# The Civil Servant's Systems Thinking Journey: weaving systems thinking throughout the policy design process

Confirm
the Goal

Implement,
Monitor and
Evaluate

Systems
Thinking
Journey

Understand
the
System

Co-design
and
Test
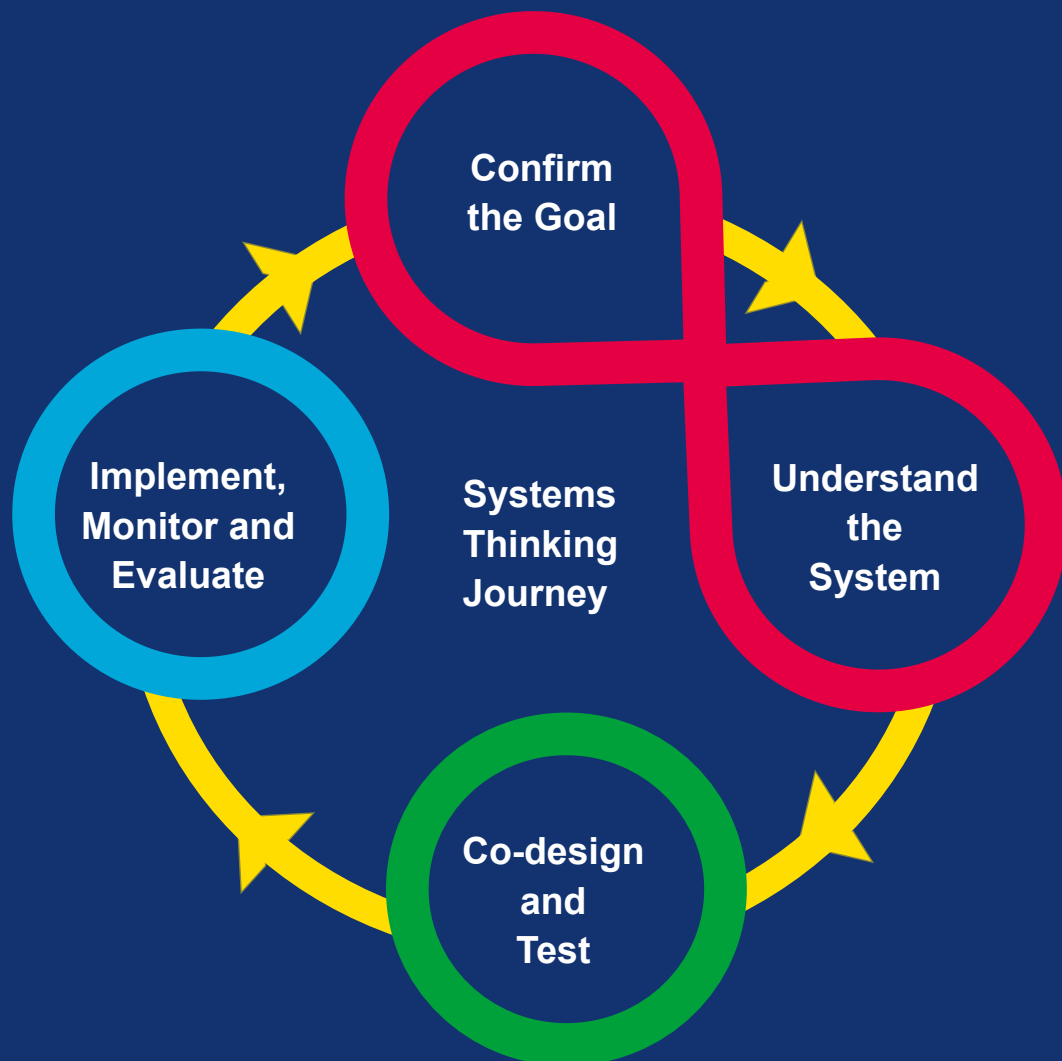
**The Civil Servant's Systems Thinking Journey is one component of a suite of documents by GO-Science that aim to act as a springboard into systems thinking for civil servants unfamiliar with this approach. We introduce a small sample of systems thinking concepts chosen due to their accessibility and alignment to civil service policy development, but which are by no means comprehensive. We hope this acts as a first step towards using systems thinking approaches to solve complex problems and we strongly encourage the reader to go on to explore the wider systems thinking field further.**

## Summary

Government faces many challenges. Some of these are simple, where the objectives are clear, stakeholder motivations align, and possible solutions are relatively easily evaluated and implemented.  However, many challenges, such as reducing obesity, improving adult social care and achieving levelling up can be difficult to fully define and understand, and ways of influencing them to improve outcomes are hard to design, evaluate and implement. Such challenges and opportunities involve many people and organisations with competing priorities and have a bearing on many adjacent policy areas. The success of an intervention often relies on collective action taken across boundaries. No single individual, agency or department can tackle a complex problem alone. Nor should they have to.

