Regulation and incentivisation of the rail infrastructure manager in a changing industry

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steer

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Introduction

Steer was commissioned in early 2020 to review the incentives on Network Rail, consider whether they support delivery of ORR's Section 4 duties and assess the implications for incentives of industry reform following completion of the Williams Rail Review.

As a result of the impact of the COVID-19 pandemic on the rail industry, the programme of reform envisaged when the work was commissioned has been delayed, and it has not been possible to consider the impact of current incentives, or potential changes to incentives, under a fully revised and clearly defined industry structure. Instead, we have sought to explore ways of making incentives more effective that might be introduced within the current legal and regulatory framework and that are also aligned with the future direction of more fundamental reform.

Theoretical framework

In undertaking the study, we have taken a broad view of incentives, covering a wide range of factors that motivate corporate and individual behaviour, including incentive mechanisms that are formally part of the regulatory framework (such as Schedule 8 of the track access agreements and fines for breaches of Network Rail's Network Licence) and less formal influences on decision-making such as job satisfaction and the effect of media comment on corporate reputation.

While formal incentive mechanisms typically assume that individuals use all relevant information with a view to optimising financial rewards, new thinking from the field of behavioural economics suggests that incentive design should be based on a more rounded and accurate view of human behaviour. In particular, it should recognise the potential for a wide range of behavioural responses such as 'doing the right thing', 'optimism bias' and 'blame avoidance'.

The evidence base

We have investigated the strength of different motivating factors on decision-making within Network Rail through a combination of stakeholder interviews (including with Network Rail management staff as well as representatives of train operators, transport authorities, ORR and other industry regulators) and research into the impact of the regulatory framework since rail privatisation.

Our review of the evidence base highlighted an apparent disconnect between the framework of regulatory incentives and the current ownership and structure of the industry. While there have been many changes to regulation over the last 25 years, the framework has not kept pace with an evolving industry and many incentive mechanisms now appear anachronistic, particularly in light of Network Rail's status as a public sector entity.

Executive summary – key findings

Overview

The evidence suggests that:

- Job satisfaction and pride in the industry are the main factors motivating the behaviour of decision-makers. Financially-based incentives operating at the corporate and individual level help to reinforce individual incentives but are not the primary influences on behaviour.
- Output-based incentives can be ineffective when there is no clear 'line of sight' between decisions and outcomes and incentive mechanisms focused on specific metrics or monetary values can give a distorted view of the impact of decisions.
- Putting Passengers First, which enables more localized decision-making and links individual objectives with key customer and industry priorities, is well aligned with these findings but not yet fully tested.

Impact of incentives of key areas of decision-making

Network development	Public sector financial planning ensures funding over the life of major projects. However, projects can still be subject to optimism bias in the early stages of GRIP.
Asset stewardship	Licence conditions and threat of enforcement provide strong incentives to improve asset condition but incentives to develop a long term asset strategy are weak.
Timetable development	Incentives on Network Rail to ensure timetable resilience have not always prevented DfT from contracting 'undeliverable' train services from operators.
Network operation	Schedules 4/8 provide moderately strong incentives to operate the network reliably but do not always reward collaboration and can encourage blame avoidance.
Managing the station estate	Network Rail does not have strong incentives to improve the passenger experience as station landlord. At managed stations, commercial and operational objectives conflict.
People management	Regulatory incentives can have a significant impact on management decisions through reputational effects, most staff are driven by job satisfaction/professional pride.
Innovation	Innovation is difficult to incentivise and is driven primarily by job satisfaction. However, the regulatory framework could focus more on impacts and less on process.
Efficiency and VfM	While they are anachronistic, many of the incentives on efficiency and value for money (e.g. 5-year cost profiling and access charges) provide useful planning tools.
Safety	NR's strong safety culture continues to provide the main incentive to keep passengers and staff safe but can also encourage undue risk aversion and resistance to change.

Executive summary – options for reform

Ideas for discussion

While the regulatory incentive framework for Network Rail does not reflect changes in ownership and structure, many of the associated mechanisms continue to serve a useful purpose, for example by challenging efficiency profiles and encouraging cost transparency.

Major reform of the regulatory framework must await legislation, but some changes could be made in the meantime, for example to encourage greater collaboration and innovation, to reinforce the positive motivation that already drives individuals and to place more emphasis on praising positive outcomes in the regulation of Network Rail.

Governance and accountability	Review of obligations in the Framework Agreement and Network Licence with a view to streamlining lines of accountability – would probably require legislation?
Changing behaviour	Greater balance of praise and admonishment in regulatory monitoring/statements, consider incentivising behaviour and inputs rather than outputs
Performance incentives	Replace Schedule 4/8 with a regime that includes a balance of input and output-based incentives, modify Schedule 8 to encourage investigation of more delay
Collaboration	Apply CAA-style constructive engagement and use evidence of collaboration to grade business plans as part of an OFWAT-style/maturity model assessment
Incentivising efficiency and value for money	Fully explore the scope for flexibility in managing expenditure under public sector financial planning and further develop OFWAT-style route benchmarking
Incentivising innovation	Develop a framework for assessing the impact of innovation on network performance and introduce an innovation competition following the OFGEM model

1 Scope and purpose

Scope and purpose – ORR's objectives for the study

Background

Under Section 4 of the Railways Act 1993, the Office of Rail and Road (ORR) is charged with holding Network Rail (NR) to account for *"delivering high levels of performance and service, as well as good value for money – for passengers, the freight industry and taxpayers"*

ORR's role may change as part of a wider programme of rail sector reform following the Williams Rail Review. Its Section 4 duties may eventually be recast to reflect a new industry structure in which the infrastructure manager functions are combined with the train service specification and procurement functions currently held by the Department for Transport (DfT).

Steer was commissioned in early 2020 to review the incentives on the rail infrastructure manager, consider whether they support delivery of ORR's Section 4 duties and assess the implications for incentives of industry reform.

Research questions
A. How has the effectiveness of functions and incentives implemented by ORR changed in relation to Network Rail as the sector has changed?
B. What can rail learn from other regulated bodies' incentive frameworks?
C. What evidence is there of the relative influence of regulatory versus non-regulatory incentives on Network Rail decision-making and the impacts on rail outcomes (safety, efficiency, value for money, passenger satisfaction, train performance)?
D. What evidence is there of the factors working together or in conflict for each of the rail outcomes?
E. What evidence is there, for each rail outcome, (safety, efficiency, value for money, passenger satisfaction and train performance) suggesting Network Rail is incentivised differently to other regulated public sector bodies?
F. What motivates people at Network Rail at different levels of the organisation? How can these motivations be aligned to deliver improved safety, efficiency, value for money, passenger satisfaction and train performance? How does this compare with other private and public sector bodies?
G. To what extent does professional pride or ranking within the internal organisation act as a motivating factor (for organisation and individual) for particular outcomes?
H. Where does existing reporting achieve the behaviours which support desired outcomes and what evidence is there different reporting (approach or topic) could incentivise in line with those outcomes?
I. What influence do the public, media and other stakeholders have on Network Rail decisions?
J. What evidence is there Network Rail's 2019 restructure will change incentives or motivation to improve the rail outcomes listed? Will any incentives weaken/distort/become perverse incentives?
K. Which incentives will strengthen/work under a proposed new industry structure for the listed rail outcomes? Which incentives will weaken/distort/become perverse incentives?

Scope and purpose - an addendum

Change in scope

The final research question concerning the impact of incentives under a new industry structure was drafted at a time when the Williams Rail Review was largely complete and a White Paper setting out proposals for industry reform was still expected in the first quarter of 2020. The impact of the measures taken to combat the COVID-19 pandemic have since led to a major change in the management of rail services, primarily through the introduction of Emergency Management Agreements (EMAs) that have the effect of transferring revenue and cost risk from the train operators to the Department for Transport. The implementation of EMAs, and consideration of the contractual arrangements that should be put in place on their expiry in September 2020, has introduced substantial delays both to the White Paper and any legislation needed to implement Williams' proposals.

This means that we are not able to respond to the final research question against the background of a clear programme of industry reform, as previously anticipated. Hence, while it is important to take account of the likely direction of reform over the long term, it is not possible to consider the impact of current incentives, or potential changes to incentives, under a fully revised and clearly defined industry structure. Instead, we have sought to explore ways of making incentives more effective that might be introduced within the current legal and regulatory framework and that are also aligned with the future direction of more fundamental reform (see appendix for an interpretation of Williams' conclusions on structural reform).

Scope and purpose - methodology

Approach

We have sought to answer the research questions through a combination of desk and field research, identifying propositions from the theoretical and regulatory literature and testing these through interviews and workshop discussion

Study design
- Scope of desk research
- Stakeholder engagement strategy

Data collection
- Desk research
- Interviews

Analysis/ review
- Categorisation/mapping of incentives
- Evaluation of incentives

Workshop
- Test of emerging findings/conclusions
- Further insight

Findings
- Reporting on current incentives
- Proposals for response to industry reform

Tools and techniques
• Review of evolution of the regulatory framework
• Review of behavioural economics and associated management literature
• Review of different categories of incentive – financial/non-financial, corporate/ individual, positive/negative
• Interviews with Network Rail staff, other rail industry stakeholders and regulators in other sectors
• Redefinition of the typology of incentives based on interview findings
• Case studies on enhancement projects, timetable development and managing a possession
• Mapping and evaluation of incentives under current structure
• Review of regulatory mechanisms in other sectors – aviation, water, energy
• Development of outline proposals to address the issues identified

Scope and purpose - organisation of the report

Scene setting → **Context** → **Findings from desk and field research** → **Analysis** → **Conclusions**

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?
- To what extent is the framework of incentives fit for purpose given the current industry structure?
- How well does the current framework of incentives reinforce or undermine individual motivation?

Conclusions

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

Scope and purpose - responses to research questions

Research questions	Response found in chapter:
A. How has the effectiveness of functions and incentives implemented by ORR changed in relation to Network Rail as the sector has changed?	7 and appendix
B. What can rail learn from other regulated bodies' incentive frameworks?	6, 7
C. What evidence is there of the relative influence of regulatory versus non-regulatory incentives on Network Rail decision-making and the impacts on rail outcomes (safety, efficiency, value for money, passenger satisfaction, train performance)?	3, 4, 5, 7
D. What evidence is there of the factors working together or in conflict for each of the rail outcomes?	3, 4, 5, 7
E. What evidence is there, for each rail outcome, (safety, efficiency, value for money, passenger satisfaction and train performance) suggesting Network Rail is incentivised differently to other regulated public sector bodies?	4, 7 and appendix
F. What motivates people at Network Rail at different levels of the organisation? How can these motivations be aligned to deliver improved safety, efficiency, value for money, passenger satisfaction and train performance? How does this compare with other private and public sector bodies?	2, 3, 4, 5, 7 and appendix
G. To what extent does professional pride or ranking within the internal organisation act as a motivating factor (for organisation and individual) for particular outcomes?	2, 3, 4, 7
H. Where does existing reporting achieve the behaviours which support desired outcomes and what evidence is there different reporting (approach or topic) could incentivise in line with those outcomes?	4, 7
I. What influence do the public, media and other stakeholders have on Network Rail decisions?	3, 4, 7
J. What evidence is there Network Rail's 2019 restructure will change incentives or motivation to improve the rail outcomes listed? Will any incentives weaken/distort/become perverse incentives?	3, 4, 7
K. Which incentives will strengthen/work under a proposed new industry structure for the listed rail outcomes? Which incentives will weaken/distort/become perverse incentives?	7, 8

Glossary I

CAA	The UK regulatory body for the aviation industry
Capacity charge	A track access charge designed to recover the increased performance payments incurred by Network Rail in accommodating additional traffic on a congested network
Control period	A period of time, usually 5 years, during which the required revenue, track access charges and other parameters determined following the preceding periodic review continue to apply
Framework Agreement	The agreement between the Department for Transport and Network Rail setting out governance and other arrangements relating to Network Rail's status as a public sector body and requiring it to comply with public sector financial management processes
Franchise/Concession Agreement	The agreement between a transport authority such as the Department for Transport and a train operator setting out, inter alia, the latter's obligations, the incentive mechanisms to which it is subject and the payments it can expect to receive for providing the train service
EC4T	Electric current for traction charge – a track access charge intended to recover the cost of electricity used by electrically powered rolling stock
GRIP	The Governance for Railway Investment Projects process used to manage and control investment projects related to both enhancement and renewal of the network
Network Licence	A regulatory instrument permitting Network Rail (and similar bodies) to undertake the management of rail infrastructure based on compliance with a wide range of licence conditions – the main mechanism underpinning regulatory enforcement of Network Rail's obligations
OFGEM	The UK regulatory body for the energy industry
OFWAT	The UK regulatory body for the water industry

Glossary II

Periodic review	A 5-yearly review of Network Rail's costs and required revenue, culminating in the determination of track access charges and grant payments for the subsequent 5 year period
PICOP	Person in charge of a possession – the member of staff responsible for ensuring the safety of a site subject to engineering works, monitoring progress and handing back the site to the line controller on completion of the works
PPM	Public performance measure – a measure of the operational performance of train services, expressed as a percentage and calculated as the ratio of services arriving within 5 minutes (in the case of regional and London and Southeast operators) or 10 minutes (in the case of long distance services) of their schedule time to
REBs	Route level efficiency benefit sharing mechanism – an incentive mechanism introduced by ORR in Control Period 5 to encourage train operators to collaborate with Network Rail in identifying and securing network efficiencies
Regulatory determination	ORR's formal determination of Network Rail's required revenue and access charges following a periodic review
RIDDOR 2013	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013, which place obligations on organisations and individuals in charge of work premises to report safety related incidents
ROGS 2006	Railways and Other Guided Transport Systems (Safety) Regulations 2006, which define the regulatory regime for rail safety in the UK, consistent with the requirements of European Union legislation

Glossary III

Schedule 4 (of the track access agreement)	A mechanism included in the track access agreement to enable compensation of train operators for planned disruption to their services due to engineering works and to incentivise Network Rail to give advance notice of such disruption
Schedule 8 (of the track access agreement)	A mechanism included in the track access agreement to enable compensation of train operators for unplanned disruption to their services and to incentivise Network Rail and operators to minimize such disruption
VUC	Variable usage charge – a track access charge intended to cover the cost of track wear and tear, which varies by rolling stock type

2 Influences on decision-making – the theory

Influences on decision-making – scope and purpose of the chapter

Scene setting → Context → Findings from desk and field research → Analysis → Conclusions

Scene setting

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7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
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Influences on decision-making - what do we mean by incentives?

The term 'incentives' includes a wide range of motivational factors

An incentive *must* lead to a behavioural response, whether:

- strong or weak
- good or bad

It *can be*:

- positive or negative
- financial or non-financial
- planned or unplanned
- broad or focused

The scope of the study is therefore very broad, going beyond a simple consideration of contractual and financial incentives. Any factor motivating NR decision-makers needs to be considered.

incentive *noun*,

1. a motivating influence or stimulus
2. an additional payment made to employees as a means of increasing production
3. serving to incite to action

From the Latin *incentivus*, meaning 'striking up' or 'setting the tune'.

Influences on decision-making – what are regulatory incentives for?

At the corporate level, incentives are a critical part of any regulatory framework – they effectively substitute for the absence of market competition

Economic and social objectives	Monopoly network	Public ownership and regulation	Incentive mechanisms
• The railway is a key national asset and must meet passenger and customer needs and wider social objectives such as connectivity and access to employment, education and leisure opportunities for different socio-economic groups • It continues to be heavily subsidised by the tax payer and needs to be efficiently operated and deliver value for money	• The rail network is a natural monopoly • The absence of competition means that there is no market-based incentive to improve cost efficiency, lower access charges and deliver innovation • Left to itself, a commercial owner and operator of the network might earn monopoly profits by charging excessive prices, operate inefficiently and/or allow assets to degrade.	• Public ownership is a means of aligning organisational with economic and social objectives • A regulatory framework acts as a form of surrogate competition, rewarding and punishing the owner and operator of the network as the market would in a competitive environment • However, the regulator cannot monitor every decision in detail – it must find a way of ensuring that commercial decisions are aligned with economic and social objectives	• Incentive mechanisms are a means of ensuring that decisions taken by the owner and operator of the network lead to outcomes that are economically and socially optimal • Having set efficient, incentives, the regulator can rely on these to encourage cost efficiency and competitive pricing and reduce, to some extent, the necessary level of monitoring and enforcement

At the individual level, incentives perform a similar role – they ensure that an individual's motivation, behaviour and performance align with the organisation's objectives

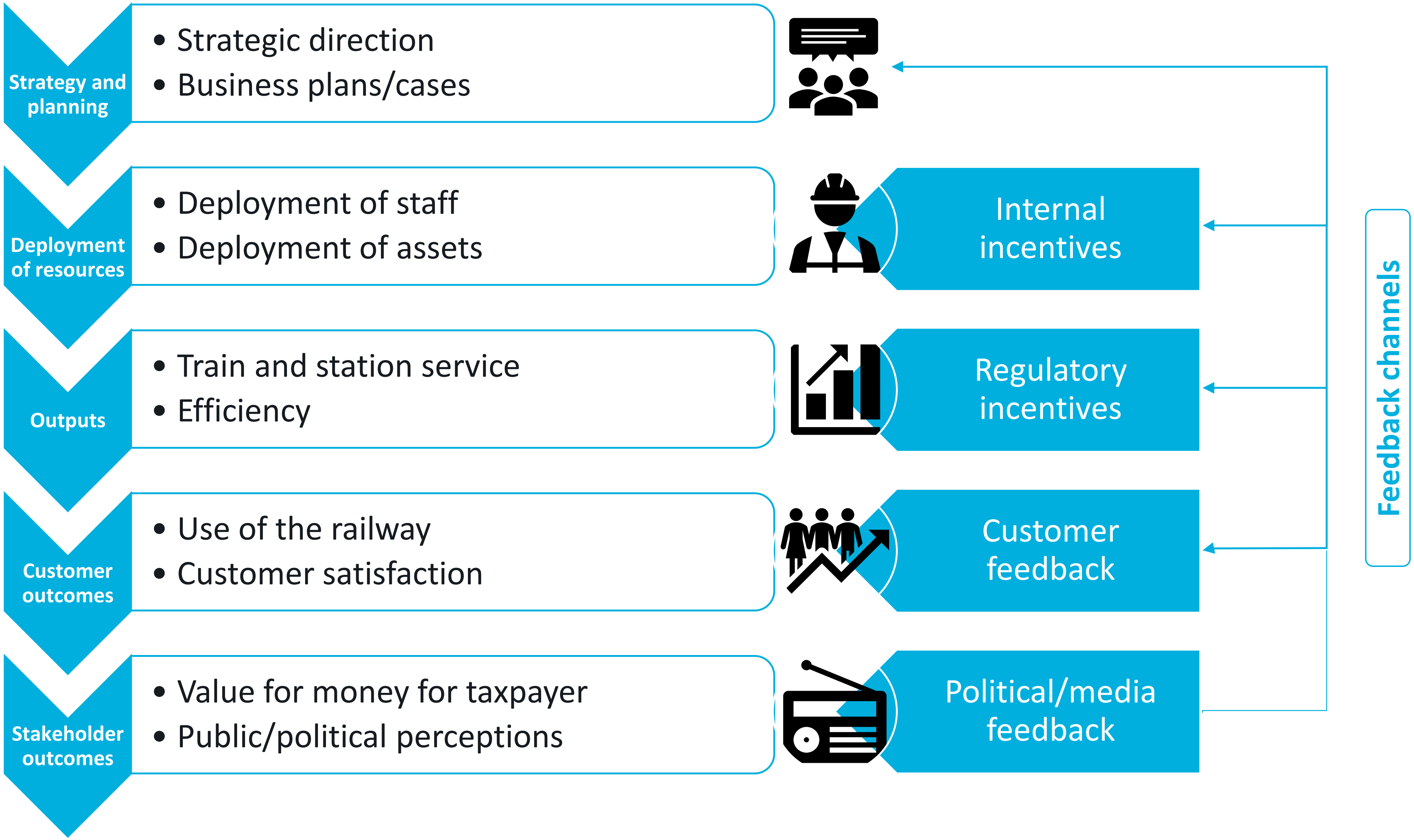
Influences on decision-making – what types of incentive have we considered?

