civity Management Consultants

Review of Network Rail's Supply Chain Management

Final Report

Office of Rail Regulation

Hamburg, May 2012

civity Management Consultants

Content

Glossary

AM	Asset Management; organisational unit of Network Rail
C&P	Contracting and Procurement; organisational unit of Network Rail
CAF	Cost Analysis Framework
CEM	Cost Efficiency Measure
CP3	Control Period 3 (2004-2009)
CP4	Control Period 4 (2009-2014)
CP5	Control Period 5 (2014-2019)
DIME	Project of Network Rail for improving capital programme delivery
EID	Efficient Infrastructure Delivery; 18 transformational change projects in Investment Projects, Asset Management and National Delivery Service (CP4)
FTE	Full-time equivalent/employee
FTN/GSM-R	Fixed Telecom Network / Global System for Mobile Communications-Railway; project delivery unit of Network Rail
GRIP	Governance for Railway Investment Projects; standard for managing and controlling railway projects (in 8 stages)
IIP	Initial Industry Plan
IP	Investment Projects; project delivery unit of Network Rail; will be replaced by "Newco"
KPI	Key Performance Indicator
LCC	Life Cycle Costs
NDS	National Delivery Service; procurement unit of Network Rail
Newco	New projects delivery organisation of Network Rail; operating as a legal entity
NR	Network Rail
Opex	Operating Expenditure
ORR	Office of Rail Regulation
PR08	2008 Periodic Review
PR13	2013 Periodic Review
RIA	Railway Industry Association
SCM	Supply Chain Management
TCO	Total Cost of Ownership
TOC	Train Operating Company

AM	Asset Management; organisational unit of Network Rail
VfM	Value for Money

1. Introduction

1.1 Background and objectives

In 2003 the Office of Rail Regulation commissioned a study to assess Network Rail's capability in supply chain management by comparing it to best practice from rail and other sectors, hereby systematically analysing different asset groups and central services. As a result the study identified a substantial savings potential in the order of up to 18% per asset group over a five year term, stating that "despite the long history of rail travel in the UK, the supply chain in Network Rail is at its infancy". By reviewing key processes and enablers a large number of findings had been identified, underpinning these savings.

Nine years later it is evident that Network Rail has taken various steps to move forward and to improve the organisation's supply chain management practices. Initiatives in the fields of human resource management, processes, performance, and supplier development have been launched to optimise the supply chain. This includes tender evaluations, career development, introducing performance indicators and especially commencing the establishment of a closer and more collaborative relationship with suppliers.

However, analysis undertaken in the context of Sir McNulty's Value-for-money-team in 2010 suggests that substantial room for improvement still remains. The expected benefit from better cost management in maintenance, renewals and enhancements of Network Rail’s infrastructure and asset base was estimated to be in a range of 10 to 30% of Network Rail's total annual spending level of £5 bn. The international cost benchmarking undertaken by civity also suggested that in general Network Rail's overhead structures seem to be binding more resources than it is the case in other asset intensive companies.

Also recently, Infrastructure UK commissioned civity to explore the root causes for total project costs of High Speed 1 which are considerably higher than in other Western European high speed projects. Based on a series of case studies and interviews the conclusion was that in the UK procurement, project management and delivery show a lack of efficiency and are not organised in an optimal way. Hence, there is quite some overlap with findings from other studies in the past. Whilst the diagnosis seems to be fairly clear, the challenge now lies in a determined and continuous process of transformation and change.

This review of Network Rail's supply chain management capabilities pursues the following major objectives:

- Determine to which extent the efficiencies identified in 2003 have been realised and what the remaining potential is;
- Evaluate the savings potential that can be realised "on top" in the course of CP5 (2014 to 2019) and;
- Underpin these savings potentials with specific recommendations and their benefit, considering international best practice.

This report reflects the findings of our analysis which has been based on a large amount of existing studies and documents, interviews held with Network Rail and external stakeholders as well as some international experience.

We would like to thank the ORR, all representatives of Network Rail and external parties who dedicated their time to this review and supported us with information and data.

1.2 Structure of the report

This report consists of seven chapters. In *chapter 2* we explain our approach and methodology. Guidance is given by an assessment framework that is consistent with many other studies undertaken before. We describe how internal and external analyses support our views on developments and improvements of Network Rail's supply chain management.

Chapter 3 intends to set the scene by providing an overview on Network Rail's current organisational structure and its procurement functions, volumes of spend in different organisational areas and the dimension of staff employed in procurement.

Key findings from the most important former studies on Network Rail's supply chain management are highlighted in *chapter 4*. We explain some of the most important initiatives Network Rail has started up or already realised. We look at savings potentials linked to initiatives and track them to the extent possible. In addition to financial values we tried to capture some more process and performance related indicators.

In *chapter 5* we assess where Network Rail is positioned in terms of good supply chain management and evaluate remaining opportunities. Network Rail's own maturity assessment as well as unit cost developments and forecasts are important elements to support this part of the study. We look at existing projections for CP5 and make our own assessment.

Finally in *chapter 6* we make recommendations which we believe are critical to success and should help to support Network Rail's extensive transformation programme. *Chapter 7* concludes our analysis.

Additional information on interviews held and documents reviewed can be found in the appendix.

2. Approach and methodology

2.1 Assessment Framework

Our assessment framework has been prepared to define the scope of supply chain management and to provide a comprehensive and well-structured approach to the analysis. It consists of two dimensions: the key processes of supply chain management as well as the crucial enablers and the asset groups/central logistics that supply chain management is applied to.

Our aim was to cover all asset groups forming the railway network. We also examined Network Rail's organisation procurement units in relation to these. Due to the fact that Network Rail has insourced a large proportion of their maintenance activities the main focus will be on the procurement related to renewals and enhancements. Since Network Rail also procures bulk materials, haulage services, recycling and other services through its National Delivery Service these logistics services will be assessed against the framework, too. Finally, there are professional services (IT, HR etc.) procured which need to be assessed as well.

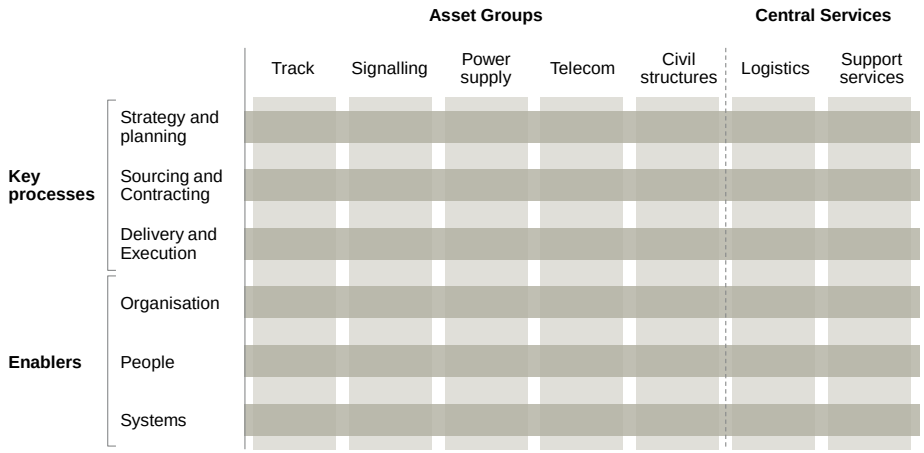


Figure 1: Assessment framework

Our review addresses elements of the following key processes and enablers.

Key processes:

- *Strategy and Planning:* this area determines how Network Rail's demand is profiled and how requirements are planned and specified
- *Sourcing and Contracting:* deals with the utilisation of markets, contractual set-up, the allocation of risks and the capability to negotiate
- *Delivery and Execution:* in this field we look at the management of existing contracts, including cost and progress as well as impacts on quality.

These processes are supported by three major enablers:

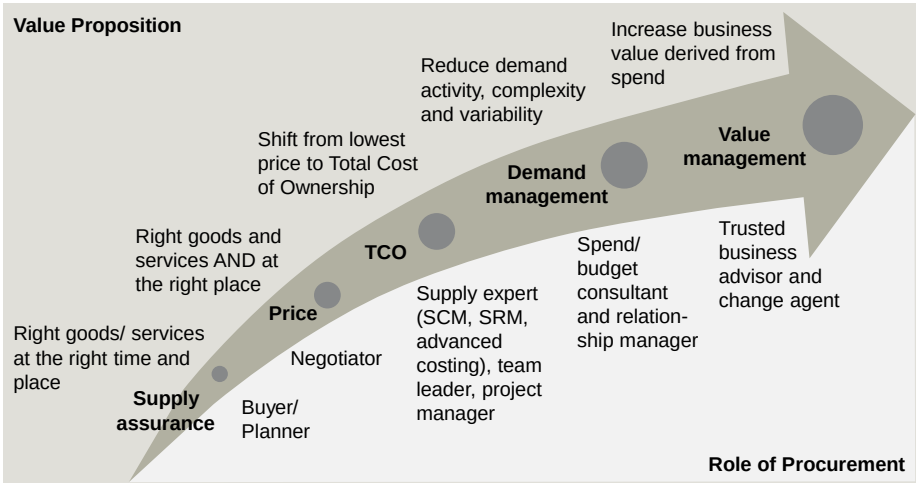
- *Organisation:* the organizational structure determines roles and responsibilities within the organisation
- *People:* supply chain management needs sufficient human resources in terms of qualification, motivation and quantity
- *Systems:* Information Technology supports processes and decisions, starting in the early determination of needs until commissioning new assets.

In the first phase of the project we have used this framework to assess Network Rail's practices, understand how they developed over time and how well they are positioned today. This part of the study was mainly derived from former reviews and studies and complemented by the experience that we have gained in our own supply chain management related projects.

Furthermore, we incorporated aspects of the future development of the railway system which will – as we learned – significantly impact supply chain management, e.g. the vertical alignment of infrastructure and operators, the devolution within Network Rail causing a reallocation of responsibilities etc.

2.2 The way to "world class" supply chain management

Becoming a "world class" supply chain management organisation can be described as a comprehensive process of transformation where an organisation is moving ahead on a development path which – in its early stage commences with procuring goods at lowest costs, prices – and gradually improves by adding more and more value to the business. This path implies fundamental changes as it does not only improve the value proposition of supply chain management but also requires procurement to play a new role, shifting from a "simple" buyer to a trusted business advisor and change agent.



Source: The Hackett Group, NR Strategic Sourcing Directs – Procurement Assessment Results, August 2011, p.19

Figure 2: Supply chain management development path

As illustrated in figure 2 the minimum responsibility of a supply chain organisation is to assure supplies, guaranteeing that the right goods and services arrive at the right time and place. More value for the organisation is generated though by introducing concepts like lowest total cost of ownership, managing demand by questioning traditional methods to build, renew and maintain, challenging the complexity of assets and reducing the variability of all investment activities.

As a consequence procurement staff need to dispose of an advanced skill set, enabling them to act as supply experts and relationship managers, bringing together asset managers and suppliers and developing solutions which are best fit to serve the company's strategic objectives. Furthermore, this requires a spirit, concepts, structures and tools which are quite different from a traditional role that procurement has played in past times.

In order to manage the necessary step-changes on the development path Network Rail needs to develop good practices in all three core processes of supply chain management. The graph below depicts some of the most important drivers to assure effective key processes.

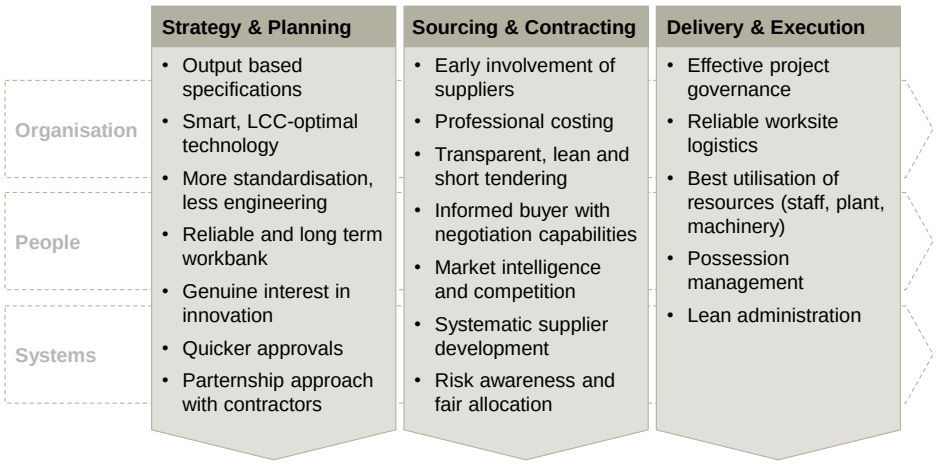


Figure 3: Effective key processes

These processes need to be supported by enablers such as adequate organisational structures, well trained and motivated human resources as well as tools and systems supporting decision making and managing routine activities. The main success factors of these enablers are shown in the illustration below.

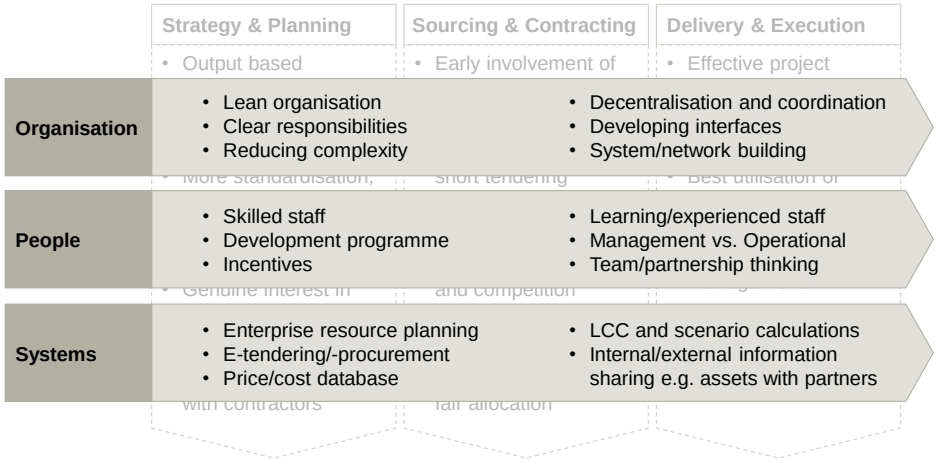


Figure 4: Effective enablers

In this review we intend to understand how Network Rail moves ahead on this development path, considering both qualitative evidence about the approach and specific activities to improve as well as quantitative data demonstrating the effects on Network Rail's financial performance (see illustration below).

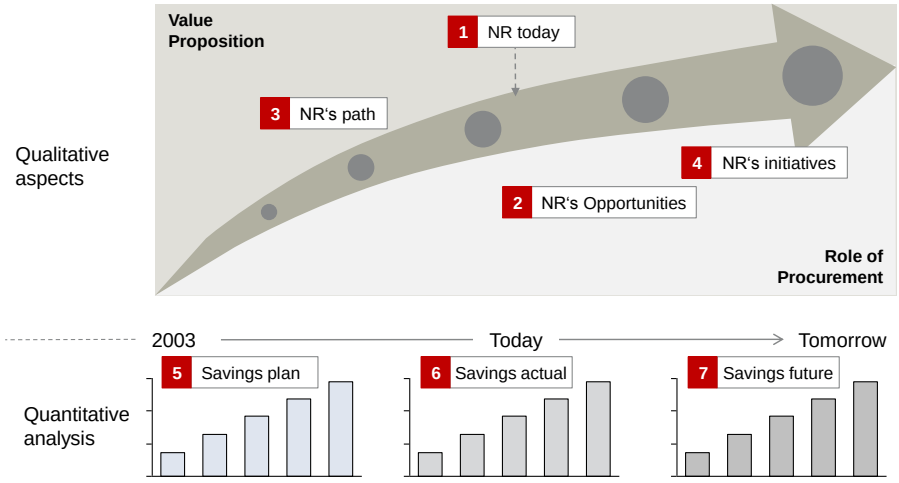


Figure 5: Analysis of Network Rail's development

Our guiding questions in analysing the process of transformation are:

1. Where is Network Rail's position today? How mature is the organisation based on self-assessments, benchmarks, internal and external analysis?

2. Based on Network Rail's current status: where are the gaps to "world class supply chain management"? What opportunities still lie ahead?

