



# Response to system operation consultation

RSSB

16 October 2015

## Executive Summary

This document sets out RSSB's response to ORR's consultation titled 'System Operation – A consultation on better use of the railway network' (August 2015).

RSSB was established following a recommendation of the Cullen Review to provide system authorities, research, an evidence base and a framework for collaboration to support industry manage its risk across interfaces. RSSB is a cross-system, member organisation, independent of any one part of the rail industry. As a cross-system body, RSSB has not duplicated the ORR's consultation with further consultation of its members, but has provided the response in this document based on its experience of managing the technically oriented issues that arise across the rail system and at its interfaces.

RSSB believes the system operator functions can enhance the delivery of a safe and efficient railway. We have three key observations we think must be considered in the development of this concept.

### Complexity of the railway system

Although much can be learned from other industries with infrastructure networks, the rail system is complex. In contrast to utilities the infrastructure carries trains and trains carry passengers (or freight). This three dimensional aspect creates additional interfaces, additional failure modes and additional risks. It also introduces human factors as a real component that influences system performance.

The interfaces operate at physical, operational, organisational, and obligation boundaries. Any system operation concept must recognise this complexity. In particular that there are many technical dimensions to the system and interfaces as well as the commercial and operational considerations in capacity management.

### Passengers and freight as the focus

The system operator consultation emphasises capacity. This is an important consideration in a growing railway. However, adding a passenger focus would promote a broader system concept. In many infrastructure networks, such as energy, capacity is the primary focus, but electrons have no concept of punctuality or customer experience. With high utilisation of the network, capacity cannot substitute as a measure for customers. A system operator model should consider measures which combine both capacity and performance such as; thousands of passengers delivered on time and the London Underground measure of Lost Customer Hours, which focuses attention on passenger experience during delays.

### An independent, whole system approach

For a safe and efficient railway it is essential to have a whole system approach. Costs and risk can be transferred across interfaces. Therefore all parties: infrastructure managers; passenger train and freight operating companies; rolling stock supply companies; suppliers and contractors must be engaged in collaboration.



The system operator functions must be independent of any single part of the railway, not only to provide commercial impartiality, but to provide diversity of perspectives in managing costs and risk, and to build trust and confidence across the system.

The management of safety has provided some useful lessons with good outcomes: clear accountabilities defined in law, by licence or by contract, aligned incentives focused on people (harm and risk to passengers, workforce and public) and an independent, cross-system, evidenced-based body to address technical interfaces.

This document provides specific answers to the questions raised in the consultation, illustrating why these three considerations of complexity, passenger and independent whole system thinking must be built into system operator functions.

## Response to Consultation Questions

### *Consultation Question 1: The rail system is complex*

### System operations in rail are more complex owing to the number of different interfaces between parts of the system and the people dimension

The system operation concept proposed in the consultation draws from the experience of adopting such concepts in other utility sectors where capacity management of the network is critical to their success.

Useful lessons from other sectors should be embraced. However, it should also be recognised that the rail network also has several key differences which puts enormous emphasis on coordination and collaboration across organisation, functional and physical boundaries (see Table 1 as an illustration).

**Table 1: Comparing the rail system to other sectors**

| Sectors                      | Flow characteristics                         | Responsibility of flow  | Human involvement and interaction  | Freedom of movement   |
|------------------------------|--|---|--|---|
| <b>Rail</b>                  | Different physical and operational behaviour | Mixed traffic of different vehicle types run by different operators                                   | Customers are being transported in the moving object with limited capacity | Controlled movement based on permissions throughout journey                       |
| <b>Electricity and water</b> | Homogeneous                                  | Homogeneous   | Customers receive output   | Network controlled movement   |
| <b>Road</b>                  | Different physical and operational behaviour | Mixed traffic of different vehicle types run by different operators                                   | Same as rail and air but passengers indirect control                       | Nearly unlimited freedom of movement for the operator                             |
| <b>Air</b>                   | Different physical and operational behaviour | Mixed traffic of different vehicle types run by different operators but greater homogeneity than rail | Customers are being transported in the moving object with limited capacity | Movement authorities mainly at origins and destinations and national borders only |

In the railway, significantly more interfaces exist between the various rail subsystems namely: rolling stock; control, command and signalling (CCS) - on board; infrastructure; CCS - track side; energy; operations; and maintenance. These parts of the system are also more physically coupled together compared to other transport modes. Coordination is therefore essential when making changes to any part of the rail system.