Corporate and individual incentives take a wide variety of forms – in principle, all are within the scope of the study although we have not been able to investigate the individual impact of each in detail

Driver	Level	Non-financial incentives		Financial incentives	
		Formal	Informal	Direct	Indirect
Positive	Individual	• Personal objectives • Promotion/ status • Role/ authority	• Recognition • Pride/job satisfaction • Belonging • Autonomy • Experience • Development	• Base pay • Pension • Performance-related pay • Other financial rewards	• Benefits in kind • Annual leave • Social events • Support for professional development
	Corporate	• Statutory power/ responsibilities	• Norms/culture	• Performance bonuses • Profitability • Company valuation	• Business development opportunities
Negative	Individual	• Legislation • Disciplinary processes	• Individual criticism • Loss of reputation	• Loss of earnings after dismissal	• Loss of privileges
	Corporate	• Legislation • Regulatory statements	• Corporate criticism	• Corporate losses • Penalties	• Loss of business opportunities

Influences on decision-making – channels of influence

These different types of incentive influence a high-profile regulated entity such as NR through a hierarchy of feedback channels – it can be difficult to determine which channels are influencing particular decisions



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Influences on decision-making - the ‘standard’ view of incentives

According to the standard view, individuals will react to an incentive by analysing all relevant information to optimise the outcome from their perspective – this has important implications for the design of incentives

An incentive regime must be ***coherent***:

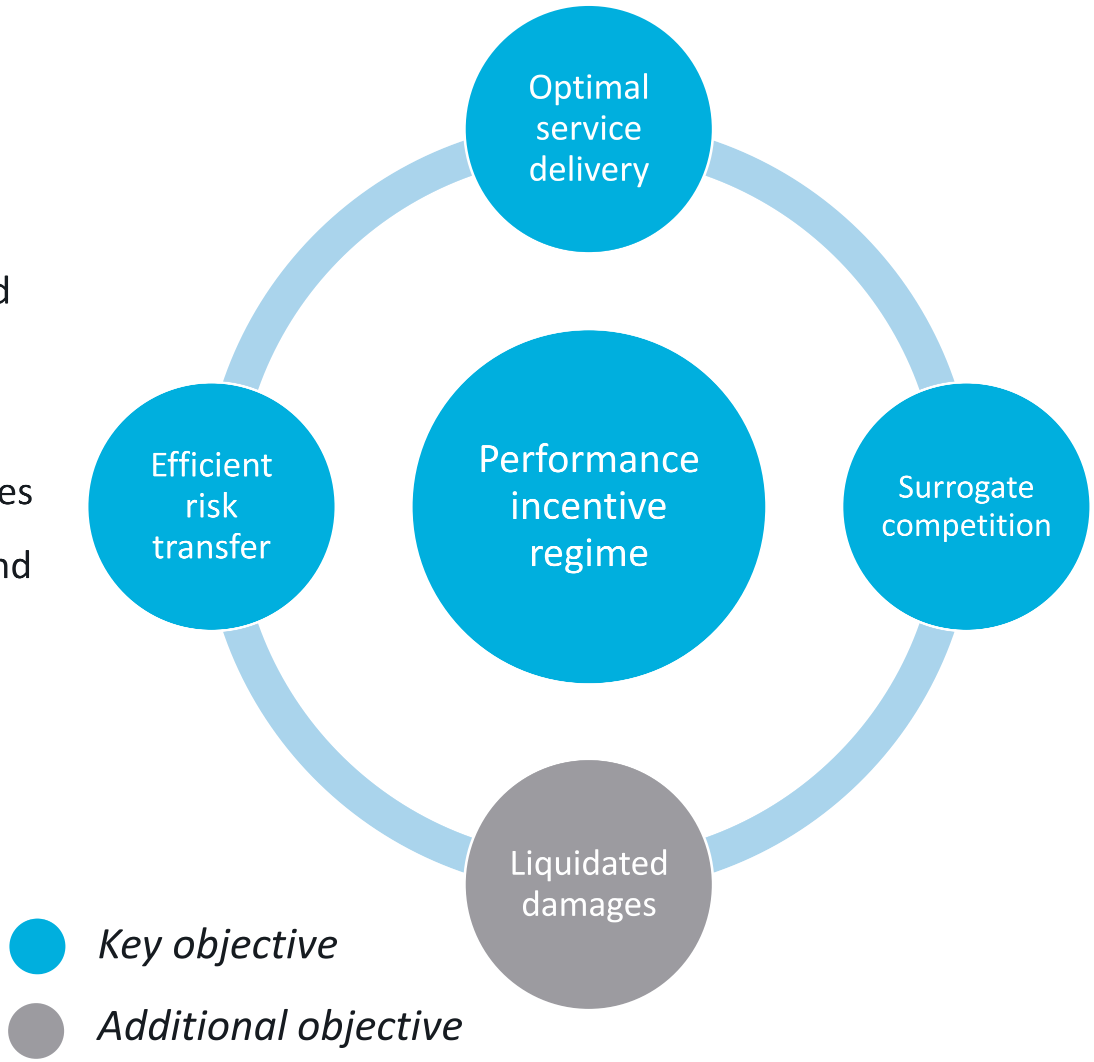
- What service must be provided? - *specification*
- How will we know if/how well it has been provided? - *measurement*
- What will happen if it is not provided or provided badly? - *consequence*

It must be based on ***objective measurement***:

- Clearly defined metrics capture relevant outcomes
- There is a strong relationship between actions and behaviour of the metrics
- Metrics can be analysed and forecast

It must be seen as ***fair***:

- Outcomes can be affected/managed by incentivised parties
- Rewards and penalties are seen as appropriate/proportionate



Influences on decision-making – challenges to the standard view

However, the standard view of incentives has been increasingly challenged by different commentators

Challenge	Argument/evidence	Research implications
Results (of current and previous incentive mechanisms)	• Incentive mechanisms such as Schedule 8 of the track access agreement and Schedule 7 of the franchise agreement have not prevented a decline in the public performance measure (PPM) from 91.6% in 2011/12 to 86.2% in 2019/20 • Similar mechanisms have also failed to deliver the expected results (e.g. the London Underground PPP incentive framework)	There is a need to test these challenges by: • Seeking the views of industry stakeholders on the practical impact of incentives in NR • Investigating whether changes in NR's ownership and organisation have led to changes in the behaviour of decision-makers • Identifying types of behaviour highlighted by the new thinking and assessing whether they influence decisions in NR
Relevance (under public ownership of NR)	• At least since the re-categorisation of NR as a public sector entity (and arguably since the demise of Railtrack), conventional incentives based on the assumption of profit maximisation have not been appropriate • More generally, the framework of incentives on NR has not kept pace with changes in rail policy, industry structure and NR's organisation over the 25 years since privatisation	
Realism (of assumptions about behaviour and decision-making)	• Conventional incentive design is anyway flawed since it fails to take account of real behaviour on the part of decision-makers – individuals do not always use the information available to them to maximise the rewards available under an incentive mechanism • Behavioural economics suggests that individuals are subject to a wide range of behavioural influences that have often been ignored	

Influences on decision making – types of behaviour I

The behavioural economics literature suggests that individuals like to work for an organisation with a clear sense of purpose that empowers its employees, treats them fairly and recognises their contribution …

	Sense of belonging	Fairness	Empowerment	Doing the right thing	Need for recognition
Behavioural research finding	Individuals prefer to belong to a group motivated by common goals	Individuals generally do not like inequity and unfairness	For individuals to be motivated, they must believe that they can make a difference	Individuals like to be seen to do the right thing for their group and for society	Individuals need to have recognition and reputation can be a powerful incentive
Potential application to NR	Staff wish to belong to an industry, organization and group with a strong identity and sense of purpose. They are generally loyal to, and protective of, NR and the rail industry more broadly.	Staff wish themselves and their colleagues to be treated fairly and their motivation will be undermined if they encounter what they consider to be unfair outcomes within the organization or due to regulatory action.	Staff like to work in an environment in which they can influence outcomes in a material and visible way. Their motivation will be undermined if they have little or no control over the outcomes for which they are responsible.	Staff will generally wish to be seen to act in the interests of the industry, NR or their part of NR's organization. They will look for confirmation that they have done the right thing from their peers and from stakeholders.	More generally, staff will seek recognition of their contribution and look to build a reputation as an effective and reliable member of their team. Recognition may take various forms, but formal recognition from NR is important.

Influences on decision making – types of behaviour II

... that they like to be seen to be responding to challenges in a collaborative way but measure their progress through comparison with their peers, avoid blame and often fail to respond to overly complex incentives

	Action bias	Conflict avoidance	Blame avoidance	Relativity	Ambiguity aversion
Behavioural research finding	Individuals believe it is important to be seen to be doing something	Most individuals avoid conflict and seek to collaborate with others	At the same time, individuals frequently seek to avoid blame	Individuals think in relative more than absolute terms when judging outcomes	Decision-makers do not like ambiguity and seek clarity and simplicity
Potential application to NR	The rail industry is high profile and subject to a high level of public awareness. NR and other industry staff (including ORR staff) will be conscious of the need to be seen to respond to publicised issues.	NR staff recognize the importance of collaborative working and will seek to cooperate with each other to achieve common goals. They will minimize conflict to ensure a positive working environment.	Staff will seek to avoid blame for adverse outcomes, particularly in areas such as safety where the sanctions for parties found to be negligent are high. The same approach may influence fault attribution.	As in other organisations, staff will be strongly motivated by promotion, which is a clear indication of progression relative to their peers. They will also compare pay levels to assess NR's valuation of their contribution.	Staff will not react as expected to complex incentive mechanisms or mechanisms generating highly uncertain rewards. Where possible they will develop simple rules of thumb to guide their actions.

Influences on decision making – types of behaviour III

… and that they will look for satisfactory outcomes that avoid short term losses rather than optimal outcomes while frequently making overly simplistic judgements about risk

	Satisficing	Optimism bias	Availability heuristic	Present bias	Loss aversion
Behavioural research finding	Individuals tend to make decisions by satisficing rather than optimizing	Individuals tend to underestimate the probability of adverse outcomes	Decisions are more affected by events that are easily imagined	Outcomes occurring soon are given more weight than those in the far future	Individuals make more effort to avoid losses than to make gains
Potential application to NR	Staff will pursue satisfactory outcomes that balance rather than optimize results. This may mean accepting the status quo or minimal improvement rather than maximizing performance.	When preparing business plans, staff are likely to overestimate what can be delivered within a given timescale or budget, especially when facing external pressure to complete projects to a programme.	When assessing the possible outcomes of their actions, staff will rely on experience of events that are easily brought to mind, even if the probability of such events occurring in the future is relatively low.	Staff can unduly discount high probability, adverse impacts that are only expected in the long term. This may encourage decisions that take insufficient account of the long term delivery risks of major projects.	Staff responding to incentives that equally reward outperformance and penalize underperformance (e.g. Schedule 8) may not plan for improvement beyond the benchmark.

Influences on decision-making – classical versus behavioural incentives I

The ORR has previously commissioned work from Nick Chater to consider the implications of new behavioural thinking for incentives in the rail sector – he suggested a tension between behaviours observed and those assumed in the standard approach to incentive design:

> *"Contracts … are often governed not merely by attempts to generate good consequences, but … by requirements about what counts as 'appropriate behaviour' (e.g. following professional norms and standards; honest reporting; coordinating and cooperating to achieve goals whether or not incentivised by the contract; and good citizenship)."* ***Nick Chater***

Classical incentives: £

- Measure outputs, not inputs
- Allocate risk to the party best able to manage it
- Undertake fault attribution
- Calculate liquidated damages when things go wrong

Classical	Behavioural
Focus onconsequences – e.g. Schedule 8 payments	Focus on 'appropriate behaviour'
Discounting of low risk/ high impact events	Acceptance of innovation risks
Attribution of specific responsibility	Coordination and cooperation
Adversarial relationships	Trusting relationships

Behavioural incentives:

- Assess behaviour and contribution, not outputs
- Recognise joint responsibility and share risk
- Investigate cause, not fault
- Assess overall impacts when things go wrong

Influences on decision-making – classical versus behavioural incentives II

There is nevertheless some correspondence between the two approaches, with the key components of the standard model echoed in some of the behaviours highlighted in the new thinking

Standard model		Behavioural economics
Coherence	• There should be a clear specification of required outputs or outcomes • Simple measurement of outputs and calculation of impacts is preferred	Ambiguity aversion
Objective measurement	• Metrics and rewards should fully capture the contribution of the incentivised party • It should be possible to assess the impact of actions and events on outcomes	Need for recognition
Fairness	• Rewards and penalties must be seen as reasonable and proportionate • The actions of incentivised parties must have a strong impact on the outcomes	Fairness and empowerment

Influences on decision-making – summary research findings

Observations

- The standard view of incentives, which assumes rationale behaviour and a focus on financial rewards, is well-established but increasingly challenged
- New thinking from the behavioural economics literature suggests the influences on decision-making are more complex

Propositions

- The standard view of incentives does not adequately explain decision-making in NR, which has never been accountable to private equity holders
- Within NR, decisions and outcomes are mainly driven by individual motivating factors, which can be varied, and by the mechanisms for cascading corporate incentives to the individual level

Further questions

- What formal incentive mechanisms are applied to NR at the corporate level and within the organisation? *(Chapter 3)*
- Is their any evidence that the behaviour types previously described are prevalent within NR? *(Chapters 4 and 5)*

3 Organisation and regulation of Network Rail

Organisation and regulation of Network Rail – scope and purpose of the chapter

Scene setting → **Context** → Findings from desk and field research → Analysis → Conclusions

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

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3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

Conclusions

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

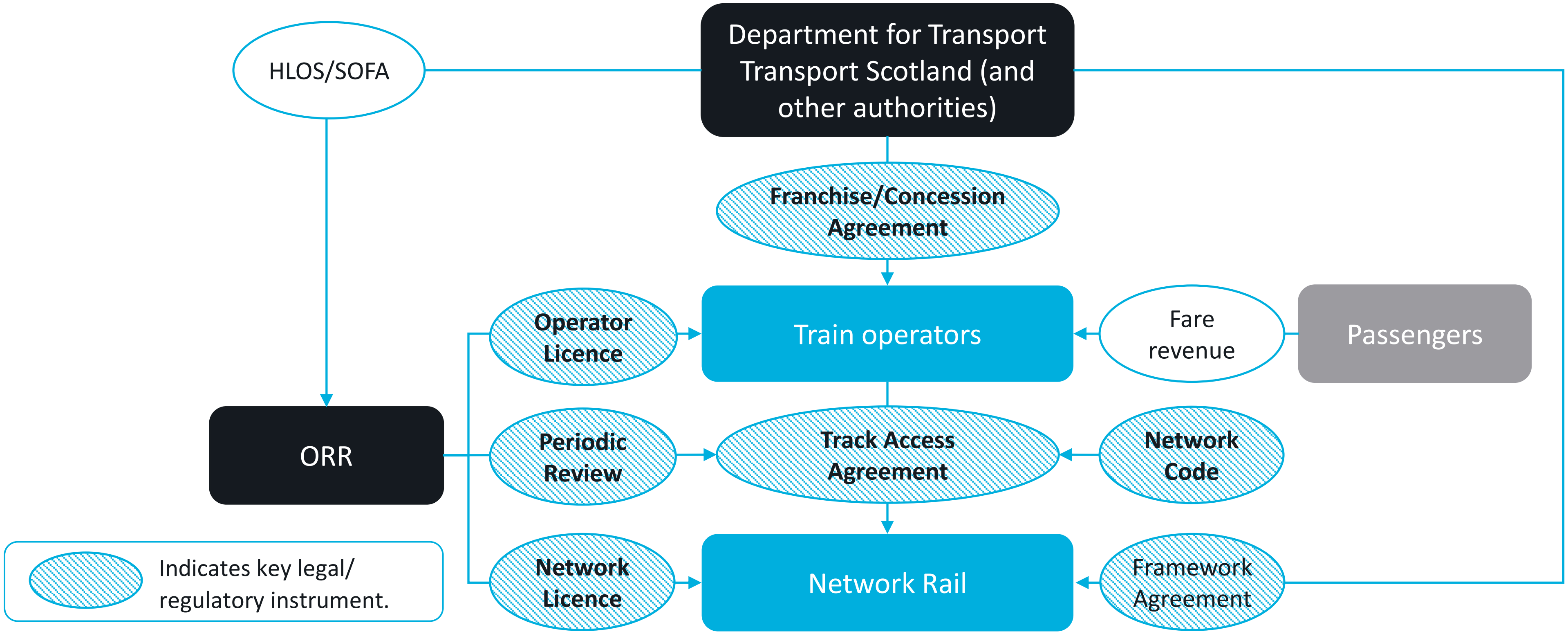
Organisation and regulation of Network Rail – the current industry structure

As previously noted, there have been major changes to the policy framework and ownership of NR (see appendix)

Nevertheless, regulation continues to rest on three principal legal/regulatory instruments, which together define many of the key incentives at play in the industry:

- The franchise/concession agreements between transport authorities and train operators incentivise train service delivery
- The track access agreements between Network Rail and train operators, calibrated through the periodic review and supported by the Network Code, are intended to incentivise efficient use of capacity as well as train service performance
- The licences issued to Network Rail and the train operators ensure accountability for key obligations (e.g. safety)

However, public ownership of NR has introduced a critical new relationship – the framework agreement between DfT and NR



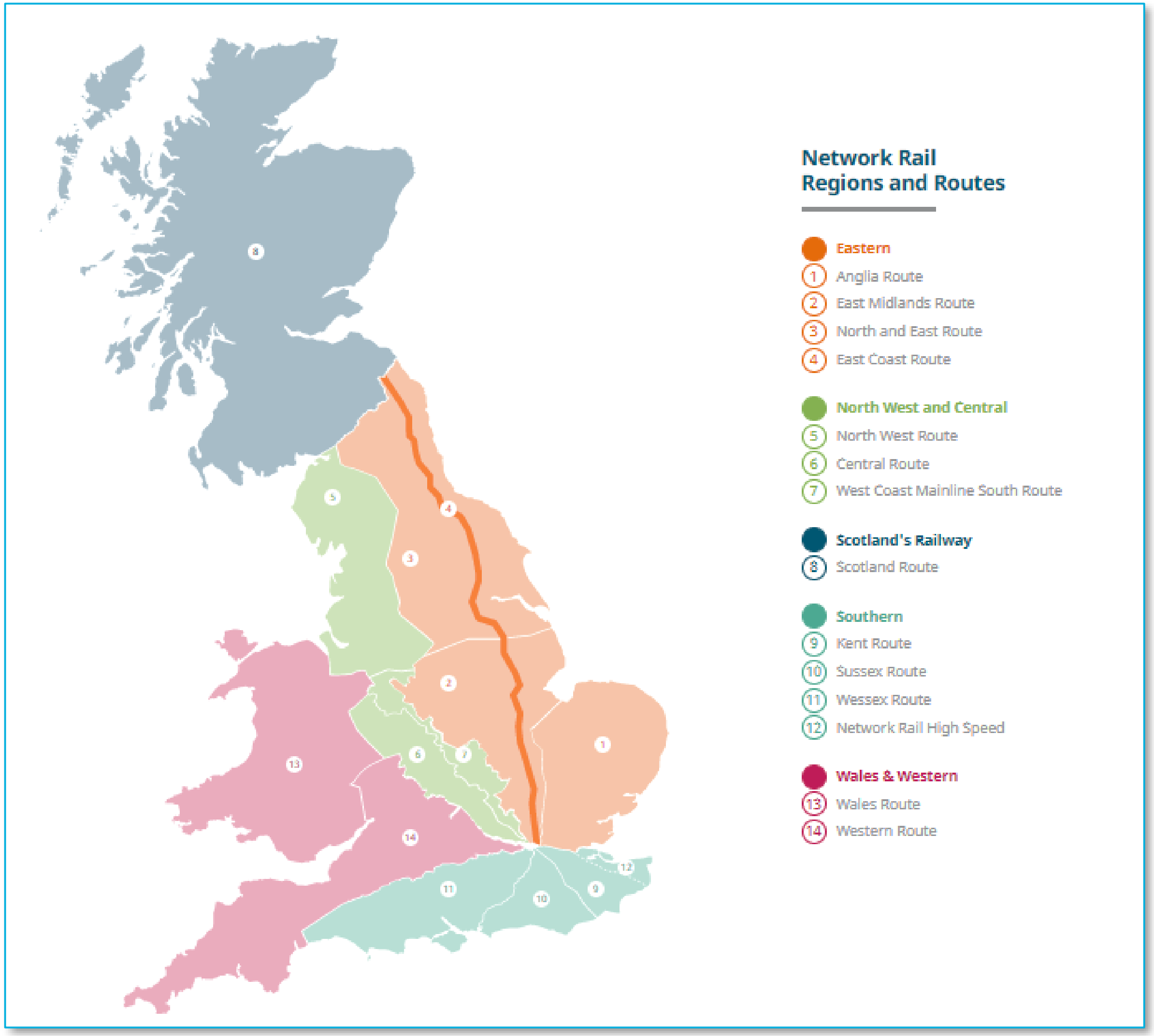
Organisation and regulation of Network Rail – devolution under Putting Passengers First

In addition, incentives within NR have evolved with changes in its structure

NR's new structure is designed to bring decision-makers closer to customers and strengthen locally-focused incentives:

- Creation of 5 regions, each with its own MD, to exploit scale economies
- Creation of 14 geographic routes to ensure customer focus and strengthen local relationships
- Devolution of decision-making to the appropriate level
- Balanced scorecard for each region and route (as well as virtual cross-country route and system operator)
- Separate regulatory determinations for each route (as well as virtual cross-country route and system operator)

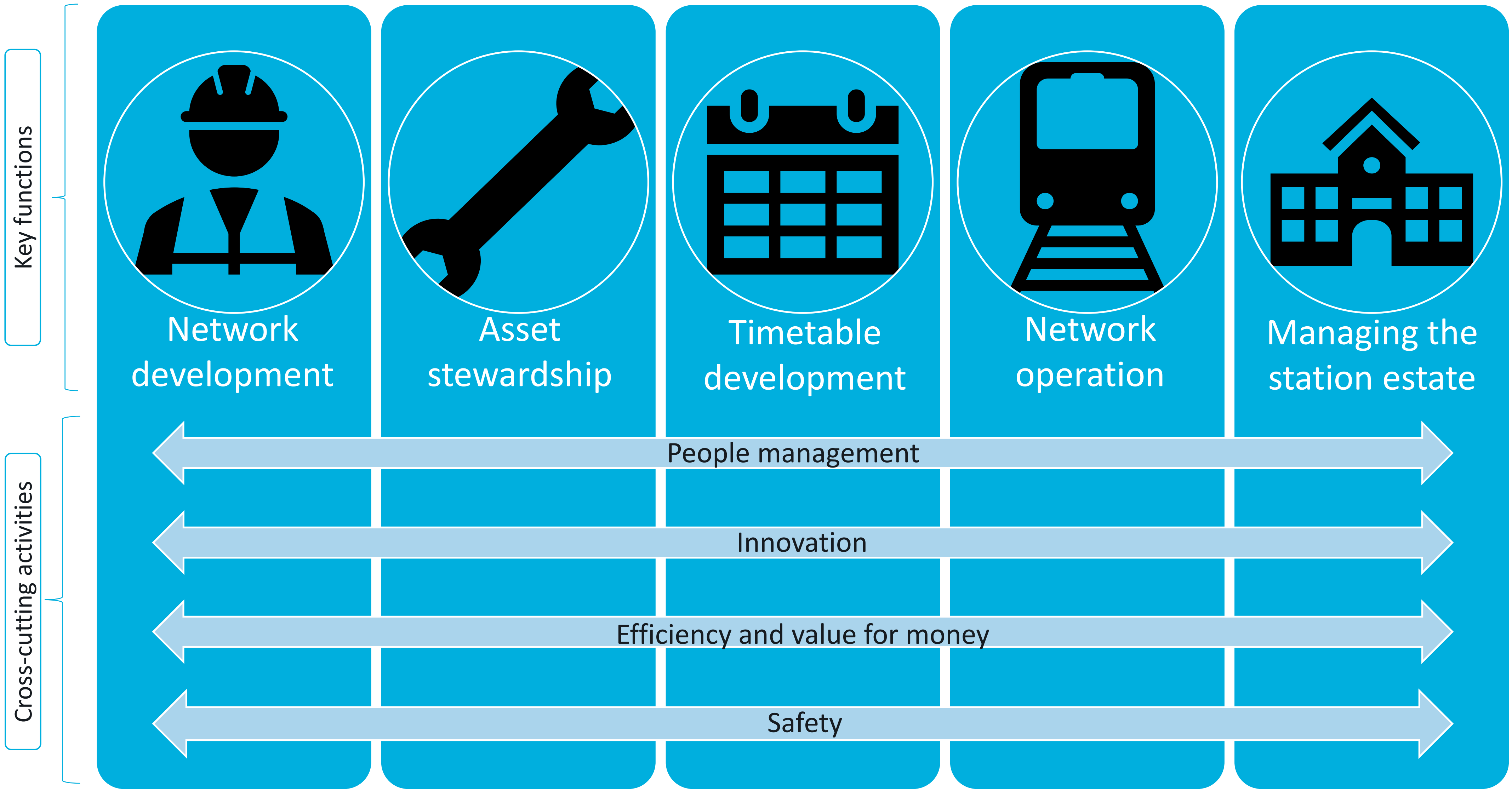
However, train services and political boundaries do not map simply to individual routes - designing incentives that resolve conflicting demands from customers will therefore be challenging



Source: Network Rail

Organisation and regulation of Network Rail – key areas of decision making

Incentives can influence a wide range of decisions within NR, covering key functions and crosscutting activities …



