THE BEHAVIOURAL INSIGHTS TEAM

Behavioural Insights Team

An Exploration of Potential Behavioural Biases in Project Delivery in the Department for Transport

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1. Introductory summary

Project background and aims

The Department for Transport (DfT)'s Governance Division, and Social and Behaviour Research Team jointly commissioned the Behavioural Insights Team (BIT) to conduct exploratory research into potential behavioural biases and heuristics in judgment and decision-making in the delivery of projects within DfT and how to drive improvements to overcome these potential biases. Behavioural biases and heuristics affect humans in many kinds of situations, and policymakers and government departments are no exception. The aim of this project was to harness BIT's expertise to develop behavioural informed solutions for improving project delivery.

The project was designed to:

1. review the current evidence of behavioural biases and heuristics in judgment and decision-making in project delivery;
2. understand current departmental processes and systems in order to assess how particular behavioural biases are manifest in DfT project delivery and assurance; and
3. generate ideas and processes that could potentially manage and reduce identified behavioural biases.

Project scope

To manage the project's scope it was decided that the research would be structured around three common biases that affect individuals in a number of contexts, including project delivery:

- Planning Fallacy – people's tendency to make overly optimistic predictions about the resources it will take to complete a future task or project. Addressing this would support more realistic project planning and delivery to specification (such as costs, time, and benefits forecast).*
- Groupthink – people's tendency to be influenced by the opinions and actions of others when operating within a group. Addressing this would encourage an environment where assumptions are challenged and a wider range of ideas are considered.
- Sunk Cost Fallacy – people's tendency to make decisions based on project costs (including time, effort and money) that have already been incurred, cannot be recovered and have no impact on future outcomes. Addressing this could allow losses to be minimised and encourage people to recognise the opportunity costs of continuing to commit to a particular project approach where there are better alternatives.

* DfT devotes considerable time to generating estimates of risk and cost, and has a structured process and definition for managing optimism bias related to risk and cost. As such, we do not focus on optimism bias in this project, and we focus primarily on planning estimates. We also address some behavioural factors that are in part caused by the other two biases of interest that could lead to inaccurate perceptions of risk.

However, as this report reflects, research has not been confined to these biases as frequently there are other heuristics and biases at play that should also be captured and considered in order to provide full advice.

In addition it was decided that the project would only consider a subset of the Department's major or 'Tier 1' investment projects. Tier 1 projects are considered by BICC* as representing the most risk to the department.

Project methodology

BIT conducted preliminary desk research to gather evidence from the theoretical and empirical literature on the three biases. A full literature review is included in an accompanying document, though the key findings are integrated throughout this report.

The field research included reviewing documents from BICC and from seven projects selected by DfT, conducting 13 interviews (of staff of different levels of seniority, though mostly Senior Responsible Officers and Project Directors, working on projects in different stages). We also attended three BICC meetings and three project board/governance meetings. These interviews took place during March and April 2016. The discussion guide for the interviews is in Appendix A.

Given their scale and scope, Tier 1 projects are necessarily complex: they involve multiple stakeholders, teams, governance boards, and take place over a long period of time. Managing such projects is very challenging due to their complexity and this exploratory project only touched the surface of many of these challenges. It is worth noting that this complexity can itself be a cause for project overruns, though addressing this is beyond the scope of this project. Instead we focus on the behavioural biases which are likely to exacerbate the challenges associated with large and complex projects.

Our interviews and observations were a snapshot of the projects and were conducted primarily with the senior team working on those projects. As many of these behaviours and biases manifest over time, we can only draw conclusions from what we were told and what we observed. The purpose of this report was to look at processes and governance surrounding projects to understand the scope for bias to arise in general, and not to assess decisions that have been made on individual projects. Relying on self-reported data brings a number of challenges, such as the known gap between what people say and what they do, as well as certain biases that affect planning (such as self-serving biases, which lead people not to be accurate judges of themselves). However, we were able to gain useful information and insights during this exploratory phase that have guided the development of solutions and ideas for further research.

Though it did not emerge in our limited interviews and observations, it is possible that these proposed solutions are already implemented in parts of the Department. Had we been able to speak with more

* DfT's Board Investment and Commercial Committee (BICC) approves business cases and commercial decisions for DfT's portfolio of Tier 1 projects. BICC is chaired by the Permanent Secretary, and is made up of DfT's most senior officials.

individuals across a greater number of projects, we would have been able to better identify where such processes may already exist.

BIT are world leaders on behavioural biases and insights, but are not specialists in the theory of project delivery. As such, the focus of the project was on behavioural biases and insights. This may have influenced our critical analysis of interviewees' project delivery knowledge and views. However, our expertise and independent perspective enabled us to approach this project with an outside view, which as we detail below, can be an advantage in overcoming certain biases.

Anticipated benefits

In commissioning this project, DfT believed that reducing biases in project delivery decision-making could:

- save money and/or increase value for money, for example by supporting more accurate forecasting of project scheduling and spending;
- improve the working environment, for example by designing more productive working systems and practices; and
- improve expertise in new and innovative techniques and practices for project delivery and managerial judgement, making DfT a leader across Whitehall.

Overview of findings, solutions, and the biases they address

All of the solutions have been developed to be 'scalable' and widely applicable, meaning they have the potential to deliver significant impact across DfT, including for Tier 2 projects, and potentially across other government departments.

The following table provides an overview of the evidence and proposed solutions DfT should consider to address the three biases explored in this report. The solutions outlined in this document were identified based on our preliminary findings, but require further development in conjunction with DfT employees to determine their suitability for the DfT project delivery context before implementation. The evidence from observations, interviews, and the literature review were consolidated using a methodology described in detail in Appendix B.

	Evidence overview	Bias	Proposed solution	Proposed solution overview
Solutions (BIT proposed)	There was evidence of strong group dynamics, which is good for project team morale and can lead to smooth project delivery; however these strong dynamics can sometimes also lead to groupthink. There is a concerted effort to promote a culture where it is safe to raise risks; however some interviewees suggested that employee confidence to raise risks is varied. . The risk culture may be focused on certain, easily accessible risks while overlooking others.	Planning fallacy Groupthink	Pre-mortem	A pre-mortem requires decision makers and project teams to imagine that their project has failed and to work backwards to conceive of all the possible reasons why it has failed. The pre-mortem can also be designed to minimise groupthink by requiring individuals to first consider risks and scenarios independently and then discuss them anonymously. The objective of the pre-mortem is for project teams to better identify risks and plan mitigation strategies accordingly.
	DfT already collects milestone data and other reporting data, which can be further built upon to enable DfT to better analyse project timelines. Planners receive limited feedback on the accuracy of their estimates.	Planning fallacy	Data collection and digital transformation	Enhancing data collection would allow DfT to perform greater analysis across its project portfolio. DfT could use data to provide feedback and prompts to planners. For example, planning documents could include default estimates for completing different project phases.