This complexity is increased as different parties could be responsible for manufacturing, owning, operating, and maintaining these subsystems. They could have specific legal and commercial

obligations placed upon them. In addition different parties may have different planning horizons which means alignment of incentives becomes significantly harder.

Additionally, the level of people involvement compared to utilities is significantly higher, be it as customers or as part of the delivery of the functions. Passengers directly impact the capacity and performance of the network. This means any assessment or enhancement of performance, such as capacity and the impact of any changes (for example on safety), is not just constrained by physical possibilities but also the unpredictability and uncertainty of human interactions. RSSB is acutely aware of this people dimension when it reports on industry's safety performance. We provide a significant amount of support and technical leadership to the industry in the area of risk management and human factors.

## The need for whole system thinking and coordination

RSSB agrees with the system operation functions identified in the consultation which can be categorised as:

1. Setting the strategic direction for the network
2. Implementation and management of the network in delivery of the strategy
3. Infrastructure management
4. Provision of [train] services, exploiting the network

However with multiple actors and interfaces creating competing needs and incentives, a formal industry collaborative decision making structure is required. Figure 4 in the consultation document only refers to the need for coordination in relation to long-term decisions and therefore does not cover two critical dimensions of coordination and whole system collective decision making:

1. Coordination across the system operation functions to ensure incentives and actions are aligned.
2. Coordination and the taking of a whole system approach (beyond just considering network and infrastructure) is needed when moving from the current railway system to a future envisaged railway system (for example the implementation of ERTMS).

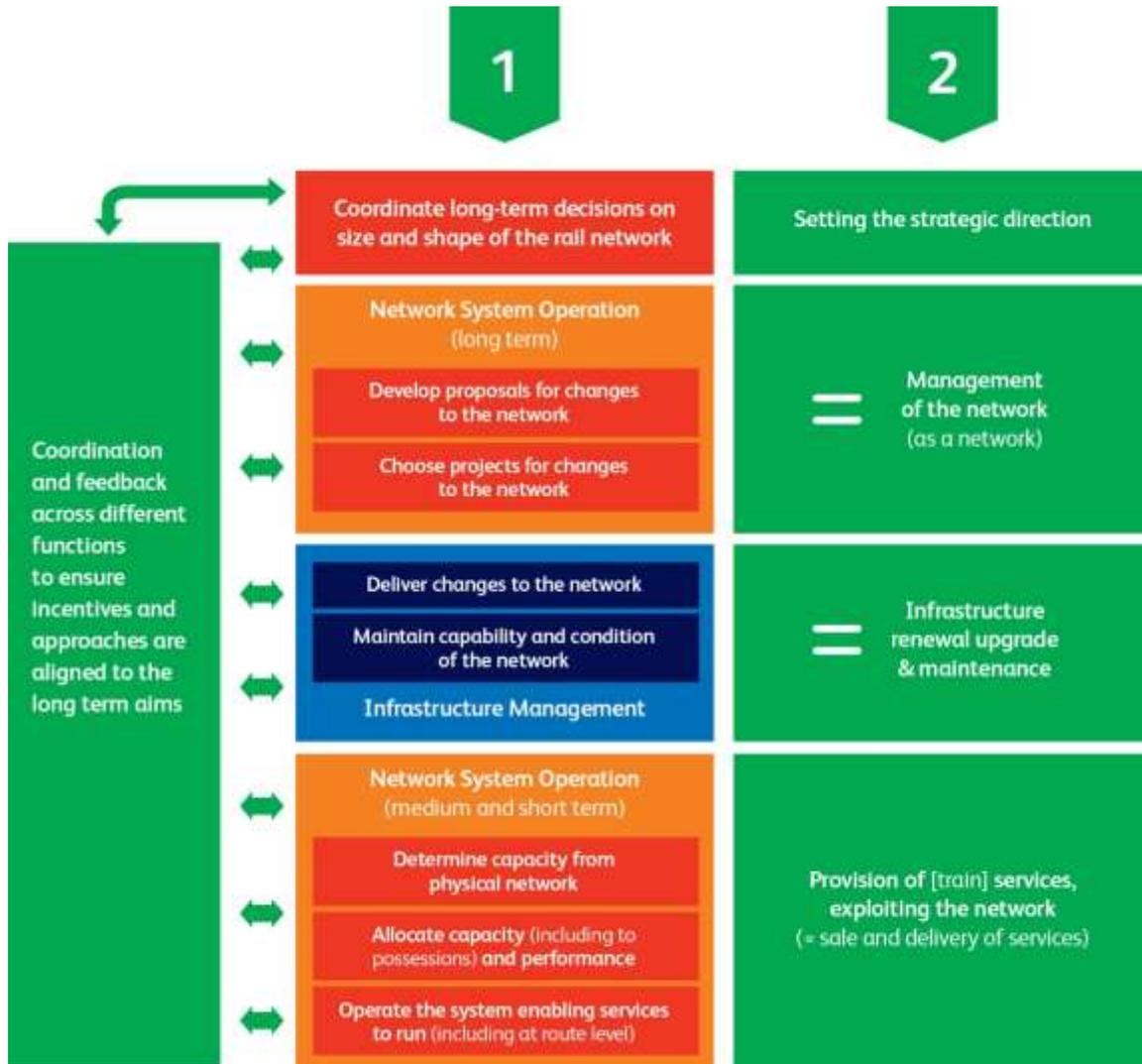
This need for coordination plays a vital role across the whole range of railway system operational functions to ensure the short-term activities are contributing to the delivery of long-term goals, and that strategy is not being developed in isolation. Alignment of incentives and intervention when perverse or unintended consequences are encountered would also be a role for a coordination function.