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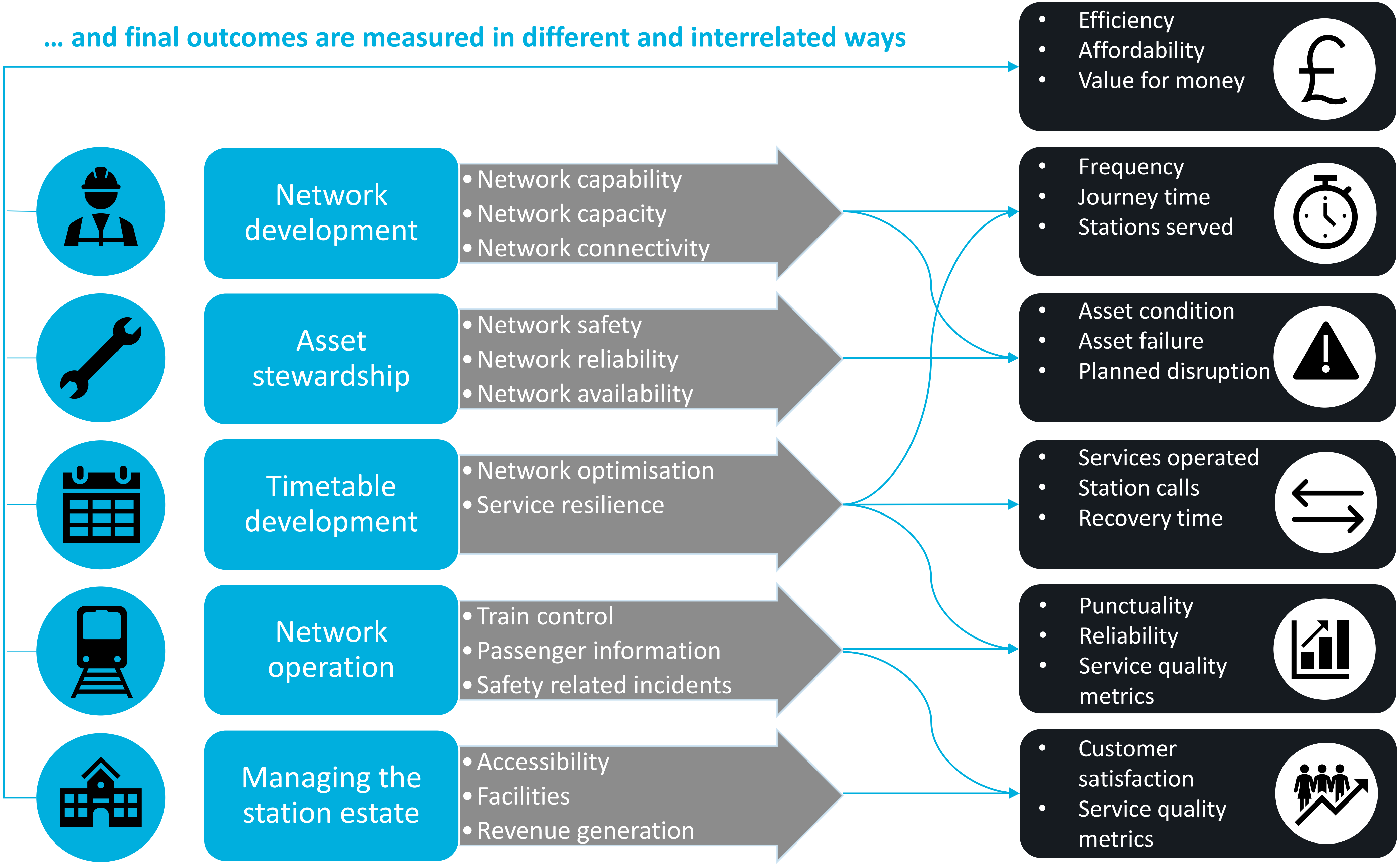
Organisation and regulation of Network Rail – decision-making through time

… in each area, decisions lead to different outputs delivered according to different timescales

Strategy – 5+ years	Planning – 1-5 years	Delivery – on the day
Enhancement strategy	Project prioritisation	Project delivery
Maintenance & renewals strategy	Work bank	Delivery of works
Long term capacity planning	Timetable planning	Service delivery
Station development strategy	Station management plan	Station service delivery

Organisation and regulation of Network Rail – measurement of outcomes

… and final outcomes are measured in different and interrelated ways



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Organisation and regulation of Network Rail – behaviour through time

We would expect the extent to which behaviour types influence decision-making to vary with the type of decision – while some behaviours (e.g. fairness) may influence a wide range of decisions in the same way, others will have more or less influence depending on the time between a decision point and its outcome

Behaviour type	Potential to influence decisions			Comment
	Strategy – 5+ years	Planning – 1-5 years	Delivery – on the day	Uncertainty increases and constraints decrease with the time between a decision and its consequences
Action bias	●●	●●	●●●	The need to be seen to take action becomes more important where the impact of decisions is more immediate
Conflict avoidance	●	●●	●●●	Individuals will be more willing to engage in conflict when timescales allow for its resolution
Blame avoidance	●●	●●●	●●●	The need to avoid blame becomes more important where the impact of decisions is more immediate and more clear
Ambiguity aversion	●	●●	●●●	Individuals will be more averse to ambiguity when decisions have short term impacts and mistakes cannot be corrected
Satisficing	●	●●	●●●	Individuals are more likely to satisfice when there is less time to consider all options and optimise outcomes
Optimism bias	●●●	●●●	●	Optimism bias is likely to increase with uncertainty and hence with the elapsed time between decision and outcome
Availability heuristic	●	●●	●●●	Individuals are less likely to rely on immediate recall of events when they have time to review the wider evidence
Present bias	●●●	●●●	●	Individuals are more likely to heavily discount future impacts when they are distant and highly uncertain
Loss aversion	●	●	●●●	Individuals taking strategic and planning decisions are more likely to take a balanced view of gains and losses

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Organisation and regulation of Network Rail – incentive hierarchy

NR's external and internal incentive mechanisms sit within a hierarchy of industry mechanisms and effects – the impact of incentives may be constrained by DfT rail sector policy and funding constraints

Industry ownership, structure and constraints	• Operators – owners require equity return, franchise agreements encourage short term revenue maximisation • NR – no equity, accountable to DfT and ORR • Capacity and funding constraints limit impact of incentives • Media comment and reputation influence all stakeholders
NR regulatory incentives	• Licence – monitoring/enforcement • Determination of revenue requirement • Track access charges (incl. Schedule 4/8) • Regulatory action often accompanied by media comment
NR management incentives	• Base pay • Annual performance-related pay • Objectives under Putting Passengers First • Personal aims (e.g. promotion) and reputation
NR operational staff incentives	• Base pay • General performance-related pay • Objectives under Putting Passengers First • Personal aims (e.g. promotion) and reputation

Organisation and regulation of Network Rail – mapping incentives to decisions I

Decisions are influenced by a complex matrix of mechanisms for providing incentives introduced at different times

– whole system outcomes depend on the interaction of legal/regulatory incentives on NR and train operators

	DfT Framework Agreement	Network Licence	Regulatory Determination	Access Agreement	Franchise Agreement	Key corporate metrics
Network development	Requirement to produce Strategic Business Plan in advance of the Periodic Review Requirement to produce Delivery Plan following Determination but before the start of the Control Period Requirement to produce scorecards, with KPIs agreed with Secretary of State as part of the Delivery Plan approval process	Part A: • 1 - core duties • 3 – sufficient resources • 4 – managing change Part B: • 5&6 – general and route network management responsibilities • 7 – System Operator responsibilities	Enhancement funding not within scope of periodic review and associated costs not recovered through access charges		Revenue growth Franchise bid commitments	• Frequency • Journey time • Stations served
Asset stewardship			M+R funding (and efficiency profile)	VUC Schedule 4 Network Code		• Asset condition • Asset failure • Planned disruption
Timetable development			System Operator Determination	Schedule 8 Network Code	Revenue growth	• Services operated • Station calls • Recovery time
Network operation			Operations funding (and efficiency profile)	VUC/EC4T Schedule 8	Revenue growth Schedule 7	• Punctuality • Reliability • Service quality
Managing the station estate		Station licence conditions	Operations funding (and efficiency profile)	Station Long Term Charge	Revenue growth Schedule 7	• Customer satisfaction • Service quality
Intended NR corporate incentives	**Does not have legal force – legislation and licence conditions take precedence**	**Fines and other enforcement measures - targeted, consistent and proportional**	**Commercial incentive to out perform cost efficiency projected at determination**	**Commercial incentive to maximise access revenue, minimise costs of Schedule 4/8**	Commercial incentive to pressure NR to increase the capacity of the network	

NR mechanisms (DfT Framework Agreement, Network Licence, Regulatory Determination)

Operator mechanisms (Franchise Agreement)

Common mechanisms (Access Agreement)

Organisation and regulation of Network Rail – mapping incentives to decisions II

Cross-cutting activities are incentivised through a similar matrix of mechanisms and additional general and specific legislation also plays a role

	Legislation	DfT Framework Agreement	Network Licence	Regulatory Determination	Access Agreement	Key corporate metrics
People management	Applicable law (e.g. on equality and diversity)	Requirement for clarity, inclusivity and empowerment	Part F 23 – incentive schemes	Determination of corporate budgets		• Staff/customer satisfaction • Recruitment
Innovation			Part A 1 –network improvement	Determination of innovation budget		• Project impacts • Project success rates
Efficiency and Value for Money		Requirement to participate in DfT annual planning	Part A 1 – 'timely, efficient and economical'	OMR funding (and efficiency profile)	Determined access charges	• Expenditure against budget • Productivity metrics
Safety	ROGS 2006 – certification RIDDOR 2013	Scorecards may include safety metrics	Part D 13 – safety and standards	Monitoring of safety performance		• Passenger/staff incidents • Level crossing incidents
Intended NR corporate incentives		**Does not have legal force – legislation and licence conditions take precedence**	**Fines and other enforcement measures - targeted, consistent and proportional**	**Commercial incentive to out perform cost efficiency projected at Determination**	**Commercial incentive to maximise access charge revenue/ minimise costs of Schedule 4/8**	

Organisation and regulation of Network Rail – aligning individual incentives I

Corporate incentives are translated into individual objectives through 'dashboards', which measure staff performance against objectives, and performance-related pay

National dashboard 30%

National metrics	Weight (%)
Fatalities and Weighted Injuries	10
Train Accident Risk Reduction	10
Public Performance Measure	15
Freight Delivery Metric	5
National Rail Passenger Satisfaction	20
Financial Performance Measure	20
Investment Milestones	10
Composite Reliability Index	10
Employee Engagement	0

Regional dashboard 70%

Regional metrics	Weight (%)
Vary by region	

NR operates two formal schemes for incentivising individuals:

- Annual – applies to a range of management bands, with performance-related pay ranging between 10% and 100% of salary
- General – applies to operational and certain other staff, with target award of £750 and maximum award of £1,500

A key issue is how important these are compared to other factors motivating individuals

75% dashboard outturn + **25% individual performance** = **Individual performance pay**

The illustration shows how the Annual PRP scheme operates in the case of regionally based staff

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Organisation and regulation of Network Rail – aligning individual incentives II

Under Putting Passengers First, individual objectives are aligned with passenger, staff and industry needs

In setting their balanced scorecard objectives, all staff must consider how their work relates to 11 themes. These go beyond a narrow definition of Network Rail's responsibilities.

Putting Passengers First – key themes	Passenger focused	Staff focused	Stakeholder focused	Relies partly on others?
My train is on time	✓			✓
My station is nice and safe and if things go wrong I am looked after	✓			✓
I get the service I am promised	✓			✓
It is easy to work with Network Rail and we are good neighbours			✓	
Network Rail deliver what they say they will for the price promised			✓	
Network Rail is efficient and value for money			✓	
Network Rail helps keep me safe and well		✓		
My manager cares about me and I am proud to work for Network Rail		✓		
I do everything I can to keep myself and colleagues safe		✓		
Network Rail is a responsible and environmentally sustainable company			✓	
Network Rail plans for the long term future of the whole railway			✓	

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Organisation and regulation of Network Rail – summary research findings

Observations

- The matrix of incentives applying to different areas of decision-making within NR is complex
- Many of the regulatory incentive mechanisms applied to NR were designed for a different type of organisation
- Under Putting Passengers First, individual incentives are more explicitly linked to customer needs and experience

Propositions

- Regulatory incentives are not the primary motivator within NR – they have an effect only in so far as they provide a convenient measure of success or failure at the management level
- Such incentives are unlikely to motivate operational staff, whose performance-related pay is anyway a significantly smaller proportion of their overall reward

Further questions

- How important are regulatory incentives in practice according to NR staff and other stakeholders and how does the situation compare with that in other regulated sectors? *(Chapter 4)*
- What incentives are at play in specific areas of decision-making? *(Chapter 5)*

4 Decision-making in practice I – industry perspectives

Industry perspectives – scope and purpose of the chapter

Scene setting → Context → **Findings from desk and field research** → Analysis → Conclusions

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
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Industry perspectives – interview programme structure and focus

Through our desk and field research, we sought evidence of the behaviours identified in the previous chapters

Field research

NR
- Senior management
- Region and route management
- Key corporate centre functions

Train operators
- Staff with experience of franchise bidding
- Staff who have planned operator-led investment
- Staff with extensive operational experience

Devolved nations and regions
- NR Scotland Route/Transport Scotland
- Translink Northern Ireland
- Transport for London

DfT
- Division responsible for oversight of Framework Agreement between DfT and NR

Other key industry bodies – RDG and ORR
- NR accountability and involvement in franchising
- Regulation of planning and performance
- Regulation of safety

Organisations outside UK rail
- ProRail – Dutch rail infrastructure manager
- CAA – regulation of air navigation services
- OFWAT – regulation of water services

Desk research

Focus of research

Our industry desk and field research was structured as follows:

- We asked stakeholders what the effects of different corporate and individual incentives have been in practice
- We asked stakeholders to identify any impact on the effectiveness of incentives resulting from changes in the ownership and organisation of NR
- We asked stakeholders to describe the factors motivating and influencing decisions and looked for (unprompted) references to the types of behaviour identified by the behavioural economics literature
- We reviewed the rail and other regulatory literature to identify further evidence of the behaviours and impacts described

In the following slides, we summarise the views of stakeholders as recorded at interview – note that while we have drawn on these views in subsequent analysis, they do not necessarily represent Steer's views

Industry perspectives – Network Rail senior management

Executive

NR has relatively few conventional incentives – it has never had shareholders, although management bonus schemes have played a part in the past. Reputation is a strong incentive.

Safety regulation creates ongoing pressure – the threat of enforcement action from safety inspectors can encourage unduly risk averse behaviour.

Incentives on train operators are different – the bid process creates pressure to maximise revenue over the franchise term. NR has challenged train service proposals during bid evaluation, but has not always prevented ‘undeliverable’ services from being contracted.

NR incentives do not always result in a full understanding of the consequences of decisions – Schedule 4/8 do not capture the real impact of passenger disruption. ‘Putting Passengers First’ is intended to refocus decision-making across the organisation.

Regional/route management

Devolution to regional executives and route managers has strengthened the relationship with operators – NR is no longer a ‘templated’ organisation. NR scorecards now include customer satisfaction, and there is more accountability for customer-facing issues.

For most staff, pride in the work is a stronger motivator than financial incentives. They thrive in challenging situations – e.g. maintenance works carried out at night to tight deadlines.

The Network Code and Schedules 4/8 continue to constrain efficiency and create perverse incentives. Some operators regard Schedule 8 revenue as a form of income and they now rarely develop business cases based on reductions in operator-caused delay.

Collaboration is nevertheless improving through joint performance teams. Failure is being redefined as a breakdown in collaboration.

Key themes

NR and operators are collaborating more but contractual frameworks and incentive mechanisms (especially Schedule 4/8) are preventing more progress.

Pride in the work and the reputation of the organisation are more important than financial incentives for staff on the ground.

Schedule 8 cost £1 billion in CP5, but NR was not really held to account for this cost, rather for the poor performance itself.

Industry perspectives – Network Rail regulation and finance

Regulation

The regulatory framework has not changed fundamentally since privatisation – it has not adapted to the changing institutional framework. The railway is no longer a market, if it ever was – it is a state-run monopoly.

Regulation is also overly complex – the Network Code is over 600 pages long and the track access agreements run to 300+. Application of the various regulatory mechanisms has become unmanageable. More generally, the framework fails to encourage collaboration, as shown by the May 2018 timetable change and the sometimes antagonistic relationship between NR and operators generated by Schedule 8.

When the railway works well, it is because individuals take pride in what they do and are focused on the customer. The regulator could do more to encourage this by offering praise and reducing the level of negative comment.

Finance

The creation of regions as devolved bodies with delivery responsibility was underpinned by devolution of financial decision-making – regional financial directors are responsible for business planning, financing and management of operational and capital expenditure on infrastructure projects. Devolution must be balanced with exploitation of corporate level economies of scale.

Scorecards now include more customer-focused metrics but still recognise the need for financial sustainability and value for money. Financial planning is more challenging following NR's change in status (e.g. annual budgeting is introducing pressures to spend in March).

Aspects of the regulatory framework work well (e.g. the escalation procedure) but overall it is not fit for purpose (e.g. Schedule 8). Enforcement works through the reputational effect rather than the financial impact of fines.

Key themes

Elements of the regulatory framework operate well but financial incentives are either ineffective or work through related impacts (e.g. reputation). Corporate financial incentives often do not affect decisions on the ground, which are driven more by factors such as professional satisfaction.

NR's change in status and the move to public sector accounting is changing behaviour.

The railway is operated by staff on the ground who have no understanding of, or interest in, regulatory incentives. They do the right thing in spite of, not because of, these incentives.

Industry perspectives – Network Rail network development

Role of business development

It is the responsibility of the regional business development teams to engage with key stakeholders to determine what they need from the railway, resolve conflicting demands and secure third party investment to help fund projects. The Eastern Region has a target of £103 million of third party funding, reflected in individual objectives. The aim is to encourage investment in the railway rather than funding that is channelled through NR.

Incentives within NR can sometimes pull in opposite directions – the property team are incentivised to generate revenue but the use of property share mechanisms (e.g. giving NR a share of enhanced land value) can undermine the value of scheme for a local authority.

Experience of GRIP

The business development teams take projects from GRIP 0 to GRIP 2, although they will stay involved as client thereafter.

GRIP is rightly safety focused but can encourage the development of prescriptive solutions that lack innovation or reduce efficiency. For example, NR continues to specify heavy duty passenger lifts when alternative specifications are available.

Following the experience of May 2018, there is now much greater accountability for the progression of projects, with individuals making go/no go decisions at key points. It is essential to secure industry buy-in but this can inject substantial delay and cost to a project. It can also be hard to attract third party funding when the funder is not certain when the project will proceed. In the later GRIP stages, progression can suffer from transfer of staff – those responsible for commissioning and close out do not always have the project history to perform the role efficiently.

Current funding arrangements create incentives for NR to 'stay on plan', which can discourage saving/cash retention.

Key themes

The regional business development teams have helped to ensure greater accountability and responsibility from the perspective of stakeholders – they provide a clear point of contact for local transport authorities and other investors.

Incentives within NR and the wider industry continue to inject delay into projects. Public sector financial planning also adds an additional layer of approval but has simplified project financial management in some ways.

Projects are now approved individually, which has addressed the control period stop-go cycle and ensured a better balance of work across the supply chain, but HMT oversight often leads to delay.

Industry perspectives – Network Rail management of possessions

Key roles and responsibilities

Possessions are managed within a highly constrained environment, in which the person in charge of the possession (PICOP) must ensure completion of the work within tight timescales while complying with carefully defined safety protocols. They receive control of a site from the controlling signaller after measures to protect staff (e.g. isolation and the placement of detonators) have been implemented. During the possession, progress of the work is constantly monitored, with the PICOP liaising with the controlling signaller in the event of a potential overrun.

The engineering work itself is separately managed by an engineering supervisor, allowing the PICOP to focus on oversight of progress and safety. Both roles may be undertaken by sub-contractors trained in relevant safety procedures. Safety training is frequently refreshed and there is a weekly briefing of all staff on safety issues.

Impact of incentives

Senior managers are incentivised to ensure that possessions are effectively and efficiently managed, with individual scorecards including objectives relating to the number of overruns and passenger impacts as well as Schedule 4 payments. Schedule 4 impacts can be difficult to assess and forecast because of the complexity of the calculations – the senior manager interviewed employed a full time analyst to forecast payments, which are reviewed monthly.

Staff on the ground are primarily motivated by the satisfaction of completing engineering work under challenging conditions, and managers highlight ‘real’ rather Schedule 4 impacts to encourage the right behaviour. It is important to explicitly recognise staff ingenuity in responding to a rapidly changing situation and to praise their efforts, especially when things go wrong – they are often in a position to mitigate disruption through prompt action.

Key themes

The working environment is highly constrained and encourages strong team identity and collaborative effort.

Schedule 4 is an important motivator for senior management staff but engineering staff are primarily incentivised by job satisfaction and an understanding of how disruption can affect the passenger.

Schedule 4 is complex and payments can be difficult to forecast accurately.

Positive feedback is important, especially when things go wrong – “but for your actions, that would have been a lot worse”

Industry perspectives – Network Rail cross-cutting functions

Human resources

People in the rail industry are driven mainly by pride in their work and the knowledge that the industry benefits society. Financial rewards reinforce rather than drive performance – people generally do not consider how good performance will influence their pay packet.

Employees must have good 'line of sight' – they need to understand how their role contributes to the delivery of rail services. NR has recently produced a diagram showing the connection between specific roles and frontline services.

Dashboards are intended to encourage a holistic view, with objectives related to national, regional and individual performance. They could be improved further, for example by including measures of how employees operate.

NR is a good place for career development. There is a strong culture of compliance and few disciplinary issues.

Research and innovation (R&I)

It is hard to develop objectives for R&I activity that align with 'Putting Passengers First' – the outcomes are too uncertain and long term. R&I staff are driven by the satisfaction from solving problems and seeing ideas for improvements get implemented.

The management of R&I activity is challenging within the current regulatory framework – an expectation that some projects will fail must be built in to the programme and expenditure profile. Projects also develop in different ways – often outside the agreed programme.

R&I needs more flexibility than the regulatory determination allows – ad hoc work can only be commissioned when the budget is small. ORR monitoring of R&I also focuses too much on process.

NR does not have adequate test facilities and cannot always 'test the boundary' – the strong safety culture and risk aversion can lead to over-engineered solutions.

Key themes

Financial incentives reinforce rather than drive positive behaviour.

Staff need to understand how their role contributes to the operation of the overall organisation.

R&I activity is difficult to monitor and regulate - the programme needs to be flexible and allow for frequent failure.

ORR should ask more challenging questions about R&I – "what impact has your programme had?", not "how many projects have been closed out within budget?"

Industry perspectives – train operators

During the course of the study, we have only had limited engagement with train operators because of the impact of the COVID-19 pandemic. We have therefore supplemented the interviews with discussions with Steer staff with direct experience of operations.

Franchise procurement

The service passengers experience is heavily influenced by bidder behaviour during the procurement process – the bidder is incentivised to propose services that maximise the bid quality score, often at the expense of deliverability and performance. In the case of the Northern Franchise, the ITT also included a large wish-list for over 20 different local authorities, which appear to have been accepted with little pushback. In practice, these were undeliverable because of insufficient capacity.

NR has the opportunity to express views on the train service before procurement as well as during bid development and bid evaluation. However, often it does not have the time or resources to fully engage, it must respect commercial confidentiality and its views have sometimes been ignored. At best, it is only able to provide a heavily caveated letter of support for an operator's plans.

During the Northern procurement, NR raised significant concerns about the south Manchester element of the service specification but they were nevertheless contracted – so far, they have not been delivered. In addition, the successful Northern bid included service commitments required by the ITT that NR ultimately rejected through the bid and offer process.

Balanced scorecards

There is insufficient visibility of the new route-based Balanced Scorecards, and the consultation with operators on scorecard contents is limited. NR is reluctant to include firm targets – the impression given is that the organisation is seeking to establish targets that are relatively easy to meet and they are not customer-led. In addition, some of the metrics are very opaque. Hence, as currently specified, Balanced Scorecards are not an adequate mechanism for holding NR to account.

Key themes

There is insufficient engagement between NR and franchise bidders, due to both time and resource limitations. This can seriously undermine the deliverability of bidder proposals. While the problem is not caused by NR, it needs stronger incentives to challenge ITT and bidder proposals.

Balanced Scorecards are neither customer-led not sufficiently ambitious.

The Northern Franchise failed because of NR's failure to deliver major projects. There do not appear to be any adverse consequences of failure either for individuals or the organisation.

Industry perspectives – train operators

During the course of the study, we have only had limited engagement with train operators because of the impact of the COVID-19 pandemic. We have therefore supplemented the interviews with discussions with Steer staff with direct experience of operations.