	Evidence overview	Bias	Proposed solution	Proposed solution overview
Solutions (BIT proposed)	Overall, interviewees felt positively towards BICC and the value the existing governance structures provide. Some interviewees found the governance landscape confusing to navigate at the start of a project. Sometimes, governance processes took longer than planners expected (in part due to lack of information), which may cause project delays.	Planning fallacy	Interactive governance map	An interactive governance map to enable team members to fill in pertinent details relating to their project and obtain a list of the necessary board approvals required for the project. In addition we would suggest providing information about the average time required to get approval at each stage.
	Interviewees found having an external perspective to be effective at challenging assumptions. This outside view is not available at all levels, such as for more junior team members responsible for planning elements of the project.	Planning fallacy Groupthink Sunk cost fallacy	Red teaming	Systematically introducing a 'red team' or devil's advocate process to challenge a project team's assumptions and plans can provide independent critical thought to improve decision-making. A red team could generate an alternative project plan or resource estimate independently from the project team. This takes place in Highways England with respect to cost estimates, and could be further expanded across the Department with respect to both cost and time estimates.
	There are processes within DfT for recording lessons learned, However, the interviewees typically do not make best use of the lessons learned documentation, but rather engage with lessons learned through their networks or more engaging formats (such as workshops).	Planning fallacy	Disseminating lessons learned through support network	Creating more engaging methods of sharing lessons learned through a support network and more timely prompts to reflect on these lessons could better ensure lessons are effectively disseminated across projects and the department.
	There were mixed views on whether the Department is supportive of modifying or stopping projects mid-delivery. Most interviewees felt such actions could be viewed negatively, with some concerned about potential reputational risks.	Sunk cost fallacy	Decision trees	Decision trees allow decision makers to easily navigate a decision, focus on the pertinent aspects of a decision, and remove extraneous 'noise' - such as sunk costs - from the process. Such a process could be used in project delivery, not necessarily to set the course of a project, but to flag when project decisions should be subject to further scrutiny. This could be particularly effective at tackling sunk-cost bias, prompting project managers to break the 'escalation of commitment' by clearly signposting at what point a project warrants reconsideration.

	Evidence overview	Bias	Proposed solution	Proposed solution overview
Solutions (DfT proposed)	Some interviewees revealed that the levels of governance can sometimes put a perceived undue burden on project teams.	Planning fallacy	Streamlined governance requirements	One way to reduce the hassle of reporting, and thereby reduce the cognitive load of the project team, would be to streamline governance requirements, such that teams can have a repository of information that they only have to modify slightly for different groups.
	One interviewee thought that it would be worthwhile for BICC members to perform a reflective function.	Sunk cost fallacy	Using BICC as a reflective forum	Regular public reflections on successes and failures are a good opportunity to share lessons learned and could reduce some of the reputational concerns surrounding the sunk cost fallacy, as a culture of acknowledging and accepting mistakes is promoted.

Structure of this report

The rest of the document is structured as follows:

- **Section 2** outlines the evidence from desk research and interviews research and puts forward solutions that could address some of the issues connected to the biases of interest in this report
- **Section 3** sets out recommendations that were put forward by DfT employees
- **Section 4** provides concluding remarks

2. Evidence review and proposed solutions

This section sets out the relevant evidence of behavioural biases and heuristics in project delivery, gathered from our interviews observations, and literature review. It puts forward six recommended solutions to manage and reduce these behavioural biases.

The following subsections are organised by solution (expanding upon the summary table on pages 6-7). Unless otherwise noted, the evidence relating to DfT processes is from interviewees. The evidence supporting the solutions is organised by bias, although it is important to note that in the real world, as opposed to in a lab setting, it can be difficult to disentangle the various biases and psychological factors and determine which is having the strongest role. We have made links between the evidence where appropriate to account for this.

A. Pre-mortem

Solution overview

A pre-mortem requires decision makers and project teams to imagine that their project has failed and to work backwards to conceive of all the possible reasons why it has failed. The pre-mortem can also be designed to minimise groupthink by requiring individuals to first consider risks and scenarios independently and then discuss them anonymously. The objective of the pre-mortem is for project teams to better identify risks and plan mitigation strategies accordingly.

Evidence review

Approaches to risk

Interviewees confirmed that there is a lot of risk and uncertainty inherent in the major projects DfT sponsors and/or delivers, especially when projects of a similar scope or nature have never been done before. Interviewees mentioned the prevalent use of risk reviews, and recognised the potential for developing more effective ways of identifying, recording, and managing risk. For example, one interviewee noted that creating a long list of possible risks doesn't necessarily translate to effective prioritisation and risk management, stating, *"There is no point having a beautiful risk register if there are 50 things on it."* Another senior interviewee criticised the process because it calls for putting together a risk assurance plan before deciding how to do the project: "*risk should not be driving project development*."

Some interviewees suggested there to be high levels of risk-aversion in the Department. In addition, there was some concern that the Department was overly focused on specific risks, at the expense of identifying and mitigating other, known or unknown, risks. We found evidence of the **availability heuristic,** whereby individuals evaluate the probability of an event occurring by the ease with which relevant instances come to mind, for example due to previous high profile incidents.[1] This could lead individuals to focus on risks with low probabilities but high impact, particularly when they have had recent high profile occurrences.

This perspective can also lead to **confirmation bias,** which leads planners to seek out, focus on and remember information which supports their existing worldview, such as a projection of success.[2] This has the potential to apply both to past projects (a tendency to selectively recall successes over failures), during current projects (ongoing feedback and progress will be interpreted selectively and unevenly), and when planning new projects (information on alternatives will be skewed to confirm to prior beliefs).[3]

Finally, there is an element of unavoidable risk that Tier 1 projects take on when delivery dates are fixed due to political or external factors. For example, when fixed deadlines apply project teams might not be able to change project timescales and instead might have to change how they approach the delivery of the project. This is likely to be a necessary trade-off at times: some projects simply have to launch on a certain date. However, interviewees noted that if these trade-offs are not fully acknowledged up front, then teams may not plan according to fixed requirements.

Groupthink

A consistent theme of the interviews was the strong group dynamics in project teams. Interviewees recognised that having a project leader the team admired and felt accountable to created a strong project team. One person felt that their team was motivated to deliver a high-quality output on time in part because they wanted to support their project director. One leader we spoke with also described the importance of "*leaning in*" and being in touch with the people on the ground delivering the project. Another described the importance of taking the time to get to know the project team before beginning, in order to understand what excites each person individually to create a "*shared vision*" of the project. This idea of creating a shared vision within the DfT team and amongst the various stakeholders was echoed in most of the interviews.

Interviewees emphasised the integral role of trust to the smooth functioning of a team. A high level of trust was cited as a factor that enables people to extend themselves into new areas, as well as allowing them to raise concerns. In addition to providing that forum, good leaders are able to create an environment of **psychological safety**, whereby team members feel safe taking 'interpersonal risks,' that is to say, team members could express wild ideas or challenges without fear of being harshly judged.[4] Project leaders expressed how they try to cultivate a culture of psychological safety on their teams; one more junior interviewee cited a Project Director who, by providing deliberately outlandish suggestions, led project members to feel comfortable raising their own ideas. However, this was not always the case. One interviewee said that on more than one occasion they felt they could not raise concerns to senior team members regarding risks.

