

Improvement Activities



Summary

This guide describes activities that can deliver a systems approach to health and care design and continuous improvement.

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Improving Improvement

This guide is part of the University of Cambridge **Improving Improvement Toolkit**, which develops the approach presented in the Royal Academy of Engineering report titled "[Engineering Better Care](#) – a systems approach to health and care design and continuous improvement". The report and toolkit were co-produced with engineers, clinicians, and healthcare leaders to explore how an engineering approach could be applied in health and social care to develop systems that meet the needs of patients, carers and NHS staff. They present a new framework to support ongoing work in service design and improvement in health and care.



Engineers routinely use a systems approach to address challenging problems in complex projects. This allows them to work through the implications of each change or decision they make for the project as a whole. They consider the layout of the system, defining all the elements and interconnections, to ensure that the whole system performs as required.

“Systems that work do not just happen — they have to be planned, designed and built”

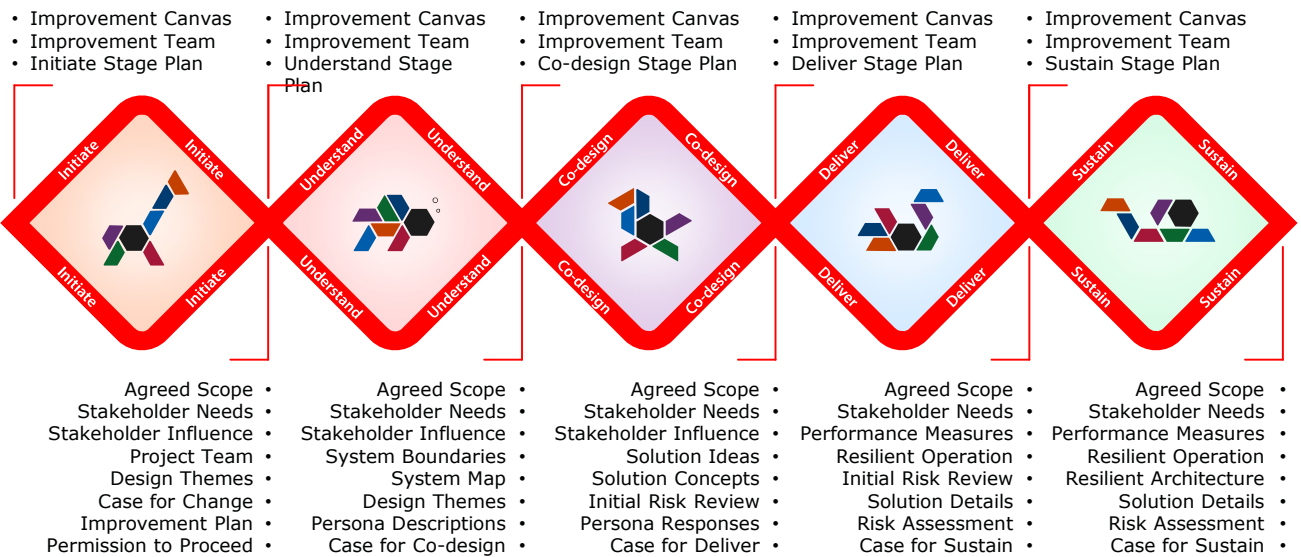
This particular guide assists in the definition, visualisation, planning and execution of any stage of the Improvement Programme. The activities highlighted provide a minimum suggested set for improvement and may be supplemented with other familiar activities. Its companion, the [Summary Booklet](#), is intended for the systems novice and for challenges of all levels of complexity. For more advanced readers, the [Improving Improvement: Resources](#) provides a comprehensive description of the elements of a systems approach.

Improving Improvement

This guide has been designed to provide minimum, direct guidance on the questions, activities and tools that might be useful at any particular stage of the improvement process:

- **Initiate** — leading to an outline description of the current system (now), a preliminary understanding of the problem, a view of what the future system might look like (better) and a viable plan for initiating an improvement process.
- **Understand** — leading to a detailed description of the current system (now), a common understanding of the problem, a consensus view of what the future system might look like (better) and a clearly articulated case for changing the system.
- **Co-design** — leading to a clear description of the future system, based on the iterative design of the system architecture with its elements and interfaces, the evaluation through successive prototyping of its likely behaviour, and a plan for its delivery.
- **Deliver** — leading to the successful deployment of the new system with the levels of measurement necessary to evidence its success, and acceptance that it achieves appropriate value for its stakeholders.
- **Sustain** — leading to the continued operational success of the new system along with consideration of further improvement potential or wider deployment.

Preliminary Stage Activities



Stage Outcomes

This guide details the requirements for deliverables early in a stage and for those that might be delivered by the end of the stage, providing the basis for a stage-gate review.



Planning Improvement

This guide includes activities that are relevant to any or all of the key stages of improvement. It may be used as a guide to the whole process and all the stages included within or for individual stages of a wider improvement process.

The first task of any planning activity is to determine whether the improvement process is to be split into multiple stages or to be run as a single extended stage. It is then important to undertake the following actions for each improvement stage:

- (a) **Understand the stakeholders Needs** – identify key stakeholders, their needs, interest in the system and potential to influence the outcome of the process.
- (b) **Select the Improvement Team** – build the best team to undertake the improvement, based on insights gained from the scoping and stakeholder analysis.
- (c) **Complete the Improvement Canvas** – describe the context and nature of the challenge at this stage of the process and ideas for improvement and measurement.

Agree the scope of the proposed improvement and refine the team as appropriate.

- (d) **Draft the Improvement Plan** – define the outcomes required for the each of the strands of the improvement process and identify possible activities from this guide.

Add any additional activities as required and draft an appropriate schedule to ensure timely delivery of the improvement programme.

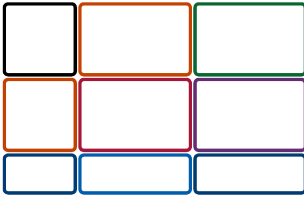
The activities in this guide are ordered to reflect their expected value to different stages of the process, but users are encouraged to determine the order best suited to their needs and iterate within and across stages as appropriate. The graphic at the lower right corner of the page, repeated on following pages, indicates which stages (initiate, understand, co-design, deliver and sustain) the activity may be most suited for (red – recommended, grey – may not be so useful).



Useful toolkit resources: printable PDFs for all of the **Stage Guides** are included in the [Stage guide PDFs](#) part of the [Resources](#) section.