Delivery of operator plans

A train service plan dependent on the introduction of new rolling stock is vulnerable to manufacturer delays – there is little an operator can do to mitigate these. However, operators are normally protected from the financial consequences by liquidated damages clauses in the rolling stock contract.

NR typically has only a limited understanding of operator delivery plans. For example:

- Many of the target milestones in the Northern ITT did not align with NR's enhancement programmes and NR took no ownership of the ITT document setting out infrastructure assumptions. When enhancement schemes were reprogrammed to be delivered later than indicated in the ITT, the franchisee was left to 'pick up the pieces'.
- Northern were only given 3 weeks' notice of a substantial delay to the lifting of the Blackpool enhancement blockade – this prevented implementation of the operator's driver training scheme, but there is no evidence NR took account of this.

The early Evergreen projects, delivered by Chiltern, illustrate what can be achieved when the party responsible for project delivery has sight of the downstream consequences of their actions.

Regulation

The role of an independent regulator in an industry that is partly owned by the public sector is unclear. ORR has played a highly effective role in regulating safety but has not challenged ORR sufficiently on costs. NR often appears to control its costs by descoping activity rather than becoming more efficient. It may have become too risk averse and too focused on safety.

Key themes

NR is not incentivised to support the delivery of operator plans once a franchise has been won – it is effectively isolated from the downstream impact of its actions.

In addition, NR is not sufficiently accountable for its costs and ORR has not regulated network costs effectively. This is in contrast to the regulation of safety, which has been much stronger.

NR is not well placed to undertake optioneering when developing enhancement schemes since it is not the ultimate beneficiary.

Industry perspectives – train operators

During the course of the study, we have only had limited engagement with train operators because of the impact of the COVID-19 pandemic. We have therefore supplemented the interviews with discussions with Steer staff with direct experience of operations.

NR as station landlord

NR is remote from the customer experience at stations and does not fully appreciate its importance for the overall journey. It tends to be heavily focused on delivering the asset management plan rather than supporting operators in meeting customer needs. However, when undertaking improvements on behalf of an operator, there is a tendency to gold plate or over-engineer the solution.

NR's asset knowledge is still inadequate, leading to problems when improvements are made. For example, there have been occasions when projects funded under the National Station Improvement Programme could not proceed without additional funding to address unexpected problems identified during the works. In these circumstances, NR has disputed responsibility for meeting the costs of the additional work, arguing that the operator should not have committed to the scheme without investigating the site.

Management of major stations

At managed stations, it is often not clear who 'owns the customer experience' and NR has been accused of 'excessive branding' of its own role, which can be confusing for passengers. There has also been disagreement over NR's involvement in aspects of the service that operators regard as their responsibility, for example the provision of passenger information. At the same time, operators have little influence over car park capacity, notwithstanding its impact on their business.

Tensions can arise as a result of NR's incentive to increase retail revenue, which in the operators' view can lead to proposals that compromise the operational efficiency of a station. These tensions may also arise within NR itself, with its property team incentivised to exploit stations as retail sites and routes and regions focused on their impact of the operation of the network.

Key themes

NR is not sufficiently focused on the role of stations in the passenger's journey experience and its knowledge of asset condition across the station estate is still inadequate.

NR's incentives do not always align with the interests of major station users, and it often exerts too much control over the station environment, sometimes to the detriment of operational efficiency.

In the regular survey of Network Rail's customers, the operators always score the station estate poorly.

Industry perspectives – train operators

During the course of the study, we have only had limited engagement with train operators because of the impact of the COVID-19 pandemic. We have therefore supplemented the interviews with discussions with Steer staff with direct experience of operations.

NR culture

Behaviours within NR are driven by the culture of the main groups of staff. It can be heavily engineering-focused or driven by short-term operational considerations depending on the background of the individuals making the decisions. Putting Passengers First has helped to strengthen NR's tactical decision-making by bringing various activities under local leadership, but it has also reinforced long-standing structural problems – Route Directors with an engineering background will make decisions that reflect their engineering focus (e.g. the press release on Kings Cross throat remodelling emphasised the characteristics of the technology and the maintenance benefits rather than the benefits for train operators and passengers).

More generally, organisational change will not address problems arising from entrenched behaviours. There is a need for wider cultural change and a different approach to leadership.

Exploiting the benefits of lockdown

The substantial reduction in train services during lockdown has provided an opportunity to rebase the timetable and improve understanding between the trade-off between performance and capacity utilisation (with operators no longer focused on meeting commitments to enhance the service). However, it is not clear that any part of NR's organisation is responsible for this – the System Operator could in principle perform this function but it is subordinate to the routes under Putting Passengers First.

Introducing new rolling stock

NR has insufficient knowledge of the asset environment and does not keep up-to-date data on how track shifts position. It therefore incorporates theoretical risk into its gauge clearance assessment for new rolling stock. Substantial work is undertaken to eliminate theoretical risks – even when the operation of existing trains demonstrates that they are not real risks.

Key themes

There needs to be an overarching strategy that provides a clear line of sight between long-term asset management and short term operational decisions. Long-term asset management can be heavily influenced by today's problems, with tomorrow's problems ignored. Equally, engineering solutions often lack an operational rationale.

Network Rail has a mix of capabilities – engineering/ asset management expertise and managing the short term response to operational challenges – but no strategy linking the two. Its approach tends to alternate between them.

Industry perspectives – Rail Delivery Group (on behalf of owning groups)

NR ownership and governance

NR's public sector status makes the ORR's role considerably more challenging as it can no longer rely on the profit motive to encourage efficiency. Reputational incentives can be powerful but ORR needs to leverage these effectively. Given the corporate status of NR it is important that ORR pays close scrutiny to NR's efficiency improvements and challenges NR to make progress well before the full assessment of efficiency undertaken during a Periodic Review.

ORR's role in holding NR to account is critical as the public sector accounting framework will not be sufficient to encourage maximum efficiency improvements (and it may even undermine it because of the lack of flexibility afforded to NR in managing expenditure). Against this background, it is helpful that the primary mechanism for ensuring accountability is the licence rather than the framework agreement between NR and DfT.

Collaboration in bidding and operations

NR needs to be sufficiently engaged with key elements of franchising, in particular during bid development so that there is greater assurance that what is contracted by client bodies is consistent with the capability of the infrastructure, reflects operational realities and can be turned into a high performing timetable. It has often been difficult for bidders to ensure that the services they propose are deliverable. The problem has been accentuated by the lack of an effective change process when it became clear there would be a misalignment of NR's enhancement plans for the Control Period with franchise commitments.

There needs to be greater consistency of engagement with operators when NR prepares its plans for PR23. The evidence from the last periodic review suggests that NR's involvement of operators in route plans has been mixed.

NR should be incentivised to collaborate locally with operators to improve cost efficiency and drive revenue.

Key themes

In the absence of strong commercial incentives on NR, there is a case for greater scrutiny of cost efficiency during a control period by the independent regulator. This is not the conventional regulatory approach but in the rail industry customers and taxpayers face the full impact of inefficiency, not shareholders.

The process of planning and securing train services through the franchising process should be better integrated with NR's planning and development of the network.

> *Aligning targets and incentives to harness the customer and commercial focus of train operators is crucial.*

Industry perspectives – perspectives from Scotland

Scotland Route

Scotland is the smallest region and the largest route. There is a one-to-one relationship between the region, the route and ScotRail, making it easier to align political objectives with industry incentives. However, the alliance with ScotRail does not always work well because the commercial incentives facing the organisation can undermine the relationship. Other operators have expressed concern about favourable treatment of ScotRail, and NR has developed metrics for long distance services to allay these.

NR does not have a monopoly of project delivery and therefore has a strong incentive to deliver efficiently. More generally, building a reputation for strong performance gives NR greater influence with Transport Scotland.

The relationship with ORR is positive, for example with safety inspectors relying more on advice than enforcement.

Transport Scotland

Although Transport Scotland is responsible for its own HLOS, there has been no material devolution of regulatory incentives. TS has nevertheless sought to align NR's performance with ScotRail's target PPM of 92.5%.

Constraints on devolution, for example in regulation and timetabling, have created problems and TS would welcome a separate licence for Scotland. TS provides guidance to ORR on its approach to regulation but is ultimately dependent on ORR for oversight of NR's expenditure – TS must bear the impact of overruns.

TS's initial concern that the scorecard for Scotland would reflect national targets has not been realised and the metrics appear to have contributed to better performance and delivery. However, NR incentives are not always well aligned with passenger needs – e.g. it books too many disruptive possessions too far in advance.

Key themes

A one-to-one relationship between route, operator and transport authority facilitates alignment of incentives and improves accountability but does not always ensure good performance.

Even in these circumstances, the behaviours that alliancing is intended to encourage can be compromised by the commercial relationships between parties.

Personal relationships are important – the strong relationship between the Chief Executive of TS and the Director of NR's Scotland Region often helps to resolve issues.

Industry perspectives – perspectives from Northern Ireland

Industry structure and governance

Translink, the public transport provider in Northern Ireland is responsible for the rail network. It has a public service contract (PSC) with the government of Northern Ireland to maintain and improve the Network. While there are some 'Chinese walls' within Translink, it is essentially a vertically integrated public sector organisation. It is also responsible for bus services.

The PSC was set for 5 years but has been extended by a year. Translink and the Department agree annual KPIs covering operating performance, customer satisfaction, safety and environmental impacts. Performance and satisfaction are measured in a similar way to that in the UK (PPM and NRPS) but safety is measured by analysing insurance claims against Translink as well as by reference to fatalities and injuries. Environmental metrics follow European standards and progress towards meeting them depends on the funding available.

Northern Ireland Ministers have the power to intervene in aspects of Translink's activities but the organisation has a high degree of autonomy, for example in relation to timetabling. The government approves fare changes and has approved a 2.2% increase (although this may be revisited as a result of COVID-19). Translink is currently facing substantial funding pressures but in practice Ministers are responsible for finding ways to meet the funding gap.

Investment

Ministers decide on high profile investment projects intended to enhance the network. Translink determines the investment programme for renewing the network and replacing rolling stock. All rolling stock is funded by government and owned by Translink.

The current PSC expires in 2022 and a new contract could provide for investment to encourage modal shift and meet environmental objectives, depending on funding available.

Key themes

There are clear advantages in a vertically integrated railway – both the government and Translink have greater freedom to redirect resources according to changing priorities. Governance through a single PSC also simplifies accountability.

However, funding is a major constraint on investment and there are no clear mechanisms for obtaining access to private sector finance.

In Northern Ireland the government sets objectives for the broader transport network and Translink manages delivery across the different modes.

Industry perspectives – Transport for London

Network improvements

TfL is frequently dependent on NR to enable the delivery of service improvements. NR tends to focus on infrastructure-based rather than operational solutions – it is perceived as primarily an engineering company within TfL. However, the cost of infrastructure enhancements is substantial, and NR tends to 'gold plate' the design, which adds further cost.

This means that TfL often finds it difficult to make a business case for a change. For example, it recently sought to increase London Overground services to Clapham Junction, but NR was unwilling to timetable more than seven trains per hour into the platform and quoted £85 million for a new platform. In TfL's view, an operational solution could have been developed considerably more cheaply – the Victoria line can accommodate 30 trains an hour and it is not clear why the Overground network was limited to seven.

TfL also considers that NR should be more flexible in its possession planning, for example to accommodate major events. TfL itself is able to act in a more agile way when planning possessions on its own network.

Capacity allocation

NR does not appear to have a strong incentive to allocate capacity efficiently, and/or is unduly constrained by the access regime. This is a particularly important issue in the case of congested routes through London. TfL is currently prevented from offering more passenger services and relieving overcrowding because of the protection of freight paths, which are rarely used – freight operators can retain the right to the paths by running a train once every 90 days. On the West London Line, around half the available paths are not used, in contrast to the situation on the East London Line where TfL runs a metro style service frequency.

Key themes

NR appears to be incentivised to develop infrastructure-based rather than operational solutions and tends to over engineer the specification.

Capacity allocation on congested lines can be inefficient – while this is primarily the result of constraints imposed by the access regime, NR needs stronger incentives to challenge inefficient use of capacity.

There should be a much greater incentive across the industry to use capacity in the most efficient way

The current appeals and arbitration process for capacity allocation is too long

Industry perspectives – DfT perspectives

DfT oversight of NR

DfT oversees the performance of NR through engagement with its Board, approving a balanced scorecard for the control period and monitoring performance against targets. It also approves senior remuneration and can remove the Chair of the Board.

Oversight mechanisms, including the scorecard, are defined in a Framework Agreement between DfT and NR. The scorecard is set by NR's Board but approved by the Secretary of State. It is applied alongside the requirements of NR's licence.

Previous scorecards have focused too much on inputs, with NR expending resources in ways that did not benefit the passenger. The approach has now changed, with more outcome and output measures (e.g. NRPS) included – NR's overall performance is expected to be 14% lower than last year's as a result.

DfT monitors NR's performance for each railway period through a variety of channels. Specific meetings are held to address any issues of financial underperformance. DfT also monitors diversity and inclusion as well as railway-specific performance.

Capital projects above a certain threshold are monitored through a joint Portfolio Board. Projects must be governed in line with Managing Public Money and Treasury Green Book guidelines.

There is sometimes a mismatch between NR's obligations and actions and those of operators, which gives rise to tension. DfT encourages dialogue to resolve these but this does not always happen. A previous attempt by RDG to address this issue has been abandoned.

Devolution of responsibility for rail services can complicate the issue further. Different transport bodies will have different objectives and NR may have to respond to conflicting demands.

Key themes

NR's public status has added an additional layer of accountability – a Framework Agreement with DfT operates alongside the Network Licence.

The path towards accommodating conflicting demands from different transport authorities following devolution is unclear.

The Department does not place great weight on financial incentives – they are part of the 'money-go-round'. Reputational incentives are far more important.

Industry perspectives – ORR perspectives

Planning and performance

Reputational incentives have always been important – going back to British Rail. Fines do not carry weight except in so far as they generate headlines. But there are signs of 'regulation fatigue' within NR, with managers becoming thick-skinned towards public criticism.

There is a risk that regulation is encouraging short-termism within NR – reliance on reputational effects coupled with the use of lagging indicators discourages people from looking ahead. E.g. enhancements – people can complete the design phase with their head held high without considering construction, handover or operation.

There is also insufficient focus on medium term asset sustainability. ORR currently focuses on a 5-year target with a trajectory that is updated every year - a very clumsy mechanism. There is no obligation to develop a 40-year look ahead, as for HS1.

The ability to benchmark routes has strengthened regulatory effectiveness – the Consistent Route Measure of Performance appears complex but is understood outside the railway.

Safety

HMRI works with NR and operators to improve safety rather than focusing on non-compliance and enforcement - significant enforcement action, when taken, then carries greater weight. Fines are relatively insignificant and the reputational damage following safety-related incidents is more important.

The division of responsibility for safety can give rise to problems (e.g. slow deployment of on-train sanders). NR can also be slow to respond except when threatened with an enforcement notice.

Any concerns that HMRI would be 'captured' following its transfer to ORR have been allayed. Inspectors are enthusiastic and proud to work for the organization, despite relatively low pay.

Key themes

Too much reliance on reputation as an incentive can encourage short-termism and managers may develop resistance to it over time.

Incentives to improve medium term asset sustainability are relatively weak. NR needs stronger motivation to develop a long-term vision for its assets.

Many high-level meetings happen around the time ORR is expected to make a public statement.

Reputational incentives can have unintended consequences – they make NR more risk averse.

Industry perspectives – a perspective from the Netherlands

Ownership and regulation

ProRail is currently a limited company but will transform into a Zelfstandige Bestuurs Orgaan (ZBO) or independent public body from 1 January 2021. The transformation is a recognition that ProRail is a monopoly with public duties and financed by the public sector.

The organisation has a 10-year service agreement with the Dutch government (there is no separate licence). It includes obligations to meet a number of KPIs covering safety, operational performance (including infrastructure outage as well as train performance), sustainability and customer satisfaction (customers being passenger and freight train operators). Passenger satisfaction is seen as the responsibility of the operators and is not within the scope of the agreement.

ProRail's Business Analysis Department submits quarterly, half-yearly and annual reports to the Dutch Ministry of Infrastructure and Water Management.

ProRail is not subject to a licence – the only mechanism for ensuring accountability is the service agreement. It receives a fine if performance is below threshold levels – this is considered inefficient, as government is imposing a fine on its own organisation, and fines will be abolished when Pro Rail becomes a ZBO. However, there is a reputational impact when fines are issued.

Separate KPIs are agreed between ProRail and operators – these are designed to align incentives and are more effective. ProRail also sets internal indicators, for example on efficiency (which is not covered by the service agreement).

Safety standards

Safety standards are detailed and prescriptive but debated extensively and generally proportionate. Standards relating to work on the track are developed by a separate organisation. Staff have a strong safety ethos, and will monitor the behaviour of their peers.

Key themes

ProRail is not subject to licence obligations – it is held to account entirely through a service agreement with government.

Fines for underperformance are not considered effective except in so far as they affect the organisation's reputation.

Safety and sustainability are important to staff – they are in the DNA of the organisation and among the first considerations at the start of a new project.

Industry perspectives – other sector regulators

Regulation of air navigation services

National Air Traffic Services (NATS), which is largely owned by a consortium of airlines, is regulated by the CAA through a licence. The majority of licence conditions relate to economic regulation but some concern safety. Operating expenditure is subject to regulatory determination every five years, with capital expenditure added to the regulatory asset base each year.

Different licence conditions attract different sanctions if they are breached and not all are linked to financial penalties. Reputational impacts arising from performance failures can be very important. However, the main measure of operational performance – delay – is captured by different metrics that are linked to a bonus and penalty mechanism (with payments capped at a small percentage of determined costs).

DfT can only influence NATS' strategy through the CAA – e.g. the CAA has introduced a licence condition requiring a delivery plan for airspace modernisation.

Regulation of water services

The price control mechanism, applied every five years, is the primary means of economic regulation in the water sector. There is considerable focus on econometric benchmarking of water companies, which effectively determines 60% of the final customer bill. Outcomes are incentivised through bonus and penalty mechanisms linked to measures of service quality (OFWAT monitors some 600 different quality metrics annually).

Some water companies are aggressive and investor-driven, often reflecting a highly geared financial structure. Developing an appropriate regulatory response is challenging – it can be hard to assess the affects of limiting gearing ratios. Managers behave differently to investors - they are more motivated by reputation interest in the industry.

OFWAT uses the regulatory process itself to generate incentives – it will expedite aspects of the regulatory process if a company's business plan is good quality.

Key themes

Reputational effects can be important for managers of private sector entities, although owners may be driven by profitability.

Benchmarking is a key component of the price control review in the water sector, while the assessment of business plan quality against defined criteria affects the speed of the regulatory process.

Water company plans are graded on a scale from 'significant scrutiny' to 'excellent' – no company has yet achieved 'excellent' but some have been good enough to secure 'fast track' status with early certainty of cost allowances.

Industry perspectives – evidence of behaviour types

References to types of behaviour by interviewees

While the number of interviews was limited, and should not be interpreted as a statistical sample, various interviewees mentioned the types of behavior identified in Chapter 2.

Behaviour	References by NR staff	References by other stakeholders
Need for recognition	●●●	●●●
Ambiguity aversion	●●●	●
Sense of belonging	●	●
Availability heuristic	●●	
Conflict avoidance	●	●
Relativity	●	●
Doing the right thing	●	
Empowerment	●	
Action bias	●	
Blame avoidance	●	
Loss aversion	●	
Fairness		●
Optimism bias		●
Present bias		●
Satisficing		

●●● **Strong evidence** – mentioned by 5 or more interviewees

●● **Clear evidence** – mentioned by 3-4 interviewees

● **Some evidence** – mentioned by 1-2 interviewees

Note, however, that behaviours may influence decision-making even where individuals are not aware of them

Industry perspectives – impact of behaviour on key functions I

Network development

ORR's independent report into the May 2018 timetable disruption identified various industry failings demonstrating, or at least consistent with, some of the behaviours described in Chapter 2 of this report (although we note that NR is acting on ORR's recommendations):

- Split accountability for the management and delivery of major projects encourages **blame avoidance**
- The apparent unwillingness among programme managers to integrate related programmes suggests **ambiguity aversion**
- The ORR report explicitly identifies a tendency to **optimism bias** in the industry and its findings are also consistent with **present bias** in the case of long term enhancement programmes (i.e. insufficient attention to long term delivery risks)

Train operators have also suggested that NR takes insufficient account of their needs when specifying projects and changing delivery plans.

Asset stewardship

Various stakeholders identified the importance of reputational incentives produced by ORR's monitoring and enforcement of NR's licence conditions, including conditions relating to stewardship of the network. Such incentives are underpinned by behaviours such as a **sense of belonging** and **need for recognition**. ORR has suggested that the impact of reputational effects can be counter-productive when combined with lagging indicators, since they encourage short termism and insufficient focus on the medium term condition of the assets. This is also consistent with **present bias** and **satisficing** (i.e. ensuring an acceptable level of asset condition in the short to medium term rather than optimising the trade-off between maintenance and renewals).

Industry perspectives – impact of behaviour on key functions II

Timetable development

ORR's report into May 2018 noted that the Industry Readiness Board overseeing the Thameslink programme was established too late and had insufficient resources to subject the programme to an independent audit. The IRB is independent of NR but its behaviour provides evidence of a more general tendency towards **satisficing** when complex processes such as timetable development require investigation.

In addition, at interview various stakeholders pointed to failings in the timetable development process, suggesting that NR has taken a **blame avoidance** approach when assessing franchise bidders' proposals for train services, and at times its actions have also been consistent with **conflict avoidance** behaviour (e.g. providing caveated letters that neither endorse nor fully reject franchise bidder proposals). Recent experience indicates that NR is now more robust when challenging train service commitments that it considers undeliverable.

Network operation

Several stakeholders commented that operational staff are motivated primarily by job satisfaction and pride in the railway, again suggesting that they feel a **sense of belonging** to NR and a **need for recognition** of their contribution. Some stakeholders have suggested that operational staff, while they are aware of formal regulatory incentives such as Schedule 8, are not motivated by financial payments, focusing instead on **doing the right thing**. The lack of familiarity with the details of Schedule 4 and Schedule 8 among both operational and engineering staff suggests a degree of **ambiguity aversion**.

Managing the station estate

Ongoing deficiencies in NR's asset knowledge from the perspective of train operators suggests a degree of **present bias**, with insufficient attention paid to the long term condition of the part of the station estate that is managed by the operators. In addition, disputes between NR and operators over responsibility for works to address structural and other problems is indicative of **blame avoidance**. The **need for recognition** among NR's property team, who are incentivised under a different performance-related pay mechanism to other NR staff, can give rise to tensions with NR's organisation, particularly where full exploitation of managed stations as retail sites conflicts with the operational objectives of routes and regions.

Industry perspectives – impact of behaviour on cross-cutting activities I

People management

Managers with overall responsibility for staff development within NR emphasised the importance of job satisfaction as a primary motivator, again suggesting that most staff are concerned with **doing the right thing**. They regarded financial rewards, whether in terms of general or performance-related pay as 'hygiene factors', serving to reinforce rather than drive behaviour, providing further evidence of a **need for recognition**. The Putting Passengers First initiative chimes with this view, since it requires staff to link their objectives to behaviours that benefit rail passengers, the industry, the organisation and its staff and reward them according to a balanced set of metrics that are similarly aligned. However, the same managers also noted that staff dashboards could be improved through the introduction of measures of how staff operate or behave, suggesting a need to explicitly encourage positive behaviour alongside positive outputs and outcomes.