Psychological safety has its obvious advantages and will often help create a strong team work ethic likely to benefit collaboration and smooth project delivery. However, such group dynamics also introduce the risk of groupthink. **Groupthink** refers to people's tendency to be influenced by the opinions and actions of others when operating within a group. Group thinking can lead to a "deterioration of mental efficiency, reality testing [*questioning and testing beliefs against reality*], and moral judgment".[5] Groupthink has been studied in a range of contexts, including in political, military,

judicial and corporate decision making, and has been documented in a range of government projects.[6,7,8] It often occurs when there is high group cohesion, a strong and directive leader and a sense of urgency.[9]

Most commonly, groupthink leads to the emergence of a middle-ground, non-contentious viewpoint, arising because people are wary of challenging others' views or of creating conflict.[10,11] Group members can also be more concerned with reaching a consensus view than with reaching the best view, and because of the lack of questioning, groupthink can also lead to overconfidence in the decision.[12] This can be observed in project planning, particularly when cohesive groups make collective decisions or time estimates without taking account of all viewpoints. One interviewee recognised that, regarding issues that may or do arise, many employees *"have the right answers, they just don't have a forum to express them."*

In addition, groupthink and group dynamics can lead groups to an overly optimistic outlook which could lead to optimistic cost and time estimation. Experiments suggest that this is because groups (more than individuals) tend to focus on factors that promote the successful completion of a task.[13] This may also be rooted in the group dynamic promoting a positive 'we can do it' attitude, an attitude that emerged in many of the interviews as something that is actively promoted.

Proposed solution

Pre-mortem

A solution to overcome the planning fallacy (especially with respect to unforeseen risks) is to think about why a project might fail at the outset.[14] To reduce optimism bias and planning fallacy, Gary Klein developed the idea of a **pre-mortem**.[15] Drawing on "prospective hindsight", that is adopting a backwards-looking perspective on something that might occur, a pre-mortem requires decision makers and project teams to imagine their project has failed and to work backwards to imagine all the reasons why the project would have failed.

Experiments show that people consider more potential risks that could lead to failure when contemplating an imaginary past failure compared with considering a possible future failure. Imagining that the event has already occurred can improve a person's ability to correctly identify reasons for future outcomes by 30 percent.[16] A pre-mortem can also be used to overcome groupthink if individuals write their ideas independently and anonymously before having a group-wide discussion on project risks. This would provide team members with a "f*orum to express the right answers*" and would also provide a platform for junior members to raise concerns anonymously without fear of being censured by more senior members. Finally, by reviewing these risks in a wider forum the project team will find it harder to dismiss the risks raised. It would also be potentially useful to include with people external to the project in the pre-mortem (see next section for discussion of benefits of using people from outside the project team).

A pre-mortem could be used as an alternative to or in addition to risk workshops. At the start of the workshop, project team members and stakeholders would come together and be told that their project has failed. Delivery partners or people with delivery experience, who we were told are often not included in the planning stages, can be included in this exercise too, as their experience could lead them to raise issues that may be overlooked by the project planners. After learning about their project's 'failure', the participants would then be asked independently to write why the project failed (potentially by using a *Thinkgroup* format, described below). They would then come together as a group and discuss the risks, prioritise them, and develop mitigation strategies. The output would be a comprehensive risk register-like document that could be revisited throughout the project.

Thinkgroup

The Behavioural Insights Team uses a meeting format called *Thinkgroup*, designed to overcome many of the group dynamics underpinning groupthink. The format is designed to minimise social influence and the presence of strong leadership during idea-generation phases of a project, although the process is applicable to other types of decision and discussion. All team members log-in to an online document, and rapidly brainstorm ideas anonymously. This maintains the benefits of seeing other suggestions (which can help prompt further ideas), but removes the tendency to conform and confirm ideas through peer pressure and aversion to conflict. It also encourages spontaneous and 'blue-sky' ideas to be presented without risk of embarrassment. This greatly increases the breadth of ideas offered.

The system could be expanded with document templates developed for various purposes, such as idea generation, challenging and critiquing decisions and risk identification.

B. Data collection and digital transformation

Solution overview

Enhancing data collection would allow DfT to perform greater analysis across its project portfolio. DfT could use data to provide feedback and prompts to planners. For example, planning documents could include default estimates for completing different project phases.

Evidence review

Data collection

DfT provided BIT with portfolio management reporting templates for six of the seven projects we reviewed.* These templates contain the information that different projects must report to BICC, typically on a quarterly basis. Each project has separate spreadsheets for each quarter, resulting in multiple spreadsheets that provide snapshots of a project for a given moment in time. Although this

* The seventh case was omitted because it had just become a BICC project and therefore had not yet engaged in BICC reporting.

information is aggregated into quarterly BICC portfolio reports, the format and layout of the templates make it challenging to track the project development and milestone changes over time.

For the purposes of our analysis we considered the following milestones (which are consistent across projects): BICC approvals (Strategic Outline Business Case, Outline Business Case, Full Business Case), Start of Construction, Start of Operation, and End of Project. The table below outlines the common milestones and available data for each of the six projects, across two years' worth of data. As can be observed in Table 2, not all projects recorded or categorised milestones in the same way.

Table 2: Presence of information on project milestones in BIT dataset

Project	Start Date	SOBC BICC Approval	OBC BICC Approval	FBC BICC Approval	Start Of Construction	Start Of Operation	End Date
1	Y	-	Y	Y	Y	Y	-
2	-	-	-	Y	Y	-	Y
3	-	Y	Y	Y	Y	-	Y
4	Y	-	-	Y	-	Y	-
5	-	-	Y	-	-	-	-
6	-	-	-	-	-	-	-

Note: (Y= data available)

Due to the exploratory scope of the project, as well as the gaps in consistent milestone recording, we were unable to perform a definitive data analysis to quantify delays and the accuracy of project estimates. *

Data can be used to provide feedback

Accurate and consistent data collection is important using data to provide clear and timely feedback has been shown to be effective in changing behaviour. For example, BIT recently ran a randomised controlled trial that provided feedback to GPs about their level of antibiotic prescribing relative to other GPs in their local area. Telling GPs that they had higher than average rates of prescribing, and providing strategies to reduce unnecessary prescriptions, led to a 3.3% reduction in antibiotic prescribing rates compared to GPs who did not receive feedback. [17]

Additionally, the very act of reporting and collecting data may change behaviour, particularly as it sends a signal that accurate estimates are valued and noticed by the department (and by extension, inaccurate estimates are also noticed). This idea is reflected in the Midata programme launched by the Department of Business Innovation and Skills, which gives consumers the right to request their transaction information from firms in a portable machine readable format. Receiving this information in

* With additional time and resources it may be possible to perform this analysis with similar data for projects not in scope.

a usable format allows consumers to make decisions based on their prior behaviour (for instance, their energy usage).[18]

Relatedly, some interviewees mentioned that they used previous estimates and experience to benchmark their planning, whereas others did not. However, one interview noted that *"a good rounded project manager or SRO will recognise the landscape in which they are working, will be able to operate at pace, but will not over promise [...] because they know what they need to take into account when they are making judgments about how long it will take to do some things"*. Using accurate and relevant data from current and previous projects makes it easier for all project managers to consistently take these factors into account.