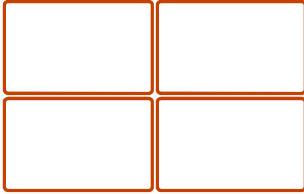
Planning Improvement

The activities described in this guide include:



Improvement Canvas

Use this worksheet to describe the team's current knowledge about the system and agree the scope of the change required.



Stakeholder Influence

Use this worksheet to identify key system stakeholders' interest and influence.



Stakeholder Needs

Use this worksheet to list the system stakeholders' needs and reasons for those needs.



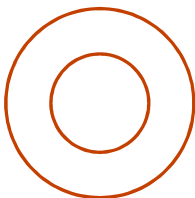
Rich Picture

Use this worksheet to sketch details of the system of interest, system of influence and external factors.



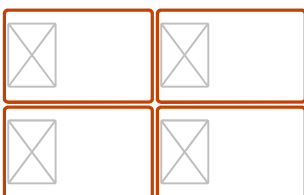
Influence Map

Use this worksheet to sketch elements of the system of interest and the nature of the influences between them.



System Boundaries

Use this worksheet to highlight the limit of the system of interest and the system of influence.

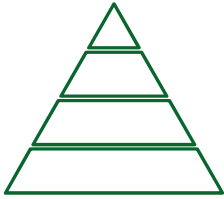


Persona Descriptions

Use this worksheet to co-design a set of personas representing patient groups and/or service providers.

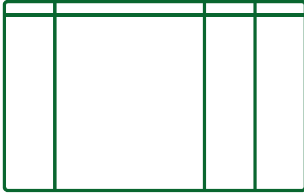
Planning Improvement

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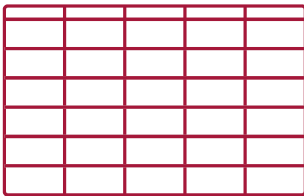
[Design Themes](#)

Use this worksheet to translate the prioritised needs into agreed themes and system requirements.



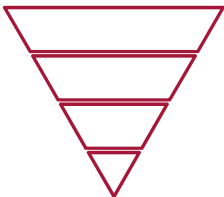
[Design Requirements](#)

Use this worksheet to translate the prioritised needs into realisable themes and system requirements.



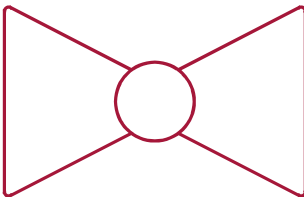
[Morphological Chart](#)

Use this worksheet to organise the presentation of ideas and concepts to facilitate system improvement.



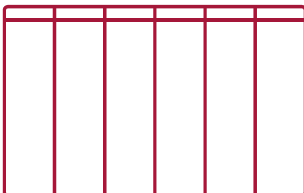
[Design Solutions](#)

Use this worksheet to translate initial ideas into viable concepts and solutions that meet the system requirements.



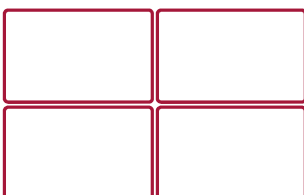
[Bowtie Method](#)

Use this worksheet to identify deviations from normal operation and their undesirable consequences.



[Failure Modes and Effects Analysis](#)

Use this worksheet to identify the causes of all possible failures in a system and their consequent risk.

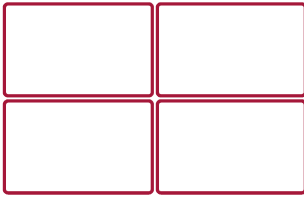


[Resilient Operation](#)

Use this worksheet to determine those elements of a system that are core to its operation.

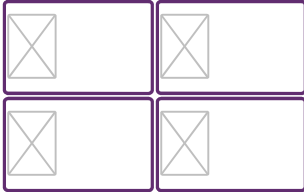
Planning Improvement

The activities described in this guide include:



[Resilient Systems](#)

Use this worksheet to determine those elements of a system that are critical to its resilience.



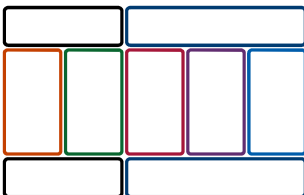
[Persona Responses](#)

Use this worksheet to capture likely persona responses to proposed systems improvements.



[Design Measurement](#)

Use this worksheet to list the system stakeholders' needs and corresponding means to measure performance.



[Theory of Change](#)

Use this worksheet to remind the team of the factors that define the activities required to deliver a successful programme.