RSSB, in the areas of standards, safety, research and innovation, performs this system operation coordination role, especially related to the role associated with change. This role becomes critical when dealing with issues which are common across the industry and require collective inputs to decision making. The consultation focuses on commercial and operational dimensions of system operation (such as capacity and its allocation). Effective and safe operation also requires a system perspective to technical issues.

## Impact of the regulatory regime

All system operation functions are governed by EU regulations. Therefore there must be consideration the market pillar of the fourth railway package and the effects that may (or may not) have. Implementation of system operation must recognise the regulatory framework within which it functions.

Figure 1: Illustrates where the coordination function sits in relation to the system operation functions.



## *Consultation Question 2: Enhancing the customer experience and providing value to stakeholders has to be at the heart of effective system operation*

*The consultation suggests a greater focus on system operation can improve outcomes in five areas:*

- 1. Continued safe operation*
- 2. Choosing the right investment*
- 3. Making the right trade-offs*
- 4. The right services using the network*
- 5. Helping train operators to deliver*

RSSB agrees with the outcomes identified but it is difficult to judge how the system operation functions and its primary focus on capacity improvement will directly improve these outcomes. Also, safety was not explicitly mentioned in the trade-offs discussed in connection with Figure 2 of the consultation document: *Trade-offs in delivering an effective network*. It is important to state explicitly that the outcome of continued safe operation is a given in line with the existing legal obligations of transport operators and key to delivering an effective network.

In the consultation the system operation concept has been put forward as a mechanism to improve capacity on the network. In our opinion, capacity is an important but an incomplete measure of customer and stakeholder satisfaction and experience.

It is the customer experience which should be at the heart of any objective for system operator. Therefore any system operator incentives and metrics have to be aligned to what is valued by the key stakeholders which span passengers, rail employees, tax payers, business customers, investors, and delivery partners (such as suppliers). In our opinion the focus of the system operator should be on:

*'Creating a more direct, coherent and transparent link between network performance and value or utility for key stakeholders namely a) tax payers; b) passengers and public, c) rail employees; c) business customers such as TOCs and FOCS; d) investors; and e) delivery partners.'*

The system operation outcomes also allude to making the 'right' trade-offs, investments and service provision, which inevitably leads to asking who decides what is 'right' [this is not clarified in the consultation document]. We would also ask at what level of devolution such judgement will be made and how; especially if short-term and long-term functions are to be separated. What is 'right' should be driven by a balance of the collective value to the key stakeholders. This is essential because when incentives lead to unbalanced assessments of value, there is a greater chance for market failure.

