The elements and the world is constantly moving, changing and adapting for survival.

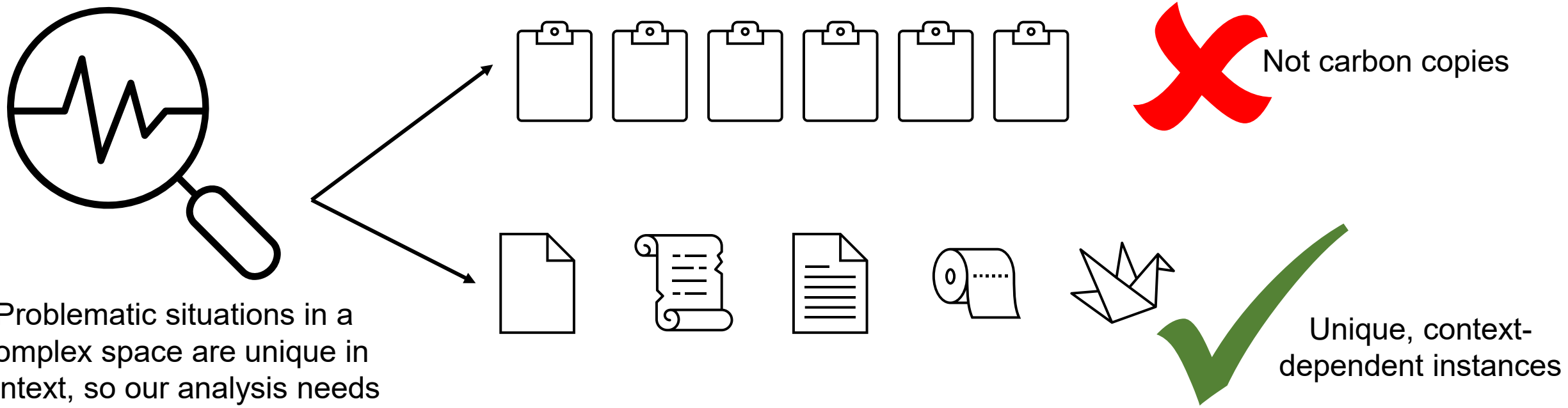
Our traditional tried and tested ways of doing research and learning about the world are not set up to deal with this complexity.

We need alternative approaches, methods and tools to help us appreciate, understand and effectively design interventions.

Soft Systems Methodology (SSM)

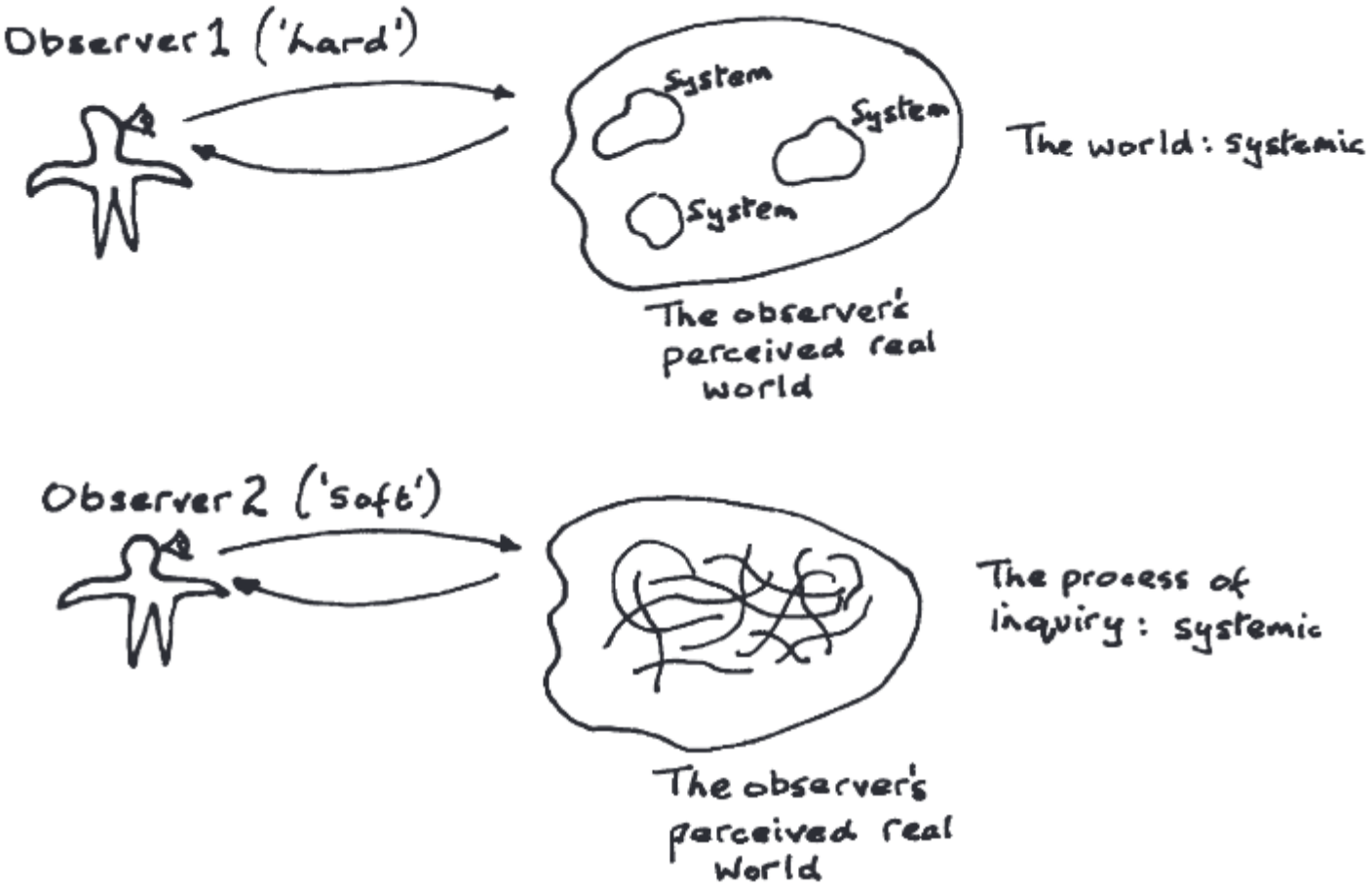
Soft Systems Methodology (SSM) is a method of inquiry for learning about the world that emerged from Peter Checkland and his colleagues at Lancaster University over the last 30 years.