Proposed solution

Data collection

Many of our recommendations on how to offset the potential impact of behavioural biases and heuristics in project delivery in DfT rely on the availability of useful and useable data. DfT already collects data, but its data collection could be further developed to introduce new ways of making data available and useable. For instance, using historical data on previous estimates as a feedback prompt when teams are making new plans requires that this data be easily updated and accessible. Data collection can be a useful way of learning and drawing out relationships that may not be apparent on an individual project level.

We recommend that DfT take stock of the data it currently collects, whether it is currently collected in a format that allows for quantitative analysis, and where any additional data could be collected. A lot of useful information is already collected in various forms across the Department - for instance through portfolio management reporting. DfT could now work to ensure that this information is easy to find, use and understand. Continuing to collect and present data in an aggregated format will allow DfT to gain a better understanding of the presence and magnitude of delays across the portfolio.

A sensible starting point is to make small changes to already mandated data collection that would generate output in a way that is usable for team members and boards. As discussed in the evidence section, the 'milestones' section of reporting documents are a valuable source of information on how project delivery schedules change over time. BICC should continue to encourage project teams to report against a common set of milestones to allow for analysis across the portfolio.

BICC could begin to track and report how long it typically takes for a project to cycle through the process for each approval. Other data, such as the median time needed to develop a Full Business Case could also be calculated from previous projects. This historical data could provide planners with a useful benchmark of how often, and by how much, their estimates differed from reality. This would inform their future estimates such that planners would not have to exclusively rely on anecdotal experience or peer networks. BICC could use data to track and report how long it typically takes for a project to cycle through the process for each approval.

This data could be presented in the form of an internal version of the live dashboards DfT currently produces to visualise the take up of government services.* Project delays could be easily quantified and visualised over time and by milestone, and the dashboard could automatically pull from updated estimates sent to BICC to generate these reports.†

Using data to deliver timely feedback

Providing planners with feedback on the accuracy of their estimates, as well as ways to improve these estimates (for instance by benchmarking from historical data) could improve the accuracy of estimates.

Lessons learned are typically most prominent at the end of a project, when the impact of particular decisions and processes is most apparent. However, the time at which they are perhaps most useful is at the beginning of a new project, or at other key points such as the start of delivery or Full Business Case completion. Extensive research has found that providing benchmarking data, even in cases where there is little information to inform estimates, have been found to deliver better estimates of outcomes in an uncertain climate.[19]

Planners should be encouraged to use *"reference class forecasting".*[20] This is already taken into account in the Department's approach to addressing optimism bias with respect to cost estimation, and we recommend expanding it to time estimation.

Reference class forecasting is an approach to generating estimates which requires planners to:

1. identify an appropriate reference class;‡
2. obtain the statistics for these classes and use them as an anchor for a baseline prediction; and
3. adjust the anchor based on project specific information.

This process is vulnerable to bias if the baseline prediction, for example a time estimate for the contracting phase of the project, is based on an individual's memory, rather than the historical evidence.

Planning documents could also include default estimates for particular stages. Linked to our recommendation above to provide accurate data on the average time taken to get board approval, this information could be pre-populated in estimate sheets. The defaults could be further tailored to specific project types (for example, sponsorship, and procurement). Team members would have to include specific justification for why they believed that their estimates would come under (or, less likely, over) the average DfT time. Using defaults would also likely reduce some of the burden on planners and streamline their processes, as well as nudge them to avoid making overly-optimistic time estimates.

* For example, see: https://www.gov.uk/performance/dft-check-your-own-vehicles-details
† This type of database management is not an area of expertise for BIT, and as such we recommend that DfT consult with data management groups to determine the most effective way of collecting and updating this live data.
‡ A pre-determined group of similar projects; even if an exact category or match cannot be found, it is better to use data from the most similar project than no data for benchmarking purposes.

Pre-filled historical data would also help to mitigate the knowledge lost when project team members change.

A longer-term solution would be to develop software that could include defaults and timely prompts to team members when generating estimates. This feedback could be personal: when filling out a timing estimate, an individual could be reminded, *"Your last three estimates for X ran overtime, consider including additional time"*. Alternatively, these prompts could include information from a wider subset of DfT projects, "*The Full Business Case typically take X to complete, consider adding additional time"*. The effectiveness of personal vs. broad feedback is something that DfT could evaluate in a randomised controlled trial.

C. Interactive governance map

Solution overview

An interactive governance map would enable team members to fill in pertinent details relating to their project and obtain a list of the necessary board approvals required for the project. In addition we suggest providing information about the average time required to get approval at each stage.

Evidence review

The majority of interviewees found BICC's requirements to be very sensible, avoiding *"form filling for form's sake"* and *"not exceptionally burdensome".* They noted that the procedures and business cases were useful for ensuring that the right decisions were made for the project; and felt that BICC asked useful and insightful questions which helped them to manage their project. However, one SRO mentioned that between the project's own internal assurance processes, DfT requirements, and other national/international bodies, there are lots of different levels of governance for DfT's most significant projects. The SRO noted that while the process has been streamlined, further streamlining could be beneficial.

A number of interviewees, with various years of experience working in the Department, suggested that the governance landscape could be confusing to navigate at the start of a project. In addition, interviewees found the purpose of some of the requirements unclear, or which boards they had to seek approval from. Additionally, some interviewees did find elements of the governance and assurance process burdensome, particularly as they perceived the paperwork and reporting requirements were not streamlined in all circumstances between different boards.

Interviewees perceived that a significant portion of project time is spent complying with governance requirements, and that project delays could thus be due to a delay in obtaining governance sign off rather than anything inherent to the project itself. These delays are not necessarily due to the governance processes, but rather may be due to a lack of understanding of how long governance

processes may take. As a result, this time is not always built into project plans and may cause unanticipated delays.

Additionally, some interviewees noted that BICC typically required additional information or work from a project team before making a decision or signing off on work. This is a necessary function of governance boards - and a signal that they are critically assessing projects - but the time required to satisfy this scrutiny must be adequately accounted for in planning estimates and communicated well, so that project teams are able to absorb the review within the project timeline. Multiple interviewees cited the need to "*wicket roll*", which involves seeking input from outside the project to see what needs to be done in advance of a formal meeting, helping the project manager ensure the right information is being supplied. . This type of informal activity might add to the time required for project governance tasks and needs to be factored into planning.

Overall, most interviewees were positive about the way BICC meetings are run and the general way BICC operates, with one interviewee noting that BICC provided *"very thoughtful and insightful questions of an assumption that we have made, which has forced us to think again about that particular assumption. [It] has added, at key points, significant value"*.

Proposed solution

An interactive online governance map could reduce the level of complexity surrounding governance. The interactive map would be a web page on the intranet with several templates for different types of Tier 1 projects. This would allow a team member to fill in some pertinent details relating to their project and obtain a list of the necessary boards and approvals required for the project. In addition, we would suggest providing information about the average time require to get approval at each stage in line with the data recommendations above. This map maybe challenging to create, however, this approach (even if not exhaustive) would be superior to static governance maps containing all potential boards across government, which interviewees found overwhelming.