**Civil servants need different tools and approaches to deliver desired outcomes in these complex situations – a systems thinking approach.**

The aim of this document is to be the first port of call for civil servants interested in using systems thinking in their complex work. It outlines how systems thinking complements and strengthens existing guidance and approaches to our work and translates a 'systems thinking approach' into five systems thinking principles that **guide you on a journey to overcoming complex problems**. Reading the journey then leads naturally to its companion document, the Civil Servant's Systems Thinking Toolkit, a step by step guide to an accessible selection of systems thinking tools. The Government Office for Science has also produced a bank of case studies that contain testimonials from a diverse range of civil servants across government on their experiences of using systems thinking.

## The Systems Thinking Approach

Systems thinking is a framework for seeing the interconnections in a system and a discipline for seeing and understanding challenges in the context of the whole system; the relevant 'structures' that underlie complex situations. **Systems thinking can seem difficult, but it doesn't need to be**. Introducing some systems thinking into your work is better than none. Drawing boundaries and seeing the interconnected patterns and forces within those boundaries – and how they relate to the outside – can be a powerful simplification that generates new insights and solutions. Where you set boundaries for the system, i.e. how far you zoom in or zoom out, depends on the problem you are looking to answer and the goal that you want to achieve.

**A system is a set of elements or parts interconnected in such a way that they may produce their own, potentially unexpected, pattern of behaviour over time**. An analogy of the different lenses through which you can view a system is that of a choir. Depending on your problem or goal there are many ways to view a choir systemically. If your goal is to change behaviours within the choir then including the different personalities, feelings, power dynamics, ambitions and concerns of your choir members in the system will be important. Alternatively if your problem is the choir's discomfort during practice you may consider the location, weather, management and other users of the building your choir practices in as the system. A final example is if your choir's goal is to win trophies you may include the rules and judging committee of a competition, other choirs' performances (past and present) and entry fees in your system.

The examples above demonstrate that defining your problem or goal with the system in mind, and then actively choosing to include or exclude parts of the system, is a pragmatic judgement call. The key is being aware and open that you are making that choice - and mindful of the subsequent benefits and limitations. The Civil Servant's Systems Thinking Toolkit has tools and methods to help you.

## Using Systems Thinking

**Systems thinking is applicable to all, regardless of prior knowledge, grade or profession.** Systems thinking is already embedded throughout government guidance to civil servants across multiple professions. It is promoted as an important capability for members of professions including Policy, Science and Engineering, Operational Research, Project Delivery, Social Research and others. Likewise, it features in HM Treasury's Magenta book (complexity), Green book (appraisal and evaluation) and Orange book (management of risk). Systems thinking can be used alongside existing project management and stakeholder management techniques like Agile, P3M and Prince2 to strengthen them for dealing with complexity, uncertainty, multiple perspectives and broader interdependencies. Systems thinking techniques can be weaved throughout policy design, as explored further in this document.

Systems thinking is clearly relevant to strategic work, but it is also valuable and applicable when work is more reactionary and fast-paced. **It helps to create the conditions in which innovative ideas can emerge**. This is vital at times of crisis, when the way forward isn't always clear or obvious. Bringing in some key aspects of systems thinking into your work can be done quickly and still increase the effectiveness of your work, for example ten minutes developing a rough map of a system, or listing possible enablers and blockers to success, or identifying your key question for testing your intervention is performing, can all be very impactful.  Likewise, systems thinking is relevant even if the goal/output for the project has already been set e.g. to increase the number of apprentices by *x* amount or reduce the time taken for a passport application by *x*. Understanding how to achieve that goal through identifying key drivers of system behaviour and broader project dependencies and exploring how best to influence the system to set the conditions for success, are all parts of a systems thinking approach.