It emerged as a result of trying to apply ‘harder’ Systems Engineering approaches to ‘softer’, more complex social problems.



Problematic situations in a complex space are unique in context, so our analysis needs to be at an appropriate level

The “Hard” vs. “Soft” Approach

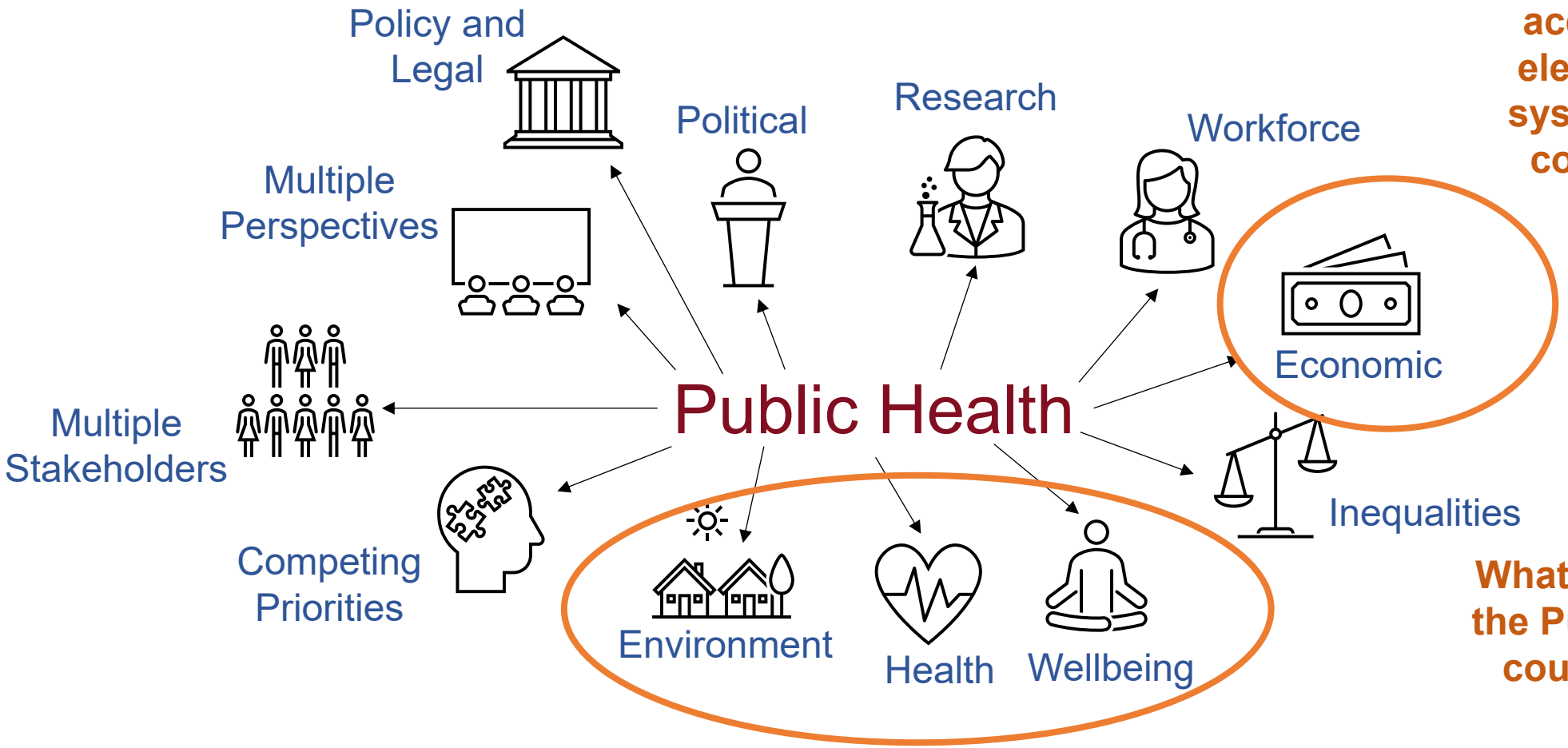


Observer 1:
“*I spy systems which I can engineer.*”

Observer 2:
“I spy complexity and confusion; but I can organise exploration of it as a learning system.”

Checkland and Poulter (2020, p.210)

The Complex Public Health Environment



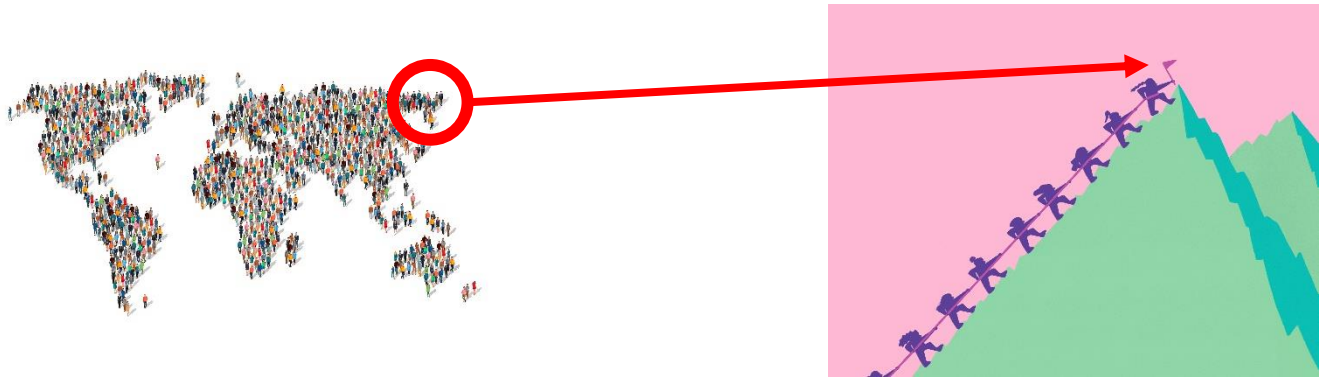
What approaches do we have that take into account all of these elements across the system and work in a collaborative way?

What other elements in the Public Health space could we add to this diagram?