Innovation

Job satisfaction and industry pride are particularly important incentives in the case of innovation as the results are typically highly uncertain and may arise only in the distant future. The expected failure rate of innovation projects is high, at least in the case of more fundamental research and development, and must be programmed into the budget. Successful innovation is therefore particularly reliant on individuals who are motivated by **doing the right thing**. At the same time, they may differ from more operationally focused staff in that they have a genuine interest in seeing the impacts of their ideas realised over the long term and will be less prone to optimism bias and present bias. Nevertheless, their **need for recognition** can be harnessed to encourage demonstration of the impacts of their efforts.

steer

Industry perspectives – impact of behaviour on cross-cutting activities II

Efficiency and Value for Money £

NR financial managers confirmed that, as in the case of other areas of decision-making, the reputational impacts of regulatory monitoring and enforcement of efficiency are more important than any financial consequences. Hence, **doing the right thing** and the **need for recognition** are as much behavioural characteristics of NR's central and route level finance departments as of any other part of the organisation. One stakeholder also indicated that the creation of routes as distinct businesses with a degree of financial autonomy would help to cement their identity, implying that staff based in the routes and regions may develop a **sense of belonging** to entities within NR as well as to NR itself. At the same time, the introduction of public sector financial management and planning, under which budgets are defined annually, can be expected to encourage short termism and hence behaviours such as **present bias** and **loss aversion**.

Safety

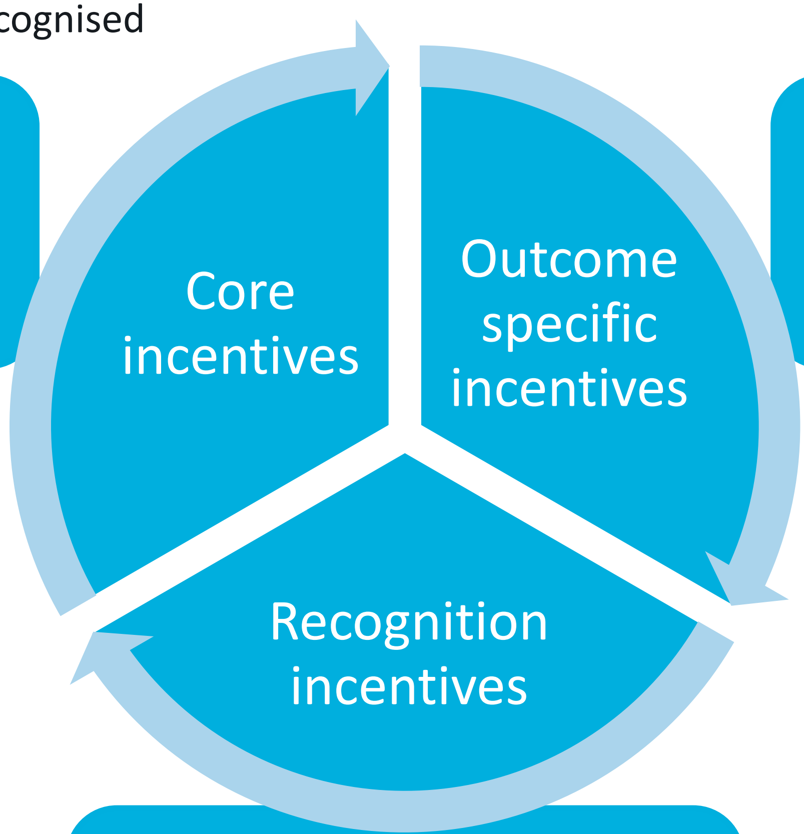
There is a strong safety culture within NR, with staff at all levels focused on **doing the right thing** to minimise safety risks to the welfare of passengers and staff. Stakeholders within NR are strongly of the view that this rather than the threat of regulatory enforcement is the primary motivating factor in ensuring safety levels. There was also agreement among stakeholders that the reputational impact of safety-related incidents were generally much greater than the impact of any associated fines. However, NR and ORR have different views on the effect of regulatory enforcement on some aspects of staff behaviour:

- In NR's view, risk aversion among staff responsible for safety is the result of ORR's over-reliance on the threat of enforcement action
- In ORR's view, risk aversion leads to a lack of action, which must be addressed through the threat of enforcement action.

Industry perspectives – the interaction between individual incentives

Overall, the interview evidence suggests that incentive mechanisms linking performance to financial rewards are not the primary motivating factor for most individuals, although they can be important in reinforcing positive behaviour – incentive mechanisms may even discourage such behaviour if outcomes imply that an individual's contribution has not been fairly recognised

Fundamental motivator of behaviour of individuals at work:
- Professional pride/reputation
- Benefitting society



Directly linked to specific outcomes:
- Performance-related pay
- Fine for specific licence breach/liquidated damages

- Individual's are mainly motivated by **professional pride** in performing their roles well – they want to see their industry and organisation succeed and to contribute to their success
- Pay, promotion and other forms of recognition are an important **confirmation of an individual's view of their value** to the organisation

General confirmation of an individual's view of their worth:
- Pay and ancillary benefits
- Promotion/other recognition

- Outcome-specific incentives are important in motivating positive behaviour at the corporate, team and individual level, but they often do so by **reinforcing other incentives**
- At the operational level, **staff are often not fully aware of key regulatory incentive mechanisms** that are intended to influence their decisions

Industry perspectives – regulation of public sector entities

We have compared the broad regulatory framework for NR with that for publicly owned infrastructure managers across Europe

- The approach to regulation of access is similar, reflecting the requirements of Directive 2012/34/EU, with regulatory bodies relying on enforcement powers backed up by remedies to ensure non-discriminatory charging and allocation (although there appears to be greater transparency of enforcement policy in Italy and the UK).
- Public service contracts with infrastructure managers in Europe include a financial monitoring framework broadly similar to that applied to NR – the diagram illustrates the framework for Infrabel, the infrastructure manager in Belgium.
- However, securing accountability for outputs primarily through a licence as well as a contract with government appears unique to the UK – there is no EU requirement to licence infrastructure managers. The parallel application of NR’s Framework Agreement and Network Licence has not yet been tested since the former has only been in place since 2019.

Financial management in Infrabel

	Planning	Monitoring	Adjustment
Operating expenditure	The public service contract defines a profile of annual expenditure – based on Infrabel forecasts	Infrabel monitors expenditure against the plan and records divergences	There is no annual adjustment – under or overspend remains within Infrabel
Capital expenditure	The public service contract defines a profile of capital expenditure for the entire contractual term – based on multi-annual investment plan	Each year Infrabel submits an investment programme and budget – requires ministerial approval before funds can be used	The minister is advised in September of any expected underspend by year end –funds are escrowed but available for following year

Source: Independent Regulators Group - Rail

Decision-making in practice I – summary research findings

Observations

- Financial incentives can play an important role in decision-making by senior managers but factors motivating individual behaviour, for example job satisfaction and the need for recognition, are generally much more important at all levels
- There is evidence of behaviours such as risk aversion, present bias and blame avoidance within NR

Propositions

- Core incentives such as job satisfaction, which are the primary motivating factors for individuals, can be reinforced or undermined by the wider framework of incentives
- The threat of regulatory enforcement and the associated reputational effect is powerful but can be counter-productive in the long run

Further questions

- How do the behaviours and incentives described in previous chapters affect decision-making in specific areas? *(Chapter 5)*
- Given the issues identified by stakeholders, does the experience of regulating other sectors have any lessons for rail? *(Chapter 6)*

5 Decision-making in practice II - case studies

Case studies – purpose and scope of the chapter

Scene setting → Context → **Findings from desk and field research** → Analysis → Conclusions

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

Conclusions

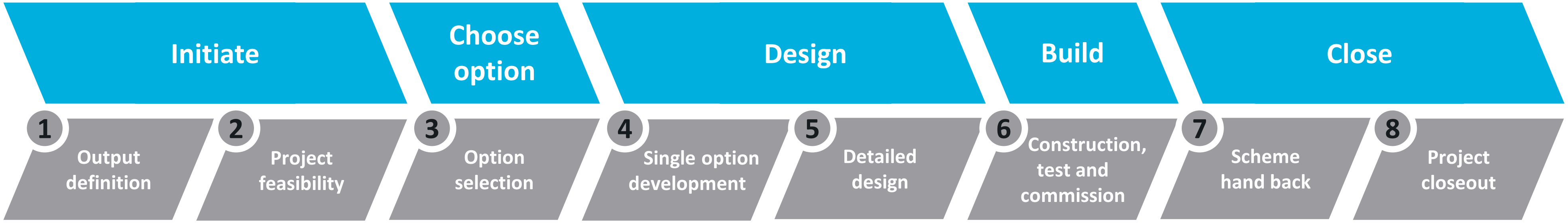
8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

Case studies - planning and delivering a major enhancement

Key stages and responsibilities - Network Rail developed the Governance for Railway Investment Projects (GRIP) process to manage and control investment projects related to both enhancement and renewal of the network. GRIP divides a project life cycle into eight distinct phases, as shown below.



GRIP

The incentives governing key decisions in this process are often most obvious at stage gates, where a decision is taken on whether to proceed to the following stage.

The process is particularly vulnerable to change in the earlier stages. This is partly because rail projects are often complex and decisions governing them can be taken in different parts of the organisation (requiring multiple approvals and/or wide consultation). It is not uncommon for long-term and complex projects to move "backwards" in the GRIP process.

Corporate incentives

The drivers of project selection vary significantly. Some may be driven by specific objectives (e.g. to generate cost savings or to improve operating performance). Others have broader aims relating to the contribution of the railway to economic and social development (e.g. improving connectivity to less well served areas). Financial incentives in the strict sense play little part in project selection, since NR has no obligation to maximise returns to holders of equity, although it must present a positive business case to DfT and the Treasury.

Reputational effects, both positive and negative, are important throughout the process. In the early stages ambitious plans can strengthen NR's reputation among passengers and the wider public. Where delivery risks emerge, negative reputational impacts can be substantial.

Individual incentives

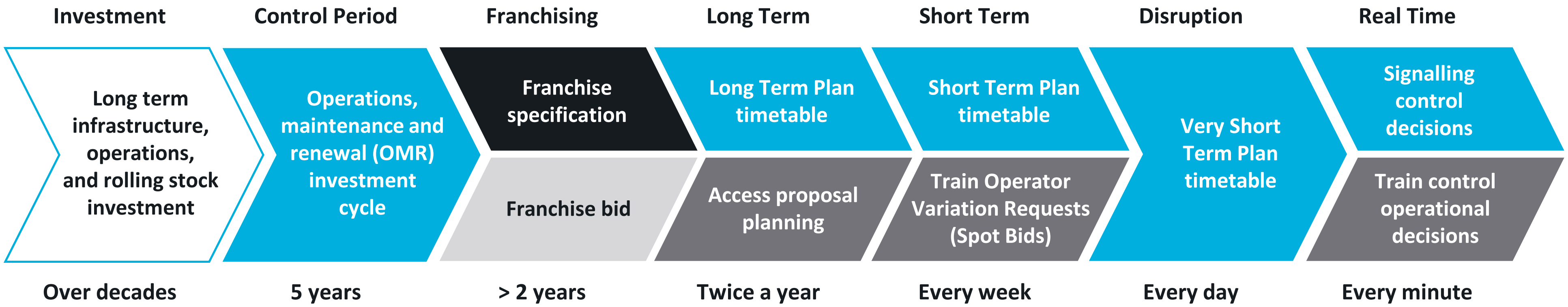
Individual behaviours are also likely to play a significant role in project selection, with regional business development teams incentivized to develop project portfolios aligned with the needs of transport authorities and other local stakeholders. In the option selection and design stages, NR's strong safety culture and risk aversion tends to result in a prescriptive approach and there is little incentive to innovate. During construction, reputational effects arising from missed deadlines act as a powerful incentive, although there is evidence that optimism bias can result in a failure to fully evaluate delivery risks. In the final stages of a project, staff turnover can result in a loss of 'project memory', which is likely to encourage risk aversion as well as blame and loss aversion.

Case studies - planning the timetable

Key participants

- Network Rail
- Specifiers
- Bidders
- Operators
- Multiple parties

Key stages and responsibilities



Key drivers of behaviour

The incentives that drive the timetable planning process vary according the time horizon and role of participants. In general terms, financial incentives dominate longer term planning, while safety is more of a focus over shorter time horizons.

Investment decisions – both long term and OMR – are generally guided by the business case process outlined for the GRIP process in the previous slide.

Franchise specification decisions are generally led by government and balance a wide range of competing interests and trade-offs (e.g. political willingness to meet stakeholder aspirations are often traded off against financial constraints).

Franchise bids are heavily driven by financial incentives. Bidders aim to win the competition by preparing the most economically advantageous bid, which balances price against quality. This often results in bidders preparing timetables to drive revenues rather than to optimise performance.

Long Term Plan timetables are developed by operators who are driven by achieving their contractual obligations (such as those in Franchise Agreements) and/or maximising revenue. Network Rail planners are tasked with consolidating numerous plans to prepare a deliverable timetable that complies with Timetable Planning Rules (which are driven by safety and performance incentives). This process often involves compromises by all parties. More recently, there is evidence that the drive to maximise revenue is undermining the resilience of timetables (and increasing their complexity)

Short Term Plan timetables are usually developed to accommodate engineering possessions and/or special events. Decision makers who are closely involved in this process reported they are strongly driven by Schedule 4 and 8 financial incentives (which are tied to revenue). Reputational incentives, such as the desire to minimise disruption to passengers, are also important.

Real Time decisions are heavily driven by safety considerations and the desire to deliver a good service to passengers and freight end users.

Case studies - managing a possession

Key responsibilities

Operations Delivery Manager
- Undertakes overall management of delivery teams (80-100 possessions per week, 75% at night, in Kent and Sussex)
- Ensures possessions are properly resourced – a major logistical exercise

Person in Charge of Possession
- Communicates with line controller to take possession of and hand back site
- Ensures protection of staff and monitors progress
- Mitigates disruption where possible

Possession Support Staff
- Implement protection measures (e.g. placing of detonators) under instruction from PICOP
- Assist the Engineering Supervisor

Engineering Supervisor
- In charge of individual worksites within a possession (there can be 50-60)
- Oversees the engineering work itself
- Liaises with PICOP on progress

Key drivers of behaviour

Safety

- Safety is the primary consideration – process for taking possession of and handing back sites follows a carefully designed protocol. Effective communication between the PICOP and line controller is critical.
- Separation of PICOP and Engineering Supervisor roles ensures that the former can focus on safety and management of disruption.

Time constraints

- Time is a precious resource, particularly in the case of overnight possessions. Set-up time is 20-45 minutes for overnight work, 1-2 hours for weekend work. A 10-minute delay to the start time counts as a late start.

Efficiency

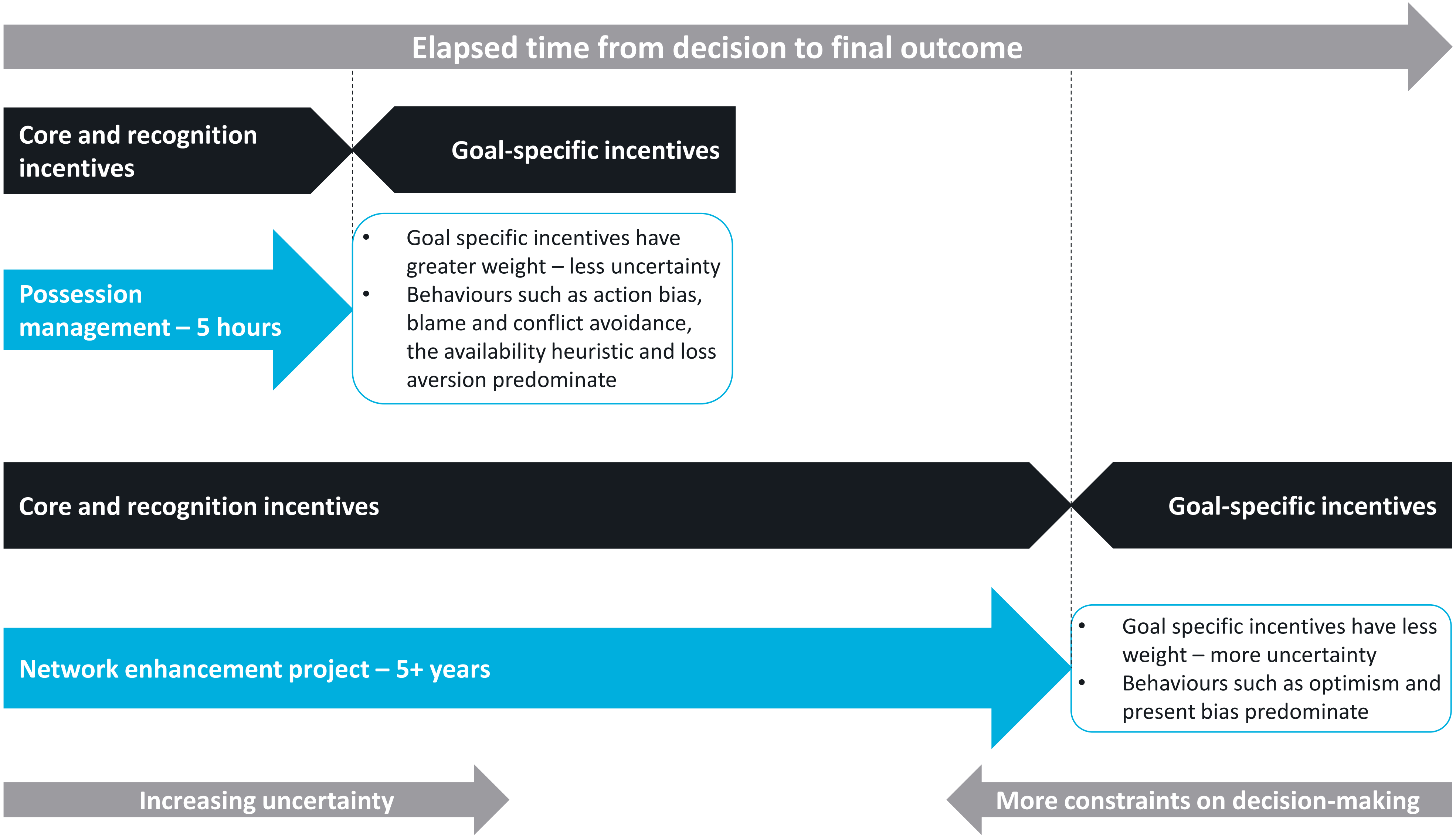
- Time and resources must be used efficiently but there are trade-offs to be made against disruption when an overrun is in prospect – it is sometimes possible to delay to another possession but this carries cost.

Resources

- Resources are carefully planned but staff must be prepared for surprises (e.g. broken machinery). Mitigating impacts depends on effective communication between the PICOP and Engineering Supervisor.

Case studies – findings I

The impact of goal-specific incentives on decisions varies with the elapsed time between the decision and its effect, while core and recognition incentives have an ongoing impact – the latter tend to dominate in the case of strategic decisions with a long time to maturity



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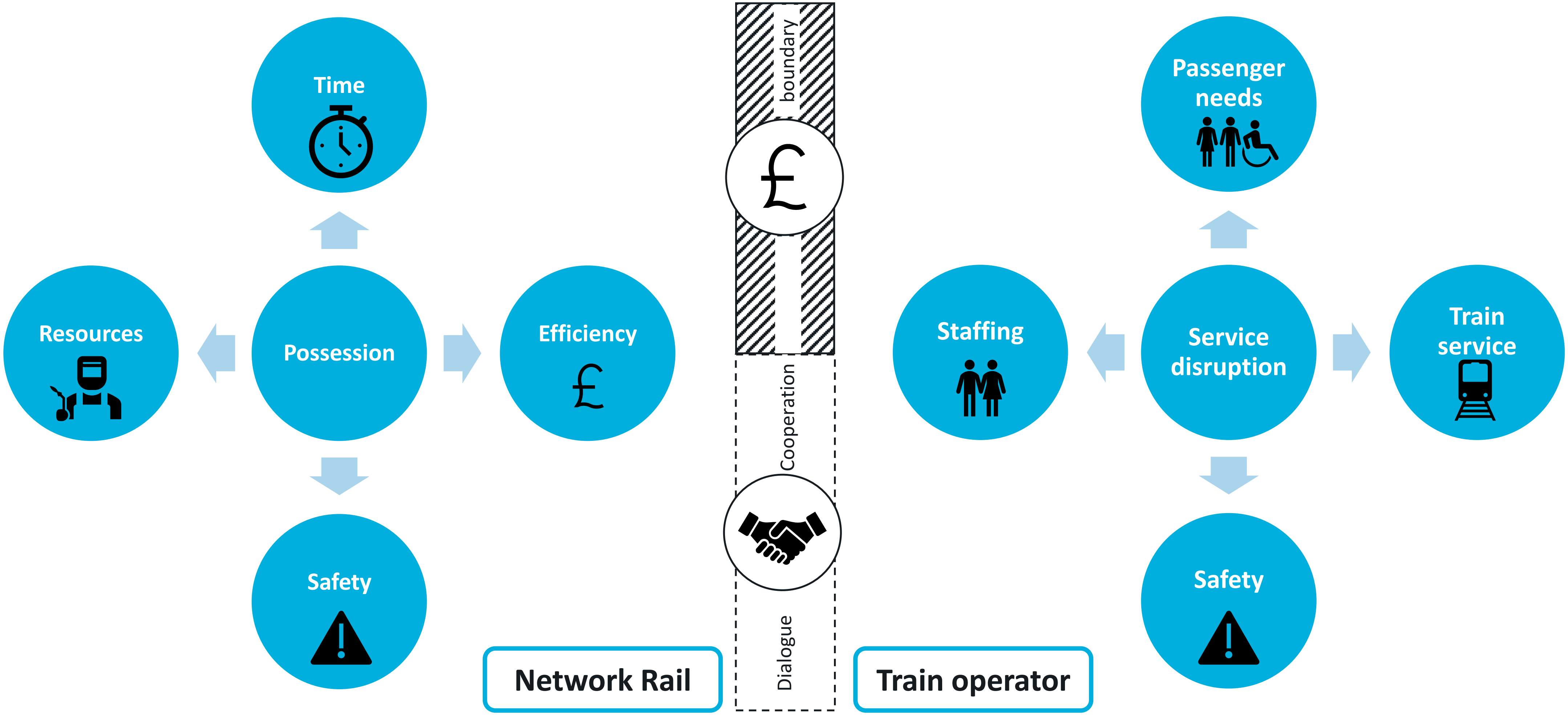
Case studies – findings II

Contractual incentive mechanisms often reduce a multi-dimensional landscape to a single metric

A full appreciation of needs and constraints on each side of an organisational or contractual boundary requires discussion and cooperation. Reducing impacts to a monetary value or any other single metric can distort a decision-maker's view of issues and pressures arising 'on the other side'.