# Systems Thinking Principles and Policy Design Stages
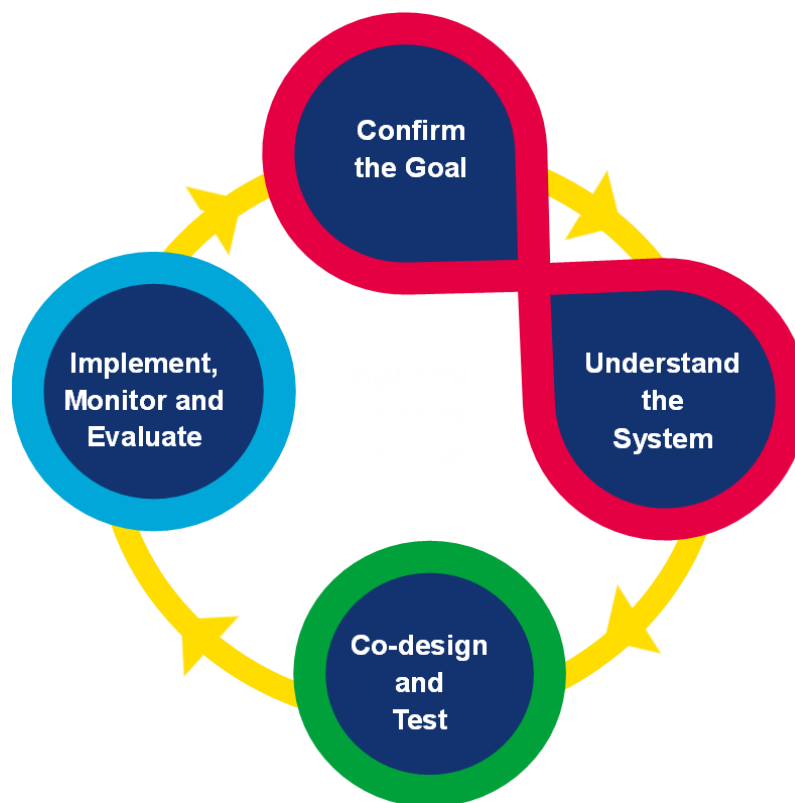


This infographic shows our thoughts on the stages required for good policy design for complex problems. It is an iterative cycle with 4 stages:

1. understanding the system and identifying the right problem to solve
2. using this knowledge to confirm your goals
3. co-designing and testing a range of possible interventions
4. refining the best of these to implement appropriate outcomes, with a plan to monitor and evaluate their performance

This iterative cycle was developed to align in part to the current policy development process described in existing publications such as HM Treasury's Green Book. This alignment aims to be helpful to civil servants in understanding when to use systems thinking in policy development.

We see this as an iterative cycle: your monitoring and evaluation strategy should inform the goals that you set and the interventions that you test, thus the stages in the infographic should be revisited multiple times during the project's lifespan. We have identified 2 of these stages, confirm the goals and understand the system, as particularly inter-related for good policy design stage for complex problems, and these are portrayed as part of a figure of eight loop within the larger loop.

In the remainder of this document we have mapped 5 systems thinking principles to these policy design stages. **These principles outline a broad definition of what we consider to comprise the core concepts of a systems thinking approach for civil servants as they design policy.** There is extensive debate about what the key systems thinking principles should be, and even how to define systems thinking. Our work is not intended to be an exhaustive list but rather an attempt to translate and condense some of the vast field of systems thinking into 5 principles useful for civil servants looking for guidance on how to approach complex problems. For those interested, we signpost further reading at the end of this document.

# Policy Design Stage: Confirming Goals and Understanding The System

This stage focuses on developing a common understanding of the situation and its context. **Here is where you consider where do you really want to be (and what are the best routes to get there).** The principles outlined within this stage help you to avoid narrow thinking or focusing on short-term, ill-fitted, incremental solutions and instead prompt you to investigate what the real causes of a problem are.

## Principle 1: Identify the key issues and establish a collaborating community with a shared goal

**We civil servants are a part of many systems, neither totally in control, nor purely an observer**. As civil servants we are familiar with the importance of promoting diversity, inclusion and equality in the way we treat each other at work. These forces also underpin a systems thinking approach - engaging with a wide range of others in the system to create a collaborating community.