An interactive map would also provide a platform to implement other recommendations in section 2B on providing updated data on board turnaround times and next meeting dates, to allow teams to incorporate these timings into their planning and estimates.

A low-tech alternative, or first stage, could be a comprehensive checklist for different project types with a list of tasks/assurances and estimated timings. Checklists have been shown to be effective at helping professionals reduce their errors in fields ranging from medical surgeries to aviation safety.[21]

However, it is worthwhile exploring whether the full ambition of the interactive governance map can be achieved. Not least because it is in line with the sentiment expressed by the Government Digital Service in its Digital Strategy that digital services should not be built to replicate paper forms and processes, but rather take advantage of the opportunities digital provides to build interactive, smart platforms.[22]

D. Red teaming

Solution overview

Systematically introducing a 'red team' or devil's advocate process to challenge a project team's assumptions and plans can provide independent critical thought to improve decision-making. A red team could generate an alternative project plan or resource estimate independently from the project team. This takes place in Highways England with respect to cost estimates, and could be further expanded across the Department with respect to both cost and time estimates.

Evidence review

Interviewees recognised the benefits of having a "*critical friend*" who can see the bigger picture and provide a different perspective. One interviewee noted the usefulness of incorporating outsiders in the project planning process, saying "*You become so close to an issue that you sometimes lose perspective. It helps to have, at those key points when it is really needed, an external view.*" A number of the SROs referred to the network they developed as part of the Major Project Leadership Academy (MPLA) or the Project Leadership Programme (PLP), which proved to be a useful resource for project management and delivery. The SROs mentioned how they were able to call upon senior project leaders from other government departments to provide outside perspectives. However, we found that this outside perspective that can mitigate biases, is not always readily available to project team members at all levels. For example, one of the more junior interviewees we spoke with did not have access to an established support network which could provide feedback on estimates and processes that they had developed on their own.

During two of the project governance board meetings we observed the board members successfully adopted an 'outside perspective' and challenged the assumptions (and resulting implications) of how a certain decision would affect the rest of the project. This is a promising start, because the biases discussed in the remainder of this section (e.g. the planning fallacy) affect individuals when they are introspective and planning their own projects, but are less prevalent when individuals evaluate the work and plans of other people, meaning 'outsiders' to the project can more effectively challenge assumptions..

<u>Some biases are not as prevalent when we evaluate others</u>

Optimism bias, as referred to in the psychological literature, is a cognitive bias leading people to think they are more likely to succeed, or less at risk of failure or of experiencing a negative event, than they really are. The bias manifests in myriad ways. For example, people tend to falsely believe they are less at risk of falling victim to crime than other people, and smokers believe they are less at risk of lung cancer than other smokers.[23] In the context of project delivery, this leads to consistent overestimation of success and benefit realisation, and under-estimation of cost and time resources.[24] Much of the miscalculation leading to project over-runs and over-spends occurs during the project planning phase[25,26] and so in this context optimism bias is commonly called the *planning fallacy*.[27]

A major cause of the planning fallacy is that people rarely consider their own past experiences with similar tasks.[28] Decision makers take an inside view of a project rather than considering the outcomes of previous projects.[29,30,31] This is because decision makers have a tendency to consider each problem as unique. They also tend to anchor future outcomes on plans and available scenarios of success, rather than past results, which leads to overly optimistic predictions.[32]

Planners are also affected by an **illusion of control** over uncontrollable events, leading them to underestimate the risk of unforeseeable or unavoidable set-backs. The illusion of control, along with optimism bias (and other biases discussed in further detail in the literature review in Appendix A) are all examples of 'positive illusions' – wishful beliefs about the world and our agency within it. Positive illusions are deep-rooted features of our psychology. Traits which are beneficial to our psyches and which motivate us to shape our environments, but which have not evolved for accurate forecasting. The illusion of control perhaps underlies the fact that those more deeply involved in a project are more optimistic about its outcomes compared to those less involved.[33] This means that people external to the project can be better placed to think rationally about planning estimates and risk assessments.

Proposed solution

Because there are myriad ways in which judgements of our own abilities and chances of success are distorted, whilst we maintain a more realistic judgment of other people, a degree of detachment and independence is therefore valuable. While many interviewees noted the value of a 'critical friend', there is opportunity to incorporate independent judgment into the planning process in a more systematic way, so that the responsibility to seek out this view is not resting with the project teams.

One way to achieve this is to introduce a 'red team' or devil's advocate process. A red team is established to challenge a group or project team's assumptions and plans, providing independent critical thought to improve decision making. Red teaming is a tool often used in the military and intelligence communities, to assess the assumptions, alternative options, vulnerabilities, limitations and risks of a decision.[34] This approach could apply to multiple aspects of project planning and decision making, and could align with the existing DfT Lines of Defence model, helping to overcome groupthink, planning bias and sunk cost fallacy.

With the role of the red team being to explicitly provoke and provide contrarian views, the strategy challenges group conformity, thus tackling groupthink. The group could also be used to provide an independent project plan or resource estimate, which helps tackle unrealistically optimistic timescales and plans. The improved accuracy arises from the external perspective of the red team, since the group is comprised of 'outsiders' less affected by the introspective biases underpinning the planning fallacy. If used strategically throughout the project the red team may also help overcome sunk cost fallacy, since a fresh perspective on the project at key milestones allows a judgement to be made unmarred by the psychological investment made in the project to date.

Anonymity and/or independence will make a red-team most effective:

- The groupthink and wider social psychology literature shows that people are often averse to raising contrarian views, particularly in the presence of strong leadership and within cohesive teams. By having a team whose role is explicitly to provide a contrarian voice, such views should become more acceptable. However there may be further value in the red team being anonymous to the main project team (similar to the 'thinkgroup' suggestion outlined in section 2A).

- If using the red team to generate an alternative project plan or resource estimate, there may be value in maintaining complete independence by developing the plan without knowledge of the primary project team's plans or estimates. The paper on Optimism Bias and Cost Estimation presented to BICC on 31 March 2016 provides an example of how Highways England have successfully developed a "*distinct cost estimation function with cost estimators being evaluated on the quality of their estimates and not whether the scheme proceeds. Cost estimators are organisationally separate from the project team although collaborate with them in order to obtain the necessary information on costs*". A red team could serve a similar function with respect to timing. Alternatively, because generating estimates is a resource-intensive task, instead of having the red team generate complete alternative project plans or resource estimates, it may be more feasible for them to work on a particular segment of the project plan as a balance check.

There is already some red teaming happening within DfT, but the evidence suggests that it is not widespread across the Department and not always conducted in a systematic way. There is potential for DfT to develop its approach to red teaming. We have learned from our DfT colleagues red team-like activities occur within HS2 and within rail franchising, but this did not emerge through our interviews. We therefore recommend further research into how this is implemented in practice, and how behavioural insights might increase its effectiveness.