Any system operation coordination function should identify areas of greatest conflict among different stakeholders as to what constitutes value; and identify how the system operator will resolve the conflict rationally and fairly (which could include compensation mechanisms for inevitable losers from any preferred approach). It is essential that any system operation

implementation considers its ability to judge (or not unfairly or unintentionally jeopardise) the correct balance of value to be provided to different stakeholders, for example passenger (planned response) and non-passenger (demand based dynamic response) operators who have different requirements of the network.

An example is the work RSSB has done in developing the GB Platform Train Interface (PTI) Strategy, which brings the industry together to collectively resolve issues. However, that experience highlights issues such as the potential incompatibility between demand for more freight routes and the demand for smaller stepping distances for passenger trains. This then raises the question of 'who decides what is right for the network?' A collective decision making and problem solving approach facilitated by an independent body is the most effective and efficient approach to reaching resolutions to such difficult cross-industry issues.

*Taking safe decisions*, published by RSSB, is an example of a framework that illustrates how such decisions and trade-offs can be made by individual companies in the context of safety and within the legislative framework. Similar approaches might be developed for other cross-system issues.

*Consultation Question 3: For system operation to be effective it has to create the right environment for positive change to occur*

To fully appreciate and comment on the system operation concept and how its functions lead to outcomes it is, in our opinion, important to understand that there is unlikely to be a direct link from system operation functions to an improvement in capacity or performance generally.

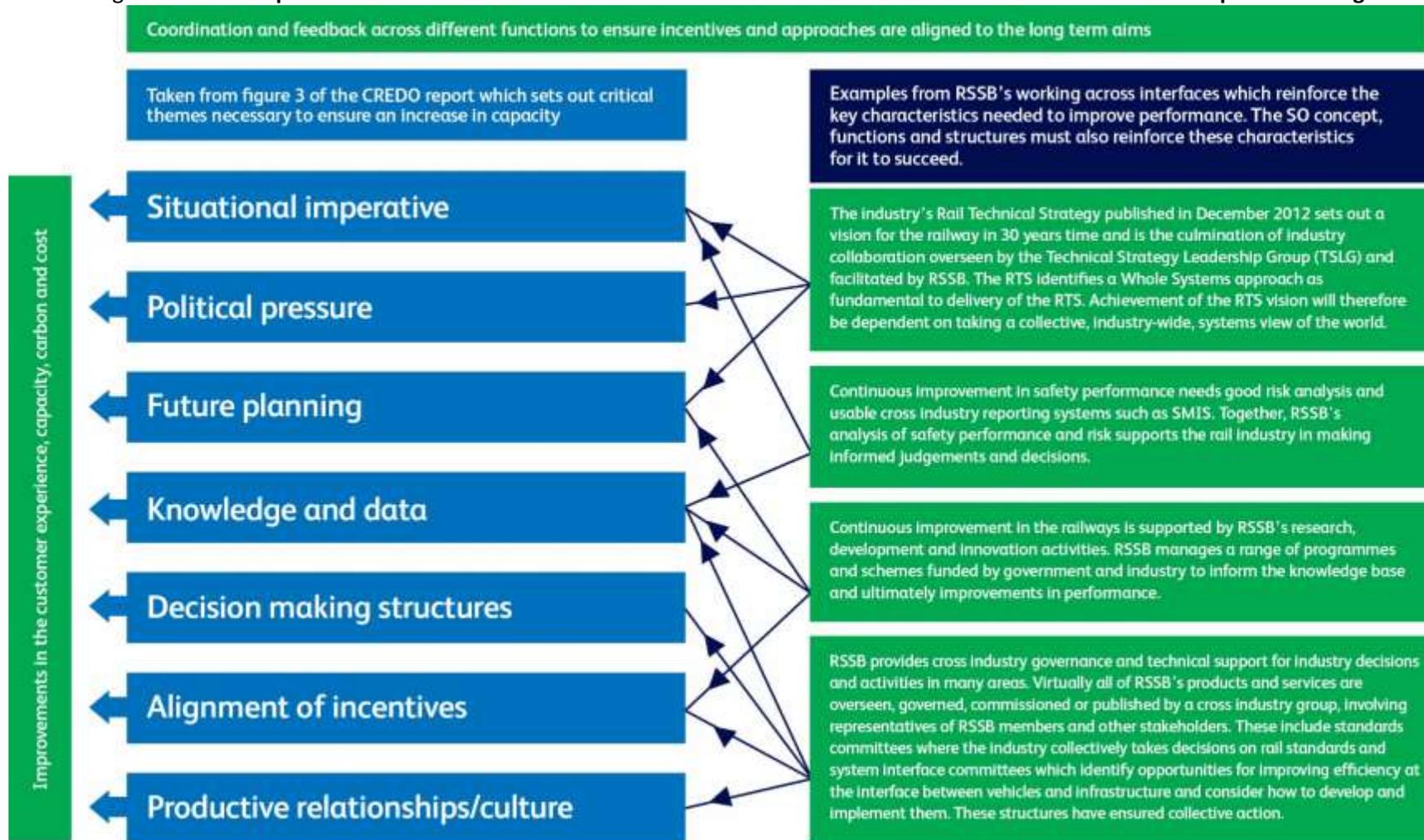
As noted in Section 2, the system approach to safety provide strong examples of how system functions can improve outcomes. The characteristic of whole system thinking, independent cross-system engagement, and an evidence base with a clear legislative framework underpin these functions.