Different groups in the community will have different ideas about a problem and the context in which it resides. **Exploring these different views will help to uncover new insights on the problem and the reasons for the behaviour**. We use the term 'collaborating community' to describe the individuals and groups you will engage with as your understanding of the system develops. **The collaborating community should include the full spectrum of perspectives, including those who may be against a proposed policy intervention.** It is helpful to understand the needs that sit behind the ideas and which will lay the foundation for understanding different stakeholder motivations. Not all needs will be satisfied, but they should at least be acknowledged.  Learning from each other will help establish a shared understanding of the system, an important foundation for developing interventions.

Creating a collaborating community can be done at any point in policy design but ideally engage early on so you can establish the reason people are coming together. There are many ways to build your community. Start by engaging widely, including those who have a stake in the design, delivery and improvement of a system, such as communications, delivery, legal and implementation teams as well as those who directly interact with or are affected by the problem, such as members of the public. This will result in a long list, and it may not be possible to engage substantially with all the community throughout the lifetime of

the project. However, the **collaborating community can be thought of as a living entity that will need to develop with the programme of change**. There are tools in the systems thinking toolkit to help you investigate who should be included in your collaborating community and how to explore their views on the key issues you are addressing.

## Principle 2: Reach a shared understanding of the problem

This principle focuses on holding conversations and gathering evidence about the system and its behaviour. Holding conversations often reveal different, but equally valid views of the system and the needs of the collaborating community. **Getting to a definitive answer is not the aim at this stage and is frequently unhelpful**. People need confidence and often require encouragement when accepting that there is no single view of the problem at hand. The perspectives and experiences of each member are invaluable. Together the community will create a deeper and richer understanding of the system.

A good place to start to reach a shared understanding of the problem is by exploring the scope and the boundaries of the relevant system. In the systems thinking toolkit we include tools such as rich pictures and context diagrams to help you do this.

Define what different people believe is inside and what is outside of the focus of the work. **Explore the structure, i.e. the content (what is in the system) and the interactions (relationships between what is in the system).** At a fundamental level there is the boundary around the system of interest (context) and around the part of the system to be changed (problem/solution).

There is no single, legitimate boundary to draw around a system. Where to draw a boundary around a system depends on the purpose of the discussion and the perspective of the person drawing it. **Boundaries are of our own making, and they can and should be reconsidered for each new discussion, problem or purpose[1].**

Developing an understanding of the system's boundaries, what is included and what is not, will clarify the links between what is happening in the system and the observed outcomes and allow the formation of an appropriate collaborating community. **Remember that changes within the system can affect things outside the system and vice versa.** To this end, a combination of several of the systems thinking approaches in the systems thinking toolkit will improve the understanding of the system.

**Systems mapping** is a particularly useful approach for dealing with complexity.  A strength of displaying the system as a map is that it allows you to show different forms of information about the system. It can be used to visualise the different perspectives of participants/users (their 'stories') to show the differences and similarities in groups' understanding of the system. The mapping of pathways (planned routes) and/or journeys (routes experienced) within a system is also very powerful in articulating how a system is thought to behave and how it actually behaves. More details on how to do systems mapping can be found in the systems thinking toolkit.

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[1] Meadows, Donella H. (2008). Thinking in systems : a primer

**By the end of this stage you will have:**

1. **Created a collaborating community**
2. **Developed a shared understanding of the system with the community, drawing on the multiple perspectives on the situation.**
3. **A shared sense of the problem (where you are) and long-term goals (where you want to be) with the community.**

# Policy Design Stage: Co-Design and Test

Once a shared understanding of the system and the causes of the problem are established with the collaborating community, the creation and testing of ideas for new policy interventions that could bring about the desired changes can be explored.

## Principle 3: Explore interventions using an understanding of the system and its possible leverage points

When dealing with a complex problem, there is **no such thing as a correct solution or potentially even one best solution.** Different interventions should be developed and compared and defining interventions as such are value judgements that will be evaluated differently by different groups.

Before creating new policy interventions, **work to understand the nature and performance of past or existing interventions.** These are important guide points and benchmarks for further interventions. They may need to be expanded, modified, stopped or continued. Likewise, reviewing policies and their implementation in other countries or regions can provide useful inspiration for generating interventions and can help avoid repeating failure.

As you consider possible intervention options with your collaborating community, you can start to identify points of leverage. **Leverage is achieved when the focus is not on incremental changes in numbers/outputs but when you change system structure i.e. achieving the greatest amount of change at lowest cost and risk**. These leverage points can be used as the foundation for interventions. Sometimes, the points that provide the most leverage are counterintuitive. Creative thinking, openly challenging assumptions and detailed discussions are central to developing interventions. Stress-test the design of interventions and challenge assumptions in current ways of working. In this way, this process will encourage innovation.

