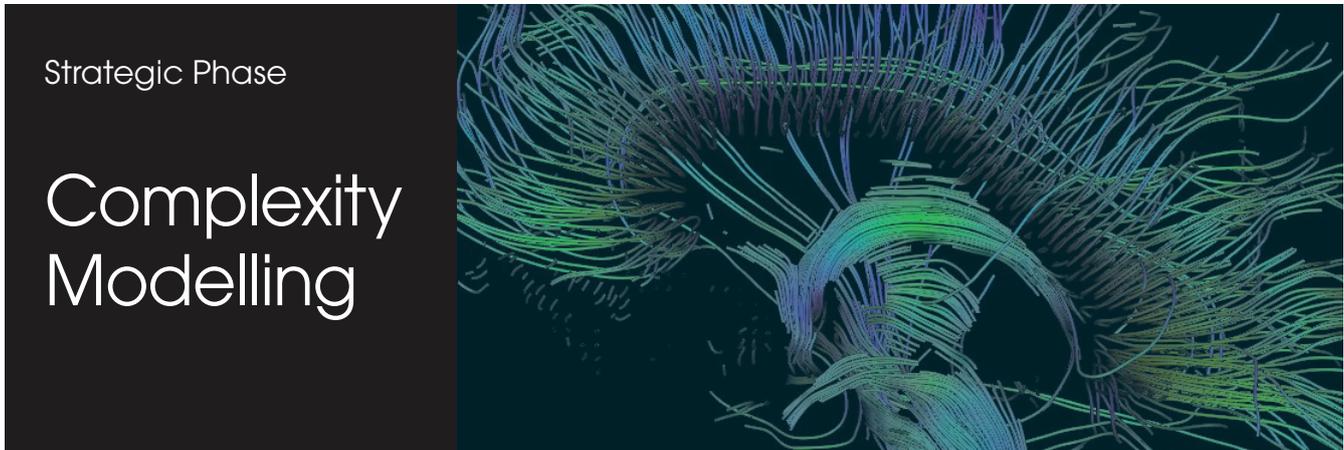


PROGRAMME LIFECYCLE							
STRATEGIC PHASE				DELIVERY PHASE			
INITIATION STAGE	DEFINITION STAGE	ESTABLISHMENT STAGE	MANAGEMENT STAGE	DELIVERY STAGE			CLOSE
PROGRAMME OBJECTIVES	PROGRAMME SCOPING	PROGRAMME PRIORITISATION	PROGRAMME OPTIMISATION	FEASIBILITY	DESIGN	IMPLEMENTATION	CLOSEOUT STAGE
			Complexity Modelling				

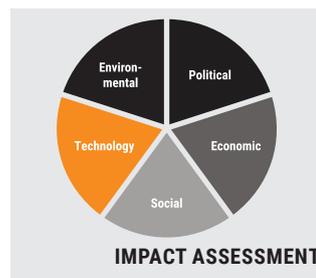
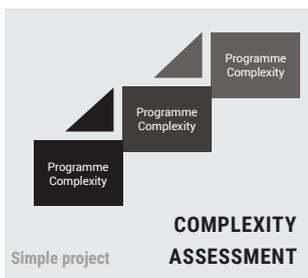


## Helping Asset Owners effectively Optimise programmes of work.

By the Introduction of Project Optimisation using Project Complexity Modelling as part of a Risk Potential Assessment (RPA).

### What is Complexity Modelling as part of Risk Potential Assessment (RPA)?

The purpose of using a complexity modelling process is to enable the Asset owner to assign the right level of governance and the appropriate lifecycle that's needed to a project based on its complexity. This provides a structured but flexible approach that is scalable to all the projects within the programme delivery tranche.



Each project in the programme will be scored against a range of criteria to give an overall Complexity rating. The criteria may include several elements which can be tailored to suit the Asset Owner's organisation, but will usually include factors such as: budget, timescale, number of suppliers, process.

Once a project has been scored it can then be allocated its governance and lifecycle requirements in line with a scoring matrix.

This could be used in isolation on a programme but in most cases it forms part of a process known as Risk Potential Assessment (RPA) which looks at both the complexity of a project and the consequential impact of the project.

### Where Does Complexity Modelling Fit into the Overall Programme Cycle?

The Complexity Modelling process is positioned in the Management stage within the Strategic phase of a capital programme. However this process can be revisited at any future stage especially if a project encounters change and becomes more complex.