RSSB has identified key characteristics and conditions that system operation functions must facilitate; which in turn will create the right environment for any positive change to occur. The characteristics have been taken from the CREDO report underpinning the consultation. They are:

1. Understanding and creating **situational imperative** to act.
2. **Political pressure** to ensure that plans and ideas are backed by formal power and leverage.
3. **Future planning** which should set out the principles for which investments and improvements are being made.
4. **Knowledge and data** to ensure that decisions and actions are based on evidence.
5. **Decision making structures** to enable collective and collaborative action.
6. **Alignment of incentives** by addressing areas of greatest conflict of value to different stakeholders
7. Promoting **productive relationships and culture** to ensure that the system operator and other affected parties work together rather than taking adversarial positions.

In light of this, Figure 2 illustrates how RSSB functions help create some of these characteristics. RSSB would be happy to provide more examples if required.

Figure 2: Examples of how activities of RSSB reinforce the conditions and characteristics needed to facilitate positive change



*Consultation Question 4: Metrics should include a passenger focus and vary over time -*

The consultation highlights some example areas where incentives may be missing, or lead to perverse or unintended behaviours, and the need for right incentives. Any incentives will require the right metrics to ensure the system operator is performing as intended. The focus (as proposed under response to consultation question two) should be on giving different stakeholders a direct, coherent and transparent link between performance and factors they value. Metrics and incentives should particularly include a passenger focus.

These incentives and associated metrics are likely to vary depending on the time scales over which they are measured. The need to align short-term incentives to long-term incentives and objectives means the system operation coordination function must monitor this, and have the powers to intervene if perverse or unintended consequences occur.