## Principle 4: Test the ideas

The testing phase can help build support for potential interventions, if they are successful. **Testing is important for complex problems as they often need a number of interventions**. Different combinations of new and existing interventions should be compared and tested to see if the combination results in a compounding or detrimental effect. It is important to explore different levels of interventions. For example, at a national as well as a

local level. These comparisons should define the assumptions and expected benefits, disbenefits, costs and risks, and be compared to making no interventions at all.

**Models can be useful here, a model is anything that, through some level of abstraction, can demonstrate or emphasise the potential performance of a new policy**. Models can range from simple pictures/prototypes (e.g. a theory of change map) to dynamic, simulatable computational systems (e.g. simulations created from stock and flow diagrams). There are tools in the toolkit to help you create a range of different models.

All models accentuate some things and ignore many others. However, models used wisely can be a powerful way of creating and keeping a common understanding of how a problem could be translated into a viable solution. They are particularly useful when developing a shared understanding across a diverse collaborating community, if built or used in a participatory way. **Simulations can be valuable for explaining or describing a process rather than predicting a specific output.** You can use your simulation to rehearse or experiment with alternative paths and make guesses about the future and see what outputs those scenarios might result in or how different stakeholders would respond to the proposed changes. Likewise, models can be useful if carefully developed for a specific purpose and to meet specified requirements.

In addition, or as an alternative to creating a model, **testing interventions in the real system is a rich way to openly and collaboratively understand the potential impacts of interventions** and further develop an understanding of the system. Interventions can be tested in small scale pilots, where many different options are tested in many isolated trials. There is more information on pilot testing in the further reading section here.

**By the end of this stage you will have:**

1. **Designed, assessed or tested a set of intervention options**
2. **An improved evidence base as to what might work, drawn from a robust evaluation of the testing stage**
3. **Agreement on an appropriate set of interventions targeted to progress towards the agreed goal(s)**
4. **Improved relationships within the collaborating community and a deeper understanding of the problem**

# Policy Design Stage: Implement, Monitor and Evaluate

This stage considers what criteria you will use to evaluate interventions and should build on and iterate with earlier work which analysed the system for points of leverage and tested ideas and assumptions. This stage should also link directly back into the first policy design stage discussed here - confirming goals and understanding the system. **Performance measures can and should influence the goals you set and onwards on to the design of the policy intervention.**

## Principle 5: Monitor and evaluate with the community

In a complex system an outcome might not be quick to reveal itself. Complex systems often evolve in unpredictable and unexpected ways. It is possible and important, however, to monitor and evaluate your intervention and determine the extent to which benefits are being realised, why or why not. **It should be clear how an intervention is expected to work** and what indicators are in place that determine whether the desired changes are emerging as intended.

The goal of analysing data from a monitoring and evaluation strategy is to build an understanding of what works, where it is working, why it is working and for whom.  It will **capture any unintended consequences or any external factors driving change early and allow the sustainability of an intervention to be assessed** and explore whether it could be adopted elsewhere. **The monitoring and evaluation strategy should be credible, robust, proportionate and accessible.** It requires clear articulation of desired performance measures and performance targets, and the means to collect and analyse the appropriate data/information to achieve this.

Creating a successfully implemented monitoring and evaluation strategy relies on effective engagement and coordinated implementation taken across boundaries.  The community should be engaged as much as possible throughout the process. The insights they offer will inform decisions and sustain positive changes and potentially provide a stronger sense of ownership. It will also make the next steps in delivery clearer. Further information is in the systems thinking toolkit and signposted at the end of this document.

**At the end of this stage you should have:**

1. **Establishment of appropriate monitoring and evaluation strategies, indicating clearly how these will be used to inform decision-making, and using these to inform and adjust your goals and planned interventions as required.**
2. **A culture of ongoing learning and evaluation embedded within the system**

## Conclusion

Complex systems are by their nature dynamic and continuously changing. It might take time before changes are observed. However, **by wrapping a systems thinking approach around existing processes – introducing new tools and approaches to improve what you already do – you will increase the chance of delivering the right solution to the right problem**. You will have created a safety net to steward the system effectively and impactfully within this complexity to create intelligent, empathetic and impactful long-lasting changes to your work.