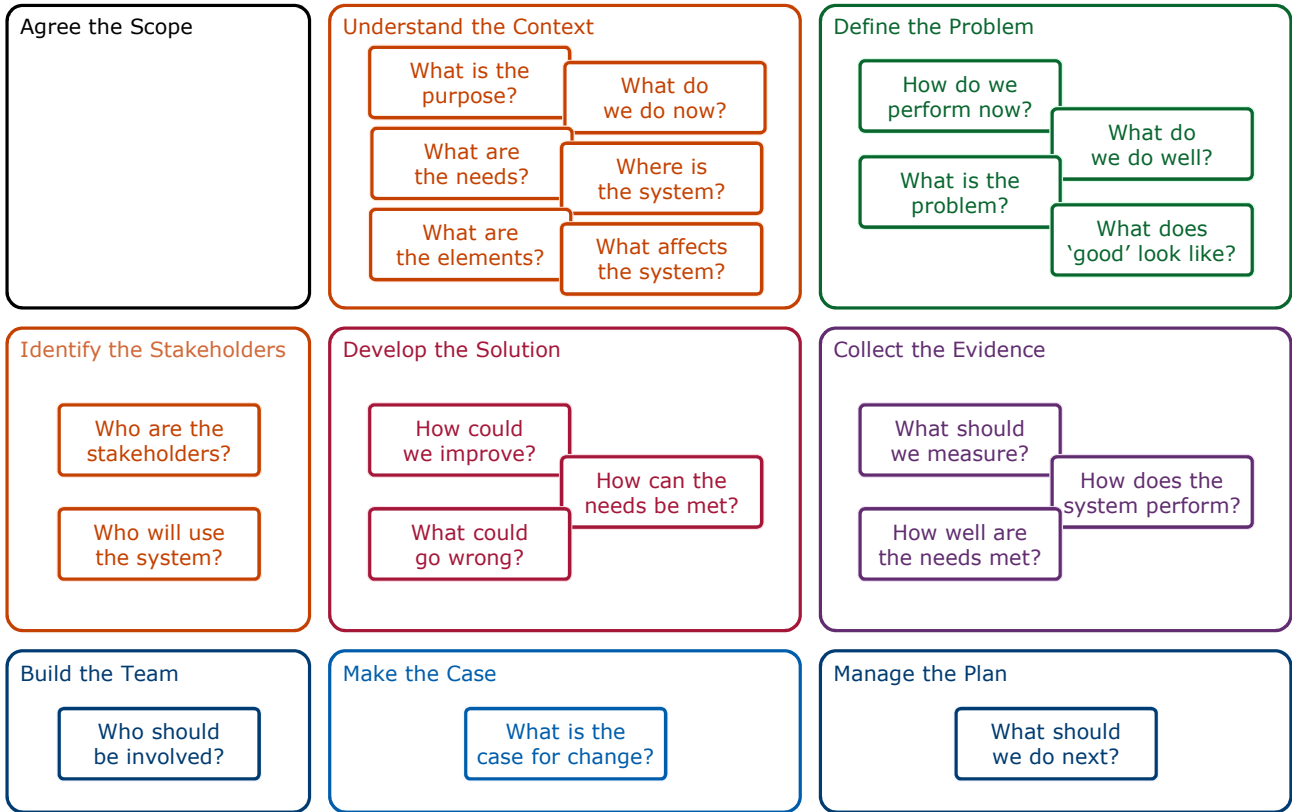


[Stage Plan](#)

Use this worksheet to select the elements of the improvement process that are required to deliver the desired outputs.

Improvement Canvas

Use the [Improvement Canvas](#) poster to investigate the team's current knowledge about the system and agree the scope of the change required.



A clear articulation of the scope helps to define the boundary between what is in and what is out of the system of interest. It also reflects the prioritised needs of the stakeholders that should drive any improvement. The scope will also be influenced by the context of the system, primary focus of the challenge, core themes of possible solutions and level of detail required to describe the system and its stakeholders.

At the beginning of each stage of the improvement programme it is important to reaffirm the content of the canvas and scope of the challenge. This helps to define the gap between what is known at the start of the stage, the needs to be met by the end of the stage, and the plan to move between them.

The questions of interest for any stage of the Improvement Programme are highlighted above.

Improvement Canvas

Use the [Improvement Canvas](#) worksheet to describe the team's current knowledge about the system and agree the scope of the change required.

Agree the Scope	Understand the Context	Define the Problem
Identify the Stakeholders	Develop the Solution	Collect the Evidence
Build the Team	Make the Case	Manage the Plan

The canvas may be completed in any order, with input from the stakeholder influence and stakeholder needs worksheets informing the stakeholder and team boxes, from the system boundaries and rich picture understanding the context, and from the design themes and persona descriptions defining the problem.

All entries are important in capturing the team's current knowledge about the challenge, and in determining a sensible starting point and scope of interest for improvement. Ideas of solutions inspire a deeper understanding of the problem, and evidence may provide context or evaluation of existing solutions.

The case for support provides a rationale for stakeholders to support the proposed change, while the plan and team describe the necessary resource and steps required to deliver the change.



Stakeholder Influence

Use the [Stakeholder Influence](#) worksheet to identify key system stakeholders' interest and influence.

Low Interest and High Influence (satisfy)	High Interest and High Influence (manage)
Low Interest and Low Influence (monitor)	High Interest and Low Influence (inform)

Successful improvement depends on a wide range of stakeholders and system users who, at any point in time, will have different levels of interest in and power to influence such improvement. They will bring a range of perspectives to any programme and through their action or inaction can enable, actively encourage or frustrate progress.

There is value in characterising stakeholders, in terms of their interest and power, to ensure that they are sufficiently informed, engaged or managed at all stages of an improvement programme. Understanding them and their relative importance is an essential element of managing change.

Use the worksheet to remind the team of the stakeholders related to the improvement process, to capture the particular needs of the individual stakeholders, and to highlight the range and diversity of stakeholder needs.

Stakeholder Needs

Use the [Stakeholder Needs](#) worksheet to list the system stakeholders' needs and reasons for those needs.

As a I need so that ...

Stakeholders are defined by their role, needs and reasons for those needs. It is useful to capture this information in the form " As a I need so that ... " where these statements provide insights into needs and the rationale for them.

Stakeholders may have multiple and diverse needs and associated rationales, which provides the basis, with their interest and influence, for early conversations to prioritise these needs. Such needs may also vary with time and, therefore, in importance to other stakeholders over time.

Use the worksheet to remind the team of the stakeholders related to the improvement process, to highlight the range and diversity of potential stakeholders, and to accentuate the importance of understanding stakeholders needs.



Rich Picture

Use the [Rich Picture](#) worksheet to sketch details of the system of interest, system of influence and external factors.

Elements of a Rich Picture

Symbols	Signs	Sketches	Icons	Keywords	Title
				CANCER	?

Rich Pictures are used to depict complicated situations in order to understand a problem by uncovering hidden beliefs, expectations and motivations.

Rich pictures were developed as part of Checkland’s Soft Systems Methodology. They use drawings or pictures on a single piece of paper to capture a complex messy situation, and can depict people, objects, parts, systems, journeys and so on, along with structure, relationships, connections, influences, issues and arguments etc.

These pictures assist a team in capturing a common understanding of a system, its boundaries and characteristic and behaviours as a prior to improving or transforming the system into something measurably better.

Use the worksheet to capture images that represent multiple perspectives of the system, to visualise connections between the collected images of the system, and to understand the inherent and emergent behaviour of the system.

Influence Map

Use the [Influence Map](#) worksheet to sketch elements of the system of interest and the nature of the influences between them.