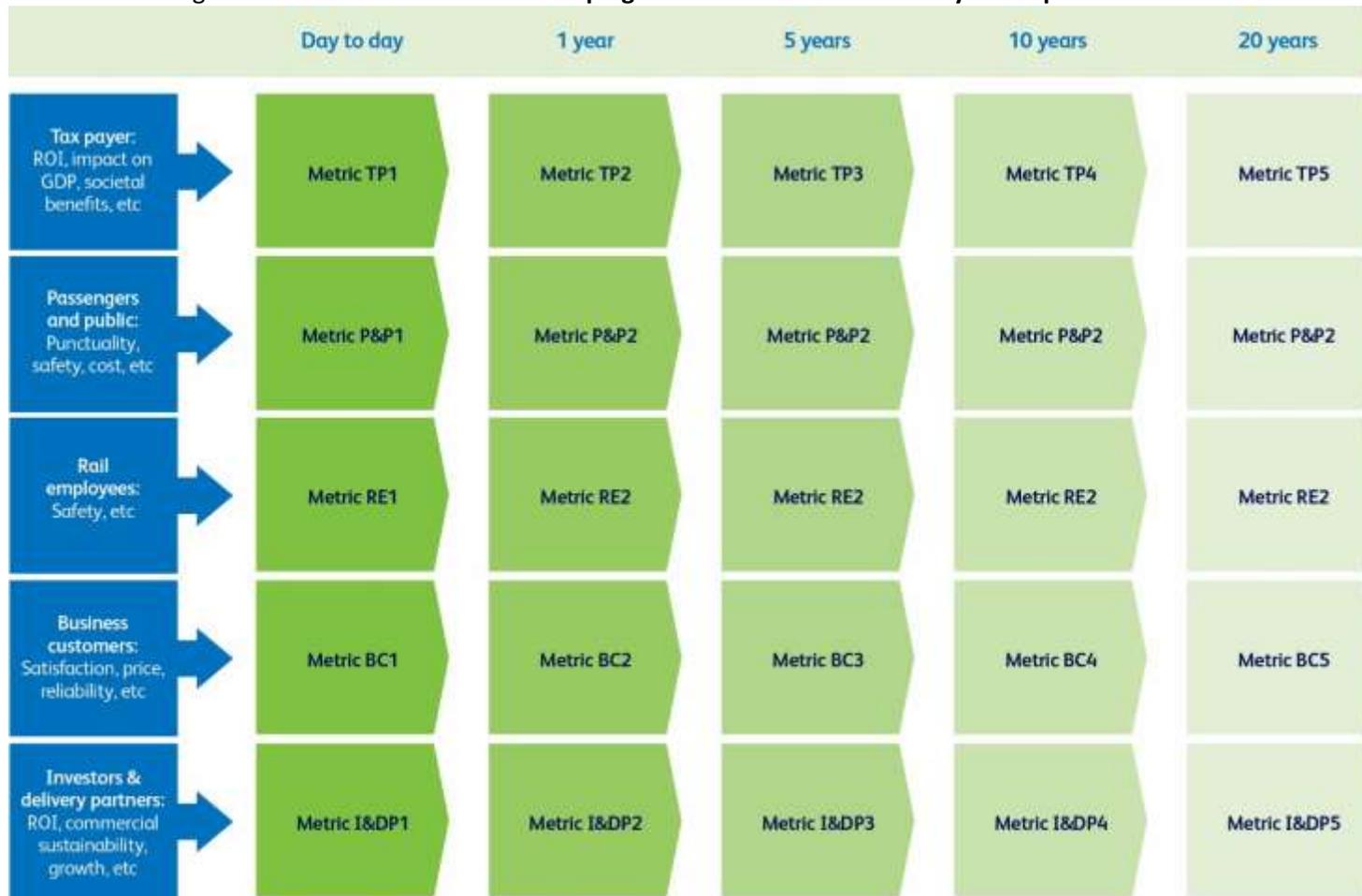
On the next page, Figure 3 illustrates the potential factors that may be of interest to the five high-level stakeholders' categories we identified in response to question two. Any metrics should be developed for different time horizons for each stakeholder group.

Most importantly, the metrics and incentives should relate to the experience of passengers. Performance (PPM) and capacity are poor substitutes for this. The London Underground approach of Lost Customer Hours directly associates the impact of delays on passengers. For a positive metric the number of passengers delivered on time encourages both on-time performance and capacity.

With reference to the metrics and incentives the 'quality of service' measure of railway performance as developed by the ON-TIME European project should be further explored. More information is provided by RSSB research project T952: *GB Railway Timetable Optimisation: Baselineing the Challenge* which highlights many of the key measures for passengers, freight customers and delivery partners.