3. How does Network Rail embark on the development process? Where does the organisation see its priorities?

4. What are Network Rail's specific initiatives to make progress? To what degree have they been developed and implemented? What remains to be done in CP5?

5. What savings had been projected for CP3 and to what extend have they been realised?

6. How does Network Rail close the current efficiency gap? How much of the gap relates to supply chain management? Will Network Rail achieve its goals and deliver according to plan?

7. What are the supply chain related savings predicted for CP5? Are they supported by specific activities and sufficiently ambitious?

2.3 Internal and external analysis

We have based our analysis on a large number of studies which have been commissioned by Network Rail and the ORR since 2003. Among these are benchmarking studies, maturity assessments, efficiency reviews, presentations to stakeholders etc. An overview on the results of these studies is given in chapter 4.1.

We have endorsed this wealth of information by a sequence of meetings with Network Rail's management staff who provided additional information on structures, staff, savings, trends, developments and initiatives.

As supply chain management to a great extent deals with external organisations we had some meetings with industry representatives such as the Railway Industry Association (RIA) and British contractors. The Head of Procurement at Deutsche Bahn gave us insight into the improvement programme of his organisation. Chapter 5.1.3 has been dedicated to the essentials of these meetings.

Detailed information about documents and interviews used can be found in the annex.

3. Network Rail's supply chain organisation

3.1 Organisational structure

Before discussing Network Rail's supply chain development it seems worthwhile gaining some insight into the way the company is structured and where procurement takes place in the organisation. This is especially important as Network Rail intends to carry out some structural reforms which will affect the allocation of tasks, accountabilities and collaboration both internally and externally.

Today Network Rail's procurement activities are allocated to Group Finance, Investment Projects and Asset Management. The following graph depicts the first and second organisational level. The red framed divisions are in charge of spend and equipped with procurement resources.

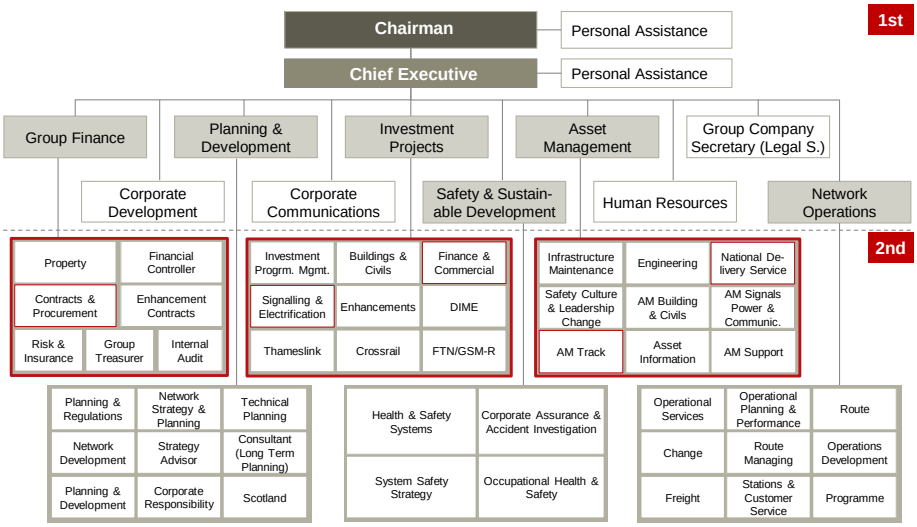


Figure 6: Network Rail's organisational structure

Contracts and Procurement reports to Group Finance and is in charge of sourcing direct goods and services like On Track Plant and Contingent Labour as well as indirects like Recruitment Services, Human Resources, IT and Telecoms and Utilities.

The largest procurement organisation can be found in "Investment Projects" (IP), being accountable for renewals in signalling and electrification and

FTN/GSM-R, enhancements and large-scale investment projects such as Thameslink and Crossrail. Procurement functions such as supply market analyses, procurement management and claims & estimating are carried out within the Head of Finance & Commercial team.

The second largest procurement unit is in Asset Management (AM). Both in Asset Management Track and in National Delivery Service (NDS) we find procurement functions (contracts & procurement). NDS procures commodities like ballast, sleepers, rail and road fleet, on-track machines and logistics. Asset Management track procures track related renewal works.

As of today the regions, belonging to Network Operations, only execute limited procurement tasks.

Although Network Rail has introduced a process led organisation a few years ago the organisation is currently not satisfied with the way accountability is allocated and intends to concentrate responsibility more on a route level. In fact, today this responsibility is split between IP, AM and the routes.

3.2 Spend

The business units described are accountable for different spend categories and show very different spending levels. The figure below illustrates how much business units spent by category in 2010/2011.

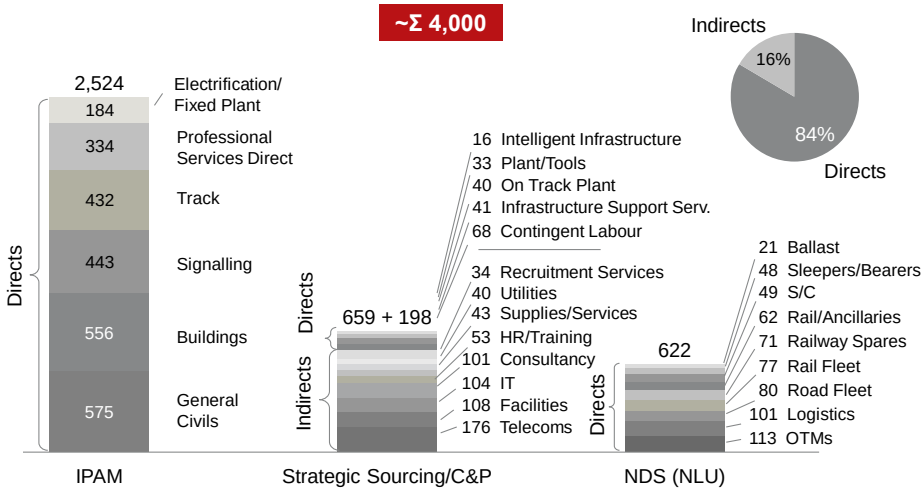


Figure 7: Network Rail's spend by organisational unit

Clearly IP and AM spend most of the £4.25 bn procured in 2010/11. Being responsible for large-scale enhancements and renewals IP and AM account for £2.5 bn, procuring directs to carry out projects such as Crossrail, Thameslink, the National Electrification Programme, Resignalling and the new headquarters at Milton Keynes.

Strategic Sourcing spends ~£0.9 bn (including telecoms and IT) on directs such as plant, tools and labour as well as indirects which are services provided to all other business units in Network Rail. NDS is in charge of procuring directs such as rail, sleeper, ballast and fleet and to take care of logistics, spending ~£0.6 bn.

The internal client-supplier relationship matrix gives an impression of spending flows between organisational units. Headquarters buy mainly indirects (IT, HR, consultancy etc.) which are procured by the central procurement department C&P. IP/AM do most of the sourcing (£2.5 bn) through their own procurement organisation, other directs and indirects are obtained from NDS and C&P. The routes receive goods and services to carry out their maintenance and operations mainly from Strategic Sourcing, IP/AM and NDS.

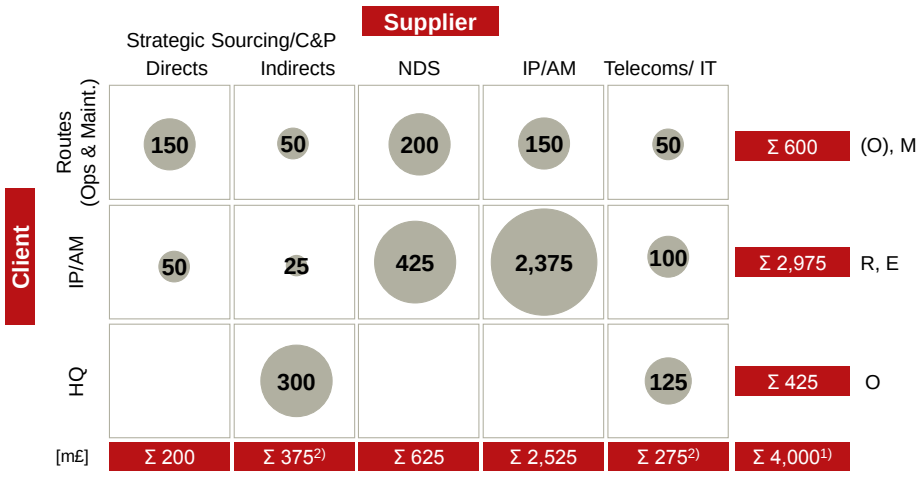


Figure 8: Supplier-client-matrix

3.3 Staff

Of course, the weight of the business units dealing with procurement is not only characterised by volumes of spent but also by human resources employed.

Today 696 FTEs support the procurement functions. As the following graph illustrates they fulfil functions such as Operations & Compliance Processes, Sourcing & Supply Base Management, Operations & Compliance Processes as well as Function Management. 91 FTE are employed in Strategic Sourcing, 67 in NDS and the majority of 433 in IP/AM. Another 50 FTE work for the National Electrification Programme (NEP) and 55 FTE in Strategic Sourcing of indirects. The numbers are somewhat "dynamic" as Network Rail is in the process of downsizing staff.

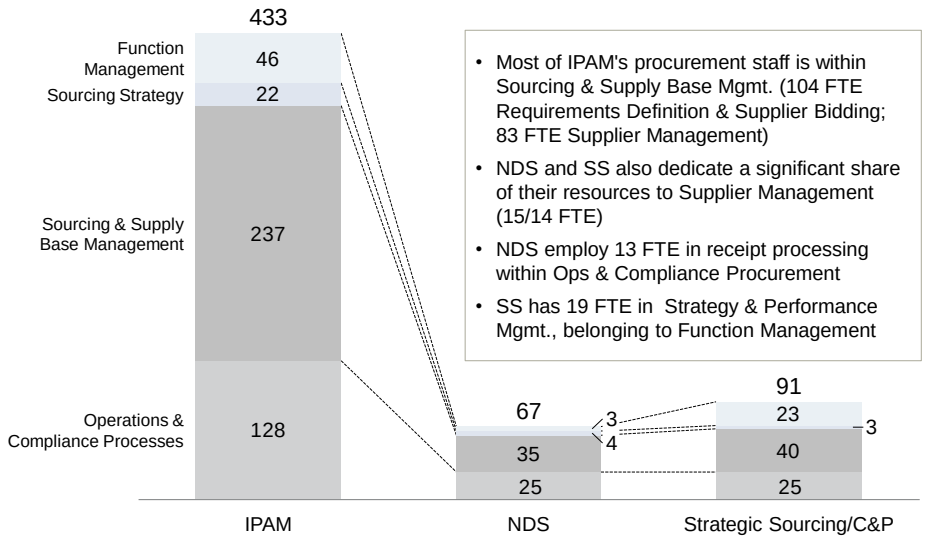


Figure 9: Headcount procurement (FTE) in directs

International comparisons lead up to the conclusion that Network Rail's annual labour costs per FTE are less than peers or even world class. However, comparisons by function and a closer look at distribution by band levels reveal a higher level of operational staff. There is a suggestion that Network Rail should reduce the volume of staff in favour of staff with a higher qualification[1].

[1] Hackett: NR S.S. Directs, Aug 2011, p. 13; NR's Hackett response to ORR, Jan 2011, p. 26

3.4 Summary

The essentials of this introduction into Network Rail's supply chain organisation are:

- Network Rail spends about 80% of its total budget on directs such as investment projects, materials and plant.
- 95% of these directs are spent by IP and AM (NDS), the majority of which is in IP.
- The £2.7 bn spent by IP are mostly procured by their own procurement staff which sits in central functions such as Head of Commercial or in business units managing investment projects.
- This is reflected in staff numbers: whilst C&P and NDS accumulate 25% of total procurement staff, the majority of 75% is allocated to IP.

Based on these facts we think it is obvious that opportunities for improvement should predominantly be sought within IP and AM. Thus we emphasized on staff, spend and practices in these units, of course without disregarding the importance and progress made in other parts of the company.

4. Network Rail's supply chain development in CP3/CP4

4.1 Key findings from former analysis

Since 2003, various consultancies have been commissioned by Network Rail and the ORR to undertake analysis related to supply chain management issues. These reports are based on the following methodological approaches which:

- Analyse different aspects of Network Rail's supply chain management processes, formulate recommendations to improve and quantify savings;
- Benchmark the organisation or business units, e.g. "Contracting & Procurement" and the National Delivery Service against peer groups and best practice to show opportunities for improvement; and
- Build on experiences and findings from internal and external surveys like jointly carried out supplier perception studies, offering feedback from Network Rail's stakeholders and partners.

Overall, the material we have considered shows a clear picture of Network Rail's supply chain management capabilities and its development over time. Our observation is that there does not seem to be a "lack of diagnosis" of findings and opportunities.

One of the earliest relevant studies on supply chain management was carried out for Railtrack by McKinsey in 2000. They identified a complex and non-integrated supply chain organisation that had led to numerous weak points. Key issues were planning uncertainty, cost escalations, high tendering costs, low site productivity and a lack of technological innovation. Unit cost models were missing and information systems as a requirement for the implementation of budget control mechanisms were deficient. The analysis recommended the introduction of category strategies, improving supplier management processes and performance management. McKinsey also described the need to boost important enablers, for example by strengthening people's skills and competencies.

Figure 10 shows the most important studies which have been undertaken since 2003. The reports stretch over control periods 3, 4 and 5 and have different focus areas with regards to direct/indirect spend, the consequences on effectiveness and efficiency and the parts of the organisation covered (Investment Projects, National Delivery Service, Strategic Sourcing, Asset

Management Track). In 2010 and 2011 various benchmarking projects helped to position Network Rail and identify gaps in efficiency and effectiveness. Below is a brief description of the most important reports and their key findings.

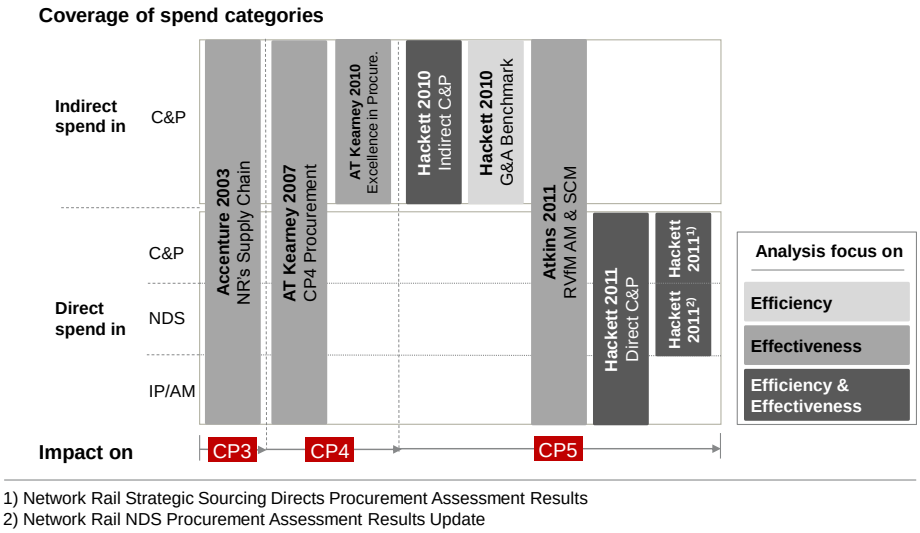


Figure 10: Key reports and studies

Accenture's review carried out in 2003 was commissioned by the ORR to validate the efficiency assumptions for Control Period 3. It is noted that many of McKinsey's issues and findings were raised again as opportunities for improvement. The report identified supply chain efficiency savings potentials of 18% in total. This figure included 9% efficiency savings out of current initiatives and 9% additional savings that could be delivered based on best practice in supply chain management.