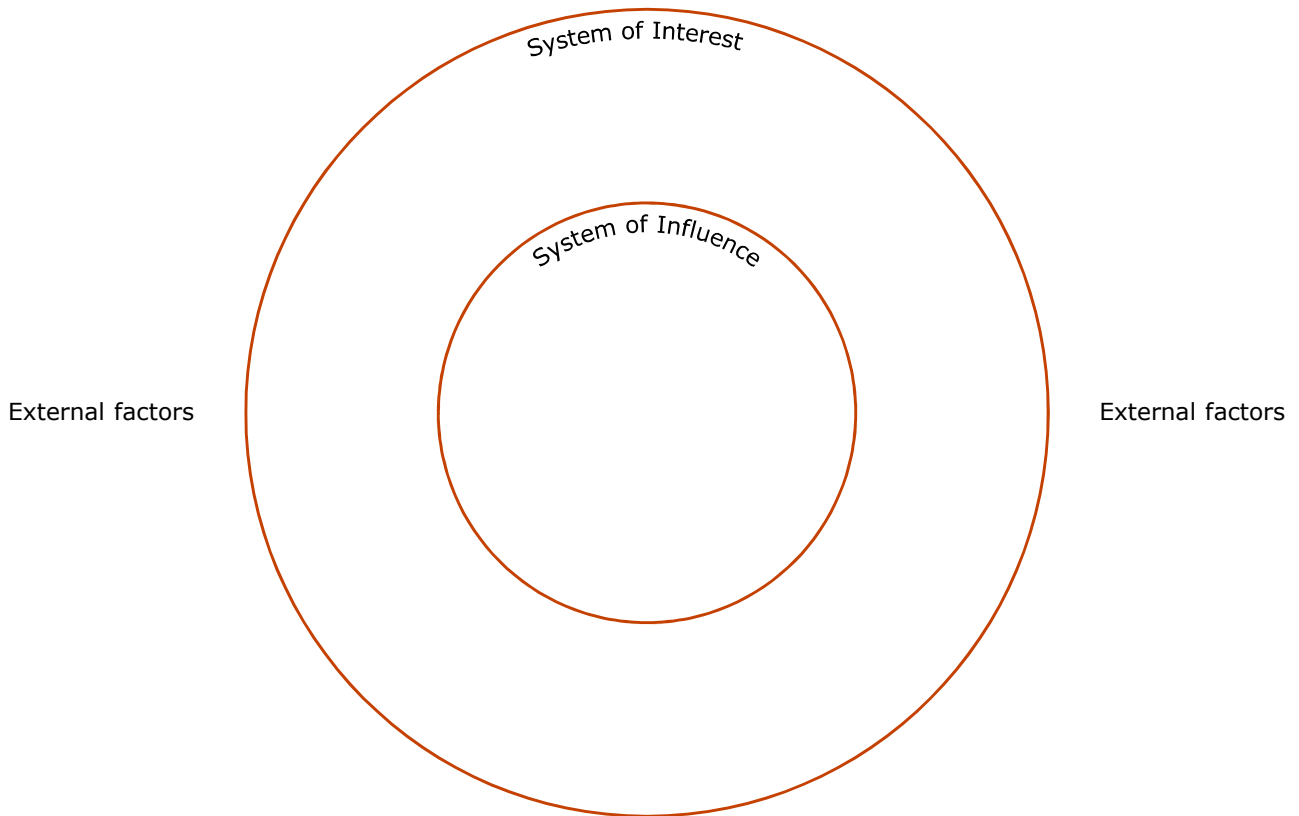
Influence maps explore the influences between elements of a system. They capture the interactions between these elements, and their environment, and enable the important relationships to be identified. Influence maps can be developed from a systems map.

The elements of the map, contained within a defined system boundary, may capture any combination of people, activities or things. The arrows, drawn from one element to another, and can be annotated to explain the nature of the influence and the thickness of the line can provide a guide as to the strength of the influence.

Use the worksheet to identify key components and/or issues present within the system, to visualise the nature of influences between the elements of the system, and to understand the inherent and emergent behaviour of the system.

System Boundaries

Use the [System Boundaries](#) worksheet to highlight the limit of the system of interest and the system of influence.



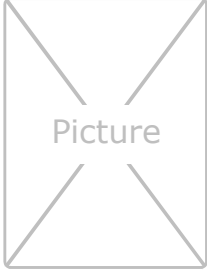
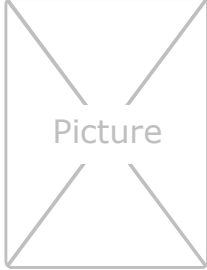
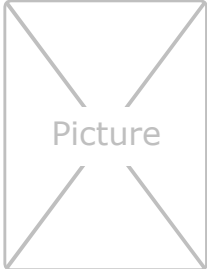
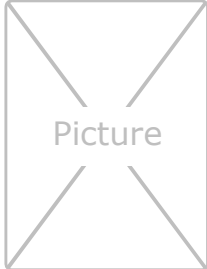
Understanding the context of the system to be improved is crucial, from the external factors to the system of interest to the system of influence. These boundaries define what is in and what is out, and are closely linked to the scope of the improvement programme and the stakeholders.

The system of interest defines the boundary of all that is important to the understanding, co-design, delivery and sustaining of change; whereas the system of influence defines the boundary of influence or control. Both may change, or need to be changed, with time.

Use the template to provide a summary of key system boundaries and external factors, to identify the wider system of interest for the improvement programme, and to highlight the [usually] smaller system of influence for the programme.

Persona Descriptions

Use the [Persona Descriptions](#) worksheet to co-design a set of personas representing patient groups and/or service providers.

 Picture	 Picture
 Picture	 Picture

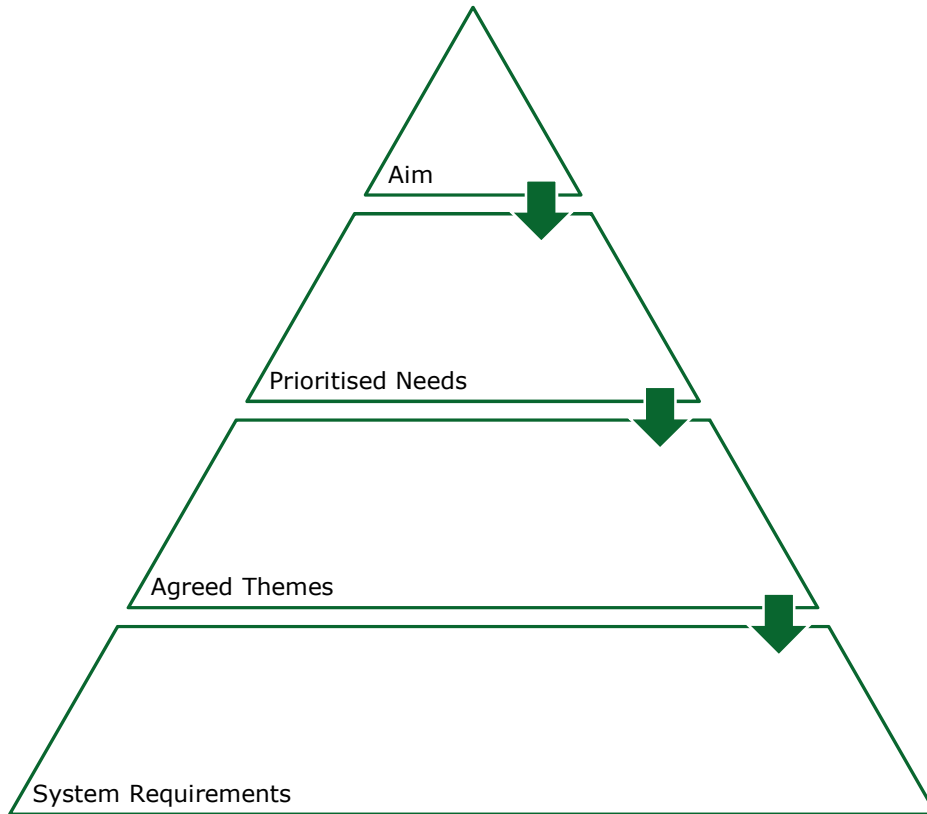
Personas are fictional characters which are created, based upon appropriate research, to represent the full range of different user types that might use a service, product, site or brand.

