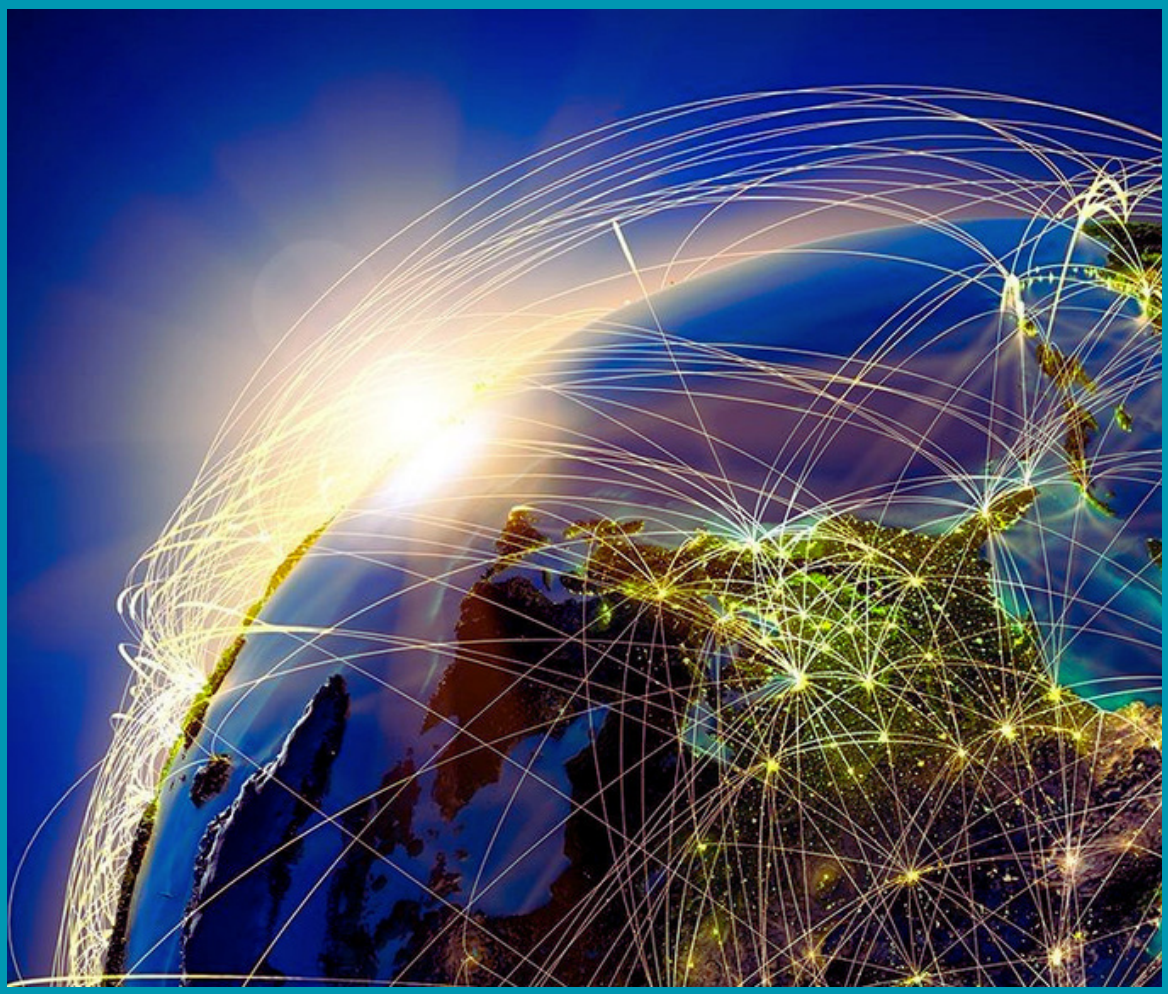
KEY OUTPUT 11: RISKS, MARKET FORCES & SUPPLY CHAIN CHALLENGES



MULTIDISCIPLINARY STEERING GROUP FOR COST ASSURANCE AND AUDITS ON INFRASTRUCTURE PROJECTS & CONTRACTS

MARCH / APRIL 2023 EDITION

CONTENTS

INTRODUCTION

Key Output 11 - Risks Market Forces and Supply Chain Challenges

In Key Output 11, our steering group examines the risks, market forces and supply chain challenges. We discuss the topic as usual from a multi-disciplinary perspective. We explore the topic from the perspective of funders, clients, legal and contract experts, audit and assurance experts and contractors delivering infrastructure projects. This output developed by our steering group includes discussions on key themes relating to the topic, real-life issues and practical examples and examines the future outlook.

Our multidisciplinary steering group of diverse experts, professionals, and member companies have the required wealth of UK and global expertise on cost assurance and audits on infrastructure projects and construction contracts. Through our CSR and governance initiative, we are working collaboratively with funders, clients, and contractors to drive change and transformation industry-wide. Our vision is to lead on this nationally in the UK and globally on construction projects.

Key Topic Q&A Themes

1. What are the impacts and risks that you are experiencing due to inflation and other market forces on UK/global infrastructure contract costs?