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Case studies – summary research findings

Observations

- Some activities such as network enhancement and timetable development are undertaken over an extended period and the factors influencing decisions change as work progresses
- Others are made in a constrained environment where decisions have more immediate impacts

Propositions

- Where the elapsed time between a decision and its impact on the final outcome is long, incentive mechanisms based on measurement of outputs are unlikely to be effective
- Incentive mechanisms that reduce the outcomes from a decision to a single metric will invariably present the decision-maker with a distorted view

Further questions

- How have regulators in other sectors sought to supplement output-based incentives and encourage dialogue and collaboration between the regulated entity and its customers? *(Chapter 6)*
- How has Network Rail's incentive framework performed in light of the evidence described above? *(Chapter 7)*

6 Lessons from other industries

Lessons from other industries – purpose and scope of the chapter

Scene setting → Context → **Findings from desk and field research** → Analysis → Conclusions

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

Conclusions

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

Lessons from other industries – focus of research

Other regulatory mechanisms have limited relevance for the rail industry as they have been designed for private sector entities motivated by profit – we have therefore focused on specific mechanisms that may address issues identified in previous chapters

Issue	Evidence	Response?
NR's engagement with its customers	• There is evidence that NR does not engage with operators sufficiently, for example when they are developing train service proposals during franchise bidding and when changes in major project delivery programmes that affect operators are required • Managing customer requirements will become more challenging in the future as routes engage with diverse customers, including national and regional transport authorities as well as operators with competing demands	**Constructive engagement in the airport industry**
NR's business and project planning and delivery processes	• ORR's report on the May 2018 timetable change and wider stakeholder evidence suggests that NR's business and project planning has not been based on a sufficiently thorough assessment of delivery risks, particularly in the case of large, complex projects that depend on, or otherwise interact with, other equally complex initiatives • NR's response to May 2018 has demonstrated that adverse reputational effects can be a strong incentive, but stakeholders have noted that relying on these carries risks – over time they may undermine positive motivating factors such as job satisfaction	**Recognition of good planning in water regulation**
Incentivisation of innovation	• Our mapping of incentives within NR suggests that corporate incentives to innovate are limited and weak. There is no licence condition explicitly concerned with innovation and regulatory oversight focuses on management processes rather than impacts. Pursuit of innovation therefore relies on the motivation of R&I staff • In addition, there is little scope for collaboration with operators given the term of franchise contracts, and NR's ongoing participation in Shift2Rail (a collaborative venture managing R&I at the European level) is subject to uncertainty, putting collaboration on major R&I projects at risk	**Incentivising innovation in gas regulation**

Lessons from other industries – constructive engagement in airport regulation I

Overview

The CAA originally introduced 'constructive engagement' (CE) in the runup to the 2007 airport price control review and has mandated it in all reviews since

The objectives of CE are to:

- Inform the CAA of airport user requirements when setting price controls
- Enable airports to conduct structured engagement to inform their business plans
- Enable airline customers to engage with airports on development proposals
- Provide a forum for reaching agreement or at least establishing clear positions

CAA mandate
- Establishes the CE process
- Defines questions and timescales

Working Group
- Includes representatives of key stakeholders
- Representatives must be able to commit their organisations to conclusions

Engaging customers
- Multilateral, with progress reported to CAA
- Bilateral, with parties agreeing deals where possible/appropriate

Key outputs
- Final report recording points of agreement/disagreement
- Adjustment of airport business plans

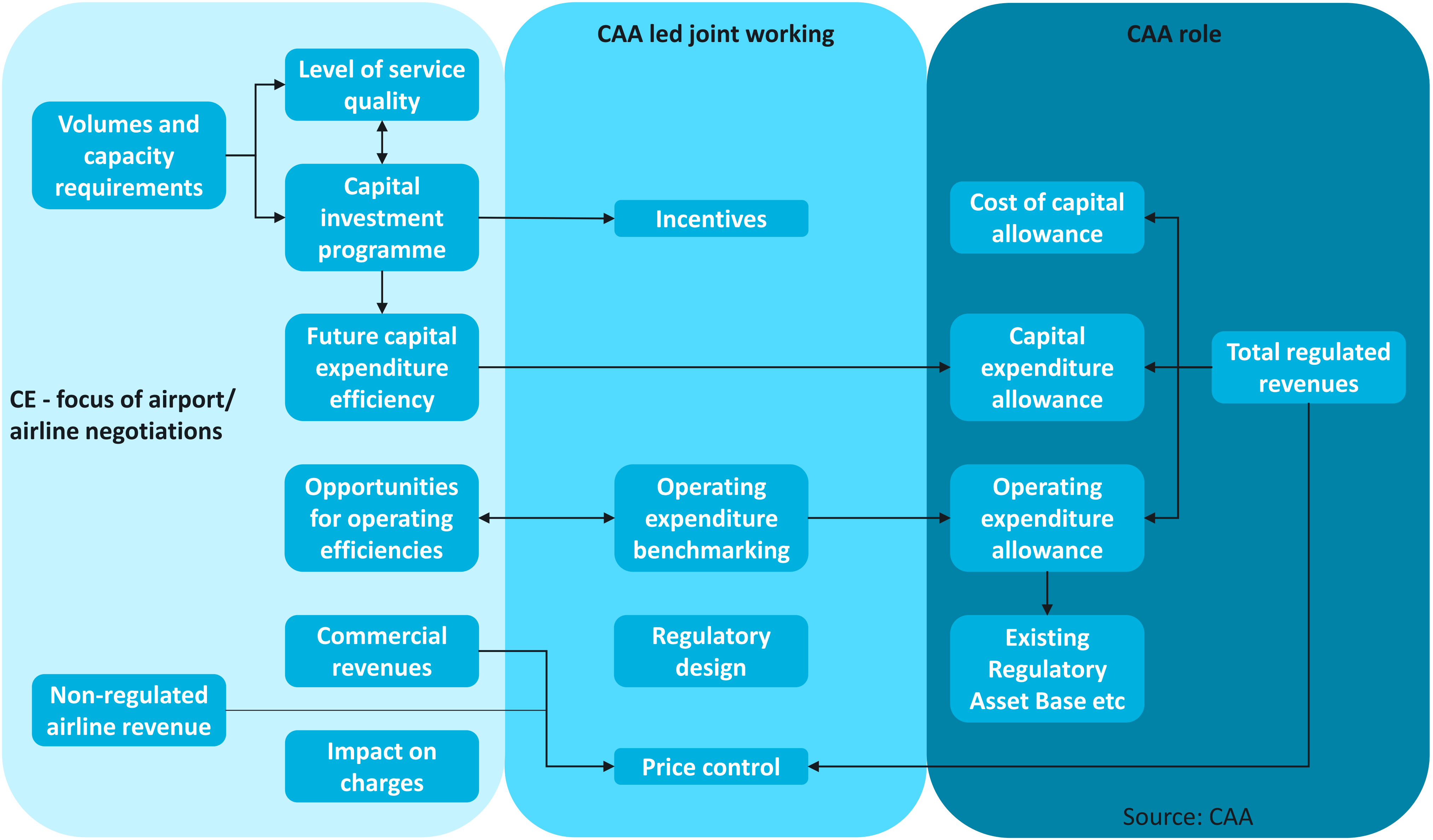
CAA proposals
- CAA review of CE outputs, agreed outcomes incorporated into own proposals
- Broader initial CAA proposals issued for further consultation

"the normal business of commercial airport/airline interaction should be reinforced by the regulatory process, rather than interrupted by it"

CAA, Airport Regulation: the process for constructive engagement, May 2005

Lessons from other industries – constructive engagement in airport regulation II

CE is part of a complex regulatory process – note that it involves negotiations between airports and airlines on a wide range of specific issues (including the impact of volumes on capital investment) and goes well beyond simple consultation



Source: CAA

Lessons from other industries – constructive engagement in airport regulation III

Rules of engagement

The CAA has defined a number of principles governing the CE process – these have been designed with commercial negotiations in mind, but could apply to discussions between NR and transport authorities

Accountability	• A clear governance framework setting out accountabilities • Scope of discussions defined by the regulator
Transparency	• Relevant information provided in a timely manner • Scope includes key issues that must be resolved to support financial determination
Collaboration	• Parties must participate constructively and in good faith • Engagement should not be seen as a 'zero sum gain' – should be opportunities to share gains
No surprises	• Timescales for providing information should be agreed in advance • The regulator is able to ignore information submitted after a deadline has passed
Dispute resolution	• Clear and efficient dispute resolution procedures • Independent facilitators can be employed – the regulator commits to working with them
Role of the regulator	• CE is not regulator-led • However, the regulator can step in when appropriate (e.g. to provide clarification)
Efficiency	• The process must be inclusive • It must also be proportionate to the issues under discussion

Lessons from other industries – recognition of good planning in water regulation

Context

OFWAT regulates 17 water/sewerage companies – the most recent final determinations were concluded in 2019. Key regulatory levers and incentives include:

- Calculation of the weighted average cost of capital (WACC)
- Efficiency benchmarking across the companies based on econometric analysis
- **Incentivisation of high quality business planning** through the determination process – quality explicitly linked to regulatory outcomes
- Ongoing monitoring of service quality, contribution to sustainability and financial resilience

Incentivisation of business planning could have an application to rail given devolution to NR regions/routes

Assessment of plan dimensions

Assessment criteria

High quality | Ambition | Innovation

- Engaging customers
- Addressing affordability/vulnerability
- Delivering outcomes for customers
- Securing long-term resilience
- Targeted controls, markets, innovations
- Securing cost efficiency
- Aligning risk and return
- Accounting for past delivery
- Securing confidence and assurance

A - High quality, ambitious and innovative plan supported by convincing evidence

B – High quality and supported by convincing evidence but not sufficiently ambitious/ innovative to be exceptional

C – Falls short of high quality and/or evidence is insufficient/unconvincing

D - Falls significantly short of required quality and/or little or no convincing evidence

Assessment and incentivisation of overall plan quality

Exceptional	• Was not achieved in PR 19
Fast track	• Financial reward – 10 basis points on rate of return • Early draft determination - April
Slow track track	• Material regulatory intervention in the plan • Later draft determination - July
Significant scrutiny	• Extensive intervention in the plan and further ongoing regulatory scrutiny • Potentially lower cost sharing rates • Later draft determination - July

Lessons form other industries – incentivising network innovation in gas regulation

Background

Incentivising innovation is challenging for regulators – projects are speculative and yield uncertain returns. In the energy industry benefits may be linked to decarbonisation of the network, which is hard to value.

Innovation is a key element of the RIIO model that OFGEM uses to set price controls for the gas industry:

Revenue = Incentives + Innovation + Outputs

OFGEM has introduced a stimulus package to provide additional funding for innovation and kick-start a cultural change where:

"Network Licensees establish the ethos, internal structures and third party contacts that facilitate innovation as part of business as usual."

NIA
- Network Innovation Allowance included in Licensee's price control settlement
- Funds smaller innovation projects benefitting customers

NIC
- Network Innovation Competition held annually
- Funds selected flagship projects for reducing carbon/improving environment

Rollout
- Innovation Rollout Mechanism
- Funds the rollout of proven innovations contributing to a low carbon sector or other environmental benefits

Portals
- Collaboration portal to enable potential partners to register and submit ideas
- Learning portal to disseminate project progress
- Licensees must have a project data sharing policy

A similar approach might fill an identified gap in the funding of NR's innovation effort (small projects) and encourage collaboration on innovation between NR and train operators.

Lessons from other industries – application to rail

These mechanisms could address some of the issues and challenges in incentivising NR and merit further exploration

Constructive engagement

- It will be challenging for the routes to reconcile and accommodate the competing demands of transport authorities and operators, especially where capacity and other issues cross route boundaries
- CE could provide a model for establishing bilateral and multilateral forums and supporting principles of engagement to facilitate agreement before regulatory intervention

Recognition of good planning

- Several interviewees have suggested that the tone and stance of regulation tends to be negative, which can be demotivating for staff in the short term while leading to ‘regulation fatigue’ in the long term
- OFWAT’s approach to formally recognising the quality of business planning as part of the regulatory process (through expedited procedures for high quality plans), possibly applied through a management maturity model, could ensure a more balanced approach
- Explicit criteria for assessing quality could highlight the importance of factors such as thorough analysis of delivery risks, discouraging present and optimism bias

Incentivisation of innovation

- Innovation is difficult to incentivise effectively and NR’s R&I lead has indicated that regulation focuses on process rather than impacts
- NR’s proactive involvement in Shift2Rail, the European vehicle for encouraging collaboration in innovation may be coming to an end due to Brexit
- Train operators have little incentive to make substantial investments in innovation as the term of most franchises is insufficient to secure a return
- OFGEMs Network Innovation Competition could provide a model for encouraging greater collaborative innovation through competitive award of funding subject to conditions

Lesson from other industries – summary research findings

Observations

- Constructive engagement enables direct negotiations between a regulated entity and its customers with minimal involvement from the regulator
- OFWAT has built mechanisms for offering praise into the formal regulatory framework
- OFGEM has a mechanism for encouraging collaborative innovation

Propositions

- Constructive engagement could help routes and regions to address competing demands for the development of the network
- OFWAT's approach to incentivising high quality business planning through constructive praise could be applied to NR's routes
- OFGEM's NIC could be a model for encouraging greater innovation

Further questions

- What are the strengths and weaknesses of NR's incentive framework and how useful are the lessons from other industries in helping to address the weaknesses? *(Chapter 7)*
- What is the scope for improving NR's framework of incentives in the context of wider industry reform? *(Chapter 8)*

7 An evaluation of Network Rail’s incentives

An evaluation of Network Rail's incentives – purpose and scope of the chapter

Scene setting → Context → Findings from desk and field research → **Analysis** → Conclusions

Scene setting

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An evaluation of Network Rail's incentives – evaluation criteria

The evaluation criteria are intended to echo some of the themes identified by Williams

We have subjected the incentive mechanisms identified in the previous slides to an evaluation using the European Commission's standard criteria, adapted to capture some of Williams' 'outcomes' and 'outputs'.

Criteria	Description
Effectiveness	• Does the incentive change behaviour materially? • Do the outcomes resulting from the incentive align with rail customer and wider industry needs?
Efficiency	• Are the costs of administering the incentive mechanism proportionate to the benefits achieved? • To what extent does the incentive mechanism give rise to disputes?
Relevance	• Is the incentive still appropriate given changes to the industry since it was introduced? • Is it regularly overridden by policy decisions?
Coherence	• Does the incentive support/complement or undermine/counteract other industry mechanisms? • Does it encourage a whole industry perspective and collaborative working?

An evaluation of Network Rail's incentives – evaluation of key incentive mechanisms

Incentive		Intended purpose/action	Effectiveness	Efficiency	Relevance	Coherence	Comment
Core Regulatory Instruments	**Framework Agreement**	Definition of the relationship between NR and DfT, covering accountabilities and obligations regarding staff and financial management	+	-	+++	++	• A necessary statement of the relationship between DfT and its owner, identifying governance mechanisms and key requirements. The lack of legal force, which gives primacy to the Network Licence, reduces the risk of inconsistencies and anomalies but also limits the effectiveness of the Agreement. The requirement to comply with public sector financial planning/annual budgeting is likely to introduce inefficiency. • The Framework Agreement has only been in place since 2019 and its impact on incentives relative to the Network Licence is not yet clear.
	Network Licence	Comprehensive statement of key obligations – the basis for ensuring compliance and enforcement action	+++	+++	+++	+++	• A necessary statement of basic requirements and has been updated to mandate NR's route structure. Reputational impacts of a Licence breach are considerable. • In principle, could include stronger/additional obligations, e.g. on innovation and collaboration. Parallel monitoring of Framework Agreement requirements and licence conditions could undermine clarity of accountability.
	Regulatory determination / monitoring	Definition of a 5-year profile of OMR expenditure, providing a target against which under/over performance can be measured	+	++	+	-	• A 5-year expenditure profile remains an important management tool, but the original incentive effects no longer operate effectively in the absence or private equity and the administration processes are resource hungry. These mechanisms are also at odds with the annual budgeting required of public sector body and they now exclude costs arising from funding of enhancements, a major element of spending.

An evaluation of Network Rail's incentives – evaluation of key incentive mechanisms

Incentive		Intended purpose/action	Effectiveness	Efficiency	Relevance	Coherence	Comment
Track Access Agreement	**Access charges**	Encourage efficient use of network - e.g. choice of rolling stock (operator) and accommodation of new services (NR)	+	+	+	- -	• Some charges continue to perform a useful function by providing cost transparency (e.g. VUC) but incentive effects have increasingly been overridden by policy choices (e.g. selection of rolling stock). Limited variability of NR revenue has reduced incentive to increase traffic.
Track Access Agreement	**Schedule 4**	Encourages NR to engage with operators and provide maximum notice when planning possessions	++	-	++	- -	• Generates clear financial incentives to maximise notice but some stakeholders believe the complexity of the mechanism and high payments result in disproportionate costs. • Schedule 4 payments are made to commercial operators and therefore result in a flow of funds out of the public sector, for which NR is accountable. • Payments can reinforce the reputational impact of poor possessions planning.
Track Access Agreement	**Schedule 8**	Encourages NR and train operators to reduce delay and lateness while compensating for lost revenue	+	-	++	- -	• Provides an incentive to maintain/improve punctuality and reliability but in practice captures only a proportion of delay. Fault attribution process leads to disputes and can undermine effective collaboration. • Schedule 8 payments can be made to commercial operators – in these circumstances, they result in a flow of funds out of the public sector, for which NR is accountable. • Payments can reinforce the reputational impact of poor possessions planning.
Franchise agreements		Provides commercial incentives on operators to secure capacity increases from NR to meet franchise commitments	-	-	+	--	• Train operators' commitments to service improvements in the franchise agreements are frequently misaligned with the scope and timing of NR's capacity plans. NR's incentives to engage in the franchising process are weak.

An evaluation of Network Rail's incentives – impact on key functions I

Network development

- Public sector financial planning may have helped to improve the management of enhancements since long term funding is now secured for each project and there is no stop-go cycle arising from the periodic review process (making for a mix of projects at different stages of maturity that can be more easily managed by the supply chain). However, this has come at the expense of delays in seeking Treasury approval, and the strong incentives to keep to spending profiles within the project plan may introduce inefficiencies (for example because it is no longer as easy to reallocate expenditure between years).
- NR's reorganisation and incentivisation of regional and route-based staff has the potential to ensure that project portfolios are aligned with local stakeholder and operator needs. Targeting third party funding should encourage NR to focus on network investment of genuine value to sponsors, although there is a risk that this encourages the selection of projects that are favoured by significant third party funders without sufficient regard for operational consequences or deliverability. More generally, the requirements of different local stakeholders and train operators will inevitably conflict, for example where project delivery involves major disruption of services provided by operators who do not benefit from the enhancement. It is not clear how staff in the routes and regions will be incentivised to balance competing priorities, nor how organizational change will address long-standing culture/behavior (e.g. an undue focus on engineering solutions).
- NR has responded to the issues raised by the May 2018 timetable change by introducing greater accountability for project progression and delivery, with clear allocation of responsibility for the go/no go decision at different stages of the GRIP process. However, lack of staff continuity through the project life cycle remains a problem, increasing the risk of behavior influenced by present bias in the early stages of GRIP and blame avoidance in the later stages.

An evaluation of Network Rail's incentives – impact on key functions II

Asset stewardship

- Monitoring and enforcement of relevant licence conditions, coupled with a strong safety culture in NR, provide strong incentives to maintain and renew the network. Incentives operate primarily through the reputational impacts of safety-related incidents and/or incidents that result in service disruption. However, there are signs of 'regulation fatigue' among some managers, and they may becoming less sensitive to public criticism.
- Five-year targets for asset condition are an inadequate mechanism for incentivising best practice in asset stewardship. NR is not required to develop a 40-year asset management strategy in the way that HS1 is. However, the introduction of the new organisational structure and the scope for benchmarking of routes that it brings can be expected to strengthen incentives in this area (subject to ensuring that the metrics used to compare routes are representative of their performance and enable a fair comparison).

Timetable development

- During franchise bidding, bidder objectives have tended to pull against NR's focus on timetable resilience. While NR has raised concerns about the deliverability of bidder proposals during franchise evaluation, it has generally not sought to prevent DfT from contracting undeliverable franchise commitments. This has often reflected a lack of time and resources needed to undertake a thorough evaluation of bidders' timetable proposals, particularly where there is a need to consider proposals from separate franchise procurements undertaken in parallel or quick succession. It also highlights a dilution of NR's accountability for, and empowerment to deliver, timetable delivery.

An evaluation of Network Rail's incentives – impact on key functions III

Network operation

- At the corporate and senior management level, Schedules 4 and 8 continue to provide moderate incentives to develop a resilient timetable and operate the network reliably. However, the incentive effect arises primarily from the importance of the associated metrics as indicators of good or bad performance, both within the organisation and among stakeholders, rather than the financial impact.
- The main driver of good operational performance is pride in the railway and job satisfaction, underpinned by individual staff seeking a reputation and recognition for good work. The alignment of individual objectives and incentives under Putting Passengers First can be expected to reinforce these motivating factors, although whether staff consider themselves sufficiently empowered to materially influence the metrics used to determine their contribution has not yet been demonstrated. There is also concern among train operators that the targets in route scorecards are opaque and insufficiently challenging.
- There is a strong view among some NR staff that Schedule 8 does not encourage appropriate behaviour and that it can be divisive, leading to a culture of blame avoidance. The fact that it is based on metrics that capture only the proportion of delay that can be readily explained and unequivocally attributed to a single party tends to distort the investigation of root causes and discourage collaboration to improve operation.

Managing the station estate

- The incentives on NR to manage the station estate appear relatively weak, at least in the case of stations managed by train operators, as indicated by concerns among operators that NR takes insufficient account of the importance of stations for customers in its role as landlord and by disputes over the responsibility for addressing poor asset condition.
- In the case of NR managed stations, the incentives to maintain the condition of the assets are considerably stronger but the motivation to maximise revenue growth can conflict with operational objectives.

An evaluation of Network Rail’s incentives – impact on key cross-cutting activities I

People management

- There is a strong consensus among NR’s senior management team that NR staff take pride in the work that they do and want to see the railway develop successfully. They are nevertheless mindful of the need to ensure that staff are focused on meeting passenger and customer needs and on supporting their colleagues. The individual objectives put in place as part of the Putting Passengers First initiative, together with the supporting performance-related pay schemes, can be expected to reinforce positive behaviours, although the framework has not yet been fully tested and is likely to evolve. The incentivisation of NR’s property team would bear further investigation as it can create tensions between objectives.
- While regulatory incentives can have a significant impact on senior management behaviour, they operate primarily through operational effects. Other staff are less concerned with the impact of particular regulatory mechanisms, but are sensitive to the negative publicity that often accompanies regulatory decisions. The motivation of all staff can be undermined by perceptions of relentless criticism and this effect can be difficult for managers to address.

Innovation

- Innovation is difficult to incentivise through regulatory mechanisms as the returns are uncertain, long term and often difficult to measure precisely. This is reflected in the impact of the regulatory framework on innovation within NR, which is limited. Progress with innovation will continue to depend primarily on the satisfaction that staff in NR’s R&I team receive from seeing their ideas implemented. However, there is scope for rebalancing regulatory scrutiny towards the impacts of innovation and away from the process while allowing for greater flexibility in the development of a portfolio of projects.

An evaluation of Network Rail's incentives – impact on key cross-cutting activities II

Efficiency and Value for Money

- Many of the regulatory mechanisms for encouraging NR to deliver efficiency and value for money, including the periodic review itself, were originally designed for a different organisation, namely Railtrack, which was privately financed and accountable to equity holders. Hence, many of the associated financial incentives, such as outperformance of required efficiency improvements, increasing revenue from track access charges and fines imposed to support regulatory enforcement of licence conditions, no longer have the effects originally intended, notwithstanding the substantial resources required to administer them. However, they can serve to reinforce reputational effects, particularly when accompanied by regulatory statements receiving significant media coverage, although such effects may be counter-productive over the long term as previously noted.
- At the same time, the regulatory framework and incentive mechanisms do ensure transparency of cost and other information, and it is important that any reform of incentives recognises the value of information contained in key parameters such as access charges and performance payment rates. For example, the information on the impact of different types of rolling stock on track wear and tear contained in the schedule of variable usage charge rates is valuable to decision-makers inside and outside NR.
- It is too soon to evaluate the impact of the introduction of public sector financial planning and annual budgeting but discussions with NR managers suggest the effects may be mixed. On the one hand, DfT and Treasury approval of enhancement projects, outside the regulatory settlement, provides long term certainty of funding and eliminates the stop-go cycle of funding for enhancements previously characteristic of the periodic review. This is expected to facilitate more efficient support for the delivery of enhancements by the supply chain. On the other hand, the need for Treasury approval and the strong incentive to keep all types of expenditure 'to plan' is likely to introduce inefficiency.