In 2007, Network Rail commissioned AT Kearney to carry out the "CP4 Procurement Opportunity Assessment". The consultants reported a savings potential of 3.6% per year, i.e. 18% for CP4 in total, which was driven by project spend opportunities in all asset categories as well as commodity spend opportunities. A comprehensive strategic analysis had been carried out for all commodities and opportunities had been identified and quantified for each category in order to reduce cost. The initiatives that were considered to unlock savings in project spend were mostly equal to what had been set out in the before mentioned studies. In March 2010, AT Kearney again reviewed Network Rail's position[2]. The conclusions were that Network Rail had put in place key

[2] AT Kearney: 2010 Assessment of Excellence in Procurement (AEP Study), March 2010

initiatives since 2007 and completed a number of them. This time in a comparison of various supply chain dimensions against a reference group Network Rail scored much better, exceeding the reference group average in most dimensions but being behind the reference group leading companies. Reading the detailed recommendations, a number of significant findings from the past were still unresolved ("C&P is a black hole, multi-year procurement plans do not exist, no resource within IP/AM to focus on the category management role …").

As part of Sir McNulty's Value for Money study Atkins identified opportunities for Network Rail to move to a "World Class Supply Chain Manager". Atkins projected substantial savings potentials for CP5 which are derived from better cost management, smoother demand management, simplified demands and reduced overheads[3]. The report picks up a number of details relating to Network Rail's current practice, demonstrating progress in some areas as well as highlighting various findings which still require action.

In 2010 and 2011 Network Rail has mandated The Hackett Group to benchmark efficiency and effectiveness of its procurement units, distinguishing between directs and indirects. Network Rail was compared to a similar peer group and to world class companies. Some of the key results were:

- Indirects procured by Strategic Sourcing:

  Strategic Sourcing's efficiency was close to the peer group with only a small gap in staff employed. Effectiveness was also considered to be good with some weaknesses like too many suppliers failing in performance, too much time spent on data collection rather than analysing data.

- Directs procured by Strategic Sourcing:

  The benchmark revealed some savings potentials to increase efficiency by reducing staff and becoming more productive in supplier, internal customer and performance management. Effectiveness was rated as high since 95% of spend is covered by formal sourcing strategies. All of the spend is directly influenced by procurement and savings made by procurement are comparatively high.

- Directs procured by National Delivery Service:

  In many dimensions of effectiveness NDS is close to performance of the peer group. Concerning efficiency, total cost and the full time employees are below the peer group median and should be improved.

[3] Atkins: Asset Management and Supply Chain Management Assessment of GB Rail, 2011, p. 62

- Directs procured by Investment Projects and Asset Management (Track):

  Efficiency and effectiveness have been rated the lowest in these units: "From an efficiency perspective Network Rail direct procurement has a significant opportunity for improvement in functional efficiency with a significantly higher headcount than peer and world class …"[4] Whilst the other benchmark studies used various measures to assess Network Rail's comparative position in terms of effectiveness, this report does not include any quantitative evidence. This is due to the fact that Network Rail does not measure cost savings, performance of key suppliers etc. Hackett scored Network Rail as poor and ranked the IP/AM procurement performance very low. Hence, Hackett concluded that IPAM "has the opportunity to achieve significantly increased spend effectiveness and cost savings".

As part of the Value for Money study an assessment of progress in supply chain management had been requested[5]. Structurally it follows the logic explained before, looking at initiatives in core processes and enablers. The figure below illustrates the study's key findings at a glance: from the author's point of view it has taken a long time for Network Rail to make demonstrable progress but we can see a step change from 2008 onwards.

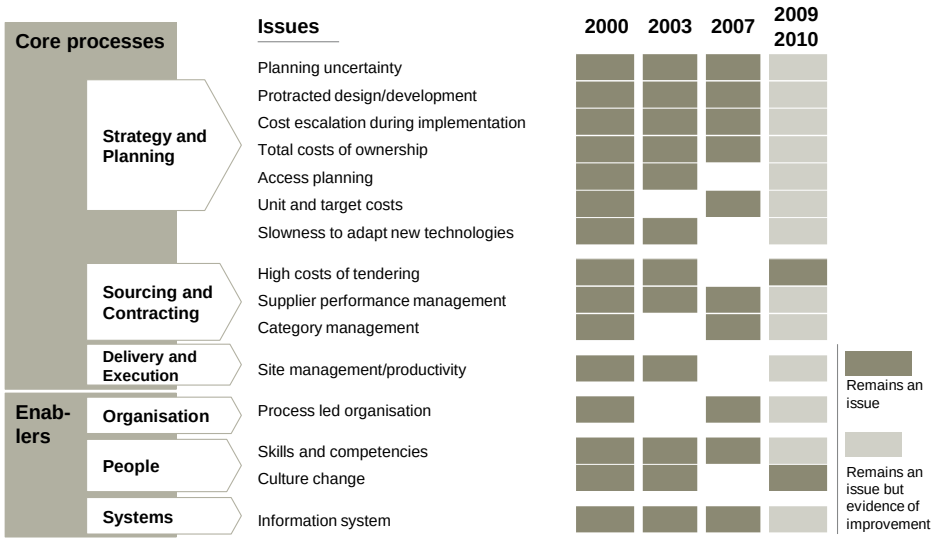


Figure 11: Progress in supply chain management

[4] The Hackett Group: Network Rail Direct C&P Benchmark Results, 7 March 2011
[5] Adventis: Transformational Change in Network Rail, March 2011

Since then – as we will explain further below – Network Rail has set up a comprehensive transformation programme named "Efficient Infrastructure Development" to close the efficiency gap. The purpose of this is to improve cost estimations and unit cost modelling, category management and developed a new organisational concept. The study also clearly points out that the slow pace of change is also due to the underlying difficulties with cultural change in a large organisation. Many of the issues are "closest to the coal face of the business and require the most amount behavioural and cultural change to deliver"[6].

4.2 Network Rail's initiatives for improvement

In order to improve its supply chain management Network Rail has developed a number of initiatives, starting in CP3 and reaching into CP5. The graph below illustrates the ones which we have identified as being the most important ones. They address several core activities of the value chain such as better cost planning, a new approach to working with contractors, a more strategic approach to sourcing goods and services etc.

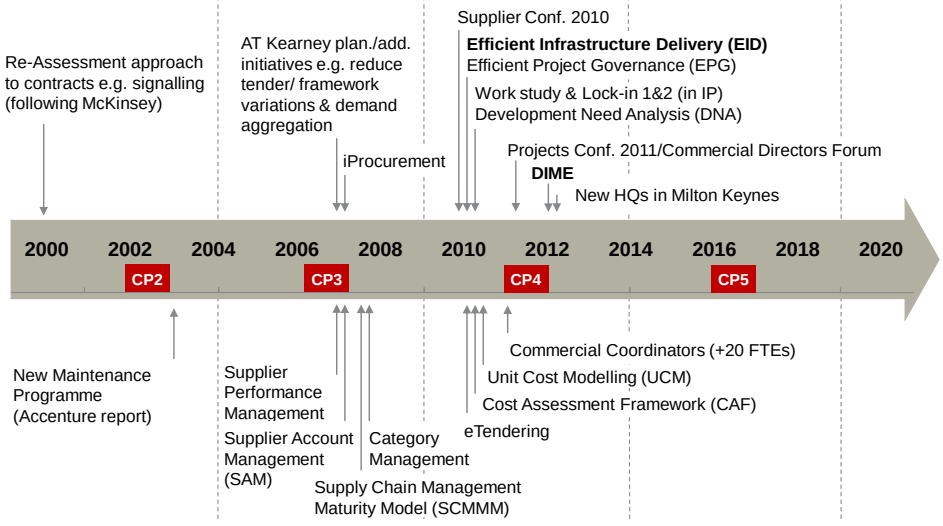


Figure 12: Network Rail's supply chain management initiatives

Some of the more recent activities aiming at different objectives are:

[6] Adventis: Transformational Change in Network Rail, March 2011, p.14

- Supplier Account Management (SAM), Supplier Performance Management and iProcurement to better manage core functions in sourcing and procurement.
- PRISM is a means of scoring suppliers' performance and feed SAM meetings on high performing/underperforming projects; it will be incorporated into the supplier selection process once a robust body of data has been collected.
- Category Management which was introduced to develop sourcing strategies for goods and services procured and to reduce purchase prices.
- The introduction of a "Supply Chain Management Maturity Model" to assess the maturity of supply chain management.
- Efficient Infrastructure Delivery (EID) which is a programme consisting of 18 initiatives to close the efficiency gap of 21% in CP4; about half of the initiatives and more than 50% of its savings potential relates to supply chain management.
- The supplier conference held in 2010 which has been superseded by quarterly meetings with directors of the top 30 suppliers (“Commercial Directors Forum”) to create a better collaboration with them.
- Unit Cost Modelling and Cost Assessment Framework which are instruments to enable staff at Network Rail to deliver more robust and dependable cost estimates.
- In late June 2010 NR decided to issue its own IPAM C&P Work-study survey to approximately 750 IPAM commercial staff and map the responses to the relevant elements of the Hackett functional structure. The work-study and further reviews have been undertaken from June to September 2010 to gain better insight into the allocation of staff resources to SCM activities. They led to a reduction of procurement staff and will result in further reductions.
- DIME programme which aims to provide a more collaborative approach with suppliers, a more commercially oriented set-up of IP (Investment Projects) and the transfer of accountability to the routes.

The most relevant planning initiatives are Efficient Infrastructure Delivery (EID) and DIME which will be assessed more in depth. They seem to have the highest impact on Network Rail's performance and tackle some of the most critical issues in supply chain management that have been discussed for many years.

Efficient Infrastructure Delivery (EID)

EID has been set up at the beginning of CP4 "to deliver a transformational programme that enables a sustainable step change in how Network Rail develops and delivers its Capex and Maintenance programme over CP4"[7]. Its 18 transformational change projects affect performance of IP, AM and NDS. The projects have been transferred into the ownership of the business units and are centrally controlled.

EID is an important programme as it addresses some of the most critical points that have been mentioned in almost every analysis. Among those are better workbank planning, creating more visibility and stability of planned works, stricter budget and contingency control and value management to deliver output oriented and fit for purpose solutions.

DIME

DIME and its measures to create a new way of co-operation with suppliers are very recent developments which have also been articulated by stakeholders outside of Network Rail. There has been a large push to get DIME off the ground over the last 18 months, which has been confirmed by our interview partners.

Project DIME is one of the most important changes which are currently underway. Changes coming through DIME are aimed at competition, innovation and closer partnerships to deliver capital projects more competitively and efficiently. It represents a fundamental shift in accountability, transferring decision power to the routes, establishing a "Newco" instead of today's IP and redefining the working relationship between them, creating informed buyers on the one side and a competing internal company on the other side.

A partnering strategy including seven new engagement models should provide a stable platform for Network Rail's new collaborative approach with suppliers. In addition, a consultancy shall be established which will provide wider services (not just IP) to international clients. Network Rail believes that the best way to demonstrate that Network Rail is innovative and market competitive with its international counterparts is for it to directly compete against them.

According to Network Rail's planning the project is in phase 3 "programme delivery" and will be implemented in April 2012.

[7] Network Rail: Efficient Infrastructure Delivery (EID) Overview, October 2011

Project DIME has been created to improve today's situation which has been characterised as follows:

- The organisation is asset driven on a national basis (track, signalling etc. in HQ);
- At the moment the routes have limited procurement capabilities (limited to some commodities);
- IP acts as an internal monopoly delivering projects;
- IP is ineffective with a high level of overhead (see Hackett);
- Work allocated to IP is not following a controlled, and uniform engagement framework;
- Requirements are rather input oriented, resulting in claims, cost and time overruns.

The future situation shall look quite different, defining clear interfaces and relationships and setting up a market environment for Newco to operate in:

- Accountability will be transferred to the routes including all assets
- Procurement functions in routes will be extended and qualified so they can act as clients
- IP will be set up as a separate entity with a profit and loss culture and capable of bidding, winning and safely delivering work
- IP will be competing with external organisations and can lose work (commercial environment)
- IP shall become a leaner organisation and more effective deliverer of projects
- Allocated work is more formalised and managed as contracts
- Requirements shall be output oriented and remain fixed during delivery, GRIP stages cut clearer and contractors involved earlier
- Newco's organisational structure will be aligned to the regional structure which is already existing on route level (see figure 13)

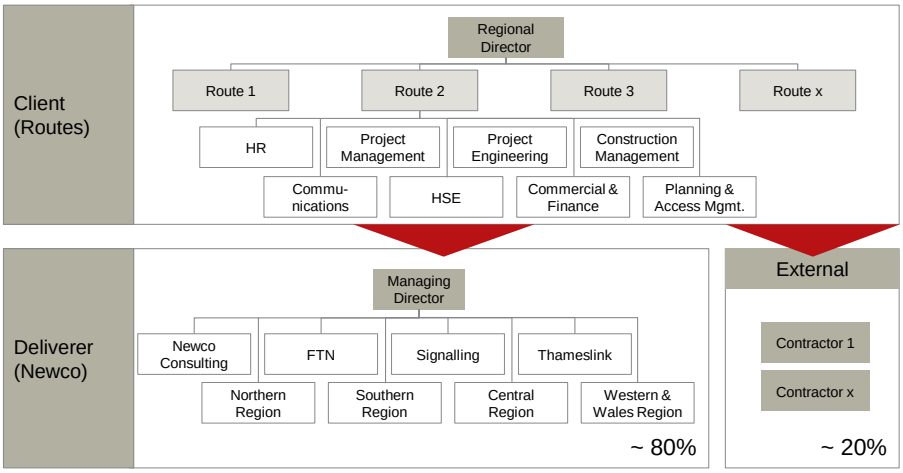


Figure 13: Structure of routes and Newco

Network Rail intends to develop competition gradually by initially only contesting up to 20% of low risk works. At the moment pilots have been established to test the new model.

Further cost reduction among Network Rail's suppliers shall be encouraged by sharing of information, longer commitments and incentivised contracts sharing gains. Network Rail has just started this approach, e.g. by establishing a Fair Payment Charter with thirty strategic key suppliers and sub-contractors to improve payment terms and provide greater certainty in terms of business planning.

New framework agreements for signalling projects becoming effective from April 2012 document Network Rail's greater focus on partnership with their suppliers. Recently Network Rail has announced these new agreements of up to seven years, covering the rest of CP4 and the whole CP5. Network Rail says that these arrangements are made to meet future efficiency targets through further reductions in unit costs. "The length of the agreements, coupled with a visible workload, will provide much-needed stability throughout the supply chain and drive further cost savings and innovation across our signalling renewals and enhancements activities."[8]

According to Network Rail, part of the business case for DIME is that the opex headcount reduction for April 2012 is a reduction of 470 FTE's whilst delivering

[8] Network Rail: NR announces £1.5 bn framework agreements, 13 Jan 2012

an increased workbank by £400m. This results in a net annual benefit of £60m which is a 22% opex reduction in IP. 2013 is targeted with a further 400 FTE reduction on a like for like workbank basis. Whilst the additional benefits cannot be quantified, the expected additional benefits are expected to come from better/fixed output specifications, earlier supply chain engagement, increased innovation and greater competition.

The consultancy business shall gradually deliver a turnover from £2.0 m in financial year 2012/13 up to £30 m in 2018/19.

DB has chosen a similar model in 2003 when "DB ProjektBau" was established. The company is a legal entity within the holding and manages construction projects for DB and other clients. The volume of projects managed by its 3,700 employees is up to £2.6 bn per year. In 2012, IP will be delivering £3.55Bn with 3,850 FTE's..

The project is not free of risks as it requires a very different culture than today which needs to be developed through an appropriate change management programme.

4.3 Savings potentials and benefit realisation

It was part of our remit to explain the savings potentials identified in each control period and to assess the realisation of benefits. In this context, we also looked at the way savings are tracked and measured.

4.3.1 Tracking benefits

As described above Network Rail has launched a number of initiatives to improve its capabilities. To be able to follow up the benefits of single initiatives they need to be monitored and controlled on a regular basis. We understood that a more systematic approach to controlling the benefits has mainly been developed in CP4 while the realisation of targets provided by Accenture in 2003 for CP3 has not been followed up.

In many of the former studies a distinction is made between the efficiency of SCM and its effectiveness. Efficiency is asking the question "Could Network Rail buy its goods and services with less staff/procurement cost?" Effectiveness is asking "Could Network Rail buy more with the same budget?"