Personas can help a team to understand stakeholders' and users' needs, experiences, behaviours and goals. The process required to create them can also help the team to recognise that different people have different needs and expectations, and help them to better identify with the stakeholders and system users.

Use the worksheet to capture the diversity of people within a chosen stakeholder group, to identify the key characteristics that should be recorded, and to provide a simple means to describe stakeholder diversity that matters.

Design Themes

Use the [Design Themes](#) worksheet to translate the prioritised needs into agreed themes and system requirements.



The delivery of an effective improvement process requires careful translation of the aim of the improvement into realisable system requirements. This is a complex, iterative process, critical to the success of the whole programme.

A clear aim should align with the existing or proposed purpose of the system and the desired improvement in quality to be delivered by the system. It should be expressed in terms of the prioritised needs it will satisfy and the agreed themes that represent the essence of the things the system must do. These can then be translated into the individual system requirements.

Use the worksheet to present the prioritised needs in the context of the programme aim, to highlight the agreed themes derived from the prioritised needs, and to summarise the systems requirements related to the agreed themes.

Design Requirements

Use the [Design Requirements](#) worksheet to translate the prioritised needs and agreed themes into realisable system requirements.

Keyword	Requirement	Demand/Wish	Weighting

Design requirements are an elaboration, expansion and translation of the stakeholder need(s) into system requirements. They provides a means of communication between all the key stakeholders, users and the project team.

Requirements should be **SMART**, i.e. **Specific** (target a specific area for improvement), **Measurable** (identify indicators of progress), **Achievable** (specify who will do it), **Relevant** (state what results can realistically be achieved with available resources), and **Timely** (specify when the results can be achieved).

Use the worksheet to translate key stakeholders needs into realisable system requirements, to agree the core themes that capture the essence of the proposed system, and to accentuate the importance of developing smart requirements.



Morphological Chart

Use the [Morphological Chart](#) worksheet to organise the presentation of ideas and concepts to facilitate system improvement.

Functions	Option 1	Option 2	Option 3	Option 4

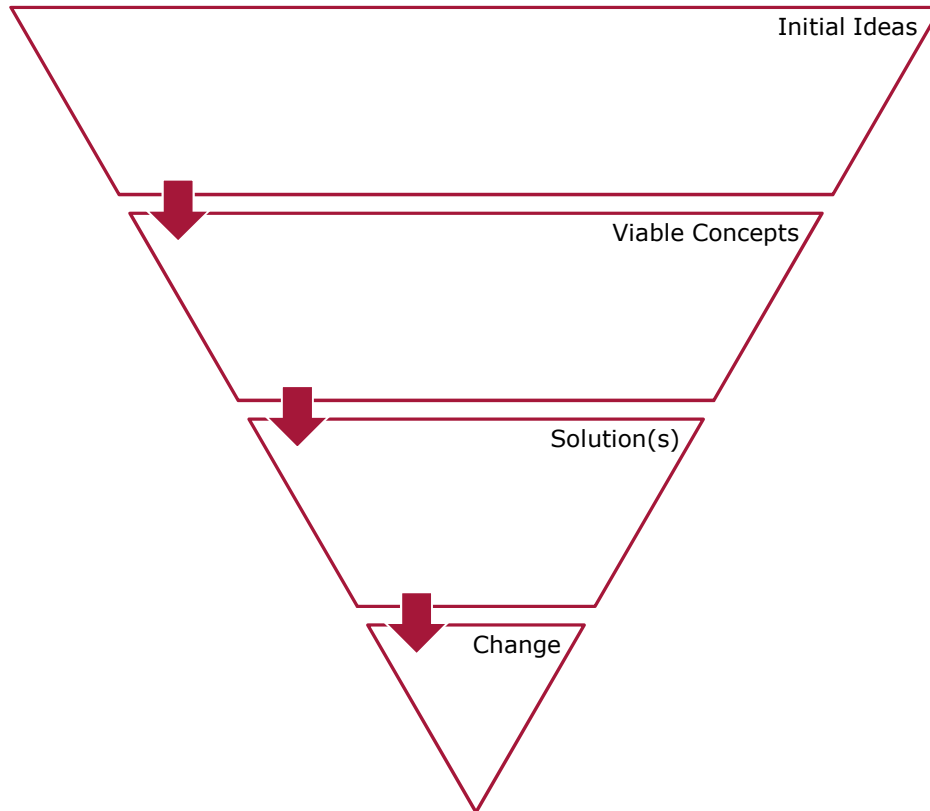
The morphological chart provides a means to capture the key requirements of a system alongside a range of possible means to satisfy those requirements. Potential solution concepts can be created from combinations of ideas, highlighting both the architecture of the solution and its elemental parts.

List the functions, features or themes that describe the nature of the design challenge in the first column of the chart, followed by a number of ideas that may satisfy these in subsequent columns. Viable solution concepts, comprising at least one element from each row, can then be identified.

Use the template to capture a variety of ideas with potential to fulfil key functional requirements, to identify combinations of ideas that will satisfy the overall system requirements, and to accentuate the importance of identifying alternative system architectures.

Design Solutions

Use the [Design Solutions](#) worksheet to translate initial ideas into viable concepts and solutions that meet the system requirements.