An evaluation of Network Rail's incentives – impact on key cross-cutting activities III

Safety

- There is a clear consensus across stakeholders that NR has a strong safety culture and that this, coupled with the potential for major sanctions (including criminal prosecution) for serious safety breaches, is the primary motivation for maintaining safety standards. As in other areas, incentives tend to operate through reputational rather than financial effects – major safety-related incidents are high profile and subject to intensive political and media scrutiny. At the same time, both NR and HMRI staff are proud of the industry's record on safety relative to its peers across Europe, although there is recognition within NR that there are still too many staff-related safety incidents and a determination to address this.
- There is also a consensus between NR and the regulator that improving levels of safety are best achieved through a collaborative relationship between NR staff and safety inspectors. In practice, the extent to which such a relationship holds appears to vary across the network – there is evidence, for example, that it is particularly effective in Scotland but sometimes strained in other areas. In addition, NR and HMRI agree that while a strong safety culture is essential and to be encouraged, NR staff with safety responsibilities can be overly risk averse and resistant to change.
- However, there is disagreement over the need for, and impact of, regulatory enforcement. In NR's view, risk aversion is the result of excessive use of the threat of enforcement, while HMRI considers that this threat is often the only means of encouraging improvement in a risk averse decision-making environment. Within the scope of this study we have not been able to determine which of these views is correct but suggest that they may be evidence of a vicious circle of behaviour in which threat of enforcement encourages risk aversion and vice versa.

An evaluation of Network Rail's incentives – strength of incentives for management

●●● Strong
●● Moderate
● Weak

	Core incentives		Recognition incentives		Outcome-specific incentives		
	Job satisfaction	Industry reputation	Pay/other benefits	Individual reputation	Monitoring/ enforcement	Track access charges	Schedule 4/8
Network development	●●●	●●●	●●	●●●	●●	●	●
Asset stewardship	●●●	●●●	●●	●●●	●●	●	●
Timetable development	●●●	●●●	●●	●●●	●●	●	●●
Network operation	●●●	●●●	●●	●●●	●●	●	●●
Managing the station estate	●●●	●●●	●●	●●●	●●		
People management	●●●	●●●	●	●●●	●●		
Innovation	●●●	●●●	●	●●●	●●	●	●
Efficiency/Value for Money	●●●	●●●	●●	●●●	●●	●	●
Safety	●●●	●●●	●	●●●	●●		

Critical motivators but can be undermined by adverse publicity and inadequate recognition.

Individual reputation is particularly important. Financial rewards are a significant but not a primary motivator.

Some incentives operate primarily through impacts on an individual's reputation (Schedule 8 payments). Management incentive mechanisms strengthen their impact to some extent.

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An evaluation of Network Rail's incentives – strength of incentives for other staff

●●● Strong
●● Moderate
● Weak

	Core incentives		Recognition incentives		Outcome-specific incentives		
	Job satisfaction	Industry reputation	Pay/other benefits	Individual reputation	Monitoring/ enforcement	Track access charges	Schedule 4/8
Network development	●●●	●●●	●	●●	●		●
Asset stewardship	●●●	●●●	●	●●	●		●
Timetable development	●●●	●●●	●	●●	●		●
Network operation	●●●	●●●	●	●●	●		●
Managing the station estate	●●●	●●●	●	●●	●		
People management	●●●	●●●	●	●●	●		
Innovation	●●●	●●●	●	●●	●		
Efficiency/Value for Money	●●●	●●●	●	●●	●		
Safety	●●●	●●●	●	●●	●		

Core incentives: Critical motivators but can be undermined by adverse publicity and inadequate recognition.

Recognition incentives: Link between financial reward and performance appears weak. Reputation is more important.

Outcome-specific incentives: Incentive mechanisms have relatively little impact on the motivation and behaviour of most staff, although the dashboard approach under PPF may strengthen their effect to some extent.

An evaluation of Network Rail's incentives – summary of evaluation conclusions I

The current incentive framework applied to NR continues to provide strong incentives, but these do not operate in the way originally intended and are arguably seriously compromised by its status as a public sector organisation and the associated requirement to comply with public sector financial planning

Effectiveness

- The regulatory framework continues to provide incentives on NR to undertake key functions efficiently and safely, although these operate primarily through reputational rather than financial effects
- However, some incentives fail to encourage a sufficiently holistic approach to improvement (Schedule 8 focuses on only that proportion of delay that can be readily attributed between parties) while others are too weak to influence decision-making significantly (as in the case of regulatory scrutiny of innovation)

Efficiency

- The administration of the incentive framework can be resource hungry – periodic reviews require substantial resources, and the potential efficiency benefits from setting 5-year expenditure profiles is undermined by the recent introduction of public sector financial planning and annual budgeting
- More generally, many stakeholders consider the resource cost of the incentive framework to be disproportionate, particularly as financial incentives are widely seen as redundant (being now part of a money-go-round) between NR and DfT

An evaluation of Network Rail's incentives – summary of evaluation conclusions II

The incentive framework was originally designed for a different organisation and has not been adapted to a changing structure, although it is important to recognise that much of the effort needed to support regulatory processes has value in its own right – the key challenge is to adapt it for NR's public sector status

Relevance

- The problems with the incentive framework largely reflect the fact that it was designed at the time of rail privatisation for an infrastructure manager that was incentivised by the profit motive – many of the mechanisms (e.g. fines for licence breach) appear anachronistic when the infrastructure manager is publicly owned
- Nevertheless, many aspects of the framework continue to provide value and would be required under any form of ownership or governance – a thorough periodic review of efficiency will continue to be required to ensure value for money for the tax payer, and the calibration of some access charges will provide useful information

Coherence

- While we have not identified any evidence of inconsistencies and tensions arising from the inclusion of obligations on NR in both a Framework Agreement with DfT and a Network Licence, we note that the implied dual accountability does not apply to other public sector infrastructure managers in Europe
- In addition, conventional regulatory principles, which generally require that the regulator should focus on outputs and allow the infrastructure manager flexibility to determine the profile of resourcing, is difficult to reconcile with the requirement to comply with public sector financial planning rules

An evaluation of Network Rail's incentives – response to research questions I

Research question	Summary response
A. How has the effectiveness of functions and incentives implemented by ORR changed in relation to Network Rail as the sector has changed?	• The effectiveness of the framework of incentives on NR has reduced over time with successive changes in its governance, ownership and internal mechanisms for incentivising staff. While the framework continues to create incentives, these operate primarily through reputational impacts at the corporate and individual level rather than through the financial impacts originally central to the design of the various incentive mechanisms.
B. What can rail learn from other regulated bodies' incentive frameworks?	• As many of the regulated entities in other sectors are privately owned and their managers have a duty to their shareholders, the relevant learning from these sectors is limited – NR would not react in the same way as a highly geared and aggressively commercial water company when faced with a given set of financially based incentives. However, the application to rail of specific mechanisms such as constructive engagement in aviation, explicit recognition of high quality planning in water and competition for innovation funding in gas, merit further investigation.
C. What evidence is there of the relative influence of regulatory versus non-regulatory incentives on Network Rail decision-making and the impacts on rail outcomes (safety, efficiency, value for money, passenger satisfaction, train performance)?	• Many interviewees have stated that individual motivating factors such as pride in the railway and job satisfaction are considerably more important in incentivising behaviour than the financial and other incentives generated by the regulatory framework. This is true of all staff but particularly operational staff who need to make decisions in real time, typically have only limited awareness and understanding of regulatory incentives and whose performance-related pay is anyway a relatively small proportion of their total remuneration.

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An evaluation of Network Rail’s incentives – response to research questions II

Research question	Summary response
D. What evidence is there of the factors working together or in conflict for each of the rail outcomes?	• Regulatory incentive mechanisms can reinforce individual incentives because of their impact on reputation. However, the negativity associated with regulatory enforcement, or the threat of enforcement, can encourage undue risk aversion and undermine pride and morale. There is some evidence that, over time, extensive use of the threat of regulatory enforcement can lead to ‘regulation fatigue’, with senior managers becoming increasingly less sensitive to criticism from the regulator and the associated adverse publicity.
E. What evidence is there, for each rail outcome, (safety, efficiency, value for money, passenger satisfaction and train performance) suggesting Network Rail is incentivised differently to other regulated public sector bodies?	• NR faces broadly the same regulatory framework regarding network access as other publicly owned rail infrastructure managers in Europe, as defined by EU legislation. However, while most such organisations are held accountable to those who fund them primarily through a public service contract with government, NR’s accountability derives mainly from its Network Licence, its Framework Agreement with government having no legal force. • While we have not identified any immediate conflicts arising from these arrangements, or any impact on specific rail outcomes, we note that the decision to give primacy to the Licence suggests that such conflicts might arise in the future, particularly given the public sector financial management arrangements and associated scrutiny now applied to NR following its categorisation as a public sector body. The interaction of the incentives generated by the Framework Agreement and those generated by the Network Licence will require careful monitoring.

An evaluation of Network Rail's incentives – response to research questions III

Research question	Summary response
F. What motivates people at Network Rail at different levels of the organisation? How can these motivations be aligned to deliver improved safety, efficiency, value for money, passenger satisfaction and train performance? How does this compare with other private and public sector bodies?	• The consensus among the NR management staff interviewed is that pride in the railway and professional satisfaction from doing a job well (and being recognised for it) are the primary motivating factors for staff at all levels. However, senior managers are arguably more driven by regulatory incentive mechanisms in areas such as efficiency, value for money and train performance as they have greater visibility of the mechanisms themselves, the associated target values and other parameters are reflected in their individual dashboards and performance-related pay accounts for a higher proportion of their overall remuneration. • Hitherto, NR staff have not been strongly motivated to focus on measures of passenger satisfaction, regardless of their level in the organisation since NR has been one step removed from the passenger experience. However, under Putting Passengers First they are now directly incentivised to contribute to improving passenger satisfaction at the national and regional level, although it is too early to assess the impacts of this change. • Staff at all levels continue to be motivated by a strong safety culture and general recognition of the importance of complying with safety standards. However, there is agreement within NR and the ORR that this can lead to unduly risk averse behaviour and that mechanisms need to be found to encourage more collaboration between NR staff and HMRI safety inspectors. • At the operational level, we have not identified any significant differences in primary motivating factors between NR and other regulated entities. However, at the senior management level pride in the industry and professional satisfaction appear to be more important in NR than in private companies motivated by profit.

An evaluation of Network Rail’s incentives – response to research questions IV

Research question	Summary response
G. To what extent does professional pride or ranking within the internal organisation act as a motivating factor (for organisation and individual) for particular outcomes?	• There is strong evidence that pride in the industry and the professional satisfaction from performing often complex and challenging roles well is the primary motivating factor for most if not all staff working within NR – this view was echoed by a substantial number of those interviewed. It is also important that staff are recognised for their achievements, although the form of recognition appears to be secondary – for most staff, performance-related pay is limited and even among the most senior managers it accounts for a substantially smaller proportion of overall remuneration than in the past. • Equally, professional pride can be undermined by adverse outcomes and incidents attracting extensive negative publicity. This can also be a strong motivating factor but, as previously noted, may be counter-productive in the long run.
H. Where does existing reporting achieve the behaviours which support desired outcomes and what evidence is there different reporting (approach or topic) could incentivise in line with those outcomes?	• The reporting of NR’s performance, broadly defined, generally encourages positive behaviour, with senior managers seeking to avoid the criticism from the public, politicians, the regulator and peers that often accompanies regulatory statements and enforcement action. The incentives from both reporting and financial impacts operate primarily through reputation and therefore carry equal if not greater weight in motivating behaviour – at interview, senior managers commenting on NR’s operational performance during CP5 noted that it was held to account for the poor performance itself rather than the associated Schedule 8 cost. • The excessive risk aversion and ‘regulation fatigue’ highlighted above appear to be the result of what many staff consider to be excessive negative commentary on reported outcomes by the regulator. The implication is that more positive behaviours could be reinforced by a more balanced approach, with greater attention paid to complementing NR for reported achievements.

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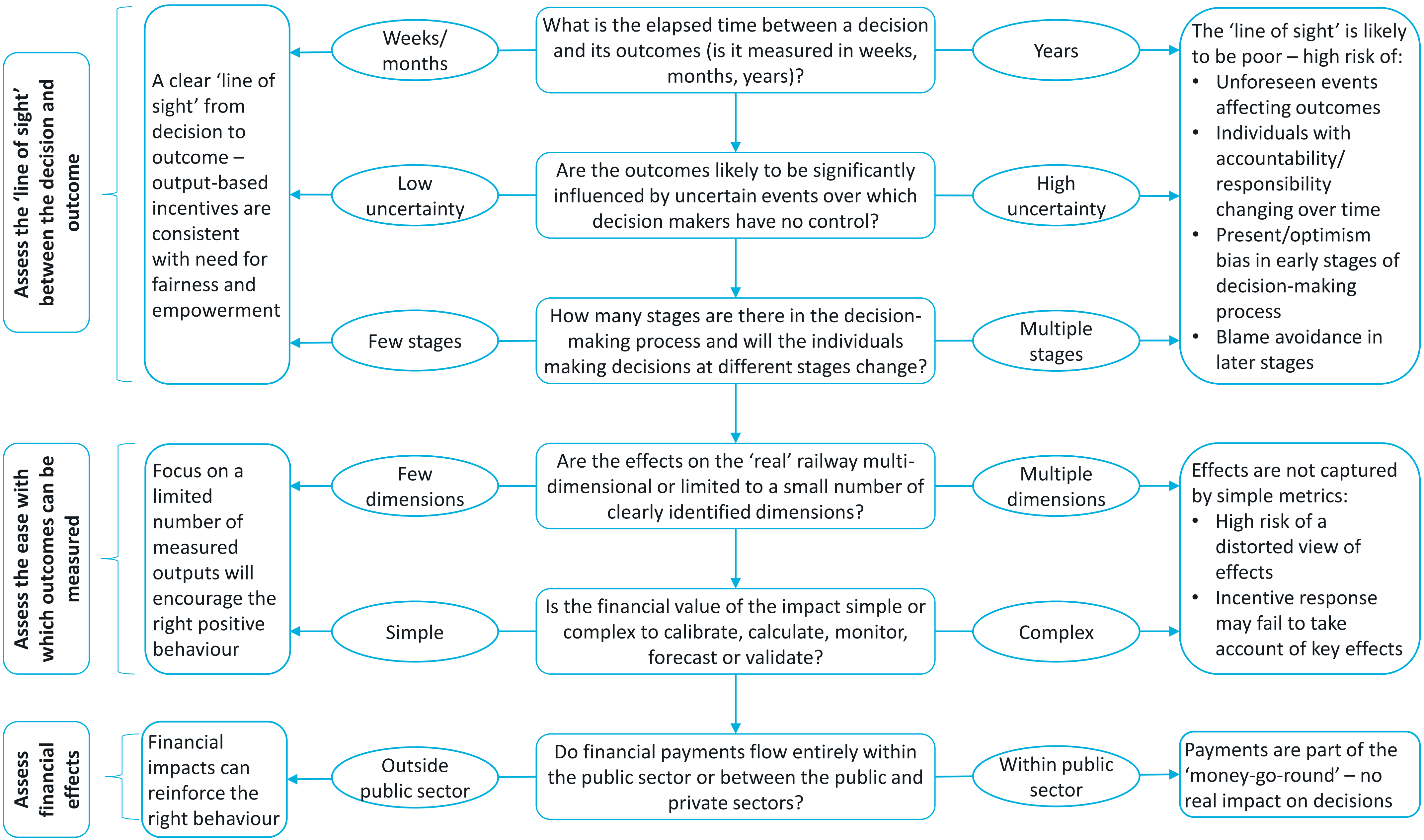
An evaluation of Network Rail's incentives – response to research questions V

Research question	Summary response
I. What influence do the public, media and other stakeholders have on Network Rail decisions?	• As indicated above, public attitudes to, and media commentary on, the railway in general and NR's performance in particular can have a substantial impact on NR decisions. This can be both positive, with managers seeking outcomes that improve the reputation of the organisation, and negative, with decision-makers exhibiting excessively risk averse behaviour to minimise the probability of outcomes that attract negative publicity. This is particularly true in areas of decision-making such as safety where adverse outcomes can be very high profile. • At the same time, the incentives created by the prospect of negative public and media comment may be blunted over time if it becomes relentless and managers and staff begin to regard it as an occupational hazard. Against the background of May 2018, there were some signs that this was beginning to happen in the view of some interviewees.
J. What evidence is there Network Rail's 2019 restructure will change incentives or motivation to improve the rail outcomes listed? Will any incentives weaken/distort/become perverse incentives?	• The framework for setting individual objectives and the dashboards supporting performance-related pay can be expected to encourage a greater focus on the passenger experience as well as on the requirements of NR's immediate customers. However, it is too early to assess the impact of these changes, which will anyway be reviewed and revised by the organisation as it learns from their application. We note, however, that there is little in the framework that is explicitly intended to discourage risk aversion and encourage innovation. • Restructuring will result in new challenges, notably the accommodation of potentially competing demands on routes from different stakeholders, and it is not clear what incentives are in place to address these.
K. Which incentives will strengthen/work under a proposed new industry structure for the listed rail outcomes? Which incentives will weaken/distort/become perverse incentives?	• It is not possible to give a definitive answer to this question in the absence of a clear description of a new structure for the industry – as previously indicated, this has been delayed as a result of the need to respond to challenges posed by the COVID-19 pandemic. The issues that could be addressed in the short term are considered in the following chapter. Here, we note that many of the incentive mechanisms embedded in the track access agreements could become redundant in the light of moves towards greater specification of operating contracts by transport authorities and a transfer of revenue risk away from train operators.

An evaluation of Network Rail's incentives – a framework for future assessment I



An evaluation of Network Rail's incentives – a framework for future assessment II

Regulate by monitoring metrics and relying on output-based incentives ← **Classical incentives** | **Behavioural incentives** → **Regulate through reviews of plans and monitoring adherence to protocols**

Weeks/ months	What is the elapsed time between a decision and its outcomes (is it measured in weeks, months, years)?	Years
Low uncertainty	Are the outcomes likely to be significantly influenced by uncertain events over which decision makers have no control?	High uncertainty
Few stages	How many stages are there in the decision-making process and will the individuals making decisions at different stages change?	Multiple stages
Few dimensions	Are the effects on the 'real' railway multi-dimensional or limited to a small number of clearly identified dimensions?	Multiple dimensions
Simple	Is the financial value of the impact simple or complex to calibrate, calculate, monitor, forecast or validate?	Complex
Outside public sector	Do financial payments flow entirely within the public sector or between the public and private sectors?	Within public sector

Example - incentivising 'simple' improvements to train performance

- Define clear, simple metric for measuring performance and establish associated value (modification of Schedule 8?)
- Rely on NR to analyse impact of initiatives on performance and payments (e.g. using historical data)
- Rely on financial impacts (e.g. reductions in performance payments to operators) to reinforce reputational gains and incentivise investment or process change
- Monitor metrics periodically to ensure ongoing effectiveness of the mechanism

Example - incentivising design and delivery of a major project

- Review plans for attention to design and delivery risks
- Review mechanisms for retaining corporate project knowledge
- Require NR to define and demonstrate best practice/collaboration

Example - incentivising possession planning

- Review approach to assessing safety, efficiency, operator and passenger impacts
- Review quality of collaborative effort

Example - incentivising good asset stewardship

- Rely on reputational effects of enforcement

An evaluation of Network Rail's incentives – summary research findings

Observations

- While it has not kept pace with industry change, in some respects the incentive framework on NR remains effective
- Some incentives have perverse effects while others are not strong enough
- The framework will continue to evolve as NR's new financial planning arrangements bed down

Propositions

- Wider industry reform provides an opportunity to address specific issues in the incentive framework
- While resolving some issues might require fundamental reform (involving legislative change) others could be addressed through regulatory change implemented within the current legal framework

Further questions

- What might be the direction of industry reform in the short to medium term and what options are available for reforming NR's incentive framework? *(Chapter 8)*

8 Options for reform

Options for reform – purpose and scope of the chapter

Scene setting | Context | Findings from desk and field research | Analysis | **Conclusions**

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

Conclusions

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

Options for reform – scope of reform in the short term

Rail policy landscape in the short to medium term

In the current climate, with the industry still developing the next steps in its response to COVID-19, in particular the replacement for the Emergency Management Arrangements (EMAs) governing the relationship between DfT and the train operators, there is little prospect of bringing forward the primary legislation required to implement the full scope of the Williams reforms. The focus is therefore on the scope of reform that can be implemented without legislation. This means retaining the broad regulatory and contractual structure currently in place while addressing aspects of reform that can be taken forward through changes to decision-making frameworks and contracts. Examples include:

- **Replacement of franchise contracts:** train operators are showing little appetite for taking back responsibility for managing revenue risk when EMAs expire in September and there is a need to identify new forms of contract that are aligned with Williams' findings.
- **Reform of the passenger offer:** the passenger offer must be radically rethought in light of the short, medium and long-term impacts of COVID-19. At the same time, the transfer of revenue risk to DfT presents an opportunity to make changes to fares and ticketing.
- **Addressing long standing issues surrounding performance monitoring and incentives:** there is a growing view within the industry and more generally that mechanisms such as Schedule 4 and 8 are not fit for purpose. The problems identified could be addressed within a wider programme of contractual change.
- **Industry behaviours:** this study has also highlighted evidence that the industry continues to be characterised by short-termism, risk aversion and lack of collaboration across organisational boundaries to varying degrees. It may be possible to address these issues to some degree in advance of legislation.