Why do we need a methodology?

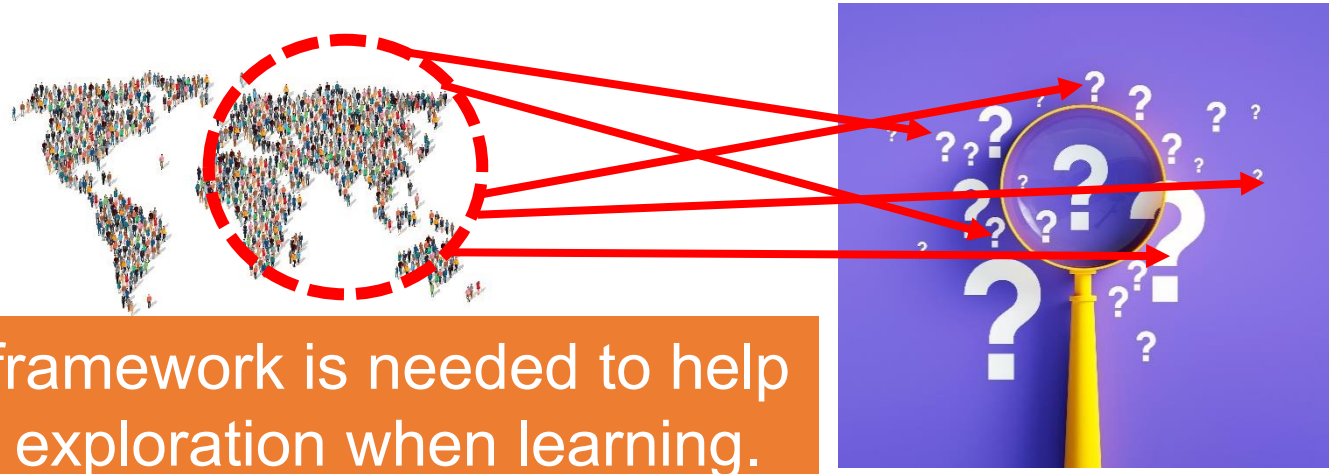
The motivation is in the difference between knowing and learning.

Knowing



- Problem is known and well structured.
- System is clearly identified.
- We know what needs to be done and how to go about doing it.

Learning



- Problem is not known, messy, ‘wicked’ and ill structured.
- System is unknown.
- We might be able to get at what needs to be done, but we don’t know how to go about it.

A thinking framework is needed to help you in the exploration when learning.

What types of question does SSM help answer?

SSM can help guide our thinking and focus during an intervention or problematic situation.

Many of you might be familiar with the notion of '*discovery questions*' (Blaikie and Priest, 2017) – those questions that guide our thinking and exploration in research or learning situations.

SSM helps us ask the '**WHAT**' and '**HOW**' type questions.

- **WHAT**: What is our purpose? What do we need to do to meet this purpose?
- **HOW**: How might we do this (in terms of activities)?

Example applications:

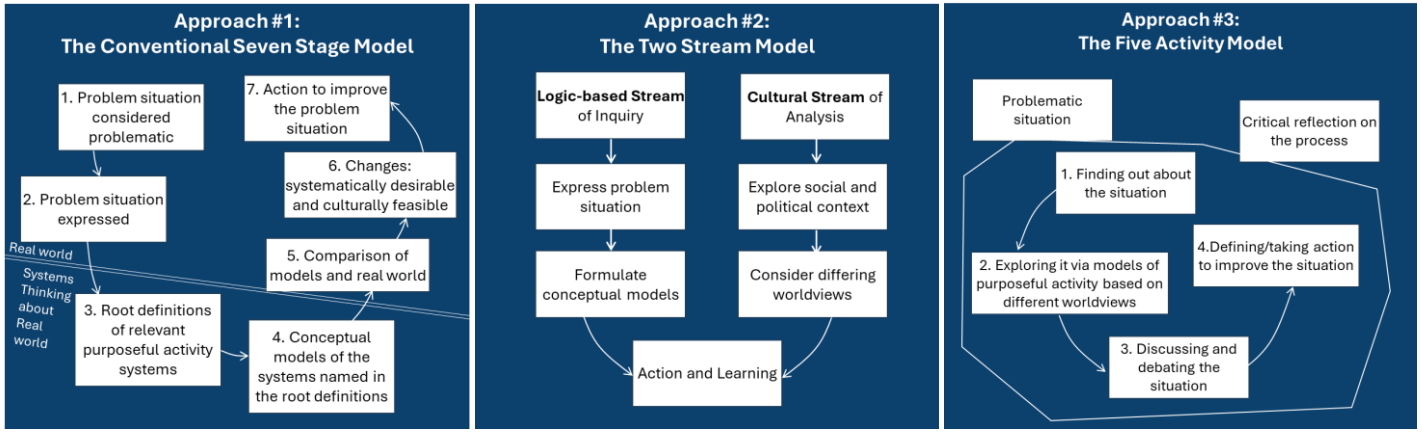
- How should Company X refocus their activities to meet the new strategy out to 2050?
- Understand how Company Y should refocus their activities to stay competitive.

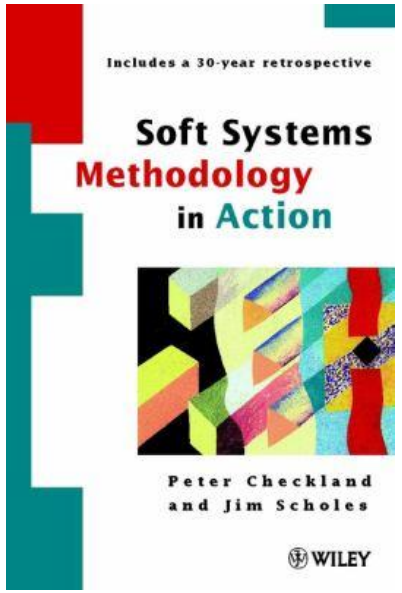
Questions?