The UK Government advocates the use of the Risk Potential Assessment model (RPA) for use on Gateway reviews and provides an example of a complexity model with multiple assessment factors.

A Detailed example for large scale Government projects can be found at the following web addresses:

<http://www.gov.scot/Topics/Government/ProgrammeProjectDelivery/Template/IATemplates/RPA>

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/61376/Risk\\_20Potential\\_20Assessment\\_20Form\\_20June\\_202011.doc](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61376/Risk_20Potential_20Assessment_20Form_20June_202011.doc)

<http://healthgatewayreviews.org.uk/wp-content/uploads/2013/09/Health-RPA-April-2010-Version-3.doc>



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### Why Do We Need Complexity Modelling?

The use of a complexity scoring matrix allows the Asset Owner to make informed decisions on how best to determine the lifecycle, governance and reporting regime for each project in a programme.

When working on large scale capital programmes, it is important to clearly understand the level of complexity of the projects that are making up the specific programme. This means as the programme moves a tranche through the strategic phase there is a need to introduce a triage facility to understand the work that's being proposed to be released into the delivery phase. This triage facility checks that the proposed projects are within the programme tolerances the specific Asset Owner can accommodate.

Following the assessment, the application of a controlled mitigation approach is introduced as part of each individual Project Execution Plan and is commensurate with the complexity highlighted. This approach brings the individual projects proposed in the programme tranche within the overall delivery tolerances.

When developing a large scale capital programme, the projects contributing to the programme will be a wide range of differing levels of complexity, from ones which are "simple" and those which are more "technically or managerially complex". By providing the criteria by which an organisation can assess project complexity, this then allows each project to follow a standardised governance process and allows an organisation to focus on high risk, highly complex projects before investing time on the less complex projects in a programme.

### Typical Complexity Model

**STEP 1** The complexity modelling process is to develop the criteria the Asset Owner organisation considers appropriate for assessing the complexity of its projects.

An example of such a model with seven complexity factors is shown below:

Project Complexity Assessment					
	Factors	Criteria Of Low Scale	Score	Criteria of High Scale	
1	Complexity	Number of Stakeholders	One key stakeholder fully bought into project	4	Ten or more key stakeholders internal and external
2		Technology	No new technology involved	2	First or extensive use of new technology with limited knowledge
3		Knowledge of Delivery Team. Use of DICE score.	Fully experienced, resourced and small skilled team	3	Inexperienced scarce resources and no previous experience of application
4		Equipment Framework Suppliers and Sub Contractor	Single Equipment provider or single sub-contractor.	3	Reliant on many 4+ suppliers delivering to cost and time
5		Long Lead Procurement Items	No Long Lead Procurement Items	5	Large amounts of off-site bespoke manufacture needed
6		Project Funding/Cost	Funds available project costs under £100k	2	Funding not secured, estimates unreliable costs exceeding £1m
7		Project Timescale	Short duration (under 3 months), no external drivers	2	Challenging schedule, limited contingency duration over 18 months
<b>Total Project Complexity Score</b>			<b>20</b>		

It is important to have a standardised scoring calculation; for the Complexity and Impact assessments the scoring is on the following sliding scale:

Relative Complexity/Impact	Complexity/Impact Score
Very Low	1
Low	2
Medium	3
High	4
Very High	5

### Typical Governance Model Based On Complexity

**STEP 2** in the process, is to define the programme governance requirements needed based on the individual project scores. This ensures the due diligence is applied appropriately and consistently.

Example of Governance and Lifecycle requirements determined by a Project Complexity scoring model:

Governance Lifecycle Model Based On Complexity Score							
Score	Sponsor	Project Board Required	Level of PM Required	Project Monitoring	Project Lifecycle*	Runway *	Gateway approval Level
Up to (7+1)= 8 (Simple)	Programme level but with delegated authority to PM	No	Junior Project Manager	Reduced	Simple (single solution COTs)	1	Department Level
9 to 14 (Medium)	Programme level but with delegated authority to PM	No	Project Manager	Monthly	Simple (single solution Bespoke)	2	Department Level
15 to 21 (Medium)	Programme Level	Optional	Project Manager	Monthly	Medium (Multiple Solutions COTs)	3	Department Level
22 to 28 (High)	Portfolio Level	Yes	Project Manager	Fortnightly	Complex (Multiple Complex Solutions)	3	Divisional Level
Over 28 (Very High)	Board Level	Yes	Senior Project Manager	Weekly	Complex (Multiple Solutions, usually contains sub projects)	4	Board Level

\* Project lifecycles are not described in this document

Once the project has been scored it is then allocated a governance and reporting route. This is based on a typical scoring matrix as shown above. The project used as an example scored 20 and therefore follows the process for a Medium Complex project. The information would be included as part the Project Execution Plan.