Options for reform – issues for consideration I

Our research has highlighted various major weaknesses in the existing framework of incentives that might be addressed as part of a wider programme of reform …

- Network development
- Asset stewardship
- Timetable development
- Network operation
- Managing the station estate

DfT Framework Agreement

The Framework Agreement lacks legal force, which raises questions about the strength of the incentives it creates

Dual accountability through separate legal instruments has no parallel in Europe – it raises questions about how any tensions between the Framework Agreement and licence conditions might be resolved in practice

Network Licence

Incentives are dependent for their efficacy on reputational effects – excessive negative publicity can undermine positive behaviour

Incentives and resources needed to challenge the impact of bidder proposals on timetable resilience have been insufficient

Regulatory Determination

Decisions are distorted by short termism - strong incentives to focus on longer term delivery risks and asset condition are needed

Network Licence / Regulatory Determination

Incentives to improve the station estate are weak and property team incentives can conflict with operational objectives

Access Agreement

Incentives often overridden by policy decisions – for example in choice of rolling stock and capacity allocation

Schedules 4 and 8 encourages blame avoiding behaviour

Franchise Agreement

Limited incentive to collaborate with NR although operations are often affected by short notice changes in scope and delivery

Strong incentives to develop service proposition that undermines timetable resilience and can be undeliverable

Disputes over accountability for station condition

Key corporate metrics

- Network development: Frequency; Journey time; Stations served
- Asset stewardship: Asset condition; Asset failure; Planned disruption
- Timetable development: Services operated; Station calls; Recovery time
- Network operation: Punctuality; Reliability; Service quality
- Managing the station estate: Customer satisfaction; Service quality

Issues to address

- Governance and accountability
- Performance incentives
- Changing individual behaviour
- Collaboration

Key:
- NR mechanisms
- Operator mechanisms
- Common mechanisms

Options for reform – issues for consideration II

… and these highlight a number of key issues that could be addressed within the existing legal framework

DfT Framework Agreement | **Network Licence** | **Regulatory Determination** | **Access Agreement** | **Key corporate metrics**

People management

Positive incentives and behaviours such job satisfaction can be undermined by adverse publicity surrounding political and regulatory intervention

- Staff/customer satisfaction
- Recruitment

Innovation

There is little or no reference to innovation in either the Framework Agreement or the Network Licence

Incentives created by determined budget are weak

Incentives created by access charges are blunted by public sector financial management and can be overridden by policy decisions

- Project impacts
- Project success rates

Efficiency and Value for Money

The constraints imposed by public sector financial planning are likely to introduce inefficiency because of the need to 'stay on plan' and avoid reallocating expenditure between years

- Expenditure against budget
- Productivity metrics

Safety

Enforcement action encourages risk aversion

- Passenger/staff incidents
- Level crossing incidents

Issues to address

- Incentivising efficiency and value for money
- Changing individual behaviour
- Collaboration
- Incentivising innovation

Options for reform – questions to address

Given this background, we have sought to identify questions concerning NR's incentive framework that could be addressed as part of a wider programme of reform

Issue	Questions
Governance and accountability	• Does it make sense to ensure NR's accountability through both a Framework Agreement and a Network Licence? Are there any tensions/inconsistencies and how can these be resolved? • How can overall accountability to DfT be reconciled with accountability to authorities with devolved responsibility?
Changing behaviour	• What changes to incentives are needed to reduce short-termism and risk aversion within NR? • How can previous failings in the assessment of longer term delivery risks be addressed? • How can the incentive framework be simplified to make it easier for staff to understand and respond to?
Performance incentives	• Should Schedule 4/8 be modified or replaced? What alternative incentive mechanisms are available/desirable? • How might the performance monitoring arrangements be improved to enable the investigation of a higher proportion of delay (in particular sub-threshold delay)?
Collaboration	• How can collaboration between NR, project sponsors and train operators in network planning, the delivery of major change and management of performance be incentivised in a reformed industry? • How can potentially conflicting demands from different transport authorities with devolved powers be resolved?
Incentivising efficiency and value for money	• How can efficiency and VfM be encouraged in the absence of equity finance and under a public expenditure management framework? How much flexibility can be given to NR to manage expenditure efficiently? • What is the appropriate structure of track access charges given the role of train operators under a new contract?
Incentivising innovation	• How can the contribution of NR's innovation activity to the development of rail services and the efficiency of the network be monitored more effectively? How can the current focus on monitoring process be supplemented? • How can NR and train operators be incentivised to collaborate on innovation?

Options for reform – ideas for discussion

The following ideas are intended to prompt discussion and have purposely not been developed in detail – however, we believe that most could be implemented within the existing broad structure of regulation without the need for legislative change

Issue	Questions
Governance and accountability	• Review of obligations in the Framework Agreement and Network Licence with a view to streamlining lines of accountability – would probably require legislation?
Changing behaviour	• Greater balance of praise and admonishment in regulatory monitoring/statements • Consider incentivising behaviour and inputs rather than outputs, for example through application of OFWAT-style assessment of business planning together with a published management maturity model for project planning
Performance incentives	• Replace Schedule 4/8 with a regime that includes a balance of input and output-based incentives • Modify Schedule 8 to encourage investigation of more (sub-threshold) delay and reduce payment rates to temper blame avoiding behaviour
Collaboration	• Application of CAA-style constructive engagement between NR and multiple transport authorities • Include demonstration of collaboration in criteria used to assess route business plans under an OFWAT-style comparative assessment framework/management maturity model
Incentivising efficiency and value for money	• Fully exploring the scope for flexibility in managing expenditure under public sector financial planning • Further development of route benchmarking, drawing on OFWAT experience
Incentivising innovation	• Develop a framework for relating impact of innovation on network performance – such frameworks have been developed previously, for example by Shift2Rail • Introduce a competition among operators for innovation funding following the OFGEM model

Appendix – the evolution of regulation in rail

Appendix – purpose and scope

Scene setting → Context → Findings from desk and field research → Analysis → **Conclusions**

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

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- What is the standard view of incentive design and how is this being challenged?

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- What incentive mechanisms applied in other sectors might be relevant to rail?

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

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Appendix – the evolving legal and policy framework

Railways Act 1993

- Enabled privatisation of the rail sector, creating the basic industry architecture – separation of train operations from infrastructure management and licensing arrangements
- Established the Rail Regulator as an independent regulatory authority
- Created OPRAF to undertake procurement of franchised services
- Provided for non-discriminatory access to the rail network

Transport Act 2000

- Created the Strategic Rail Authority (SRA), an arms-length body responsible for developing and implementing a strategy for the rail sector.
- Transferred responsibility for franchise procurement from OPRAF to SRA
- Short-lived, with the government abolishing it in 2005 due to failure to contain costs and coordinate franchise planning with infrastructure investment.

Railways Act 2005

- Transferred responsibility for determining the outputs required from the railway from the SRA to DfT and Transport Scotland
- Introduced the High Level Output Specification (HLOS), the mechanism by which DfT and Transport Scotland communicated required outputs to the industry
- Created the ORR as a regulatory body responsible for safety and economic regulation

Access, Management and Licensing of Railway Undertakings Regulations

- Mechanism by which European railway law has been implemented in the UK
- New Regulations introduced in 2016 in response to European Directive 2012/34/EU, which strengthened the legal framework relating to non-discrimination, management independence for train operators and infrastructure managers and regulatory independence

Appendix – changes in ownership and organisation of the infrastructure manager

Railtrack (1994-2002)

- Created as a limited company and subsequently floated
- Subject to shareholder scrutiny of profitability – a major incentive to improve efficiency
- Received no direct subsidy – subsidies paid to train operators, with access charges covering the full costs of the infrastructure
- Regulated under a similar framework to the previously applied to the utilities
- Placed in railway administration in 2000

Network Rail (2002-2014)

- Established as a 'not for dividend' company limited by guarantee
- Had no equity finance but could raise debt on commercial terms
- Permitted to earn a weighted average cost of capital incorporating an allowance for risk as well as the efficient cost of debt (determined by the Regulator)
- Responsible for producing an industry plan in response to the HLOS, with the Regulator assessing efficiency

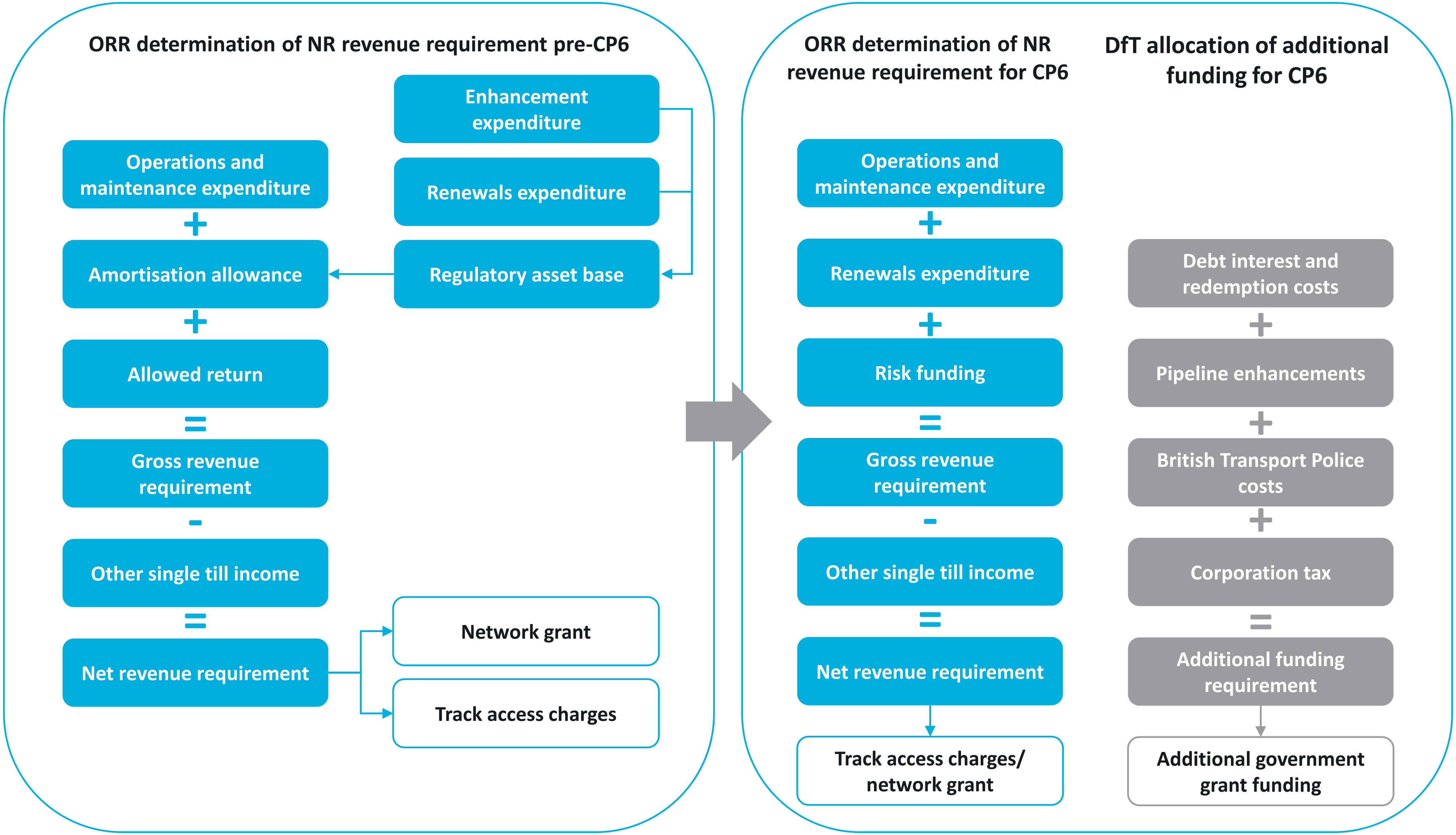
Network Rail (2014-2019)

- Categorised as a public sector body in 2014 following Office of National Statistics' assessment of risk
- Governance and funding arrangements set out in a framework agreement with DfT
- Secretary of State appoints the Chairperson and approves the Chief Executive
- Subject to Treasury requirements for managing public funds and operates within departmental expenditure limits

Network Rail (2019- …)

- Decision-making devolved to 5 new regions and 14 new routes under the Chief Executive's 'Putting Passengers First' initiative
- Key corporate functions remain centralised, including the System Operator -responsible for timetable development)
- Each route and the SO subject to a separate regulatory determination
- Routes prepare scorecards focused on customer requirements

Appendix – changes to the regulatory structure



Source: ORR

Appendix – examples of changes to the framework of incentives

Variable Usage Charge

- Frequently recalibrated to reflect the impact of different types of rolling stock on the track
- In principle, an incentive on train operators to select rolling stock that minimises wear and tear on the track
- In practice, often overridden by DfT specification of rolling stock in franchise agreements

Capacity Charge

- Intended to recover Schedule 8 performance penalties incurred by NR as a result of accommodating more traffic on the network
- Involved complex calibration – discontinued following the 2018 Periodic Review (PR18) as ORR judged that the incentives were too complex to influence decision-makers

Route-level efficiency benefit sharing mechanism

- Intended to encourage operators to support NR in improving efficiency and value for money
- Also discontinued following PR18 – not possible to identify operator contributions and mechanism anyway lacked support among stakeholders

Examples provide evidence of some of the behaviours/issues described in the main report

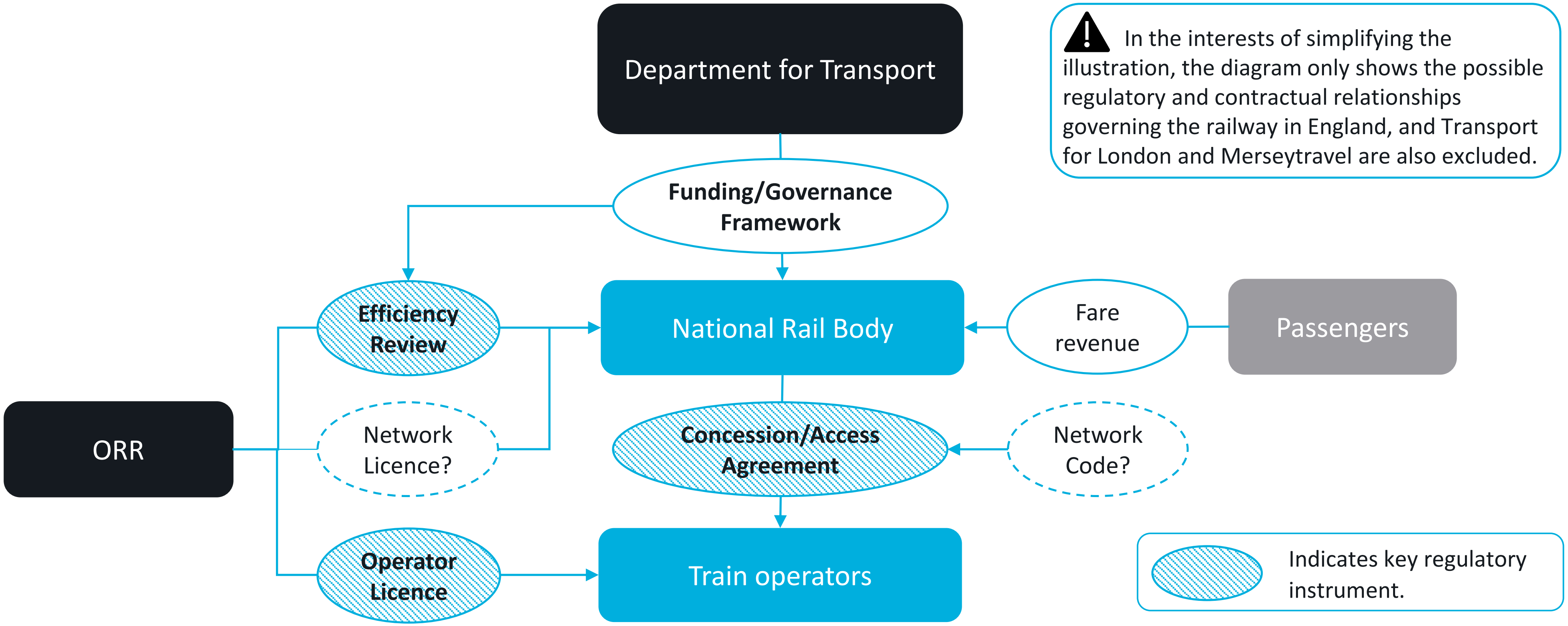
- A trade-off between satisfying ambiguity aversion and ensuring the precision of an incentive
- Decision-makers need 'line of sight' between their decisions and the outcome of incentive mechanisms
- Policy priorities and regulatory incentives pull in different directions under the current framework

Appendix – a possible future structure for the rail industry

Key elements of a possible future financial and regulatory framework

The diagram shows one interpretation of the proposals that have emerged from the Williams Rail Review:

- The franchise and track access agreements are replaced with a single concession contract that both specifies train service requirements and provides for access to infrastructure managed by a National Rail Body
- There is provision within the funding and governance framework between The Department and the National Rail body for a periodic efficiency review, undertaken by ORR, to inform a periodic funding settlement
- Licences defining key obligations for both the infrastructure manager and train operators remain



In the interests of simplifying the illustration, the diagram only shows the possible regulatory and contractual relationships governing the railway in England, and Transport for London and Merseytravel are also excluded.

Bibliography

Appendix – purpose and scope

Scene setting → Context → Findings from desk and field research → Analysis → **Conclusions**

Scene setting

1 Scope and purpose
- Why did the ORR commission the study?
- What are the research questions?
- How have we sought to answer them?

2 Influences on decision-making – the theory
- What are incentives?
- What is the standard view of incentive design and how is this being challenged?

Context

3 Organisation and regulation of NR
- What is the regulatory framework governing NR and what are the regulatory instruments that give effect to incentives?
- What are the key areas of decision-making and accountability within Network Rail that incentives are expected to influence?
- How are outcomes in each decision-making area measured and incentivised at the corporate level?
- How do corporate-level incentives translate into individual incentives within NR's organisation?

Findings from desk and field research

4 Decision-making in practice I – industry perspectives
- What incentives are in play and how effective are they according to industry stakeholders?

5 Decision-making in practice II – case studies
- How do incentives influence decisions in key areas such as major projects and timetable development?

6 Lessons from other industries
- What incentive mechanisms applied in other sectors might be relevant to rail?

Analysis

7 An evaluation of NR's incentives
- How strong are the different incentives on NR and how do they relate to one another?
- **How do regulatory incentives perform in terms of their effectiveness, efficiency, relevance and coherence?**
- **To what extent is the framework of incentives fit for purpose given the current industry structure?**
- **How well does the current framework of incentives reinforce or undermine individual motivation?**

Conclusions

8 Possible responses
- How might regulatory incentives be changed?
- What implications does industry reform have for regulatory incentives?

Appendix
- How has the policy framework and industry structure changed over time?
- How has the regulatory framework responded?

Bibliography
- What are the primary sources for the desk research?
- What does the behavioural economics literature say?

Literature on behavioural economics I

Source	Description/relevance to the study
Dan Ariely (2008): "Predictably Irrational: The Hidden Forces That Shape Our Decisions"	The author explains a number of the ways in which people make decisions which are apparently irrational (given that they do not conform with traditional economic theory), but more importantly, in a way which is predictable. The behavioural economics concepts described include relativity, anchoring, social norms and the need for recognition, the endowment effect, and honesty.
Cicala (2015): "When Does Regulation Distort Costs? Lessons from Fuel Procurement in US Electricity Generation"	This paper examines how regulation distorts cost and how deregulation may be the way forward for the electricity industry. It explains how asymmetric information, regulatory capture and capital bias all lead to substantial distortions in procurement decisions.
Everis and NTU (2010): "Study on Regulatory Options on Further Market Opening in Rail Passenger Transport"	A review of the regulatory options available to open the passenger rail market to new entrants. The study suggests: • It is important to share information to avoid the barrier of 'asymmetric information' to developing innovation / efficiency gains. • The infrastructure manager needs to take a long-term view on infrastructure provision but also have a shared vision with train operators (which have short-term, profit driven priorities).

Literature on behavioural economics II

Source	Description/relevance to the study
B. S. Frey, J. Gallus (2017) "Honours versus Money"	This book brings together the latest research on the value of awards and honours as ways of incentivising employees, as compared with monetary incentives. It acknowledges that the academic literature on the economic impact of awards is relatively sparse and recent. The research suggests that: • The use of awards and honours is very widespread, despite the lack of hard evidence as to their economic value. • Awards and honours are important as they indicate recognition by others and are a better means for showing appreciation than financial rewards. Awards can back-fire, however, if they are seen to be unfair or a cheap substitute for financial rewards.
Kahneman and Tversky (1979): "Prospect Theory"	Prospect theory is a behavioural model that shows how people decide between alternatives that involve risk and uncertainty. It was derived from experimental evidence which demonstrated that people are loss-averse and think in relativistic rather than absolute terms, and that choices are affected by how they are presented (or framed). Prospect theory now underlies a number of well-established behavioural economics concepts.
Daniel Kahneman (2011) "Thinking Fast and Slow"	This book establishes the idea that there are two ways in which people make choices (fast, intuitive thinking, and slow, rational thinking).

Literature on behavioural economics III

Source	Description/relevance to the study
Pete Lunn (2008) “Basic Instincts: Human Behaviour and the New Economics”	In this book, Lunn shows how basic human instincts affect our decisions and mean that the outcomes differ from those expected by traditional economists.
Maskin and Xu (2001): “Soft budget constraint theories – From centralisation to the market”	This paper examines the theoretical literature on the impact of soft market constraints, focusing on constraint as a problem of commitment. A soft budget constraint occurs when the strict relationship between expenditure and earnings has been relaxed (because any excess expenditure will be subsidised by the state). When there is a soft market constraint: • There is a reduced ability to drive efficiency improvements; • There is less financial incentive to keep costs down; and • There is a greater likelihood that funding of innovation will continue beyond the point at which it should stop.
Alain Samson (Ed) “The Behavioural Economics Guide 2019”	The Behavioural Economics Guide is an annual publication that includes a mix of articles related to behavioural economics. It also provides a listing of behavioural economics concepts and biases. The latest issue identifies 107 such effects.

Literature on behavioural economics IV

Source	Description/relevance to the study
Herbet A. Simon (1978): "Bounded rationality"	Simon was one of the first economists to recognise that people's decisions were often apparently irrational (in the sense that they did not appear to conform to the predictions of classical economic theory) because they are constrained by thinking capacity, available information and time. He also developed the concept of 'satisficing' – a combination of satisfying and sufficing – as a description of the aim of decision-making within these constraints.
Richard Thaler and Cass Sunstein (2008): "Nudge"	This publication brought behavioural economics to the attention of the general public and showed how some of the concepts behind it could be used to influence behaviour in a manner which benefits both the individual and society.
Richard Thaler (2015): "Misbehaving: The Making of Behavioural Economics"	This book explains how behavioural economics came about and introduces a number of the key concepts.

Literature on behavioural economics V

Source	Description/relevance to the study

Vagliasindi (2008): "Governance Arrangements for State Owned Enterprises"	The paper examines several countries with different models of how state-owned enterprises operate, and highlights policies and incentives to improve efficiencies given a lack of competition. It identifies a number of issues of relevance to the study:
	• It highlights the importance of defining goals and performance criteria as well as the challenges which need to be overcome.
	• It introduces the concept of 'incentive intensity', which can be useful to understand when designing managerial incentives. Incentive intensity should:
	  ◦ decrease with increasing uncertainty about the performance of the agent;
	  ◦ increase with the responsiveness of performance to the agent's effort;
	  ◦ take account of the informational advantages, the abilities, and the incentives of the different parties; and
	  ◦ delegate control to the party with superior information, resulting in better decision-making.

Literature on behavioural economics VI

Source	Description/relevance to the study
Van Ees et al. (2009): "Toward a Behavioural Theory of Boards and Corporate Governance"	The paper describes a set of behavioural concepts to explain the roles of board members and the decision-making process. These include: • Bounded rationality; • Satisficing behaviour; • Routinisation of experimental decision-making processes; and • Political bargaining in the context of the corporation as a coalition of stakeholders.
Nick Wilkinson (2019): "Introduction to Behavioural Economics"	A regularly updated textbook providing a comprehensive, rigorous survey of the major topics in the field of behavioural economics. It includes an up-to-date and critical examination of the latest literature, research, developments and debates in the field: • The substantive nature of the annual updates to this publication illustrates how quickly the field of behavioural economics is developing (and expanding in scope). • It identifies some of the concepts now being incorporated into mainstream economics (or the emerging 'standard model' of economics). These include loss aversion and present bias.

Other sources

Source	Link
CAA Mandate for Constructive Engagement at Gatwick, CAA, April 2012	https://www.caa.co.uk/home
Performance Incentives for Network Rail: A Perspective from Behavioural Economics, Nick Chater, 2019	https://orr.gov.uk/__data/assets/pdf_file/0010/39790/a-behavioural-economic-perspective-on-performance-incentives.pdf
Framework Agreement Between the Department for Transport and Network Rail, Department for Transport, 2019	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/809091/network-rail-framework-agreement.pdf
Update of review of regulatory bodies' competences and remedies, findings of IRG-Rail members' survey, IRG-Rail, May 2019	https://www.irg-rail.eu/irg/documents/position-papers/166,2019.html
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PR18 working paper: Collaborative working on the rail network, ORR, 30 November 2017	https://orr.gov.uk/__data/assets/pdf_file/0014/26123/working-paper-7-collaborative-working-on-the-rail-network.pdf.
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