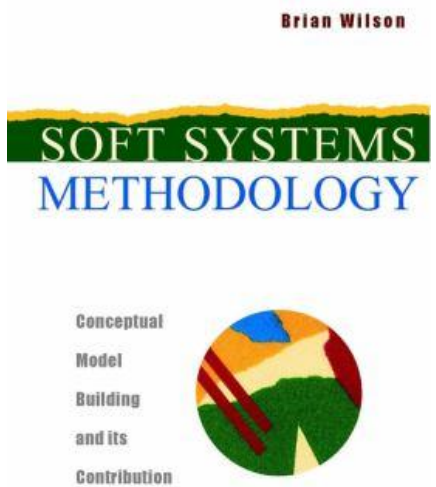
1. Introduction and why SSM

2. The SSM Approach

The Development of SSM







Checkland, P. and Poulter, J. (2020). 'Soft Systems Methodology'. Pp. 201–53 in Systems Approaches to Making Change: A Practical Guide, edited by M. Reynolds and S. Holwell (Retired). London: Springer.

Checkland, P. and Scholes, J. (1999) Soft Systems Methodology in Action: A 30 Year Retrospective. John Wiley and Sons: Chichester.

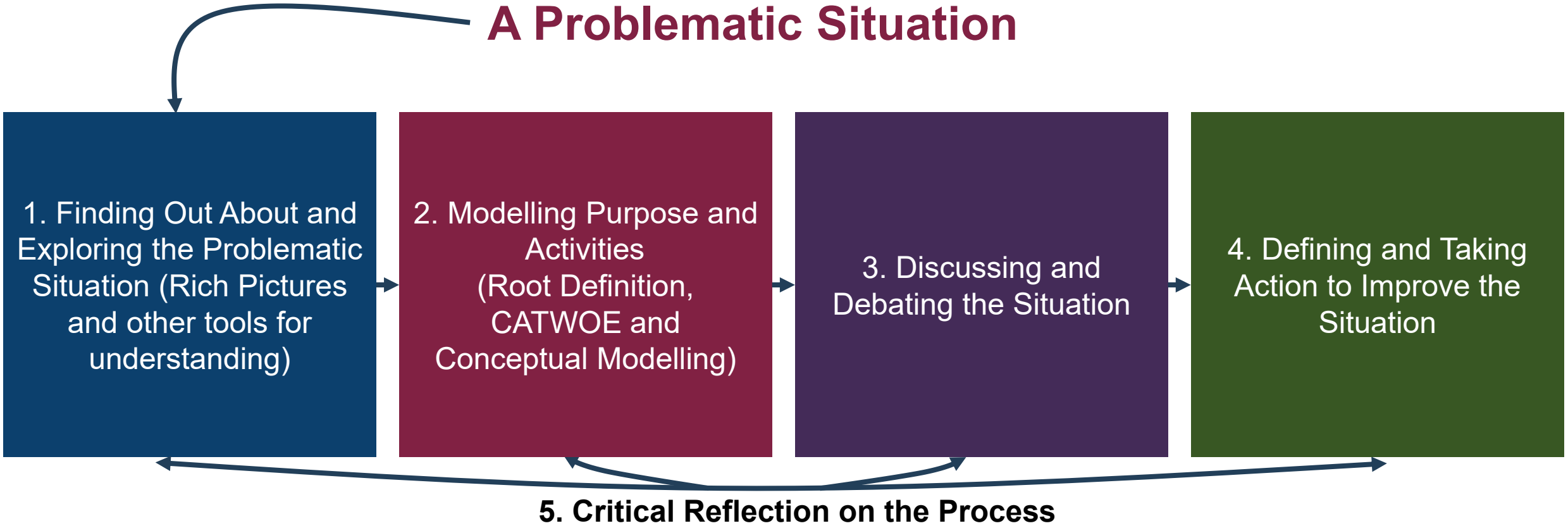
Jackson, Michael C. (2025). 'The Development of Soft Systems Methodology through the Lens of the FMA Framework'. *Systemic Practice and Action Research* 38(4):36.

Wilson, B. and Van Haperen, K. (2015) Soft Systems Thinking, Methodology and the Management of Change. Palgrave: UK.

What is Soft Systems Methodology (SSM)?

- A qualitative and interpretive approach to appreciating wicked, messy, ill-structured, complex problems where there is no single agreed definition of the problem.
- A methodology (a structured framework and system of principles, methods and underpinning philosophy)
- Defines several tools:
    - Rich Pictures
    - Root Definitions
    - CATWOE Analysis
    - Conceptual Models

A Practical Approach to SSM



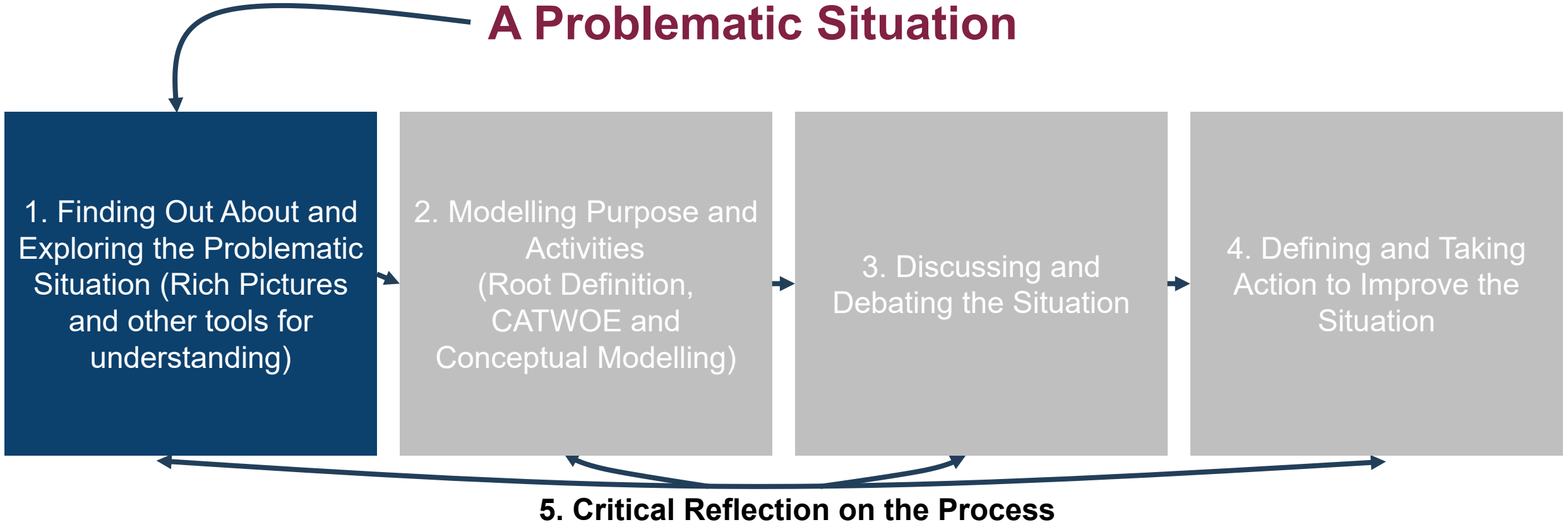
This is not just a linear process – it should be iterative and each step should build and influence the others.