Tracking efficiency

Efficiency is mainly measured by looking at the development of overhead cost. Since these costs are largely staff driven headcounts (measured as FTE) are a useful indicator. The Hackett Benchmarking reports benchmark Network Rail's staff against the peer group. Based on these benchmarks Network Rail recently developed its own functional structure and analysed how many FTEs are allocated to different functions in procurement. "Lock-in 1" and "Lock-in 2" in IP were internal exercises taking a critical view at staff resources and resulting in large headcount reduction plans.

Tracking effectiveness

Effectiveness is more difficult to measure but, it has a much higher impact. The addressable cost base for efficiency is mainly staff plus some additional cost. Looking at approximately 600 people in procurement the cost base is around £40 m. The cost base for effectiveness is the budget for all goods and services procured which at £4 bn is a hundredfold. Hence a clear focus should be on following up measures in respect of effectiveness.

To determine Network Rail's position of effectiveness against an international peer group Hackett has used indicators such as:

- Number of suppliers
- Spend covered by formal sourcing strategies
- Spend influenced by procurement
- Cost reduction savings/avoidance as % of total spend

For IP and AM, Network Rail's largest business units in terms of spend, Hackett could not build their assessment of Network Rail's effectiveness by benchmarking the above mentioned indicators – the necessary data were not available. In contrast, the data was available for NDS and Strategic Sourcing which are accountable for much lower spend. Hackett was able to estimate IP/AM's SCM effectiveness as being very low which reinforces the need for a substantial improvement in this area.

Tracking cost

A broader view of the development of effectiveness would be supported by looking at unit cost or activity cost. They are partially driven by supply chain related functions and benchmarking unit or activity cost shows where Network Rail stands in an international context. In CP4 Network Rail has undertaken

various international studies to analyse the competitiveness of its unit and activity cost and we have used some to assess Network Rail's progress.

We have asked for the development of unit cost over time and have been directed to the responsible asset managers: We have collected various pieces of work for example from track and civil structures which clearly show the large potential which still lies ahead of Network Rail.

Tracking single initiatives

A fourth way of measuring Network Rail's supply chain development is reporting and monitoring on single initiatives. This is done regularly for the EID programme. Other initiatives though have not been assessed financially. We have asked, for example, for the effects of DIME which should mark a step change in Network Rail's supply chain management capabilities. We have discussed some headcount reduction and received future revenue forecasts generated by the new consultancy business.

4.3.2 Savings in CP3

In CP3 Accenture had undertaken an estimate of savings potentials covering all spend, covering renewals and maintenance in Network Rail's "main market sectors" (track & electrification, signalling and telecoms, structures and operational property). Furthermore, the study identified savings for professional services and National Logistics Unit (NLU, National Logistics Unit is now NDS)[9].

As shown in figure 14 the potential for CP3 was estimated to be 18% on a total initiatives basis, which corresponds to annual savings of £165 m.

[9] Accenture: Review of NR's Supply Chain, 11 July 2003

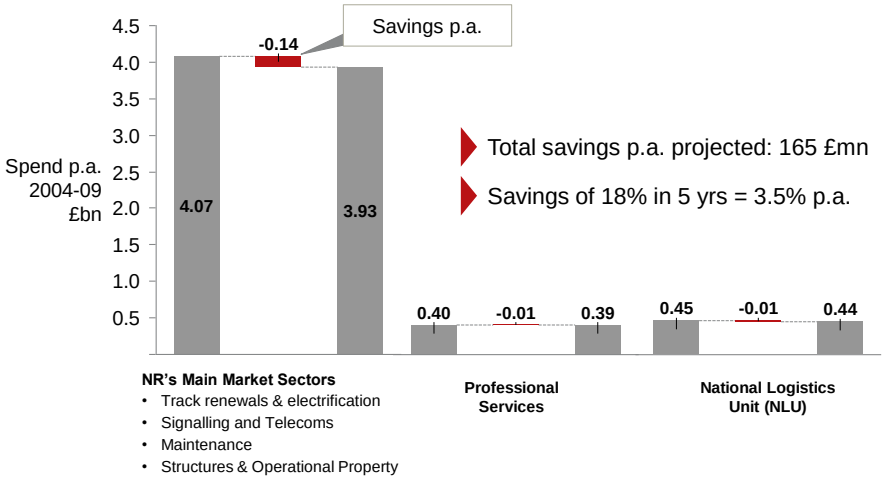


Figure 14: CP3 savings potentials

As highlighted in chapter 4.1 several of the findings reported by Accenture are still live issues and are being addressed by Network Rail. It is not transparent to what extent the savings made in CP3 relate to supply chain management and how the recommendations made by Accenture contribute to savings. According to Network Rail these savings were not tracked.

4.3.3 Savings in CP4

In 2007, AT Kearney had undertaken an efficiency review of Network Rail's procurement effectiveness relating to spend on projects and commodities. Savings related to a cost base of £3.2 bn and were calculated to be £166 mp.a.[10] Enhancements were not in scope.

[10] AT Kearney: CP4 Procurement Opportunity Assessment, Main Report Update, 30 October 2007

	Total spend (2006/7 in GBP m)	Thereof		Total savings	
		Project spend	Commodities	as % of total spend	in GBP m
Renewals	2,241	1,238	541	5.3	119
Maintenance	1,146		718	2.1	24
Opex	1,213		613	2.1	25
Total	**4,600**	**1,238**	**1,872**	**3.6**	**166**

Excludes commodities and project spend for WCRM and enhancements (116 + 811 = 927 m GBP)

Excluded:
- Miscellaneous
- Non procured (128)
- Spend (1,361)

Source: AT Kearney, CP4 Procurement Opportunity Assessment, Main Report Update, 30 Oct 2007

Figure 15: CP4 savings potentials

We have received an overview on the benefits achieved in reducing spend on commodities which was driven through category management and demonstrates that Network Rail has made savings in the order of magnitude that had been projected by AT Kearney. The measurement is based on the concept of Network Rail's "Benefit Realisation", established in 2007 and applied to calculate and validate the "benefits arising from sourcing activity"[11]. These benefits are composed of pre-contract benefits and post contract benefits. Hence, they are an indication on how effective Network Rail's procurement is. However, it is unclear if Network Rail spends the money on goods and services which create maximum value to achieve the company's strategic goals nor do they indicate if for example projects were delivered at planned cost.

The fact that Network Rail seems to have realised these benefits underlines the impression that at the beginning of supply chain management initiatives the focus was on improving core functions in sourcing.

In contrast to commodities, it is not clear if savings on project spend have been made as predicted. According to Network Rail there is no transparency and tracking of these savings which should be delivered through IP and AM ("black box").

The bulk of supply chain related savings in CP4 is expected to be delivered by Network Rail's programme "Efficient Infrastructure Development". The

[11] Network Rail: Benefits Realisation – Guidance Note, Version 8, October 2010

programme picks up a number of issues that were raised in the AT Kearney study, for example the development of standard designs, providing suppliers with accurate and robust pipeline visibility and continuous learning impact on schedule of rates / project costs. We cannot see how many of the contractual issues raised by AT Kearney and leading to project opportunities have been included in EID initiatives. Among those were reductions of tender and framework variations, an optimised balance between usage of framework agreements vs. competitive tendering, a move to target costing from fixed price lump sum and include incentives such as bonuses to deliver on-time etc.

	EID No.	EID Description	P6 2011/12 Latest forecast [£k]						P7 2010/11 [£k]	
			2009/10	2010/11	2011/12	2012/13	2013/14	Σ CP4	Variance	Variance %
Supply Chain related EID	EID01	Standard Plain Line track delivery	32.652	26.905	47.645	42.495	46.397	196.094	- 20.559	-10,5%
	EID02	High-output plant optimisation	3.870	56.885	119.090	148.905	155.270	484.020	- 20.610	-4,3%
	EID03	Modular switchings & crossings	16.468	28.570	37.139	26.246	25.390	133.813	- 7.416	-5,5%
	EID04a	Modular signalling	-	5.886	14.448	27.450	31.450	79.234	20.585	26,0%
	EID04b	Signalling Plug & Play	199	1.354	6.414	11.758	9.850	29.575	- 32.602	-110,2%
	EID05	Make vs Buy	1.464	7.135	3.673	6.820	6.172	25.264	- 16.643	-65,9%
	EID08	Workbank Planning	21.944	126.686	130.185	87.995	127.151	493.961	- 4.148	-0,8%
	EID09a	Stricter Budget & Contingency Control	3.103	52.782	128.776	138.193	26.859	349.713	248.523	71,1%
	EID09b	Cost modelling and Investment: UCM	-	3.937	5.436	5.925	5.882	21.180	- 17.810	-84,1%
	EID10	Standard Designs	-	14.529	25.190	30.394	33.686	103.799	49.340	47,5%
	Subtotal		**79.700**	**324.669**	**517.996**	**526.181**	**468.107**	**1.916.653**	**198.660**	**10,4%**
Non Supply Chain related EID	EID07	Access Planning	26.400	73.766	69.253	35.705	11.821	216.945	65.789	30,3%
	EID11	Efficient project governance	-	8.397	35.124	36.094	33.946	113.561	- 1.873	-1,6%
	EID12	Streamline	-	-	-	-	-	-	-	-
	EID14	Standardisation of maintenance organisation	82.040	98.735	30.926	-	-	211.701	- 11.170	-5,3%
	EID15	Maintenance workforce productivity & utilisation	9.517	12.600	70.100	90.000	95.600	277.817	1.124	0,4%
	EID16	Plant Strategy	-	-	-	-	-	-	-	-
	EID18	Value Management	-	159.977	171.570	105.684	133.577	570.808	316.061	55,4%
	Subtotal		**117.957**	**353.475**	**376.973**	**267.483**	**274.944**	**1.390.832**	**369.931**	**26,6%**
	Total		**197.657**	**678.145**	**894.969**	**793.663**	**743.051**	**3.307.485**	**568.592**	**17,2%**

Figure 16: Efficient Infrastructure Development

In 2010, the savings potential of EID was £2.52 bn, of which £1.72 bn related to SCM. Some activities such as access planning, maintenance workforce productivity and efficient project governance were categorized as Efficient Governance and Asset Management and not considered SCM relevant. We have received an update of the EID savings based on period 6 2011/12, showing a total savings of £3.31 bn, thereof £1.9 bn relating to supply chain management.

Most of the activities lag somewhat behind the originally planned values. This is more than compensated for by "modular signalling", "standard designs" and especially "cost modelling SBCA" where the potential has been increased by around £250 m.

We were told that the total savings potential to cover the gap is now around £5 bn but that the additional initiatives do not relate to supply chain management. We did not have an opportunity to verify this information.

Network Rail's large efficiency savings programme raises the question of whether CP 4 delivery targets will be fully met and if volume efficiencies are sustainable and generated without causing negative effects on network performance. According to the most recent review of Network Rail's expenditure data and efficiency calculations[12] concerning Network Rail's methodology, it needs to be stated that:

- Network Rail has made substantial progress in its reporting instruments and increased transparency.
- Overall 73% of Network Rail's total spend is covered by unit cost which is already a considerable share.
- Positive management actions (PMA) are being reported to demonstrate how savings have been achieved.
- Network Rail has established a number of (internal) reviews to challenge track renewals and states that there is "healthy tension" in these processes.
- On the other hand Network Rail's efficiency model does not provide a detailed forecast of future efficiency savings.
- The degree of detail is varying between asset groups. Whilst track seems to be most advanced others like buildings & civils are lagging behind, providing only limited visibility of costs and efficiency, e.g. 22% of efficiency claimed in buildings could not be explained by specific actions or projects.
- In buildings Network Rail is using KPIs which are linked to cost savings, for example: work bank remitted and locked down, budget competitively tendered, lead time from award to year of implementation, budget expended in periods 1-7, number of development schemes cancelled.
- Some target values are not defined and Network Rail expects rates below target for some of the KPIs in deadline years (for example the workbank KPI).
- Some savings are demonstrable on a project by project basis (for example in signaling) while others are provided at a high level only.
- Some policies used for justification of sustainable efficiency gains are not formally endorsed by the ORR (for example buildings & civils, E&P)

In terms of meeting delivery targets there is a continuing trend of underspend with a risk of inappropriately affecting serviceability and sustainability of the

[12] ORR: Part A Independent Reporter Mandate, Mandate AO/023, Network Rail 2011/12 Regulatory Accounts Interim Review, February 2012

network. Network Rail intends to recover deferred renewals in track but the reporter sees a risk to delivery which is not mitigated by contingency plans. Regarding cost efficiencies the reporter points at track renewals current unit costs which "are significantly above target rates projected in the annual budget".

In civils, some assets lag behind massively (tunnels, culverts, retaining walls) and unit costs have risen by up to 72% (underbridges). Considering unit costs alone, inefficiency has increased by £17 m out of £151 m spent. There is no explanation for underspending on culverts, the explanation on tunnels ("improved management techniques") and retaining walls ("re-prioritisation") is rather vague and should be questioned.

In track, unit cost efficiency has mainly been driven by renegotiated contracts, moving from cost reimbursement to fixed price contracts. Some of the savings described by the underlying PMAs are related to the supply chain.

For signalling in particular many PMAs have been associated with efficiency savings, some of them relating to the supply chain (aligned planning with other assets, contractor discounts, standardized technology, work bank and schedule stability, reduced contingency funds).

4.3.4 Headcount reduction in CP4

In October 2010, Network Rail had 725 FTEs in IP and the benchmarking carried out by Hackett suggested a significant potential compared to the peer group and even more comparing it to world class. NDS and Strategic Sourcing were assessed as well but their headcounts (see chapter 3.3) and the efficiency gaps were far smaller, resulting in comparatively low headcount savings.

As illustrated in figure 17 Network Rail has already gone through two phases of headcount reduction (Lock in 1 and 2). Additional staff have been build up to carry out NEP (National Electrification Programme). Network Rail has defined 248 FTE to be out of scope (allocation to other functions, such as finance, HR etc.). This value is much higher than Hackett's out of scope staff of 184 FTE but we are not able to analyse the details of Network Rail's work study and the Hackett taxonomy to form an opinion if this is justified.

Network Rail agreed that in comparing their actual target value of 374 FTE there is still a remaining gap to Hackett's adjusted gap (which is peer group and not world class) of 100 FTEs. Network Rail assumes that another 40 to 50 FTE could be reduced in the process of DIME. To cope with potential risks during

the implementation of DIME Network Rail is reluctant to commit to reducing the remaining 50 to 60 FTE now. Given the risks of the upcoming changes we believe that this cautious approach is justified.

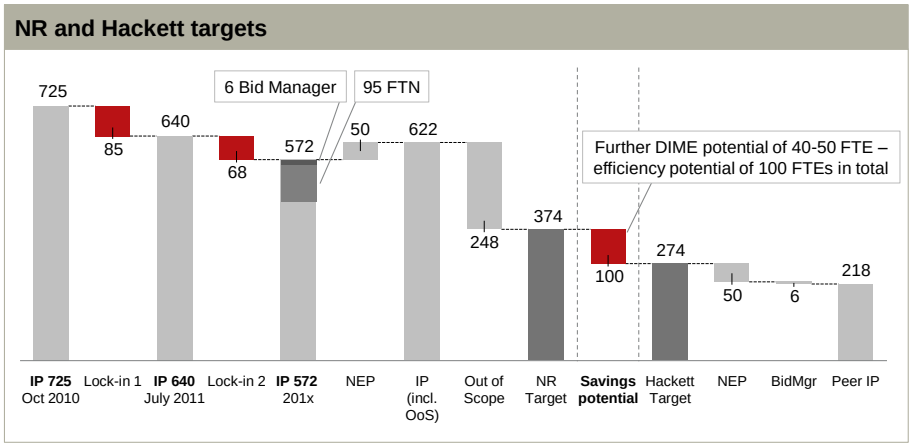


Figure 17: Staff reduction in IP

One of Hackett's conclusions was that average annual labour costs of procurement staff is 7% lower than peer group and 17% lower than world class[13]. Furthermore, Hackett stated that Network Rail's analysts spend more time collecting and compiling data, rather than analysing it. In their response to Hackett Network Rail explains that comparatively more resources are dedicated to operational activities[14]. These are further arguments pointing towards lower cost but also lower qualifications, leading to the recommendation that staff skills shall be reviewed.