E. Disseminating lessons learned through a support network

Solution overview

Creating more engaging methods of sharing lessons learned through a support network and more timely prompts to reflect on these lessons could better ensure lessons are effectively disseminated across projects and the department.

Evidence review

The length and scale of Tier 1 projects means that drawing on previous "lessons learned" is relevant for the project management process in two ways:

1. To allow DfT to apply the lessons to future work; and
2. To allow a project team to learn and incorporate lessons to adapt their approach throughout the project lifecycle.

These are particularly relevant given that project teams may consist of civil servants or contractors new to DfT (this was the case for a number of projects we reviewed). In addition, the members of project teams change over time and it is important that valuable lessons are passed onto new individuals working on the project.

Whilst there are already processes in place, the interviews suggest that the existing process for carrying out and disseminating project wash-ups and lessons learned could be developed. While there was some evidence of an SRO referring to old lessons learned documentation, the prevailing sentiment was that there could be a better way to learn from others' experience.

Interviewees reported spending time on writing up reports that they did not believe would be used in the future. One interviewee felt that lessons learned documents were *"something that you do, in some ways, to tick a box. You do it, you have a very reflective moment, and then whatever you produce gets put in a drawer and quietly forgotten about".* Another interviewee responded that *"of course"* the formal written up lessons learned documents are useful, but when asked about using them when planning new projects, the interviewee responded "*not always, is the truth…sometimes… part of the issue is finding them or knowing who to talk to, but we've gotten better at that."* Interviewees said that frequent staff turnover sometimes makes finding the right person to talk to challenging. Some interviewees felt that there was no clear path for how the lessons would be shared with the wider organisation, or incorporated into future projects. One interviewee noted, there "*needs to be collective learning and it needs to be captured a bit but it's the practical application of it. Need to have people who stay with a project long enough to learn from these things…*"

Although there are some barriers to using lessons learned project teams reported that when they did engage with lesson learned workshops or documents, they found them to be beneficial. For example, certain interviewees did raise instances in which lessons learned workshops or documentation from previous projects had been useful for planning similar projects. Interviewees also mentioned peer and professional networks a number of times as a potentially valuable way of sharing valuable lessons across projects and over time. Several interviewees mentioned that they used their personal and professional networks and "*communities of practice*" (for example, the MPLA cohort) to share practical experiences and lessons across project teams. Another interviewee who had experience in the private sector would use their external network, saying "*I seek my support and guidance from other people. I have a network of people who come from a similar background and talk to them.*" However, many of these networks and sharing experiences focus on sharing between senior colleagues. One interviewee acknowledged support for more senior colleagues when developing business cases, but there is a lack of support for the more junior members of the project team who are responsible for dividing and delivering specific tasks.

Interviewees recognised the importance and need for lessons to be disseminated to the entire project team.

Proposed solution

Though many interviewees noted that lessons learned are already a part of the project delivery process at DfT, there are opportunities for DfT to present them in more accessible, timely and social ways.

Lessons learned can be shared in more social ways, to encourage reflection and adoption. One of the senior members interviewed for this project mentioned being in the early phases of developing a support network or "profession" within the Department. These networks can be used to effectively disseminate lessons learned. Any network should be easy to join (consider defaulting people with relevant posts into the network) and easy to access. The option for drawing up the network should be made salient at relevant times in the project, for example via prompts in reporting tools.

The benefit of such a network is that it will be accessible to project team members at every level, not just to the most senior leaders (who have more networks and resources at their disposal, such as the MPLA cohort).

Further incorporating lessons learned in a timely way is discussed above in Section 2B, where lessons based on historical data can be embedded in planning documents in the form of pre-populated estimates and timely feedback prompts reminding planners about how long a similar phase had taken on previous projects.

F. Decision tree

Solution overview

Decision trees allow decision makers to easily navigate a decision, focus on the pertinent aspects of a decision, and remove extraneous 'noise' - such as sunk costs - from the process. Such a process could be used in project delivery, not necessarily to set the course of a project, but to flag up when project decisions should be subject to further scrutiny. This could be particularly effective at tackling sunk-cost bias, prompting project managers to break the 'escalation of commitment' by clearly signposting at what point a project warrants reconsideration.

Evidence review

While our interviews provided mixed views on whether or not the Department is supportive of modifying or stopping projects mid-delivery, most interviewees felt that such actions could be viewed negatively and might cause reputational damage. Some senior staff said that it would be possible to "*pull back*" from delivering a project; others said something would have to go dramatically wrong before stopping would be considered an option. One interviewee said that "*it could be a good thing to stop a project or to pause it - it could save hugely on costs and reputation by doing so - that's what we're paid to do.*" This type of culture is indicative of one in which the sunk cost fallacy tends to operate. Whilst there could a number of reasons for not stopping or amending the scope of projects DfT needs to be careful it does not allow decisions to be made by sunk cost fallacy.

The **sunk cost fallacy** is a cognitive bias which results in backward-looking decision making. Suboptimal decisions are made when they are based on project costs that have already been incurred, cannot be recovered and have no impact on future outcomes. In traditional microeconomic theory, a decision maker would only account for prospective (future) costs. Accounting for sunk (past and irretrievable) costs could be suboptimal because the decision maker fails to assess a decision solely on its own merits.[35]

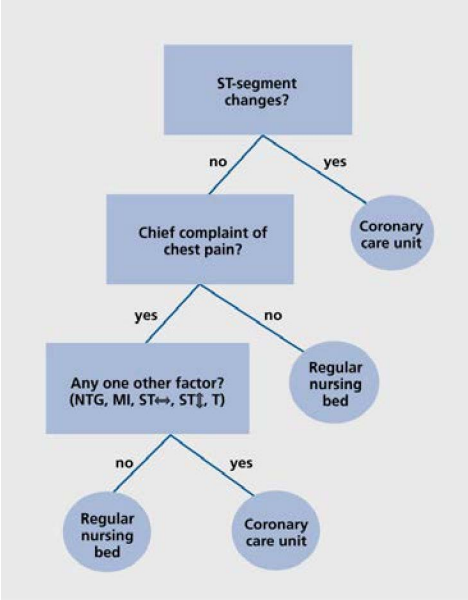
Empirical evidence shows that most people allow these sunk costs to influence future decisions. The sunk cost fallacy is psychologically justified by a desire not to appear wasteful.[36] By committing additional resources, decision makers attempt to justify their original decision and prior expenditure. Research has shown that decision makers commit the greatest amount of resources to existing investments when they are personally responsible for their negative consequences. It is harder to admit a poor decision when we are personally responsible for it, and therefore we are more strongly motivated to justify that decision.[37] The evidence also suggests that people who have incurred a sunk cost overestimate probabilities of success for their project compared to estimates by those who had not incurred a sunk cost.[38] In this way, sunk cost bias is linked to optimism bias and the planning fallacy, whereby sunk costs lead us to be more optimistic about a project's success (the belief that a project might fail becomes harder to accept once investment has been made).