Problematic Situation – Radiotherapy Workforce Capacity and Demand

Problem statement:

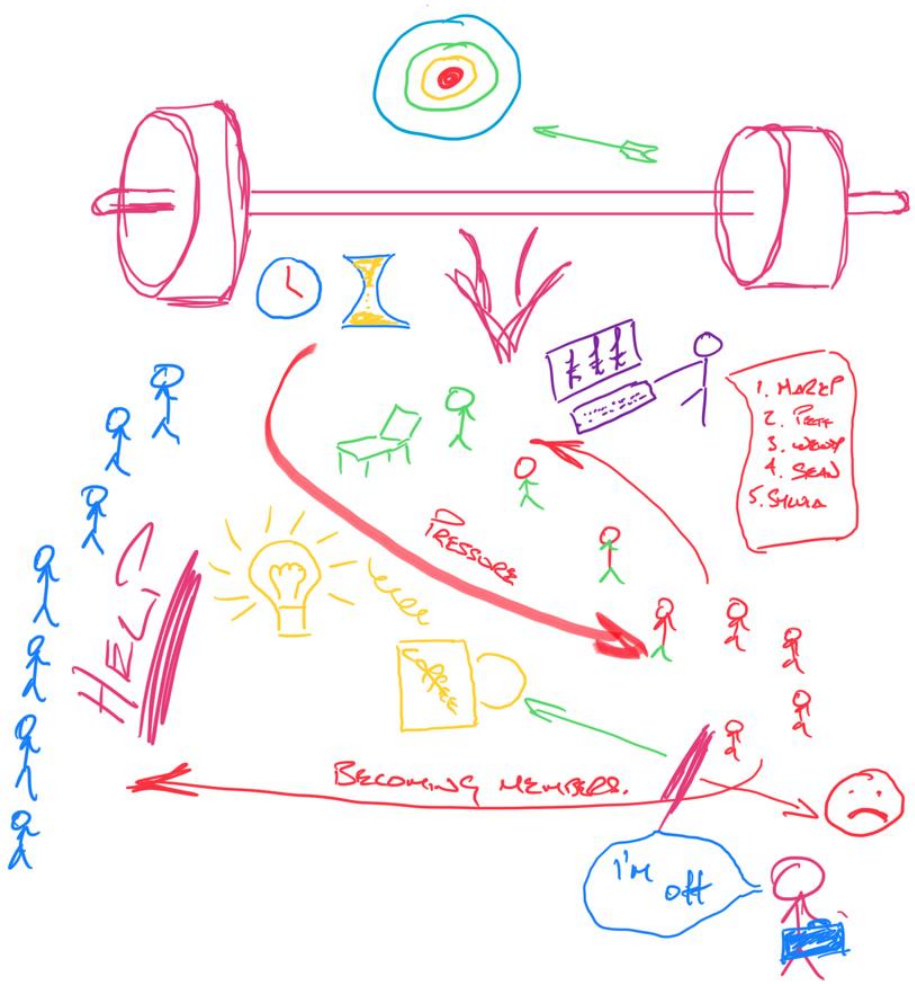
You lead a Radiotherapy Network responsible for 15% of all UK cancer patients. With an increasing population, you need to ensure the staff are appropriately trained, resourced and coordinated to meet future demands of the service. They need to be able to take advantage of new technological developments and treatment protocols, whilst maintaining patient outcomes and staff wellbeing.

A Practical Approach to SSM



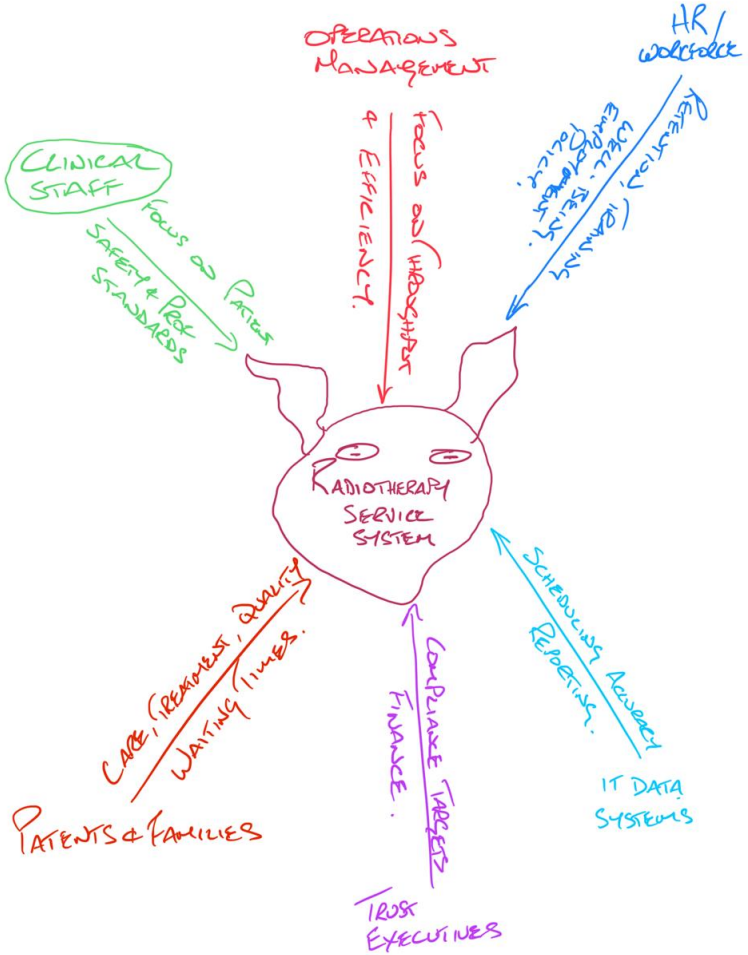
Exploring the problematic situation means just that – using any tools and methods of dialogue necessary to get as much of an appreciation of the situation as possible. This can be done in a single or multiple groups.