As a consequence Network Rail has conducted a Development Need Analysis. Based on a set of 20 criteria all jobs in Contracts & Procurement (C&P) were profiled in 2009 in order to produce a reference point of competency. Then each employee in C&P has self-assessed his profile and reviewed with his/her line manager, giving C&P a competency profile of its staff. Mapping the employees' assessments against job profiles to reveal the gaps is the next step which is now in progress.

The benefits from this exercise have not been estimated yet and remain to be realised; from our perspective they should add up to the savings potentials that

[13] Hackett: NR Strategic Sourcing Directs, August 2011, p. 13
[14] Network Rail: NR's Response to ORR, January 2011, p. 26

already have been drawn from Network Rail's own work study (plus lock-in 1 and lock-in 2).

So far the Development Needs Analysis has not been rolled out to the other divisions in IP, AM etc. Given the large number of staff employed in these divisions this is definitely needed and is definitely recommended.

4.4 Non-financial performance

In addition to financial performance we intended to analyse the development of some non-financial key indicators reflecting efficiency and effectiveness in the supply chain and its development over time. Given the number of issues that have been identified over the years, we expected Network Rail to have set strategic targets for the supply chain organisation and to measure their implementation through these indicators.

The problem of instability and lack of visibility of the forward workbank by contractors needs to be monitored. We would suggest monitoring the volume of projects planned in work banks, the time span and the degree of completion. Another example would be the duration of tenders, the number of tenders cancelled and the resources dedicated to tenders to assure lean and efficient tendering processes. Significant opportunities can be found in delivery and execution where Network Rail needs to reduce changes in scope and design and make better use of possessions. These objectives could be measured through appropriate indicators, too.

We have asked for a set of indicators that would make Network Rail's trends and developments more transparent. We also asked for the IP Balanced Scorecard (which had been announced in the 2010 supplier conference) and the C&P Assurance Card (was made available).

We received information about Network Rail's corporate KPI programme including process related performance indicators and unit cost efficiency indicators. We asked for data, ideally covering several years, on a few KPIs which from the supply chain perspective seem to be of importance, such as investment project cost delivery, investment planning efficiency, possession irregularities, possession set-up & close-down time, time to order and some others. We have not received any of these data. The corporate dashboard is said to be currently under review.

The IP Balanced Scorecard has not been provided because it is not existent. The corporate dashboard we received is very high level without any visible link

to supply chain management subjects while the C&P assurance card is focused on individual performance and very operational.

However, we were provided with some information on schedule adherence and project cost which is shown below.

Schedule Adherence

The following graph shows Network Rail's KPI Schedule Adherence in Investment Projects. The indicator is measured as a percentage of how many projects complete GRIP stages on or before their scheduled completion date, within the period, based on their Programme Managers Baseline. Obviously Network Rail has made enormous improvements within the last three years. IP had reached the target value of 90% in late financial year 2010/11 but has fallen back recently.

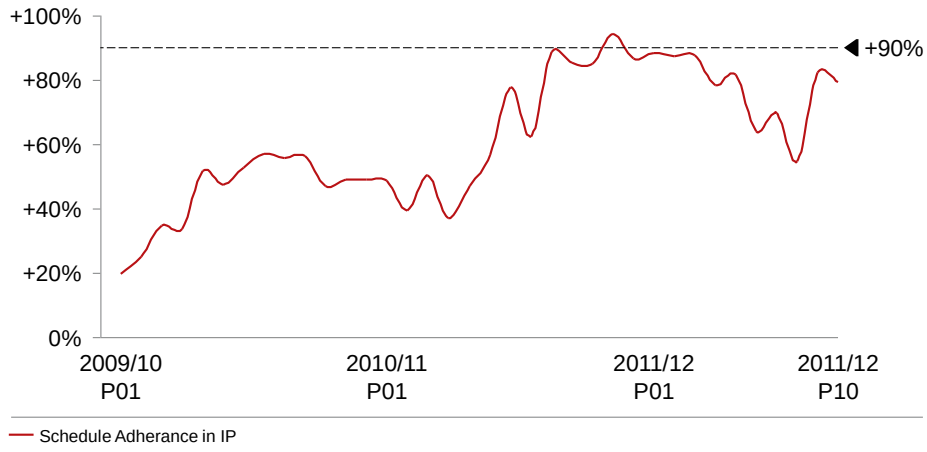


Figure 18: Schedule adherence of projects in IP

Some of the reasons for missing the target were:

- In Building Civils there have been problems with errors in baseline and update plans.
- Slippage was caused by design amendments and additional work.
- Enhancements projects have not been finished on time because of issues with investment authorities and re-designing.
- Signalling & Electrification projects have been recently late because of scope changes, quality issues and time extension for engineering deliverables.

Project cost

Project Cost Delivery is another performance indicator from Network Rail's IP Dashboard. It shows the number of projects completed within "'first implementation authority" in relation to the total number of projects completed in a period. This measurement has improved over the last three years but is very volatile and oscillates around Network Rail's target of 90%.

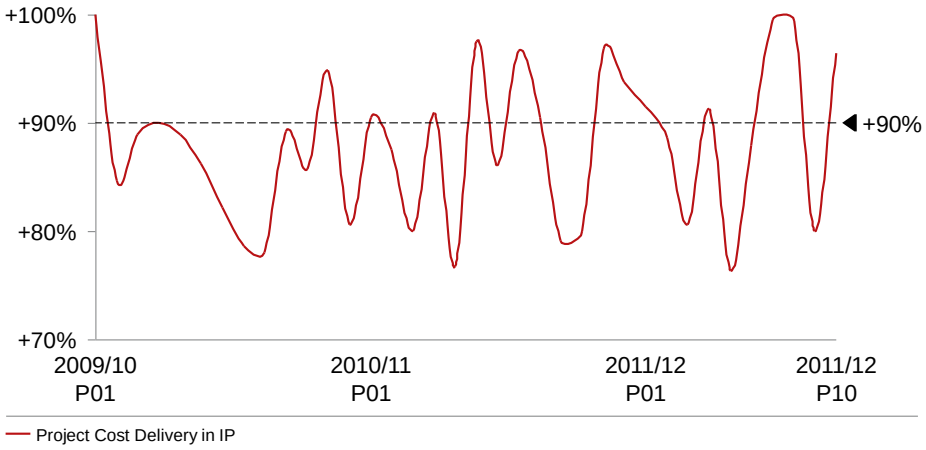


Figure 19: On cost delivery of projects in IP

In Buildings & Civils additional costs were caused by requirement growth. In 2011/12 enhancement projects had to cope with scope changes, changing construction methodologies and site access issues.

4.5 Summary

Summarizing what we have observed from the existing reports and studies and considering what has been stressed in recent works we would see the most crucial points to be:

- The lack of planning stability and visibility, exacerbating contractors' resource management and resulting in risk premiums and elevated costs. However, Network Rail has made progress in setting up and publishing work bank planning.
- More industry involvement is needed in the early stages of planning and procurement to assure that project designs are fit for construction and do not need to be re-iterated.

- Advanced sourcing strategies which are reflected for example in performance orientated contracts and supplier performance measurements are missing or under development.
- Insufficient cross functional collaboration within Network Rail and a lack of accountability are challenges to the organisation. That includes adjusting the organisational structure to avoid silo-thinking, over-complexity and create clearer ownership for the assets.
- Network Rail is over-staffed and given the low skills base there is a potential to increase productivity. The organisation is for example busy with collecting data and not yet making best use out of it.
- Innovation is said to happen too slow. It needs to be promoted by a more collaborative approach with suppliers in combination with a genuine interest in change within the organisation.

Many of these issues have been repeated time and again and progress has only been made after 2008.

We believe that in CP3 and especially in CP4 Network Rail has emphasized on activities which are closely related to improvements in sourcing such as iProcurement, supplier account and supplier performance measurement. These were important measures to assure compliance of transactions, increase transactional performance and to pay contractors promptly.

However, recent studies have stated a large gap in effectiveness of IP and AM. As described before IP and AM are responsible for the majority of spend and employ around 75% of the procurement staff. Benchmarking results demonstrated severe weaknesses in managing procurement and measuring its results. In contrast various recommendations from past studies seemed to have been mainly picked up by Strategic Sourcing and NDS. AT Kearney's review commented that IP/AM lacks the necessary resources. We therefore see a strong need to concentrate on improving the performance of IP and AM in the wider sense of the supply chain, including key processes such as demand profiling, supplier management and delivery, and addressing the drivers which will bring down unit cost in the next control period.

To close the efficiency gap in CP4 Network Rail has started up EID as a comprehensive programme, consisting of initiatives to improve supply chain management, asset management and project governance. The programme now addresses some of the core issues which have been flagged up for so long, including workbanks, standard designs, possession management etc.

There is a risk that the existing trend of underspending continues to remain below volume and expenditure levels set out within the PR08 determination. The track programme in particular is deferring plain line and S&C renewals as well as buildings and civils where inefficiencies are noted.

If and to what extent volume reductions (which are for example happening in track) reduce sustainability by negatively influencing degradation or other asset stewardship indicators has not been analysed by the reporter. Solely the fact that these measures are in place is not sufficient to judge on the consequences of deferred renewals. We believe that this needs to be further investigated.

Positive management actions are considered but not challenged in terms of robustness, sustainability etc. From our point of view the fact that the control process is supported by a project-by-project cost breakdown which makes reported efficiencies traceable does not assure that they are sustainable and robust.

KPIs have been introduced partially and the report backs our impression that the concept of measuring performance in different asset groups is not fully living up to the requirements of a consistent and complete monitoring system.

We did not receive any projections reaching into CP5 but our assumption is that many of these initiatives must continue as they:

- Affect long term reinvestment programmes (e.g. modularisation of switches and crossings, signalling etc.),
- Have not been completed as we have learned in our interviews with Network Rail (e.g. establishing cost modelling),
- Require a new way of thinking and a concept of closer collaboration with suppliers (which is on its way but still at an early stage).

As a consequence we believe that a continuation of EID will definitely be needed to unlock additional savings in CP5.

Concerning DIME, the principles behind this new concept are valuable and should contribute to a more effective supply chain management by establishing a more professional and structured framework for all parties involved. We expect that the model will lead to better decision making (as the routes have the full responsibility for the assets, maintenance included). DIME will also increase transparency in IP and in particular create enough competitive pressure to assure high quality delivery of projects in terms of cost, resources and output and resulted in a significant reduction of cost.

We are sceptical that establishing an international consultancy at this point in time will create sufficient additional value. It might be motivating for the staff deployed in this new venture but, in our opinion Network Rail's full attention should be dedicated to the core elements of this demanding project.

Track works were in the original scope of DIME but it was removed as the access impact and focus is great, and concern was that the new IP regions would end up being too focussed on the track works each week rather than forging a new organisation and driving overall value. According to Network Rail, once established and matured, it will be possible to review this situation again. As track represents one of the largest asset categories we believe that it would be helpful to also increase the competitive pressure and follow the concept of integrating responsibilities and reducing interfaces.

Finally, we are missing a full business case explaining the costs and benefits of the new model. It should generate significant benefits beyond headcount reduction but, there is also a risk of for example raising transactional costs and increasing resources needed at route level.

We have described several ways of tracking savings. For CP3 supply chain related savings have not been followed-up by Network Rail. Procurement savings planned for CP (based on the AT Kearney study) have been followed up for commodities in CP4 and reach target values. If and how IP and AM have realised savings in projects has not been made transparent. For CP4 supply chain related improvements are measured through the monitoring of EID initiatives. We have looked at the latest status and the savings plans dating back to 2010. According to these Network Rail has increased the savings volume over time and is on track to realise predicted benefits.

The Hackett reports, looking at efficiency and effectiveness, have shown high effectiveness in NDS and Strategic Sourcing. This positioning should be interpreted with caution as it is based on various "technical" parameters. For example:

- The fact that a high percentage of spend is covered by formal sourcing strategies does not imply that these strategies are effective.
- Cost savings as a percentage of spend may be high but this does not necessary reflect a mature and effective procurement organization which already has squeezed out the potential savings in the market.

- Savings achieved in pre- or post-contract phases do not prove that Network Rail has profiled its demand correctly, uses output specifications and fit for purpose designs etc. This reflects only a part of successful procurement.
- Furthermore, Network Rail's methodology does not seem to calculate net savings by off-setting cost increases.

Efficiency has been benchmarked for all procurement units and Network Rail has started to reduce headcount significantly. Network Rail still has a way to go to achieve comparable peer group levels but is now making efforts to achieve these savings. Demand needs analysis has not been rolled out and provides further potential to assure the right allocation of staff and an appropriate mix of skills.

Regarding KPIs, demonstrating Network Rail's development with regards to efficient processes, projects and delivery our impression is that most of this information is non-existent or that Network Rail does not intend to disclose this information. This seems to be confirmed by the Hackett benchmarking report on IP and AM. As we mentioned before, Hackett had to estimate Network Rail's position with regards to effectiveness due to a lack of quantitative information.

Furthermore, there is no corporate supply chain management strategy with explicit objectives which are monitored or reported. Given the way procurement functions are spread in the organisation there should be an overarching strategy which is led and followed up by a central unit (Strategic Sourcing).

5. Supply Chain Related Savings in CP5

The analysis of Network Rail's supply chain development in CP3 and CP4 demonstrates a broad range of initiatives and a cost savings programme established to close the efficiency gap. For CP5 we have evaluated the opportunities which are still to come. This is based on four pillars:

- Network Rail's own maturity assessment illustrates where the organisation itself sees its actual position in different dimensions of supply chain management.
- Stakeholders provided an external view on Network Rail's capabilities and gave us valuable recommendations on where to focus.
- We also draw on the experiences from Deutsche Bahn where we had a high level meeting with DB's heads of procurement.
- Cost analysis and the results of Network Rail's own international benchmarking activities show trends in savings as well as future opportunities to further increase efficiency.

5.1 Network Rail's maturity assessment

In chapter 2.2 we have introduced the development path of a value driven supply chain organization. Overall we believe that Network Rail has made some progress over the last years, although recent evaluations of the overall situation reasoned that major issues did not improve before 2009/2010 and still remain an issue[15]. As a consequence we see Network Rail still at an early stage of the path.

Network Rail has carried out its own assessment of maturity and the results support our findings. As illustrated below Network Rail has been moving from a low level of 2 towards level 3.

The five stages of maturity are derived from an evaluation of dimensions such as culture, planning, design etc. and can be summarized as follows[16]:

[15] For example Adventis Consulting: Transformational Change in Network Rail, March 2011, p.13
[16] Network Rail: Supply Chain Management Maturity Model SCM3, December 2008

Level 1: Ad hoc

Processes are unstructured and ill-defined. Process measures are not in place and the jobs and organisational structures are based upon the traditional functions, not horizontal processes. Individual heroics and "working around the system" are what makes things happen.

Level 2: Defined

Basic processes are defined and documented. Changes to these processes must go through a formal procedure. Jobs and organizational structures include a process aspect, but remain basically traditional. Representatives from functions meet regularly to coordinate with each other concerning process activities, but only as representatives of their traditional functions.

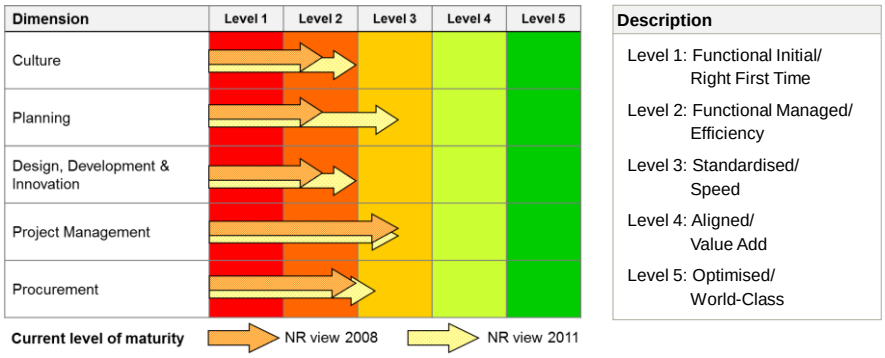


Figure 20: Network Rail's maturity assessment

Level 3: Linked

The breakthrough level. Managers employ process management with strategic intent. Broad process jobs and structures are put in place outside of traditional functions. Cooperation between inter-company functions, vendors and customers takes the form of teams that share common process measures and goals.