RSSB research projects *Brighton Main Line timetable optimisation study* (T1063), *Reliability Modelling of the Brighton Mainline* (T1019) and *Making the case for a whole-system strategic approach to reliability improvement* (T935) all demonstrated that worthwhile gains in train performance and capacity can be achieved through new approaches to asset management and timetabling rules.

Figure 3: A framework for developing metrics and incentives for system operation functions



## Concluding remarks

RSSB believes the system operator functions can enhance the functioning of a safe and efficient railway, but has three key observations that we think must be considered in the development of this concept.

### 1. **Complexity of the railway system:**

- Although much can be learned from other industries with infrastructure networks, the rail system is complex. In contrast to utilities the infrastructure carries trains, the trains carry passengers (or freight). This three dimensional aspect creates additional interfaces, additional failure modes and additional risks. It also introduce human factors as a real component influencing system performance.
- The interfaces operate at physical, operational, organisational and obligation boundaries. Any system operation concept must recognise this complexity. In particular there are many technical dimensions to the system and interfaces as well as the commercial and operational considerations in capacity management.

### 2. **Passengers and freight as the focus**

- The system operator consultation emphasises capacity. This is an important consideration in a growing railway. However, a passenger focus would promote a broader system concept. In many infrastructure networks, such as energy, capacity is the primary focus, but electrons have no concept of punctuality and customer experience. With high utilisation of the network, capacity cannot substitute as a measure for customers. A system operator model should consider the measures that are used to align incentives that combines both capacity and performance (such as '000s of passengers delivered on time: the London Underground measure of Lost Customer Hours focuses attention on passenger experience during delays).

### 3. **An independent, whole system approach**

- For a safe and efficient railway it is essential for a whole system approach. Costs and risks can be transferred across interfaces. Therefore all parties across infrastructure managers, train and freight operating companies, rolling stock supply companies and suppliers and contractors must be engaged in collaboration.
- The system operator functions must be independent of any single part of the railway, not only to provide commercial impartiality, but to provide diversity of perspectives in managing costs and risks and to build trust and confidence across the system.

## Appendix 1 Role of RSSB and its functions – Correction in relation to consultation

### Bringing the industry together to collectively resolve challenges and improve

Through research, the understanding of risk, and analysis, RSSB helps the rail industry in the areas of safety, standards, knowledge and innovation.

RSSB supports a wide range of cross-industry topics requiring its knowledge and independence. RSSB is an expert body with a wide compass of knowledge, skills and experience.

RSSB is part of the industry, non-profit-making and independent of any commercial interest. It spans the whole system, including in our membership infrastructure companies, train and freight operators, rolling stock owners and suppliers.

RSSB is also involved in cross-industry research and innovation activities such as the development of the Rail Technical Strategy; and is an industry leader in risk analysis and safety performance reporting. Therefore, any decision on changes to assets or operations to enable increase in capacity and any trade-offs with safety, or new research and innovation to understand factors affecting capacity, is likely to involve an input from RSSB.

The consultation only recognises RSSB's input to the system operation functions under standards, suggesting that RSSB produce 'safety standards' for the industry, and only produces Railway Group Standards (RGS). These are one type of standard RSSB manages on behalf of the rail industry and the State; they contain national rules (rules imposed by the State) for the GB mainline railway system. These rules mainly relate to ensuring technical compatibility between railway subsystems by developing standards related to interfaces between them. Complying with RGSs does not guarantee safety.

RSSB also produces, supports, influences and provides advice on a wide variety of rail-related standards from EU regulations like Technical Specifications for Interoperability (TSIs), European Standards (ENs), Rail Industry Standards (RISs), National Operations Publications (NOPs) such as the Rule Book, and Rail Industry Guidance Notes (GNs). RSSB also provides help and advice to its members on regulatory matters as necessary; especially in the areas of interoperability and safety, as well as technical and analytical support to national programmes such as implementation of ERTMS and GSM-R.

Figures 4 and 5 illustrate how RSSB brings the industry together and influences improvements on the railway.