Example Rich Picture – Radiotherapy Workforce Capacity and Demand

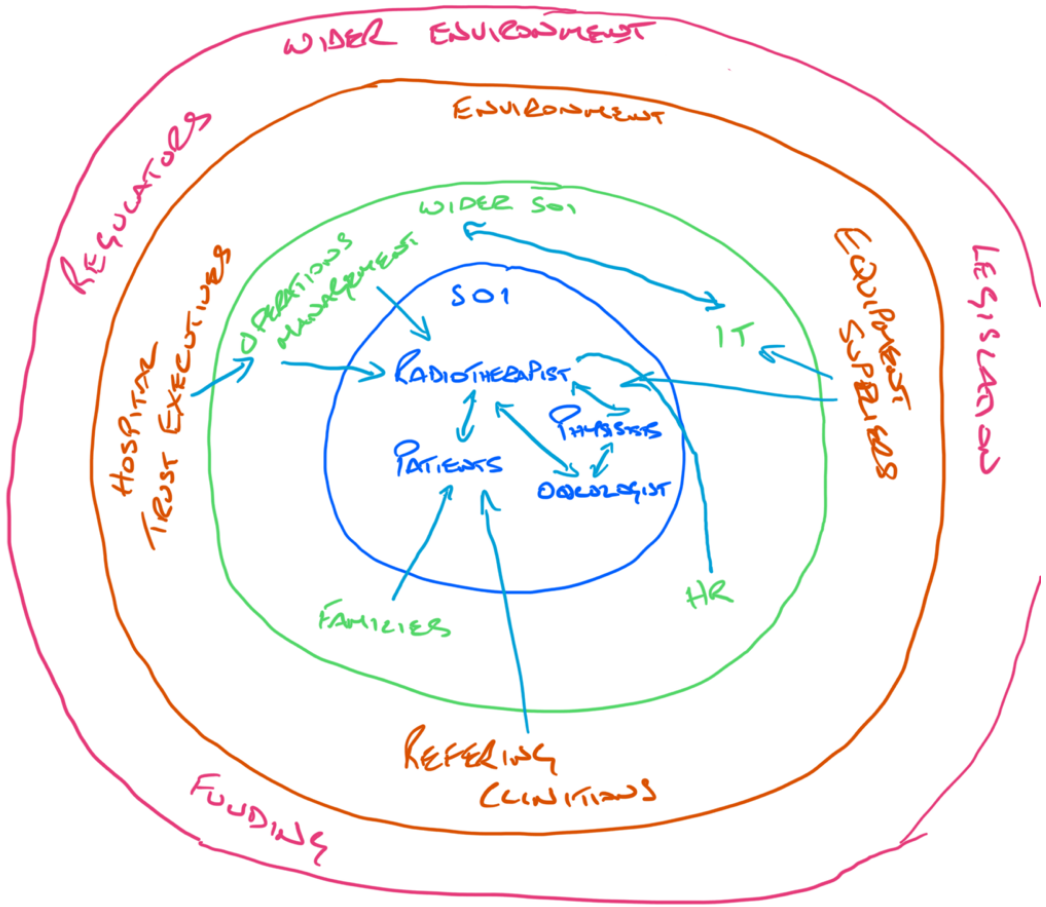


Theme	Purpose
Patients & Demand	Show the flow of patient referrals and treatment needs rising faster than capacity.
Workforce Capacity	Staff shortages, shift patterns, skill mix issues.
Clinical Operations	The operational coordination layer—schedulers, senior radiographers, service leads.
Leadership & Governance	Senior management and Trust Board expectations.
HR & Workforce Planning	Training, retention, and well-being.
Data & IT Systems	Scheduling software, dashboards, reporting to NHS targets.
External Policy Environment	Funding, national recruitment constraints.

Examples – Radiotherapy Workforce Capacity and Demand



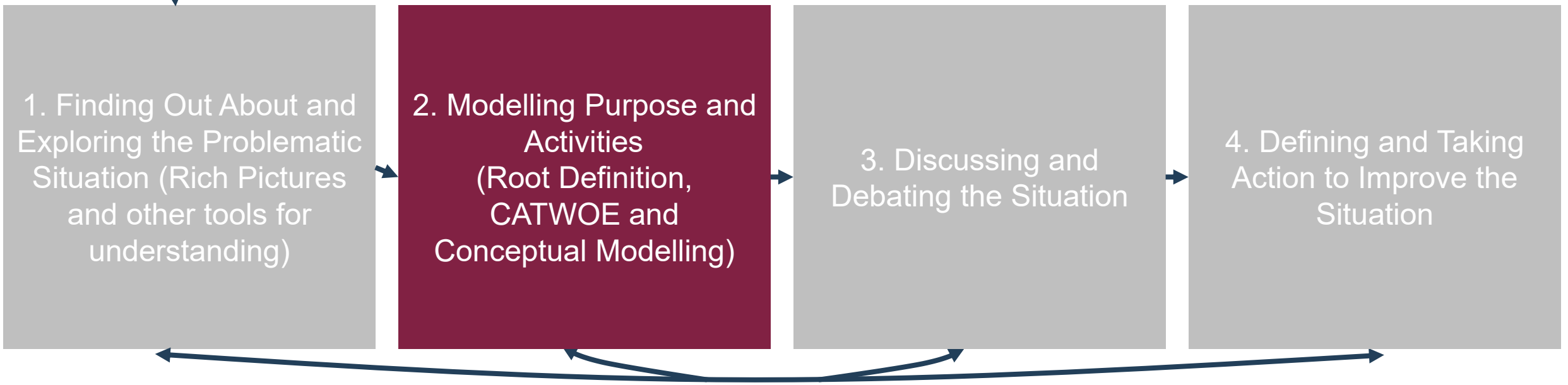
Multi-perspective "Pig" Model (Morgan, 1997)



Context Diagram (Flood and Carson, 1993)

A Practical Approach to SSM

A Problematic Situation



This step is about modelling the system. Root definitions – a structured statement or expression of purpose – are developed and the CATWOE (Customer – Actor – Transformation – Worldview – Owner – Environment) pneumonic is used to ensure a holistic view of the situation is captured. A set of activities needed to achieve that purpose are identified in the Conceptual Model.