Level 4: Integrated

The company, its vendors and suppliers, take cooperation to the process level. Organisational structures and jobs are based on process, and traditional functions, as they relate to the supply chain, begin to disappear altogether. Process measures and management systems are deeply embedded in the organisation. Advanced process management practices take shape.

Level 5: Extended

Competition is based upon multi-firm networks. Collaboration between legal entities is routine to the point where advanced process practices that allow transfer of responsibility without legal ownership are in place. Trust and mutual dependency are the glue holding the extended network together. A horizontal, customer-focused, collaborative culture is firmly in place.

5.1.1 The contractors' views

As part of our analysis we held a number of interviews with stakeholders in the UK, Germany and Switzerland (see Appendix). We were keen to learn how they see Network Rail's development and to understand where they believe Network Rail should concentrate its efforts.

The most important statements made were:

- Contractors observe a number of initiatives which have been launched in the last 18 months, resulting in massive changes that the organization is undergoing. Among the positive changes, they particularly mentioned the collaborative policy Network Rail is currently taking in working with the supply chain. Network Rail has for example started a series of quarterly meetings with commercial directors of the top 30 suppliers and has entered into an open exchange since April.
- This positive trend is reflected in the supplier survey conducted by IPSOS Mori[17] which shows an increase of the suppliers' satisfaction with Network Rail. Earlier involvement of contractors in design and planning work presents a further opportunity for improvement.
- There is dissatisfaction with the quality that "design-only" engineering firms deliver because of their non-exposure to real work. For a contractor this often means costly amendments, re-works and/or disputes with the client.
- Contractors see large potential in the application of the partnership agenda and its seven contractual models. There is expectation that the new collaborative approach will be beneficial to all parties.
- Concerning the work bank contractors acknowledge that it has been partly established. However, this is still seen as a critical issue and contractors claim that there is much more to be done. Examples of this are work banks are held back in signalling, frameworks don't materialise, overheating in

[17] Network Rail/RIA/CECA: Supplier Perception Study 2011, Full Report, p. 27

OHLE when major work packages are let to the market. There is also "the notorious industry problem with labour" which is due to ramping up and down resources. Solving the ramping up and down problem should contribute significantly to further savings.

- We were told about typical "CP4 to CP5 transition issues". The work bank dries up towards the CP4 end because Network Rail are not taking the burden to (or shying away from) plan and design "next - CP" projects, without knowing how much will get funded.
- Hence, the somewhat artificial "slicing and dicing" of longer term investment and renewal strategies into CPs creates friction and economic disadvantages. Network Rail together with the industry partners needs to overcome this - as experience in other sectors such as utilities and gas has demonstrated.
- Only when the determination has been set for the Control Period, does Network Rail start to build up the work bank, which can take up to a year before the first new projects can be executed. The contractors are inevitably forced into a "hire-and-fire" cycle, which is costly and absolutely detrimental to staff skills and motivation.
- It had been pointed out that it needs to be clearly understood that in this specific market there is no smoothing the order-books from various customers, which could act as a natural stabiliser. This market is indeed a near monopoly on the buy-side and the contractors have to deal with it. Network Rail needs to better understand the implications of the ups and downs and the effect that it is having on the supply chain.
- One contractor calls firmly for new alliance agreements, where (i) early contractor involvements in design stages (discussing best possible solutions, as well as innovation) are normality and likewise (ii) risk-sharing is assessed in detail, (iii) gains-sharing incentivises both sides and delivers continuous efficiency advancements, (iv) true cost of ownership aspects are considered and bidder-selection relevant and last but not least (v) teams are really lean and hybrid teams, which is to say that there is no "mirror-functions" dually staffed by client and contractor, but rather one specific function by one side and another by the other.
- Despite these improvements one contractor raised the question of track-possession policy, where a thorough evaluation of trade-offs between durations and achievable effectiveness might turn the tide towards longer and better utilised windows. In "High Output" work-sites the company now typically realises 2 productive hours only out of an 8 hour shift.

- Furthermore, it has been found that Network Rail's structural organisation structure is so complicated that they are having real difficulties in finding the right counterparts to talk to for their customer relationship.
- Network Rail is in the state of flux and implementing some very large scale transformation programs. The route devolution increases accountability in the regions, DIME stands for the concept of a more collaborative approach to suppliers, a more commercially oriented set-up of IP (Investment Projects) and a significant staff reduction which is already underway. On top of this Network Rail will move its headquarters to its new site in Milton Keynes which is expected to further drive down headcount.

The evidence we have seen proves that Network Rail is seriously engaging in a more collaborative strategy. The Ipsos MORI survey proves that satisfaction has increased markedly, meetings with strategic suppliers have been intensified, the content of supplier conferences is getting much more specific, a new engagement model is being implemented, workbanks are being improved etc.

5.1.2 Observations at Deutsche Bahn

We had a meeting with the Head of Procurement of Deutsche Bahn (Holding) and of DB Netze (Infrastructure) about their recent developments. We believe that there are some interesting aspects which can potentially stimulate the discussion at Network Rail.

Organisation

- When discussing organisational structures DB pointed out that sourcing and procurement are nowadays widely centralised. DB has organised its purchasing department as a corporate group function, albeit with a clear internal client focus on the core operational divisions of which infrastructure is one. The infrastructure purchasing department (IPD) is the central procurement department servicing the 7 regional branch offices spread across Germany.
- IPD has broken down its portfolio into strategic sourcing market segments, for which separate teams are responsible. In each segment, explicit sourcing strategies are defined, based on market assessments, targeted gains / goals and firm purchasing volume commitments from the asset owners. As a next step then, the type of envisaged contracts and the choice of bidding / purchasing procedures / formalities are being decided together.

Planning at Deutsche Bahn:

- Asset owners are truly accountable, even internally to purchasing (to IPD) about purchasing volumes (within brackets, often plus/minus 10-20 %), as well as work sequences/track possessions and IPD translates this commitment to suppliers/service providers in contracts. Not only do contractors know their likely work volumes, but also the actual work programmes are well defined, known early and strictly adhered to. The pipeline of track possessions planned in detail reaches about 17 months forward at the moment. Contractors have indeed planning dependability for their resource allocation.
- Investment projects are financed through the state. The budget for planning and design of projects is limited to 13%. Any efforts in excess need to be financed out of DB's own income.
- DB has standardised many design specifications, for example for interlockings and bridges. A team approach to purchasing is seen to be essential and cross-functional teams have been set up to create these specifications in eight technological areas. Every regional director is also in charge of one technological area, e.g. the regional director South is responsible for civil structures. Technological strategies developed by these groups feed into national procurement strategies.
- Although still at an early stage, DB is encouraging project managers to tender on a life cycle cost basis in order to follow a total cost of ownership approach.

Sourcing and Contracting

- Meetings of asset managers and procurement with contractors are held three times a year to discuss the quality of projects and possibilities for improvement
- Quality as a criterion for awarding contracts is weighted up to 70%. Large-scale investment projects which are under significant budget pressure include bonus malus agreements with contractors. 50% of the savings realised are shared with the contractor.
- Related to the total annual volume of purchase of €6 bn claims have been brought down from €1.2 bn to about half of that. Values of 5-6% as in the private construction sector though are seen to be out of reach. Currently there are negotiations with a German association of construction companies about a fair allocation and split of risks, which is supposed to introduce a spirit of claims avoidance, rather than claims management.

- Asset managers are asked to communicate and commit to their annual procurement volumes which would help the central procurement department to negotiate better prices with suppliers.

Delivery

- To increase utilisation of plant and equipment DB is sequencing work sites by time and region. Thus travel and idle times of large machines are being reduced. Furthermore DB incentivises contractors to coordinate the use of their equipment with the buyer.
- IPD units and the asset owners convene at least once a month to discuss on-going business concerns. One anecdotal outcome of this is an initiative of DB AG to go out and bundle as many as 50 individual bridge maintenance/ refurbishment projects and bring them to the market as one package. DB reckons that some 15% of savings should emerge from that.
- Another example is that DB AG has decided not to tender any track rehabilitation project which are less than 3 km of length.
- DB's supplier management is judged to be very strict and consequently applied. Suppliers without pre-qualification can be excluded from bidding. More than 40% of applications for prequalification are rejected. 90% of the procurement volume is assessed based on a scoring system.
- If delivery is not meeting DB's quality standards the prequalification can be withdrawn which has happened in the past. DB is regularly conducting audits (without prior notice) and random inspections at manufacturers.

DB's primary objective is to further reduce cost of all goods and services procured, focusing on both efficiency and effectiveness. Headcount had been reduced drastically and today about £5.2 bn are procured by 400 people (Network Rail £4 bn with ~700 FTE). In 2011 DB saved £350 m on goods and services procured, for 2012 the same order of magnitude is being expected (on top). These are net savings, including cost increases occurring during the year.

Interestingly savings are also made on commodities. Even on a standard product such as concrete sleepers DB has achieved price decreases by 20%. Partially this was driven by sourcing more internationally.

Despite all efforts to procure goods at lowest reasonable cost DB does not solely focus on cost cutting. Procurement officers also need to accommodate basic logistical goals and assure that goods are provided on time and at the right place.

5.1.3 Cost analysis

We believe that benchmarking and analysing project, unit and activity cost is a very powerful instrument to assess Network Rail's current position and to evaluate additional savings potentials. Although changes in unit cost (for example the cost for plain line renewal per metre) are not purely driven by supply chain related activities they play an important or even predominant role – ~60% of the savings in EID planned for CP4 relate to supply chain management. This is why we considered some unit cost developments as well as gaps to international comparators.

We have asked for a comprehensive overview on the most important activities which was not available. Instead we have collected several pieces of information which form the basis of our assessment.

Unit Cost Developments

We tried to follow-up the development of unit cost over time. The data needed was extracted from Network Rail's Annual Returns and Delivery Plan Updated to the extent it was available.

The graphs below show that unit costs have dropped especially for conventional signal equivalent units and level crossings. S&C unit costs have been brought down, although the effects of modular switches and lower costs for installation have not yet materialised. The cost for plain line renewals remains on an almost constant level. However, some of the positive developments could be linked to volume efficiencies since volumes have increased strongly in signalling and level crossings.

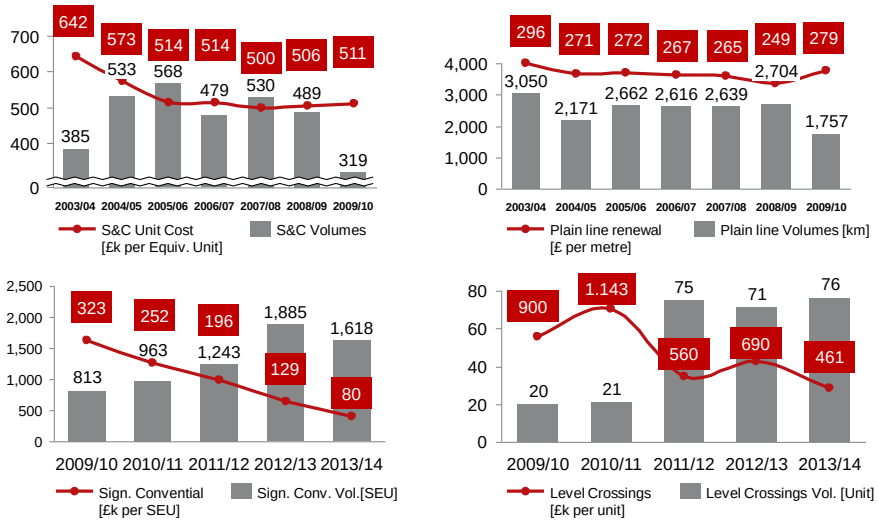


Figure 21: Unit cost development

Unit cost of S&C and track renewals

An efficiency review carried out by Network Rail in November 2011 predicts delivery efficiency targets for CP5 of ~30% for S&C renewals, ~15% for plain line renewals and ~20% for refurbishment[18]. As pointed out in the study fundamental changes are required in Network Rail's contracting and supply chain management strategy to realise this potential. Unit rates for S&C and plain line renewal (high output) would be brought down to £345k vs. approx. £500k today and £584k vs. £684k today.

Among the issues Network Rail still faces today is a lack of incentive to innovate and invest on the supply side which is partly enforced by squeezing out installation supplier and decreasing the attractiveness of track renewal works. The visibility and certainty of renewal works over a meaningful period of time is still considered too low. Network Rail is generally in control of a worksite and seen as being too prescriptive and involved. Productivity is hampered by various problems such as:

- Large numbers of staff on site (twice the amount of operatives for the delivery of a single turnout as compared to European comparators),
- Too low productive time during possessions (for example average time a ballast cleaner works in a 7 hours possession is 2 hours) and

[18] Network Rail: Track Asset Management, CP5 benchmarking & delivery efficiency review, 16th November 2011

- Long cycle times with too low value added time, inefficiency has been identified at each stage of the process, complex interfaces and push rather than pull strategies.

As a consequence Network Rail intends to assign greater control to suppliers, smoothe out work banks and increase the utilisation of work force. Network Rail has started modelling business cases for S&C and will set up further cases for S&C and plain line renewal. A "contracting strategy and supplier engagement to support the delivery of the business cases" are defined as next steps.

The savings for CP5 which have been derived from these benchmarks and improvement programmes have been built into Network Rail's Efficiency assumptions for the Initial Industry Plan: "Track will deliver around 14% efficiency in CP5 in its S&C, conventional plain line and High Output delivery programmes"[19].

Project Cost of Civil Structures

In 2010 the cost of three platform renewals projects in the UK had been compared to a comparator "UK Civil", the Netherlands and France[20].

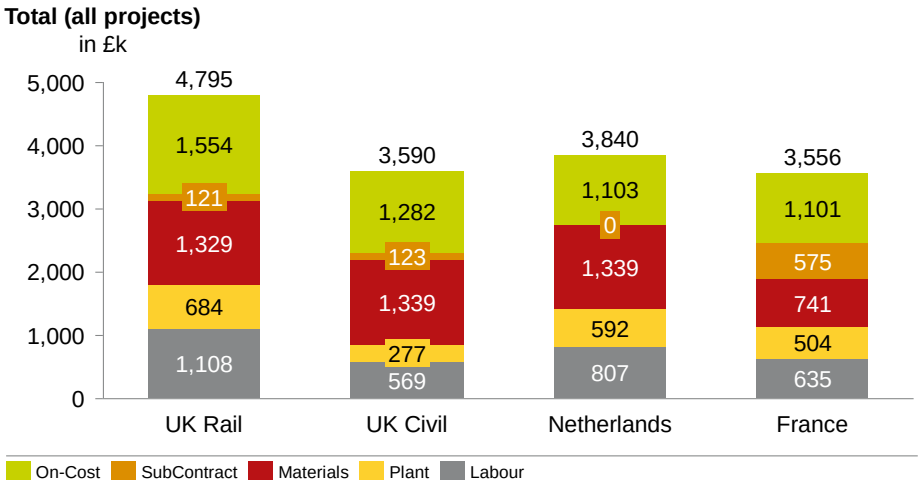


Figure 22: Project cost comparison in civil structures

Total material and plant costs were similar to other comparators, the UK had significantly higher on-cost. The underlying reasons were UK's possession

[19] Network Rail: Periodic Review 2013, p.6
[20] Civils Benchmarking Alliance: Benchmarking UK Rail Civil Engineering Projects To Europe, January 2011

regime which allowed only for shorter slots on holidays, higher risk premiums priced in by contractors driven by safety standards, higher design costs and some over-specifications. Total costs in the UK were about 25% higher than the peer with the next highest cost position.

Building & Civils Efficiency Review

Building & Civils Asset Management have also undertaken various benchmarking activities with international railway companies, UK organisations and internally across routes and assets to inform estimating efficiency savings in CP5. The initiatives derived from benchmarking relate to reduced project management overheads, performance specifications, procurement packaging improvements, efficient tender designs and other supply chain related issues, accumulating to total savings of 11% in CP5[21].

Telecoms, Electrification & Power

According to a "Bottom-up Benchmarking Programme Audit" Telecoms is one of the "less advanced workstreams with no benchmarking data yet provided for review"[22]. The same statement has been made for this asset category.