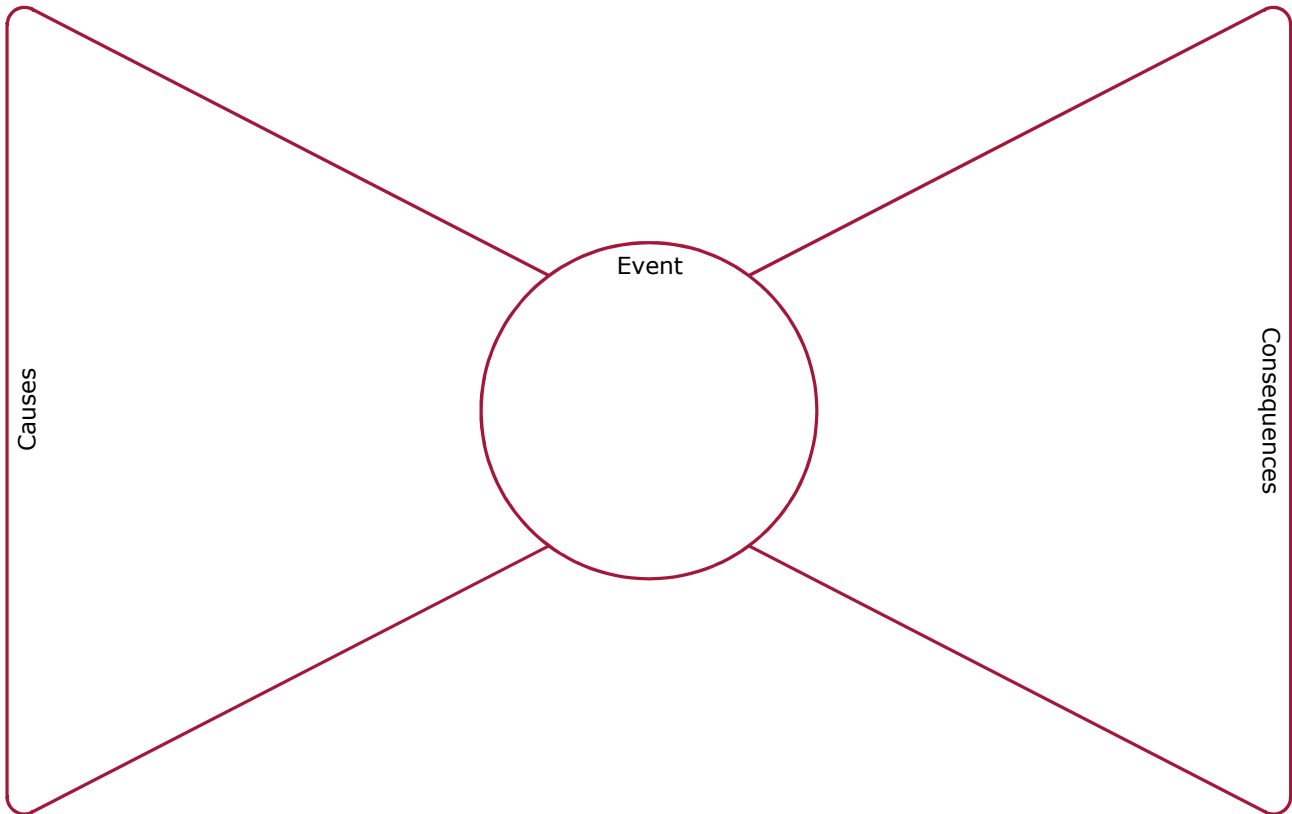
The delivery of an effective improvement process requires careful identification of initial design ideas and their integration of into viable concepts and solutions with the aim of the delivering realisable system change. This is a complex, iterative process, critical to the success of the whole programme.

Initial ideas that provide elements of an overall solution to the system requirements must be generated and captured. A number of these can be integrated into viable concepts that inspire the design of a solution to the design requirements. This in turn can be incorporated into a programme to deliver measurable change.

Use the worksheet to present the initial ideas generated in response to the system requirements, to highlight the viable concepts inspired by the initial ideas, and to summarise the solution(s) developed from the viable concepts.

Bowtie Method

Use the [Bowtie Method](#) worksheet to identify deviations from normal operation and their undesirable consequences.



The bowtie method is a useful visual summary of risk management practices targeted at a particular high-risk threat. Elements shown to the left of the event summarise steps taken to eliminate the threat and elements shown to the right capture steps to mitigate the impact of the threat.

Identify a critical threat to the operation of the system and describe it at the centre of the bowtie. Possible causes of the threat and barriers to block them can be sketched to the left, and potential consequences and barriers to block them to the right. Any likely degradation of these barriers can also be identified, along with steps to monitor or eliminate such degradation.

Use the worksheet to visualise the links between causes of an event and potential consequences, to identify the barriers between the causes and potential consequences, and to understand the impact of possible degradation of the barriers over time.

Failure Modes and Effects Analysis

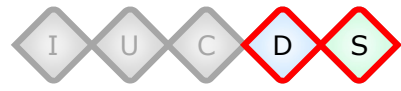
Use the [Failure Modes and Effects Analysis](#) worksheet to identify the causes of all possible failures in a system and their consequent risk.

What is going on? (list the main parts of the system)	What could go wrong? (Based on experience)	What problems might it cause? (harm, lack of care)	What are we doing to prevent it? (leave blank if nothing)	How bad is it if it does go wrong? (high, medium or low)	How likely is it to go wrong? (high, medium or low)

Failure Modes and Effects Analysis (FMEA) is a systematic, proactive method for evaluating a system to identify where and how it might fail and to assess the relative impact of different failures, in order to identify the parts of the process that are most in need of change.

FMEA can be used to review the performance of a system concept or a finished design. Failure modes, causes, effects and mitigating actions can be evaluated to determine the risk of 'harm' for a wide range of potential failures for a proposed change in a process prior to its implementation.

Use the worksheet to provide a systematic framework for the assessment of system risks, to prompt the identification and preliminary evaluation of hazards and risks, and to highlight the value of a clear system description as a prerequisite for assessment.



Resilient Operation

Use the [Resilient Operation](#) worksheet to determine those elements of a system that are core to its operation.

Adaptability – approach may be adjusted

Agility – approach can be changed rapidly

Robustness – approach must be the same

Flexibility – approach can be changed easily

Resilience is the process by which a system can face disturbance in such a way that it continues to perform in an acceptable manner. This can be reinterpreted to describe how a system needs to be constituted to ensure that its performance meets acceptable quality requirements.