Figure 4: How RSSB fits into the complex map of railway industry actors leveraging collective industry judgement through RSSB managed collaborative structures

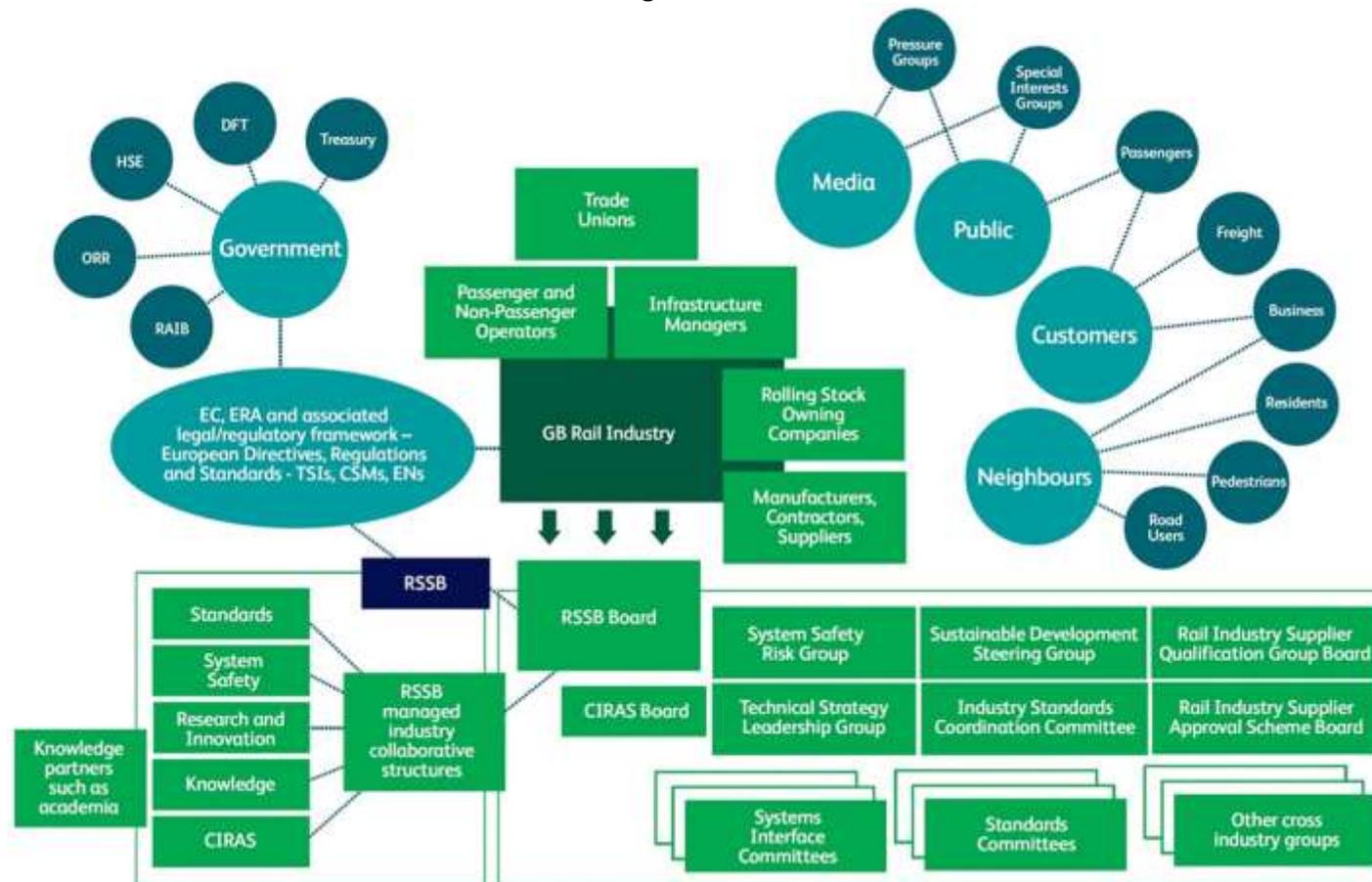


Figure 5: How RSSB works and influences improvements on the railway