Materials Cost Benchmarking

One source was Arup's Material's Cost Benchmarking Study of August 2011. The study focused on material cost of nine commodities such as rail, sleepers, ballast, switches and axle counters and benchmarked about 50% of NDS' spend on materials. Most categories were showing a low cost efficiency potential with Network Rail having a better price than European comparators. Only switches and crossing and axle counters were more costly than elsewhere.

Nevertheless – as the example of Deutsche Bahn demonstrates – future savings could be possible by further improving sourcing strategies. Our own comparison of rail and sleepers to other European countries showed similar or slightly lower prices in one country even though volumes there should be smaller due to the size of the network.

[21] Network Rail: IP & AM Building & Civils Efficiency Review, 21 November 2011
[22] Arup: NR Bottom-up Benchmarking Programme Review, Draft Final Report, December 2011, p. 13

5.2 Opportunities

In this chapter we summarise our findings about Network Rail's future opportunities. We have matched Network Rail's current status quo against the important aspects of good supply chain management (see chapter 2.2) and derived some of the most important points which should be followed up in the future.

Strategy & Planning

Issue	Opportunities
Output based specifications	Design planning and re-working designs throughout the implementation still is a crucial issue; Network Rail will improve for example by earlier involvement of partners and standardisation of assets.
Smart, LCC-optimal technology	According to Hackett benchmarking the Total Cost of Ownership is not yet implemented in Network Rail's procurement; as we know Network Rail is considering life cycle cost in their asset strategies which in the future need to be linked to procurement strategies.
More standardisation, less engineering	Standardisation has started and is one of the work packages in EID; we expect this to be a long term and on-going activity subsequently taking effect with each renewal activity.
Reliable and long term workbank	Network Rail has started to set up and publish workbanks; however, planning and visibility is still an issue for contractors.
Genuine interest in innovation	Innovation shall be fostered by a more collaborative approach and contractual agreements which is at an early stage; it furthermore requires a cultural change.
Partnership approach with contractors	Network Rail has created a new engagement model which is piloted; it should become effective throughout CP5 and will be a major pillar of Network Rail's new collaborate approach to working with suppliers.

Sourcing & Contracting

Issue	Opportunities
Early involvement of suppliers	Network Rail is planning to shift contractors' responsibilities to earlier stages of the project; in general contractors shall receive greater control for design, assembly, logistics and installation; this is part of Network Rail's CP5 strategy
Professional costing	Network Rail has started to support estimating and cost transparency by establishing processes and tools such as Unit Cost Modelling and Cost Assessment Framework.
Transparent, lean and short tendering and contracting	There are some cumbersome contract creation processes, cycle times are 82 days compared to 35 in world class and internal utilisation of contracts is said to be poor.
Informed buyer with negotiation capabilities	A step change is needed both on client and supplier side when accountability is transferred to routes and IP operates under market conditions; this will be launched in April 2012.
Market intelligence and competition	Category management has been introduced to develop sourcing strategies and realise savings in C&P and NDS but not yet sufficiently in IP and AM Track.
Systematic supplier development	Communication with suppliers is improving (for example quarterly meetings with top 30 suppliers). Supplier performance management has started (PRISM) but needs to be further developed; the practices at Deutsche Bahn might be a good reference for consequently developing suppliers.
Risk awareness and fair allocation	Contractors claim that risk-sharing should be assessed in detail and gain sharing should be incentivised on both sides. New contractual models incorporate these concepts.

Delivery & Execution

Issue	Opportunities
Effective project governance	While delivery on time has improved, cost overruns and probably claims are still to be improved; EID has picked-up project governance as an initiative.
Reliable worksite logistics	Contractors have insufficient control over logistics, push rather than pull-strategy; the Swiss are known and have been quoted for their excellent "clockwork" logistics and industrial planning logic – this is a reference model.
Best utilisation of resources (staff, plant, machinery)	The utilisation of resources is not efficient yet and shows room for significant improvement; CP5 savings are strongly driven by an increase in productivity. Inefficiency today is driven by too short productive times in possessions, many parties involved, long worksite preparation, a lack of multi-skilled workforce utilised 5 days a week etc. See also DB's approach to increase utilisation of plant and equipment.
Possession management	Possessions remain a very critical issue, getting increasingly under pressure as demand and utilisation of the network are growing. Short possessions have been identified as a major cost driver. Misaligned incentives of TOCs and Network Rail lead to conflicting behaviour.
Lean administration	Creating a leaner organisation is a challenge throughout the supply chain. It affects staff in procurement (sourcing, contracting etc.) as well as planning staff, project management and delivery (staff on worksites).

Organisation

Issues	Opportunities
Lean organisation	Today procurement is spread throughout the organization. Contractors remarked that organisation is too complex and not transparent. Deutsche Bahn has much more concentrated procurement functions.
Clear responsibilities	Responsibilities were said not to be always clear (for ex. Strategic Sourcing is a black hole").
	There are split responsibilities between routes, IP and AM; a "true ownership" for assets covering operations, maintenance and investment activities is needed (and will be addressed through devolution and DIME).
Integration and coordination	The organization is not integrated; the way it is structured today facilitates thinking in silos. This has been flagged up by previous reports and today's asset driven structure still supports this behaviour.
Reduce interfaces	As the McNulty study has shown the industry is very fragmented, causing numerous interfaces. One approach to improve the situation is devolution, creating a closer alignment between the infrastructure manager and train operators.

People

Issue	Opportunities
Skilled staff	As processes become more advanced, new concepts and procedures are being introduced, so Network Rail's staff need to be trained and skilled accordingly. Management will face new challenges, for example when new internal client-supplier-relations are being built which will probably require additional skills.
Development needs analysis	Development needs analysis assessing staff qualification has been undertaken in IP Contracts & Procurement; it was introduced in 2011 and needs to be rolled out further.
Monitoring performance	A C&P Assurance Card was introduced in April 2011 to monitor staff performance (mainly concerning compliance of procedures and transactions). So it's a new instrument which will take some time to bed in and yield benefits.
Cost level	In international comparisons Network Rail's average annual procurement staff cost had been ranked lowest against the peer group. However, there is a trade-off with skill levels and recommendations pointed towards employing significantly less staff at higher skill-levels (which would also increase staff cost per employee). Total cost for staff are above peer group level.
Staff allocation	Too many professionals are doing transactional work in procurement functions.
Culture	Transformation in Network Rail is extremely challenging and requires fundamental cultural changes; this is one of the key success factors and it seems to be at an early stage. In all the documents, reports, presentations, meetings etc. cultural change is not present at all. It should be a focus area as this represents a key risk to successful implementation.

Systems

Issue	Opportunities
Enterprise resource planning	Controlling and monitoring of strategic goals in SCM seems week, especially in IP/AM There seems to be no supply chain strategy embracing all procurement units and being managed through a score card or common dashboard. Transparency about transformation could be increased by providing more complete performance indicators, unit cost, benefit analysis and linking savings with management action plans.
E-tendering/-procurement	Advanced procurement systems such as E-tendering and i-Procurement have been introduced in 2010 and 2007.
Price/cost database	Cost transparency is being increased through the Cost Assessment Framework and Unit Cost Modelling; both tools were established in CP3 and are still developing. External benchmarking on the level of activities has progressed, yet there are further opportunities for some of the asset categories to compare their practices and cost against international peers.
LCC and scenario calculations	LCC and scenario calculations are being developed in asset management but, are not linked into procurement strategies. Total cost of ownership remains a requirement for SBP to demonstrate sustainability and efficiency.

Internal/external information sharing	Network Rail is starting to share more information with partners and uses various instruments such as supplier meetings and publishing on their website to provide information to suppliers and foster exchange. As new contract models and the partnership approach mature this should become even more important.

5.3 Projections for CP5

We derive our view on future savings potentials from various perspectives and analysis. As part of the McNulty Value for Money study Atkins has estimated supply chain related savings potentials for CP5. In the Initial Industry Plan Network Rail has outlined its own projections for CP5. Based on these two sources and the evidence from our analysis we have formed our own opinion on what might be realistically achieved in terms of supply chain related savings during CP5.

5.3.1 Atkins' projections

Atkins has identified three categories of improvement (range of estimated savings in brackets):

- Cost management based on more transparency and control (10-30%)
- Smoother demand management through more plan stability (1-5%)
- Simplification through reduced overheads and simplified underlying demand (10%)

These ranges were applied to the addressable cost base (enhancements, renewals and maintenance) and resulted in a gross potential of £0.78 bn to £1.98 bn per year. As EID has been started in CP4 overlaps with supply chain related activities have been eliminated, reducing the range of savings to £0.2 bn to £1 bn per year.

We have made the following adjustments in order to achieve an updated and realistic savings target:

- Maintenance costs have been taken out of the addressable cost base as maintenance has been brought in-house and is not directly influenced by the supply chain anymore.

- Enhancement costs have been taken out of the addressable cost base as the VfM-team came to the conclusion that these cost are not controllable due to advanced status of the enhancement projects.
- Accordingly we have reduced the overlaps in the Atkins calculation, assuming that they referred to the original cost base and will decrease as the cost base is reduced.
- We have assumed long term initiatives (in the category "simplification") to take around 15 years and reduced these savings to a third of their original value.
- We have modified the cost base for renewals to the value used in Network Rail's Efficiency Assumptions in IIP (Periodic Review 2013). Based on the efficiency savings we have calculated an average annual renewal cost base for CP5 of £2.568 m which is 12% higher than the value used by Atkins

As a consequence the range of savings is between £90 m and £530 m per year, the median being **£310 m**.

5.3.2 Network Rail's planning for CP5

Network Rail's own efficiency forecast for CP5[23] proposes savings of around 16% for each of the principal asset categories within renewals. Enhancements are explicitly excluded. This translates to average annual savings of £372 m and would tend towards the "low" scenario of the VfM "should cost" analysis. The breakdown of the 16% is shown in the table below.

[23] Arup: NR Bottom-Up Benchmarking Programme Audit, Appendix E, 2011

	Efficiencies modelled for Current Railway							
	Scope Efficiency	Unit cost Efficiency	Scope plus Unit cost Efficiency	Network Operating Strategy	AIS/II	Total Efficiency without input price	Input Price	Total Efficiency with input price
Operations	6%		6%	15%		21%	-1%	20%
Support			12%			12%	-4%	9%
Maintenance	4%	9%	13%		3%	16%	-1%	14%
Track		14%	14%		8%	22%	-1%	21%
Signalling	3%	13%	16%		2%	18%	-1%	17%
Civils	5%	11%	16%		0%	16%	-1%	15%
Building	5%	11%	16%		1%	17%	-1%	16%
Electrification & fixed plant	3%	13%	16%		7%	23%	-1%	22%
Telecoms	3%	13%	16%		0%	16%	-1%	15%
Wheeled plant & machinery		9%	9%		0%	9%	-1%	7%
IT		6%	6%			6%	-1%	5%
Corporate Offices		1%	1%			1%	-1%	0%
TOTAL OMR			13%	1%	3%	17%	-1%	16%

Figure 23: Network Rail's core efficiencies in CP5

According to Network Rail's assumptions, a number of underlying opportunities are linked to supply chain management and applicable across the organisation:

- Scope savings brought about by better specifications and by differentiating asset policies and working practices more precisely to the requirement of individual routes;
- Revising standards and operating rules in order to increase productive time, reduce headcount in lines under possession, and by challenging derogations and dispensations;
- Improving contractual relationships. The key elements are simplifying the contracting process, more performance-based specifications, elimination of man marking and also encouraging contractors to innovate;
- Providing better defined, stable and occasionally cross-asset workbanks allowing greater materials procurement scale economies and enabling suppliers to smooth out their workload with perhaps a greater degree of surety and therefore encouraging them to invest in plant and people;
- Delivery savings brought about by a greater degree of multi-skilling among the internal and contractor workforce;
- Improved management and contestability in projects. Network Rail has developed proposals to reduce project delivery costs through three key initiatives: partnering, developing our client capability and creating a project delivery business that can compete and win work in an open market for UK regulated and unregulated rail business.

- Better specifications, contractual improvements, more stable work banks, standardisation, improved working windows and an increase in productivity.[24]

Further opportunities are asset driven, for example:

- Optimised conventional and high output renewal processes in track, depending on a different approach to managing worksite safety
- Optimised whole-life renewals requirements, whole rail-system optimised operational requirements and asset type standardisation in signalling
- Contractual improvements and better workbank planning in SPC

Including maintenance Network Rail expects annual average savings of £372 m.

Savings (m GBP) 2011/12 prices	14/15	15/16	16/17	17/18	18/19	Total	Total %	Average savings pa
Track renew als	82	100	118	135	151	586	21%	117
SPC renew als (Sign/Pow er/Tel)	31	63	96	134	158	482	18%	96
B&C renew als	24	46	63	83	103	319	16%	64
Others renew als	4	7	9	13	12	45	7%	9
Maintenance	30	59	87	113	140	429	14%	86
Total	**171**	**275**	**373**	**478**	**564**	**1.861**		**372**

Figure 24: Savings on a yearly basis

Based on Network Rail's explanations about opportunities and our assumptions we estimate that roughly 60% of the annual cost are driven by initiatives which can be linked directly to supply chain management, meaning that supply chain management improvement can generate savings of **£172 m** (out of the £372 m, not considering maintenance). This is about the same order of magnitude represented by supply chain related initiatives in the currently running EID project.

[24] Arup: NR Bottom-Up Benchmarking Programme Audit, Appendix E, 2011, p.6

5.3.3 Our assessment of CP5 savings

As illustrated in figure 25, savings in CP5 will mainly be derived from improvements in project related spend, i.e. 10 to 15% efficiencies can result in up to £300 m of savings. Smaller savings in commodities of 1-2% will result in savings of £15 to 30m. Efficiency savings in procurement functions across the organisation will result in rather low savings as they are mainly staff driven. These are rough estimates which are useful to highlight the major opportunities.

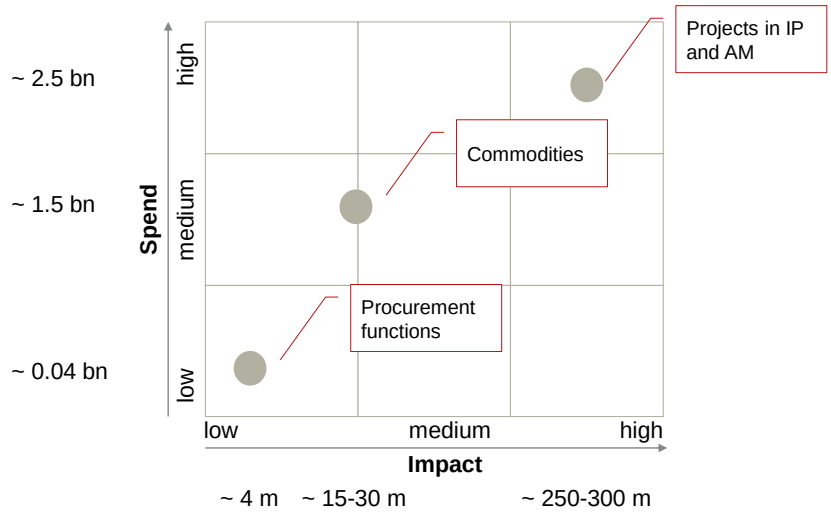


Figure 25: Spend and impact of savings

We believe that Network Rail's efficiency targets as described in the Initial Industry Plan are rather conservative and that various opportunities might lead to a higher savings potential stemming from supply chain related initiatives:

1. Enhancements

The cost base is not complete as enhancements are excluded from Network Rail's efficiency projections for CP5. They had also been excluded from the Atkins scenario. There certainly will be opportunities to transfer the improvements and lessons learned from renewal projects to future enhancement projects which will add to the supply chain related savings projected so far. In CP4 renewals expenditures add up to £12.5 bn, almost the same amount, £11.8 bn, is spend on enhancements. If just a fifth of this enhancement spend can be influenced in CP5 it will significantly increase the cost base and additional efficiency savings will top the currently predicted savings. If we apply the potential supply chain savings as per renewals (16% * 0.6) this would result in a further £46 m savings per annum.

2. Workbank Planning

A large part of the expected savings in CP5 will stem from a better working relationship with contractors. It has been emphasized throughout our interviews that stability and visibility of planned works is one of the most crucial issues which still creates significant inefficiencies and drives contractors' cost.