Resilient operation is achieved when elements of a systems exhibit properties of robustness, adaptability, flexibility and agility in such a way that critical core elements are consistently delivered and variance is acceptable only where it does not impact these core elements.

Use the worksheet to identify those features of a process that are core to its operation, to determine which features must be delivered in common or related ways, and to understand where a degree of local variation is necessary.

Resilient Systems

Use the [Resilient Systems](#) worksheet to determine those elements of a system that are critical to its resilience.

Adaptability – approach may be adjusted

Agility – approach can be changed rapidly

Robustness – approach must be the same

Flexibility – approach can be changed easily

Resilience is the process by which a system can face disturbance in such a way that it continues to perform in an acceptable manner. This can be reinterpreted to describe how a system needs to be constituted to ensure that its performance meets acceptable quality requirements.

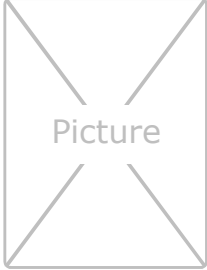
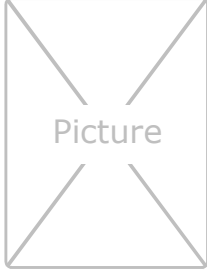
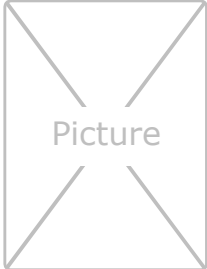
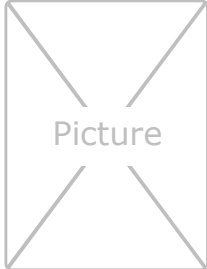
Resilient operation is achieved when elements of a systems exhibit properties of robustness, adaptability, flexibility and agility in such a way that the whole system performs consistently in the presence of likely and unforeseen disturbances, from planned change to unexpected shocks.

Use the worksheet to determine those features of a system that are critical to its resilient, to identify features that will be robust or adaptable in response to change, and to identify features that may be agile or flexible in response to change.



Persona Responses

Use the [Persona Responses](#) worksheet to capture likely persona responses to proposed systems improvements.

 A square box with a purple border containing a grey square with an 'X' and the word 'Picture' in the center.	 A square box with a purple border containing a grey square with an 'X' and the word 'Picture' in the center.
 A square box with a purple border containing a grey square with an 'X' and the word 'Picture' in the center.	 A square box with a purple border containing a grey square with an 'X' and the word 'Picture' in the center.

Personas are fictional characters which are created, based upon appropriate research, to represent the full range of different user types that might use a service, product, site or brand.

Using the previously created personas, predict their likely response to proposed improvements or changes to the system. Individual team members may wish to 'adopt' personas to review the changes, helping them to empathise with people with different needs and expectations, and to better identify with the stakeholders and system users.

Use the worksheet to predict the response of people within a chosen stakeholder group, to facilitate a preliminary evaluation of their response to a given situation, and to provide a simple means to reflect on stakeholder diversity that matters.

Design Measurement

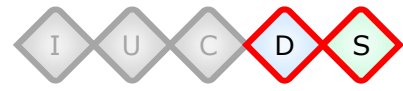
Use the [Design Measurement](#) worksheet to list the system stakeholders' needs and corresponding means to measure performance.

As a I need / require which could be measured by ...

Successful improvement depends on a wide range of stakeholders and system users who, at any point in time, will have different levels of interest in and power to influence such improvement. They will bring a range of perspectives to any programme and through their action or inaction can enable, actively encourage or frustrate progress.

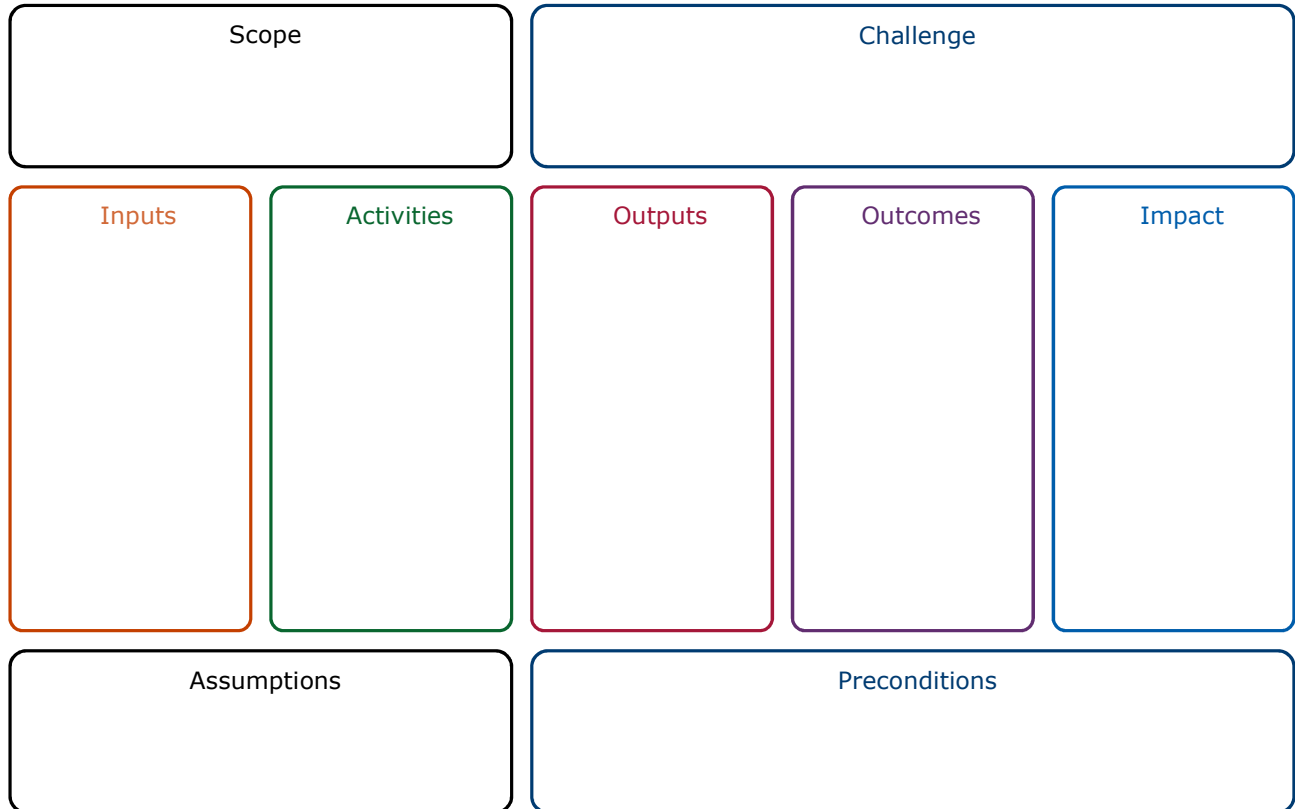
There is value in characterising stakeholders to ensure that they are sufficiently informed as to how the proposed system performance will be measured to provide evidence of alignment with their needs, in particular the prioritised needs.