The sunk cost fallacy is also related to the status-quo bias, describing our tendency to stick to a current course of action, even when it may no longer be the optimal path.[39] This is partly explained by the fact that it is harder to justify a change of course than it is to justify the status quo. Status quo bias is also rooted in the fact that changing course is inherently costly. Furthermore, alternative options are rarely made salient: once we have committed to a course of action, often foregoing alternatives, those alternatives tend to be put out of mind and are rarely reconsidered.

Proposed solution

Decision trees can be an effective way to harness our reliance on heuristics in decision making to generate optimal outcomes. Many decisions in project management are complex and information rich, requiring the trade-offs and assimilation of many viewpoints and uncertain outcomes. Contrary to the view that more information is always better, some research suggests a simple rule-based approach can lead to better decisions,[40] provided those rules are sound and not themselves rooted in biases. Decision trees have been shown to generate good outcomes in medical settings. Figure 1 shows a decision tree which is used to help doctors effectively ascertain whether a patient should be sent to the coronary care unit or a regular nursing bed.[41]

Figure 1: A decision tree to determine how to treat a patient with a heart condition



Source: Mawreski & Gigerenzer (2012)

The purpose of the decision tree is to remove much of the available information but to focus on key predictive factors which help clarify and focus the decision of the doctor. A similar process could be used in project delivery, not necessarily to set the course of a project, but to flag when project decisions should be subject to further scrutiny. This could also be integrated with the existing Gateway Review process, considering project decisions at defined review points. This could be particularly effective at tackling sunk-cost bias, prompting project managers to break the 'escalation of commitment' by clearly signposting at what point a project warrants reconsideration. This outcome could trigger the assignment of a red-team (see section 2D above) to provide an independent critique of the project.

Implementing solutions

In implementing solutions, it is also important to think about the behavioural challenges related to encouraging officials to adopt the recommendations. BIT would suggest using the principles set out in our EAST framework; namely that you should make the desired behaviours Easy, Attractive, Social, and Timely.[42]

- **Make it easy:** Focus on removing the hassle factor associated with the behaviour, thereby minimising friction costs. For example, the removal of one click in the process of paying tax online (by sending taxpayers directly to a form, rather than a webpage that contains the form), led to a 20% increase in the number of people paying their tax on time.[43] This shows how reducing the number of steps it takes to comply with a process can increase compliance. Making project resources easily available (not requiring extensive searching or too many clicks to access them) or defaulting people into networks are ways of making it easy with respect to project delivery in DfT.

- **Making it attractive.** Maximise salience, making people more aware of the desirable action. For example, providing colour-coded stickers to indicate how healthy a beverage is (with green as healthy, yellow as less healthy, and red as unhealthy) led to a 35% decrease in sales of unhealthy beverages and a 15% increase in sales of healthy beverages. Personalisation can also be a powerful way to promote a behaviour. In the case of project delivery, people may be more likely to pay attention to tailored information that relates to their specific project, than to general guidance. Such personalisation can be implemented with bespoke project feedback and tools, such as the interactive governance map.

- **Making it social:** People are social creatures, influenced by one another, and that sometimes the best way to encourage a behaviour is through describing what other people are doing (social norms) or using existing networks. For example, providing information about other people's experience, through companies like TripAdvisor or Yelp, has been shown to affect consumers' decisions. One study demonstrates that a restaurant's one point increase in rating leads to a 5-9% increase in revenue.[44] For project delivery, social networks can be effective for promoting lessons learned.

- **Make it timely:** It is important to present relevant information or to prompt certain behaviour when people are most likely to be receptive. For example, simply asking people if they would like to leave a legacy gift while they are writing their wills makes them more than twice as likely to leave a gift (and asking in a way that highlights a social norm tripled the number of people who gave).[45] Providing information or asking questions at timely moments on a project, such as embedding prompts or information within the reporting spreadsheets, may lead to smoother project delivery.

3. Recommendations from DfT employees

In addition to the ideas captured above, interviewees provided two additional recommendations that the Department could consider.

A. Streamlining governance requirements

Some interviewees suggested that the levels of governance can sometimes put a perceived undue burden on project teams. One way to reduce the hassle of reporting, and thereby reduce the cognitive load of the project team, would be to streamline governance requirements, such that teams can have a set of project information that they only have to modify slightly for different groups. One interviewee suggested this, "*rather than having to reinvent the wheel each time*." This could be accomplished by ensuring all teams use standardised Departmental templates, forms and formats for information across various board and assurance levels (rather than developing their own local products).

B. Use BICC as a reflective forum

Most interviewees were satisfied with the way BICC and its fortnightly meetings are run. One interviewee thought that it would be worthwhile for BICC to hold regular reflection sessions, whether it is during additional time added to the end of the fortnightly meeting or at a separate regular meeting. Regular public reflections on successes and failures are a good opportunity to share lessons learned and could reduce some of the reputational concerns surrounding the sunk cost fallacy, as a culture of acknowledging and accepting mistakes/failure is promoted.

For example, the Social and Behavioural Research Team and BICC could collaboratively create a standard presentation highlighting mistakes made in previous projects, evidence of the biases, and promoting the various tools (such as those recommended here) that managers could be using.

4. Concluding remarks

This report summarises preliminary evidence gathered to identify whether and how the planning fallacy, groupthink, and the sunk cost fallacy affect Tier 1 projects, and outlines potential solutions to mitigate the impact of the biases. There are several avenues for future work, and the recommended next steps for the Department include:

- **Collecting and using data better.** A cross-cutting recommendation is that DfT could built on current ways of collecting data, and use that data to visualise project performance and create systematic feedback loops within and between projects to improve project planning. For example, future work should focus on how the data that is collected can be standardised, and how it can be better used for benchmarking and providing feedback.

- **Co-developing solutions in consultation with DfT employees.** After identifying which solution(s) to develop for use in DfT, we recommend developing them in consultation with the project teams that would be using them. Input from these 'end users' is invaluable as it ensures that the solution will be tailored, useful and have support from the start.

- **Evaluating the effect of the solutions.** The size and impact of behavioural biases is often context specific, and the potential for any specific solution to overcome a particular bias cannot be perfectly predicted. For this reasons, we strongly advocate testing and iterating solutions within the department. This empirical approach is increasingly being used across governments to evaluate policy, and can be employed to evaluate process improvements as well.

- **Sharing with other government departments.** The literature review that underpins this report, as well as many of the findings, are relevant for other government departments, especially those that manage projects of a similar scale and complexity. This report could be modified and shared with other government departments to initiate a discussion about how these findings and solutions could be applied across government, and explore opportunities for testing solutions across departments.

Appendix A: Discussion guide used in interviews

1. Research objectives

The objectives of the research are to understand the DfT project planning process with the overall aim of identifying biases that emerge in project management and coming up with solutions of ways to mitigate or overcome these biases (primarily planning fallacy, groupthink, and sunk cost fallacy).

The primary research questions are as follows;

- What is supposed to happen vs. what does happen?
- How can the guidance can be made easier?
- What biases emerge, when, and why?

The findings of these interviews will allow BIT to understand the DfT project management process (as described/understood by senior employees) and identify what/where biases may emerge.