### Typical Governance Model Based On Impact

**STEP 3** in the process is to develop the impact assessment. The impacts that a project have on the surrounding business and community environment can apply stress to the project. In many cases this can be expressed using a PESTLE analysis (Political, Economic, Social, Technological, Legal, Environmental). In other more insular projects a smaller impact assessment, more bespoke to the Asset Owner, is carried out.

Project Impact Assessment				
	Factors	Criteria Of Low Scale	Score	Criteria of High Scale
1	Customer	No Impact	1	Major change in Behaviour
2	Risk exposure	No Risk Exposure	1	Major potential impacts to reputation or processes
3	Internal	Minor impact to small team	3	Major impact to many business areas
4	External	No impact to external stakeholders	1	Major change in Behaviour for external stakeholders
<b>Total Project Impact Score</b>			<b>6</b>	

Example of Project Impact scoring model

**STEP 4** in the process is to define the programme governance requirements needed based on the individual project impact scores. This ensures the due diligence is applied appropriately.

Score	Sponsor	Project Board Required	Level of PM Required	Impact Monitoring	Gateway approval Level
Up to (4+1)=5 (Simple)	Programme level but with delegated authority to PM	No	Junior Project Manager	Reduced	Department Level
6 to 8 (Medium)	Programme level but with delegated authority to PM	No	Project Manager	Monthly	Department Level
9 to 16 (Medium)	Programme Level	Optional	Project Manager	Monthly	Department Level
13 to 16 (High)	Portfolio Level	Yes	Project Manager	Fortnightly	Divisional Level
Over 16 (Very High)	Board Level	Yes	Senior Project Manager	Weekly	Board Level

Example of Governance and Lifecycle requirements determined by a Project Impact scoring model

Once the project is scored it is then allocated an Impact management route based on a scoring matrix as shown. The project used as an example scored 6 and therefore follows the process for a Medium Impact project. The information would be included as part the Project Execution Plan. Where there is discrepancy between the complexity and the impact model, the most onerous measure should be adopted.

### RPA Tolerance Appetite Matrix combining complexity and impact

For all projects within a Programme a tolerance appetite matrix should be developed. This ensures that when work is moved from the strategic phase to the delivery phase the approach taken is within a pre- agreed boundary criteria. Subject to the type of work being undertaken in the Programme the Asset owner will set the parameters on the amount of perceived risk the projects can take.

If the required project is outside the risk tolerance / appetite range for the overall Programme, the project will need to amend its approach to either reduce the complexity or impact,

i.e. change the project team, alter funding arrangements, and change procurement strategy.

In the Strategic Phase of the Programme only a very high level of the perceived solutions and impacts will be understood.

### Assessing the Benefits for the Business?

There is a general consensus that projects and programmes that consist of many interdependent and dynamic activities are complex. Therefore failure to understand this complexity often leads to project failure and potentially the programme failure. This method of complexity modelling helps the organisation to diagnose project complexity before the programme tranche moves into delivery; it also provides invaluable information to the programme boards and leadership teams. For reference it is important to note that the model and technique will require refinement and ongoing review to ensure the scoring mechanism is appropriate and not subjective.

Programme Tolerance / Appetite Matrix							
Complexity	Very High	5	Orange	Red	Red	Red	Red
	High	4	Orange	Orange	Red	Red	Red
	Medium	3	Green	Orange	Orange	Red	Red
	Low	2	Green	Green	Orange	Orange	Red
	Very Low	1	Green	Green	Green	Orange	Orange
			Very Low	Low	Medium	High	Very High
			1	2	3	4	5
			Impact				

Pre agreed tolerance / appetite level for specific programme stream / tranche

### Key Benefits

- Constant Standardized Approach
- Every project can be scored
- Provides effective governance on projects
- Identifies highly complex projects

Dice is a patented mathematic formula for checking the health of a project developed by Boston Consulting Group (BCG)



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