Use the worksheet to remind the team of the stakeholders related to the improvement process, to capture the particular needs of the individual stakeholders, and to highlight the range and diversity of stakeholder needs.



Theory of Change

Use the [Theory of Change](#) worksheet to remind the team of the factors that define the activities required to deliver a successful programme.



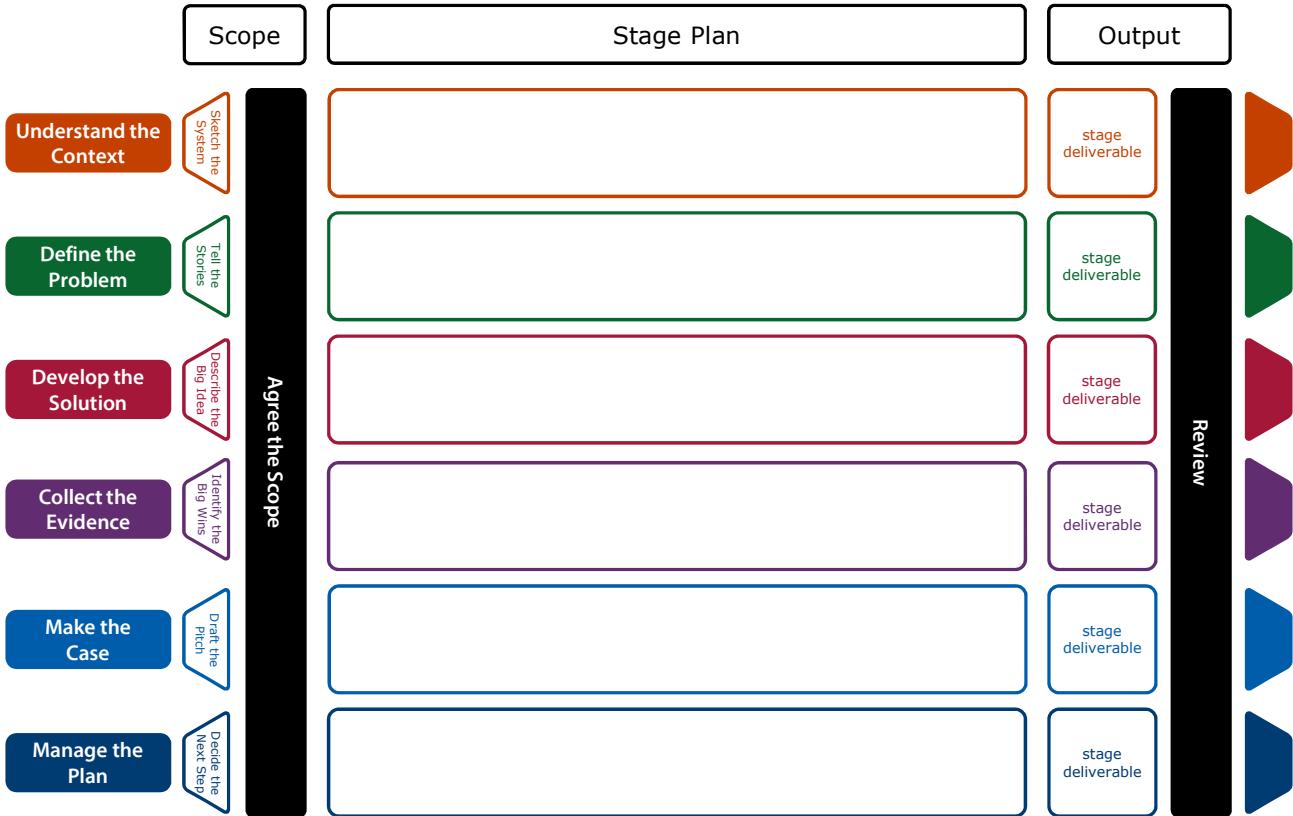
Successful improvement depends on a wide range of stakeholders and system users who, at any point in time, will have different levels of interest in and power to influence such improvement. They will bring a range of perspectives to any programme and through their action or inaction can enable, actively encourage or frustrate progress.

A theory of change identifies the scope and challenge of the improvement, records the assumptions made to arrive at this description, presents the preconditions required to initiate and deliver the improvement. This is supported by a case that identifies key costs, activities and benefits.

Use the worksheet to focus on the development of a viable theory of change that can be presented to key sponsors and enablers of the improvement process, building on the content of the Improvement Canvas.

Improvement Plan

Use the [Stage Plan](#) worksheet to select the elements of the improvement process that are required to deliver the desired outputs.










This model underpins the stage gates of an Improvement Programme, where progress is driven by clear objectives for each of the key elements at each stage of the programme.

The desired outputs or outcomes should be identified, based on the content of the Improvement Canvas for each stage of the Improvement Programme and the particular objectives of that stage.

The stage plan should identify the questions and activities that are required to achieve the specific understand stage deliverables. They are more likely to focus on understanding the context of the challenge and on defining the problem. Later stages will see a shift in focus to developing the solution and collecting the evidence. All stages should reflect the need to make the case and manage the plan.

Improvement Worksheets































Recommended 
 Optional 

Initiate  Understand  Co-design  Deliver  Sustain 











Agree the Scope

Improvement Canvas     































Understand the Context

Stakeholder Influence     
 Stakeholder Needs     
 Rich Picture     
 Influence Map     
 System Boundaries     
 Personas Descriptions     

Define the Problem

Design Themes     
 Design Requirements     

Develop the Solution

Morphological Chart     
 Design Solutions     
 Bowtie Method     
 Failure Modes and Effects     
 Resilient Operation     
 Resilient Systems     

Collect the Evidence

Personas Responses     
 Design Measurement     

Make the Case

Theory of Change     

Manage the Plan

Improvement Plan     