The Railway industry has attempted quantification in substantial areas and expects a potential between 10% and 30% to be attributable to demand volatility. If we just assume a lower range of 10% to 15% to be feasible in a mid-term perspective this would result in a cost reduction of £250 to 375 m per year.

The current EID initiative to optimize Network Rail's workbank planning produces average annual savings of £100 m, suggesting that additional potential of another £150 to 225 m is still left for CP5.

3. Efficiencies in Track

According to Network Rail's Initial Industry Plan track will contribute to savings with 21% (total efficiency with input price). Savings total up to £586 m, two thirds thereof are unit cost driven. Accordingly, annual savings of £78 m can be expected.

Network Rail's "Track Asset Management CP5 Benchmarking Delivery Efficiency Review" has set out delivery efficiency targets of 30% for S&C renewals, 15% for plain line renewals and 20% for track refurbishment. Based on track renewals planned in CP4 this would result in savings of £121 m per year which is £43 m more than forecasted in the Initial Industry Plan. Furthermore, we would expect savings of 10% to be set out for the other track renewals activities not covered by benchmarks. These savings would result in a further £31 m p.a.

4. Other asset groups

With 21%, track is still the dominant contributor of the CP5 savings. Although other asset groups like electrification, telecommunications, civil structures, operational property and IT have a substantial share of ~50% of all renewals and the fragments of evidence available show low efficiencies and partially also insufficient delivery in CP4, most of them will only provide savings between 5% and 17%.

In contrast to track and signaling, no explicit actions have been defined in the

Efficient Infrastructure Delivery project for these asset groups. Furthermore, assessments have stated a low level of unit cost benchmarks (if at all). Despite the large contribution of other assets to total renewals and assuming that the gap to efficiency is not much less than track, we recommend a critical review of the savings potential identified in the Initial Industry Plan.

We are not able to quantify any additional savings potential in these asset groups but recommend challenging the figures stated in the Initial Industry Plan.

5. Investment Projects

In Hackett's benchmarking IPAM has been marked with the lowest efficiency and effectiveness compared to other business units dealing with supply chain management within Network Rail. Unfortunately, no quantitative information about IPAM's effectiveness has been stated in Hackett's report. Although no business case has been provided to us by Network Rail we believe that the project DIME which is in the course of being established will be helpful to create a step change in this part of the organisation which is accountable for most of the maintenance, renewal and enhancement budget. Everybody expects large potential from implementing the new engagement model and pilots are running. However, we have not received any quantitative estimates on this potential. It should contribute significantly to savings in CP5.

6. Ongoing opportunities

We believe that some EID initiatives are rather long term and will be continuously implemented as the lifetime of assets ends. Among these are modular switches and crossings, modular signalling, signalling plug & play and standard designs. We assume that for these activities at least the average savings of CP4 can be carried forward throughout CP5 which would result in an additional £100 m per year.

7. Commodities

As we have explained category management has been introduced but still has room for further development in IP. We assume that as in other spend categories some further savings in a range of 1-2% could be feasible. This would result in savings of £7 to 15 m per year.

Future opportunities

If we add up the further effects of the other initiatives such as the increased use of possessions, leaner processes, better worksite logistics then a range of **£300 to 400 m** in annual savings driven by supply chain improvements seems to be in reach, although we are not able to substantiate this potential by single quantified initiatives.

Savings potential from …	Annual savings in m £ (min)	Annual savings in m £ (max)
1. Enhancements	46	46
2. Workbank Planning	150	225
3. Efficiencies in track	31	31
4. Efficiencies in other asset groups	No quantification possible	
5. Investment projects	No quantification possible	
6. Ongoing (EID) opportunities	100	100
7. Commodities	7	15
Total	334	417

Figure 26: Potential savings in CP5

A more in depth analysis would require discussing the underlying calculations of Network Rail's Initial Industry Plan and future activities which will be carried on in the Efficient Infrastructure Delivery programme or come on top.

6. Conclusions

Since 2000 Network Rail's supply chain management has been subject to various studies and analyses. The initiatives we studied, feedback from stakeholders and the actual level of maturity demonstrate that Network Rail has undertaken a lot of analyses but commenced just a few years ago to really push change in supply chain management. Network Rail has started with transactional improvement such as tendering platforms, supplier and category management and - in addition to completing and finalising these practices - the focus is now on the complete supply chain and also extends to aspects such as planning, scoping, standardisation and efficient delivery.

The success of CP3 has not been tracked and it is not possible to quantify savings based on optimizing the supply chain. For CP4 savings are being followed-up for a number of large-scale initiatives, stemming from Network Rail's Efficiency Infrastructure Delivery (EID) Programme. It has made good progress but, reports on unit cost efficiency confirm that this might happen at the expense of delivering renewals according to PR08 delivery targets. There is a noticeable trend of underspending especially in track and buildings & civils.

Several approaches to explore more information on underlying performance indicators in supply chain management failed. One of the most recent studies on IP and AM's effectiveness also lacked the necessary quantitative evidence. From our perspective a corporate supply chain management strategy backed by an appropriate dashboard should be in place to steer improvement activities.

Today Network Rail's supply chain management has reached a level of maturity which – according to Network Rail's own assessment – is characterized by defined but traditional processes. Network Rail is at the turning point to employ supply chain management processes with more strategic intent. This is reflected by its new collaborative approach with suppliers but also some of the initiatives which have been started up in EID. As a consequence there still remains a long way to go, which will challenge the organisation but also bear a large potential for further improvement and efficiency savings.

Current transformation programmes such as EID and project DIME illustrate that substantial unit cost reductions can still be achieved through better supply chain management across the complete value chain. In order to make further step changes by continuing on the development path described and creating a stronger value proposition to the business, Network Rail needs to animate the

new collaborative approach with contractors, further standardise assets and assure efficient delivery through more industrial production logic. Despite increasing visibility and stability of works to allow contractors a more consistent and less costly resource management, some potential can still be expected from finalising these plans.

External stakeholders clearly acknowledged that Network Rail has embarked on a transformation programme consisting of a number of large scale initiatives and implying fundamental changes. In practice, for example communication with the supply base is more systematic and intense, and new contracting models are being piloted. The satisfaction index of suppliers shows a positive trend.

Network Rail transformation process is both comprehensive and complex. The combination of a new philosophy of working with the supply base, headcount reduction and organisational changes will require not only different working methods but also a drastic change in people's mindset. There seems to be a lot of positive spirit and a high level of engagement at top management level. The challenge will be to instil this spirit across the organisation right down to route level. If this is not achieved the process might be slowed down and delay benefit realisation.

In CP4, EID will deliver savings of £3.3 bn, 60% of which relates to supply chain management. This corresponds to average annual savings of ~£400 m per year. Network Rail's Initial Industry Plan is proposing average savings of £372 m in CP5. We estimate that roughly £200 m of these savings are supply chain driven. Given the level of maturity Network Rail has reached so far in its supply chain management, the high level of savings which is feasible in CP4, the opportunities identified and the remaining issues still to be solved, this seems to be a rather conservative plan. Large changes such as DIME, the new contracting model which just started, an ongoing process of standardisation, lean and more cost efficient delivery etc. still bear significant room for improvement which should materialise in the next control period. On the basis of our analysis, we would expect a range of £300 to 400 m to be achievable.

Appendix

Interviews

Date	Meetings/conferences with	Participants	Topics
13 Sep 2011	ORR | NR	M. Sultan | P. Colley, I. Smith | F. Zschoche, S. Wiedmer	Analyses, literature, framework
27 Sep 2011	NR	P. Colley, I. Smith | F. Zschoche, S. Wiedmer	Network Rail's supply chain management
27 Sep 2011	ORR | NR	M. Sultan | I. Smith | F. Zschoche, S. Wiedmer	Analyses, assessment framework
03 Oct 2011	ORR | NR	A. Wallace | P. Colley, I. Smith | F. Zschoche, S. Wiedmer	NR's SCM development
03 Oct 2011	ORR | NR	N. Carruthers, P. Colley, I. Smith | A. Wallace | F. Zschoche, S. Wiedmer	Project DIME
08 Nov 2011	NR	P. Harwood, S. Jenkins, S. Chuda | F. Zschoche, S. Wiedmer	Project DIME - Client organisation, NewCo
08 Nov 2011	Halcrow	G. Biggam | F. Zschoche, S. Wiedmer	Knowledge exchange and ORR studies
09 Nov 2011	DfT | ORR	D. Kemp | A. Wallace | F. Zschoche, S. Wiedmer	Adjustments on RVfM/Atkins analyses
09 Nov 2011	NR	A. Tappern, S. Chuda | F. Zschoche, S. Wiedmer	Efficiency tracking, Unit cost assessment
09 Nov 2011	NR	S. Blakey, S. Chuda | F. Zschoche, S. Wiedmer	Work Study, Hackett response, Unit cost
11 Nov 2011	Sersa	M. Benkler | Dr H. Bente	Contractor's interview
24 Nov 2011	ORR	M. Sultan | F. Zschoche, S. Wiedmer	Preliminary results/status discussion
24 Nov 2011	Atkins | ORR | NR	Dr J. Elphick, F. Greenwood | M. Sultan, A. Wallace | P. Colley, T. Chuda | F. Zschoche, S. Wiedmer	Atkins explanations
24 Nov 2011	NR	P. Colley | F. Zschoche, S. Wiedmer	Supply Chain Management
28 Nov 2011	Colas Rail	Julian Dunn | Dr H. Bente	Contractor's interview
29 Nov 2011	Invensys Rail	Will Wilson | Dr H. Bente	Contractor's interview
29 Nov 2011	NR | Halcrow	J. Frangou | G. Biggam | F. Zschoche	EID workstreams and impacts on CP 4/5
29 Nov 2011	NR	V. Hartnall, K. Ferrier | F. Zschoche	C&P Assurance Periodic report, BSC
29 Nov 2011	NR	P. Colley | F. Zschoche	Benefit realisation analysis
29 Nov 2011	Railway Industry Association	J. Candfield | Dr H. Bente	Network Rail's supply chain management
05 Dec 2011	Deutsche Bahn	U. Günther | Dr H. Bente	Contractor's interview
06 Dec 2011	Balfour Beatty	P. Anderson | Dr H. Bente	Contractor's interview
19 Dec 2011	Halcrow	G. Biggam | F. Zschoche, S. Wiedmer	Knowledge exchange and ORR studies
19 Dec 2011	ORR | Halcrow	M. Sultan, A. Wallace | G. Biggam | F. Zschoche, S. Wiedmer	Interim results
13 Jan 2012	Steer Davies Gleave	S. Prentice | F. Zschoche	Maintenance/renewal expenditure PR13
19 Jan 2012	Deutsche Bahn	J. Manegold, U. Günther, Dr K. May | Dr H. Bente, F. Zschoche	Contractor's interview
13 Feb 2012	NR | ORR	D. McLoughlin, I. Sexton, E. Algaard | M. Sultan, A. Wallace | F. Zschoche	SCM review, SCM in Network Rail

Literature

ID	Author	Title	Published
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2	The Hackett Group	Achieving World-Class Performance - Network Rail Indirect C&P Benchmark Results	06.10.2010
3	The Hackett Group	Achieving World-Class Performance - Network Rail Direct C&P Benchmark Results	07.03.2011
4	The Hackett Group	Network Rail Strategic Sourcing Directs - Procurement Assessment Results	03.08.2011
5	The Hackett Group	Network Rail Strategic Sourcing Directs - Procurement Assessment Results - update	03.08.2011
6	Network Rail	Briefing to ORR on Hackett Benchmarking of C&P & Pending Efficiency Proposals	30.03.2011
7	Ipsos Mori	Supplier Perception Study 2011	13.09.2011
8	New Civil Engineer	Network Rail slashes its framework list	11.08.2011
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10	AT Kearney	CP4 Procurement Opportunity Assessment - Main Report Update	30.10.2007
11	AT Kearney	CP4 Procurement Opportunity Assessment - Appendix 2	10.09.2007
12	AT Kearney	2010 Assessment of Excellence in Procurement (AEP Study)	31.03.2010
13	Network Rail	Job advertisement "Head of Client Services"	13.09.2011
14	Adventis Consulting	Transformational Change in Network Rail	01.03.2011
15	Accenture	Review of Network Rail's Supply Chain	11.07.2003
16	Railway Gazzette Int.	A Vision of Change (Summary of McNulty's findings)	01.06.2011
17	Civils Benchm. Alliance	Cost Benchmarking Report - Benchmarking UK Rail Civil Engineering Projects	27.01.2011
18	Network Rail	Network Rail spend 2010/11	11.05.2011
19	Atkins	Rail Value for Money Study - Asset Management and Supply Chain Management	25.05.2011
20	Atkins	Rail Value for Money Study - Whole System Programme Management (Final Report)	25.05.2011
21	Network Rail	Supplier Conference 2010 - Supply Chain Charter & Sustainability	15.07.2010
22	Network Rail	Supplier Conference 2010 - Moving Forward Together 1	15.07.2010
23	RIA	Supplier Conference 2010 - Moving Forward Together 2 and continued by RIA	15.07.2010
24	Network Rail	Supplier Conference 2010 - The Asset Management Challenge	15.07.2010
25	Network Rail	Supplier Conference 2010 - EID Project Discussions	16.07.2010
26	Network Rail	Supplier Conference 2010 - Innovation	15.07.2011
27	Network Rail	Supplier Conference 2010 - Programme Management & Administration	15.07.2011
28	Network Rail	Control Period 4 Delivery Plan update 2010	01.03.2010
29	ORR	Annual efficiency and finance assessment of Network Rail 2009-10	01.09.2010
30	Network Rail	Benefit Realisation Guidance Note	01.10.2010
31	ORR	Periodic review 2008 (PR08) - Determination of Network Rail's outputs & funding	01.10.2008
32	Arup	Network Rail Materials Costs Benchmarking Study	01.08.2011
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34	Network Rail	C&P World Class Programme	06.06.2007
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36	Review Team	Independent PR08 Programme Evaluation	05.08.2009
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38	Network Rail	Project Dime - Changes to our capital programme delivery	26.09.2011
39	Network Rail	Project Dime - Discussions with the ORR	24.08.2011
40	ORR	Periodic review 2013 - Establishing Network Rail's efficient expenditure	01.07.2011
41	Booz&Co.	SCM reader - The Missing Link	30.06.2005
42	RailKonsult	Review of European Renewal and Maintenance Methodologies	05.03.2008
43	Network Rail	Organisational charts - first 3/4 levels	01.11.2011
44	Atkins	Asset and supply management savings and costs	02.02.2011
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46	DfT	Explanation on Atkins' savings and costs model (Duncan Kemp)	01.11.2011
47	Network Rail	Initial Industry Plan - England & Wales	01.09.2011
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49	Network Rail	Strategic Business Plan 2008 update	01.04.2008
50	Network Rail	Annual return 2011	01.07.2011

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57	Network Rail	Initial Strategic Business Plan 2006	01.06.2006
58	Network Rail	CP4 Delivery Plan 2009	01.03.2009
59	Network Rail	CP4 Delivery Plan 2011 update	01.02.2011
60	Network Rail	Presentation Hackett response, Unit Cost Modelling	09.11.2011
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63	Network Rail	Presentation on NR's Supply Chain Management Maturity Model	18.11.2011
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65	Network Rail/RIA/CECA	Network Rail/RIA/CECA Supplier Perception Study 2011	01.07.2011
66	Network Rail	CP5 IP&AM BC Efficiency Review	21.11.2011
67	Network Rail	EID Slides overview	01.10.2011
68	Network Rail	C&P Assurance Card Periodic Report (P7)	01.10.2011
69	Network Rail	Supply Chain Management Maturity Model Update (by Pete Colley)	24.11.2011
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89	Network Rail	Periodic Dashboard Period 5 2011/12	16.12.2011
90	Network Rail	Network Rail's key performance indicator groupings - KPI dashboard info	16.12.2011
91	Network Rail	Track Efficiency & benchmarking (redacted) - ORR	20.12.2011
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95	Arup	Regulatory Accounts Data Assurance (Mandate AO/011)	01.09.2011
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97	Network Rail	KPI IP Dashboard - ID 307: Investment Project Cost Delivery 2009-2012	19.01.2012
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99	Network Rail	Partnering Framework Briefing	23.01.2012
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