2. Structure

Section	Purpose	Timing
1. Understanding project and role	Gain an understanding of the background of the project and their role	10 mins
2. Understanding thoughts on current processes	Going through PD processes, the interviewees' roles, and the interviewees' perceptions of the various processes in place.	12 mins
3. Generating timing and planning estimates	How they think about estimates and timing	10 mins
4. During the project	Processes during the project	12 mins
5. Recommendations	Their recommendations to improve PPM and other people to speak with	10 mins
6. Conclusion	Conclusions and questions	6 mins

3. Questions

QUESTIONS	NOTES
1. Introduction – understanding the project and your role	**10 mins**
Could you give a short summary about your role? Length of time in the Department? Length of time in this position/project management?	
Length of time in the Civil service? Where else posted? Have you managed any other major projects?	
Any formal project management training before you took on this position?	
Could you take a moment to summarise this project for us please? What stage is the project currently at in the business case life cycle? Do you manage this project full-time?	
2. Understanding thoughts on current processes	**12 mins**

How do you generally find the DfT's PPM and Governance requirements? ▪ Do they help? ▪ Do they hinder? ▪ How well do you know the process?	
Are there any recurring issues that commonly get in the way of complying with these requirements?	
How much time of the total project is spent on governance?	
Do you have any workarounds/personal project management tools/techniques you use that help you do your job?	
If you could modify PPM and Governance requirements what would you do? Both large and small modifications are of interest to us.	
Are there any previous organisations that you've worked in/seen project planning done better?	
3. Generating timing and planning estimates	**10 mins**
How do you generate timing/planning estimates for different components of your projects? What do you consider? Do you draw on lessons learned from other projects? How?	
What are the guides or precautions in place for estimating timing in projects? Do you include contingency time in your estimates?	
How often do you think your timing estimates are correct? How often do you need to use your contingency time?	
Does anyone challenge or audit your estimates? Do you receive any feedback? How iterative is this process?	
To what extent do you ensure there is some external or independent scrutiny of your project planning and progression? ● To what extent does the culture at DfT help or hinder this kind of scrutiny of decision-making?	
Do you think about how your previous projects and any lessons learned when generating new project estimates?	
Do you ever feel under pressure to overpromise when estimating deliverables or deadlines? ● Do you feel like you have to say you'll get things done by a certain date knowing it will be nearly impossible to deliver by then?	
Do you think that you are held to account for project delays?	
4. During the project	**12 mins**
What are common reasons for projects slipping?	
What processes do you have in place to prevent slippage during a project?	
Has slippage occurred on this project? What processes do you have to in place to mitigate it if slippage occurs?	

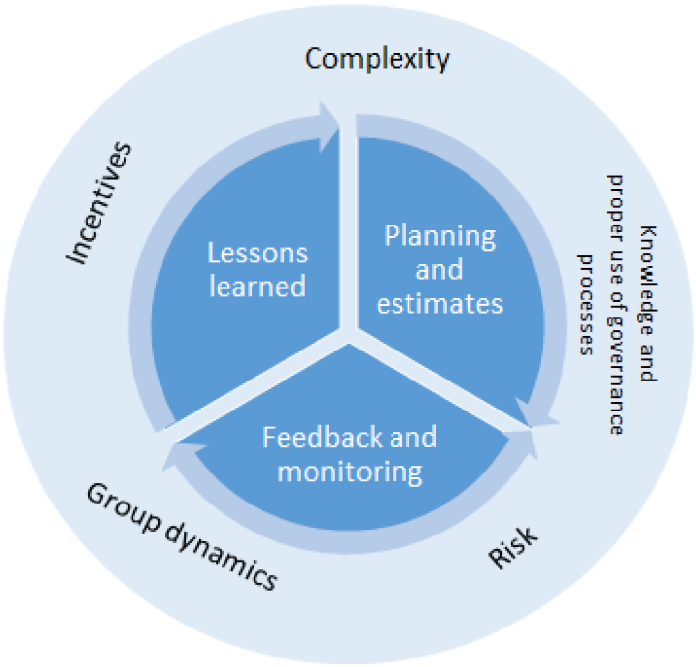
Are adjustments made to estimates during the project if slippage occurs? • Are you held to account by the original estimates? • Do you use lessons learned from the early stages of the project to update estimates for the rest of the project?	
Once a project has started how easy is it to pull back on it or even reverse it, for example if new information comes to light? • Why easy/not easy? • What are the barriers to reversing decisions? • Is there anyone who has the role of scrutinising or playing devil's advocate?	
How do you find your project's group dynamics? • Do you think that you are able to get clear and honest views from everyone? • If not, what do you think are the barriers to this?	
Do you think the right behaviours are rewarded?	
To what extent do you ensure there is some external or independent scrutiny of your project planning and progression? • To what extent does the culture at DfT help or hinder this kind of scrutiny of decision-making?	
Do you do a wash-up/post mortem at the end of projects or phases of the project? What do you think about the lessons learned log?	
If yes, how are these learnings incorporated after projects?	
Is there any data or feedback would be useful to you to help you in project planning, generating timing estimates and monitor your project?	
5. Recommendations	**10 mins**
Do you have any general thoughts/ recommendations you want us to include in our report?	
Any processes that are missing that you think should be included?	
Any processes that are included that would be better without?	
Are there any other people you think we should speak to about project management? • Other positions on your project/team? • Other people in the Department?	
6. Conclusion	**6 mins**
We're almost out of time. Is there anything you want to tell us that we haven't covered in this interview? • Do you have any other questions for us?	

Appendix B: Consolidation methodology

In order to synthesise the evidence collected from interviews and observations of governance meetings, BIT ran internal consolidation workshops. The process for these workshops is described below.

Stage 1. Evidence consolidation: using affinity diagramming, we organised the evidence from the process review into themes, anonymously on post-its (to prevent groupthink). We listed quotes, observations, and insights gathered from the interviews and document reviews. As a group we clustered the post-its and identified themes (the 6 themes discussed above). As the themes emerged, we contextualised them within the DfT project delivery landscape. See Figure 2 below for an illustration of the themes that emerged from the process and literature review.

Figure 2: Emerging themes from exploratory research



We did not group the observations/key takeaways by bias, because there are many biases at play that interact to cause different behaviours and outside of the lab it is hard to isolate what particular bias is independently responsible for causing a particular behaviour. Instead, in the real world context, we looked at the behaviours and drew on the literature to understand some of the underlying biases and their underlying mechanisms in order to use that understanding to come up with solutions to change the behaviours. Therefore we use the literature to inform our understanding of the behaviours we are observing, but also return to the literature before generating solutions.

Stage 2. Behavioural factor review: Building on the structure that emerged from stage 1, we identified the behavioural factors at play (in addition to the three behavioural biases we identified at the start of project).

Stage 3. Initial solution generation: We brainstormed solutions at the end of the process to each theme individually, as creative solutions tend to emerge from a tighter problem/brief. We drew on our knowledge of the behavioural science literature, including using our 'EAST cards', and user-generated solutions that emerged during our research, to stimulate our thinking. Because many of the solutions cut across themes, we decided to arrange the ideas in this report based on the solutions, rather than themes.

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