Root Definitions – a statement/expression of purpose

The PQR formula:

"A system to do P, by Q, in order to achieve R."

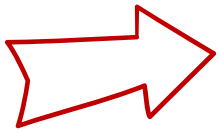
P = purposeful activity, Q = means/method, R = intended outcome

The statement should be checked to ensure all element of CATWOE are represented.

"A trust owned system to deliver sustainable Radiotherapy Services (P) by coordinating staffing, meeting service demand and fostering interprofessional learning (Q) to maintain patient outcomes and staff wellbeing (R)."

C = Customer/Beneficiary, A = Actors, T = Transformation, W = Worldview/Means, O = Owner, E = Environmental constraints

Conceptual Modelling



"It is only a model of a concept (not reality), hence the name, 'Conceptual Model' (Wilson, 2001, p.14)"

A conceptual model:

- "…*is the minimum necessary activities to meet the requirements of the root definition and CATWOE*" (Checkland and Scholes, 1990, p.37).
- "…*represents those structured activities that must take place if the purpose [as defined in the root definition] is to be achieved*" (Wilson, 2001, p.xvi).

Key steps:

1. Review root definition.
2. Assemble the minimum necessary activities to meet the requirements of the root definition and CATWOE.
   - Write out the root definition in PQR format (do P by Q in order to achieve R).
   - Identify CATWOE elements.
   - Map out the activities (~7)

Conceptual Modelling

Root Definition (PQR):

A Trust owned system to deliver sustainable Radiotherapy Services (P) by coordinating staffing, meeting service demand and fostering interprofessional learning (Q) to maintain patient outcomes and staff wellbeing (R).

CATWOE Analysis:

C – Patients, Clinical Staff

A – Radiographers, Physicists, Nurses, Oncologists, Schedulers

T – Overstretched → Coordinated, sustainable service

W – coordinated staffing, meeting service demand, fostering interprofessional learning