We hope that this document has successfully framed systems thinking as an approach that is accessible and relevant to all civil servants when dealing with complexity, and furthermore is complementary to much of the guidance that we are already exposed to. The principles outlined here summarise how to weave systems thinking throughout the policy design process and lead naturally to the more step by step approach described in the Civil Servant's Systems Thinking Toolkit.

# Further Reading

**Government for Science Products (Insert Hyperlinks When Ready):**
- The Civil Servant's Systems Thinking Toolkit
- The Systems Thinking Case Study Bank

**Department Specific Systems Thinking Guidance (Insert Hyperlinks When Ready):**
- Defra Primer
- BEIS Systems leadership document

## Policy Design Stage: Confirm the Goal & Understand the System

- Royal Academy of Engineering – Creating Systems that Work: Principles of engineering systems for the 21st century
- Royal Academy of Engineering – Engineering Better Care
- Approaches adopted by service design around building empathy and, particularly ethnographic studies which involve living and observing life with and alongside people, can be valuable here. Helpful approaches and advice can be found in:
    - Cabinet Office, Open Policy Making Toolkit - section 2 'Discovery: understanding user needs'
    - Department for Education, Delivery Book - 'Understand your problem' section
    - HM Treasury, Public Value Framework - Chapter 4 and annex A
    - Magenta Book - section 3.7 on 'Synthesis methods'
- The Nesta Collective Intelligence Design Playbook provides guidance on how to bring people together to tackle complex challenges.
- The Human Learning Systems report on Public Service for the Real World as an approach to public management at any scale – from local voluntary sector to national government.

## Policy Design Stage: Co-design and test

- Policy Lab's 'Government as a System Toolkit' explores how the government can intervene systemically.
- Policy Lab's Open Policy making toolkit
- Regarding the practical application of causal loop diagrams, more detail can be found in the Munro Review of Child Protection and the Tackling Obesity and Net Zero Strategy reports.
- For more about leverage points, 'Places to Intervene in a System', Donella Meadows provides a useful introduction.

- The GO-Science futures toolkit can be used to explore future challenges, prospective opportunities and risks.
- Guidance on identifying criteria for success can be found in the HM Treasury Green Book Multi-Criteria Analysis manual.
- For guidance on prioritisation of interventions:
  - The HM Treasury Green Book sections 4 and 5 covers developing a rationale for intervention and generating options
  - The Department for Business, Energy and Industrial Strategy Better Regulation Framework (Annex 4) - useful checklist of issues to be considered in appraisal and evaluation.
- Testing is a flexible process with a range of approaches available with varying costs and risks:
  - The Cabinet Office Open Policy Making Toolkit - '4: Delivery: prototyping and improving ideas' presents tools to move from ideas to delivered policies and services
- Acumen Academy Systems Practice course material for guidance on using systems thinking when approaching a problem and on creating and analysing causal loop diagrams.
- There are many useful and accessible posts about systems thinking tools and techniques here https://thesystemsthinker.com/
- The HM Treasury Magenta Book - section 3 covers the different evaluation methods
- The HM Treasury Aqua Book – chapter 5 on the importance and implications of uncertainty
- Nesta's 'Prototyping Public Services' describes an approach that can be used to help develop new and innovative services by testing ideas out early in the development cycle.
- General guidance on Theory of Change is provided in chapter 2 in the HM Treasury Magenta Book and in particular how this is applied for complexity in sections 3-4 in the Supplementary Guide for Handling Complexity.
- The Behavioural Insights Team paper, Test, Learn, Adapt: Developing Public Policy with Randomised Control Trials sets out nine separate steps that are required to set up Randomised Control Trials.

## Policy Design Stage: Implement, Monitor and Evaluate

- When considering the implementation of effective monitoring and evaluation, the ROAMEF policy cycle is detailed in section 3 of the HM Treasury Green Book.
- Advice on communicating performance information can be found in the Performance Improvement Council Playbook, play 8.
- Guidance on how best to measure performance towards goals can be found in the National Audit Office's 'Choosing the right FABRIC'.
- Further information regarding theory-based evaluations methods can be found in:
  - Page 36 and section 4.3 of the Magenta Book
  - Section 4 of the Magenta Book Supplementary Guide: Handling Complexity in Policy Evaluation
- Acumen Academy Systems Practice has useful advice on monitoring and evaluating your system.

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