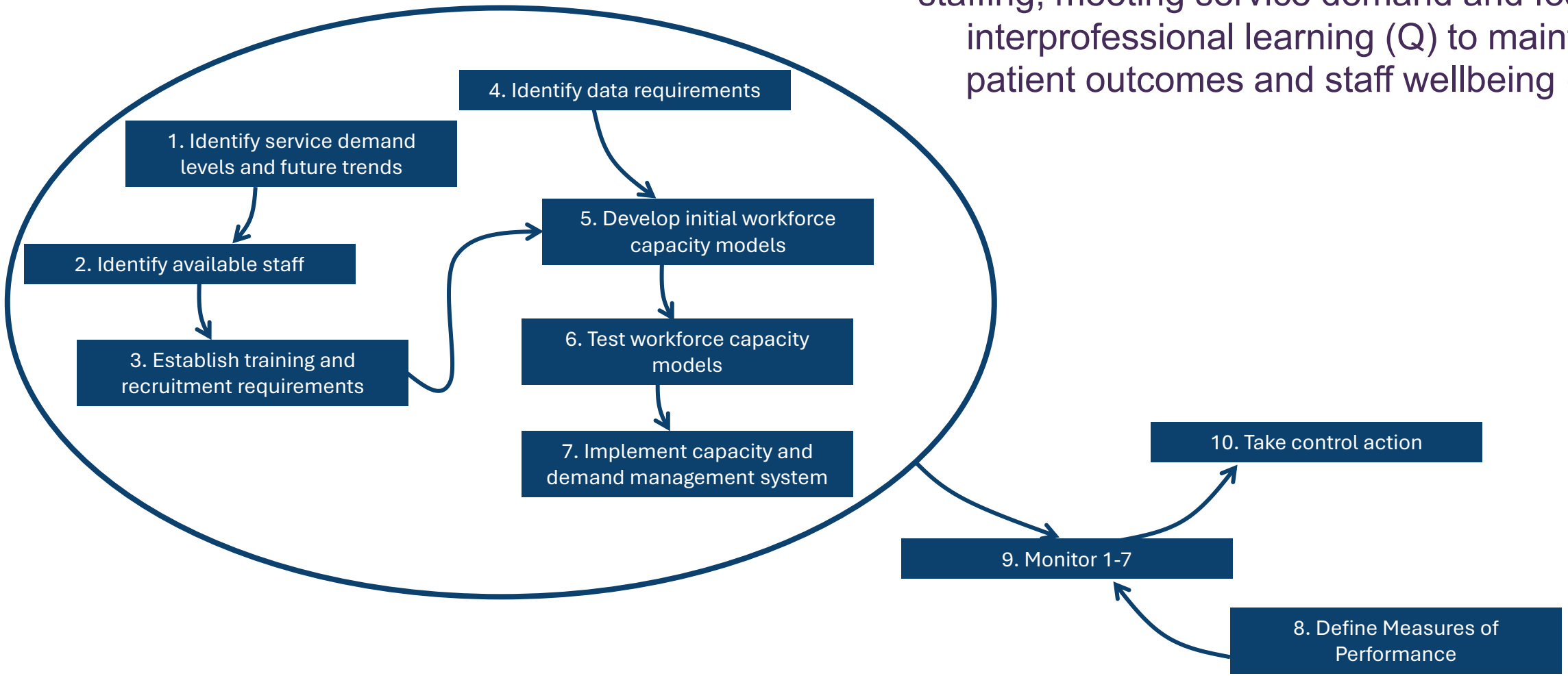
O – Trust

E – Funding caps, recruitment lag, national targets, funding

Conceptual Modelling

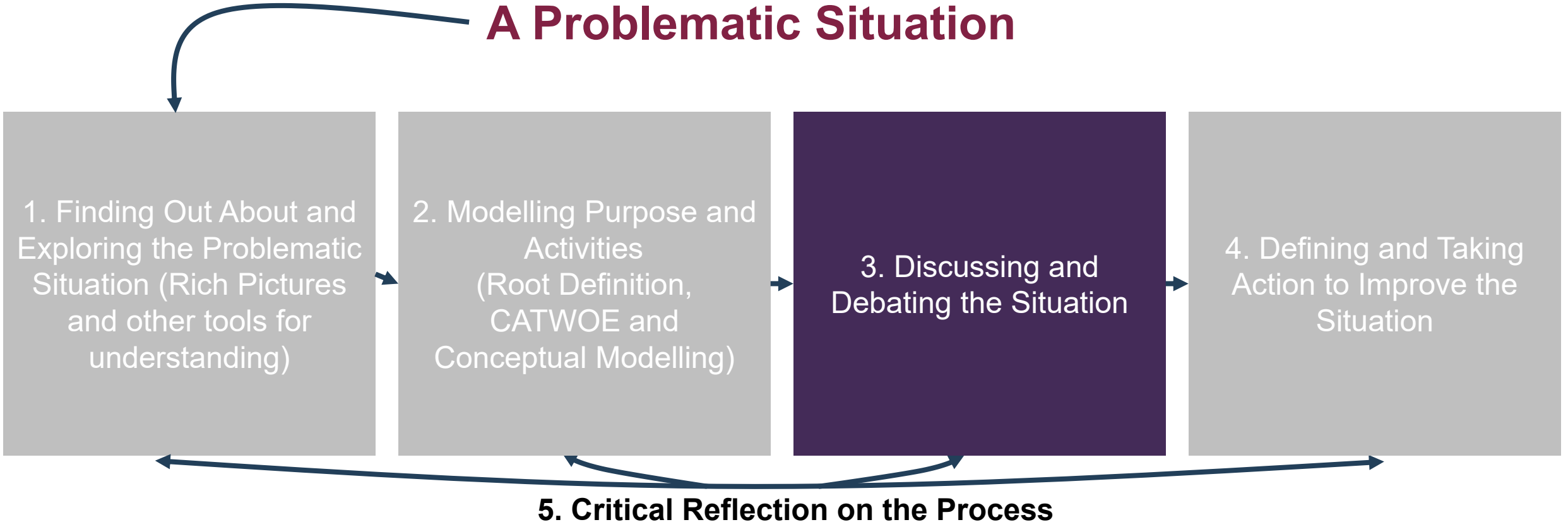
Root Definition (PQR):

A Trust owned system to deliver sustainable radiotherapy services (P) by coordinating staffing, meeting service demand and fostering interprofessional learning (Q) to maintain patient outcomes and staff wellbeing (R).



The Workforce Capacity and Demand System

A Practical Approach to SSM



The models produced in the previous step should be used to structure the discussion and debate about the situation and its improvement. Is it culturally appropriate? Is it politically feasible?

Example Questions

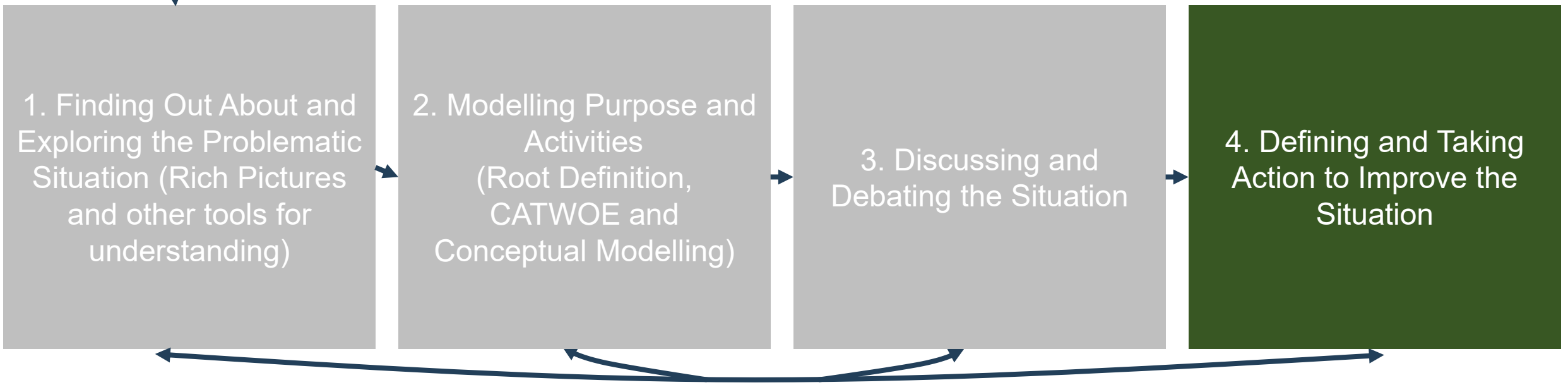
- This activity **2. Identify available staff** does this exist in the current system?
- If so, who does it? Who else could do it?
- When is it done? How is it done?
- What data does it require?
- How can we measure if it is done?
- Who is Responsible, Accountable, Consulted, Informed (RACI)?

If a more structured approach is needed to guide the discussion, this information can be input into a table.

Activity	Is it done?	Who by?	How?	How is it measured?

A Practical Approach to SSM

A Problematic Situation



5. Critical Reflection on the Process

Then, the final stage is to actually put the plan into practice and implement the models. Additional change management processes can be used within this stage, according to organisational policy and scope/scale of the intervention. Critical reflection on the process is important to ensure the learning is captured and fed back into the development process. It may take several loops to get it right.

Summary

Soft Systems Methodology (SSM) is a powerful tool to promote collaborative approaches for addressing problematic situations in complex environments like Public Health.

It enables problem owners, decision makers and practitioners to bring together diverse groups of individuals and seek either accommodation or consensus on purpose and ways forward to achieve that purpose.

SSM is dynamic and iterative. It is not a tool for knowing, neither is it a process just to tick a box. It requires critical reflection to appreciate complexity and to be open to learning.

It is about collaborative learning.

Questions?

Next week's session:
Wednesday 4th February 10:30-12:30 GMT

https://www.qub.ac.uk/sites/who/whats-on/IntroductiontoSoftSystemsMethodology-Session2.html

Evaluation Survey

We would really appreciate a couple of minutes of your time to let us know how you found this session.

Please follow the QR code to access our evaluation survey.

References

Checkland, P. and Scholes, J. (1999) Soft Systems Methodology in Action: A 30 Year Retrospective. John Wiley and Sons: Chichester.

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