2. How can the different forms of infrastructure contracts help to govern resilient and sustainable supply chain practices globally?

3. How is it possible to achieve assurance of cost and value in a period of uncertainty and changing global market forces?

4. How can infrastructure projects globally best mitigate against risks of contract price increases in a volatile inflationary period?

5. What effects i.e. pros and cons, are we likely to see in future from increasing global demand for supply chain collaboration?

6. How can collaboration create opportunities to resolve current and emerging supply chain challenges on infrastructure projects?

7. What are the outlook, the pros, and the cons that we will we see from increased government demand for supply chain transparency globally?

8. Leveraging technology, what will an effective, highly visible supply chain look like and what benefits and challenges will this present for the parties?

Access our past steering group key outputs and CICES articles here: http://bit.ly/3zXEXpo

FOREWORD

There is currently no industry-wide, UK-wide, or global standard for cost assurance and audits on infrastructure projects or contracts. Actual cost data and lessons learnt from previous projects throughout the project lifecycle are not always correctly captured, passed on or used to make better informed cost decisions. All participants in the value and supply chain for construction are therefore still subject to risk. Assurance should start with data-led decisions at all stages from pre-contract investment funding, budgeting, design, estimating, contracting, contract management, reporting to the cost assurance audit phase.

Multi-disciplinary Steering Group

The multidisciplinary steering group for cost assurance and audits on infrastructure projects and contracts (a CSR initiative) was borne out of the joint agreement by the parties on the need for this. From the onset, we sought to make this a diverse multidisciplinary group of experts because we know from experience that successful projects across sectors consist of experts from diverse backgrounds and professions. The steering group comprises a panel of professionals and representatives from a cross-section of the industry, including lawyers, contract specialists, auditors, engineers, quantity surveyors, and consultants.

The objective is to meet quarterly in a setting where lessons learnt and best practices from real-life experiences from projects delivered around the world in various industries and sectors are shared confidentially, creating a common voice of interpretation to help identify and resolve issues quickly and to share knowledge, expertise, and best practice on infrastructure projects. The goal is for the group to deliberate early on emerging issues, key issues, and short, medium, or long-term options for resolving these from multiple lenses.

The challenge and remit (in volume 2) of the steering group's work informed by our 2022 industry-wide conference in collaboration with Eversheds Sutherland were an industry wide call to continue 1.To continue discussing and highlighting more real-life practical challenges 2. To address assurance throughout the project lifecycle from funding to completion 3. To provide through our expertise deep insight into the future of UK and global infrastructure projects and construction contracts. The steering group responds to this call to address these challenges through access to our deep diverse multi-disciplinary expertise, and our quarterly key outputs and thought leadership reports that are driving industry-wide change and transformation on infrastructure projects and construction contracts by addressing:

1. Risk and market forces
2. Supply chain challenges
3. People challenges
4. Cost audit and todays wider ESG assurance remit
5. Legal and construction contract settlements
6. Technology and digital in cost and sustainability assurance
7. Process standardisation and improvements
8. Digitisation data analytics and cost and sustainability reporting

FOREWORD

Outputs

The steering group is multidisciplinary, and collaborative and jointly produces quarterly outputs in articles, protocols, documents, and best practice guides and communicates guidance on the latest thought leadership to the broader industry. Technology and sustainability are fundamental aspects of our remit that are featured quarterly. These outputs are summary recommendations and the latest thinking from multiple lenses and our experts, and we hope that the industry finds these beneficial. Our past outputs can be found and downloaded here: https://www.cfbusinesslinks.com/multi-disciplinary-steering-group/

Our Members

- Cecelia Fadipe - CFBL Consulting (Chair)
- Imran Akhtar - Turner & Townsend
- Claire Randall-Smith - Eversheds Sutherland
- Ian Heaphy - INCC / NEC
- Gary Bone - Blake Newport
- Darren Ward - The Orange Partnership
- Tom Leach - Southern Water
- Kathleen Hannon - Scottish Water
- Shy Jackson / Jennifer Varley - BCLP
- Charlotte Edwards - Atkins / SNC Lavalin
- Jim McCluskey - Vinci Construction /CICES
- David Worsley - Transport for the North
- Elliot Patsanza - Ridge & Partners
- David Sharp - Mott Macdonald
- Michael Bamber - WSP
- Justice Secheles - Arup
- Chris Leech - Balfour Beatty
- Victoria Hill-Stanford / Lisa O'Toole / - Network / HS2
- Martin Perks - National Highways
- Chris Richardson - Colas
- Charlotte Hughes - DLA Piper

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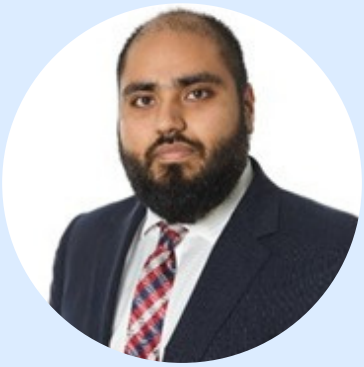

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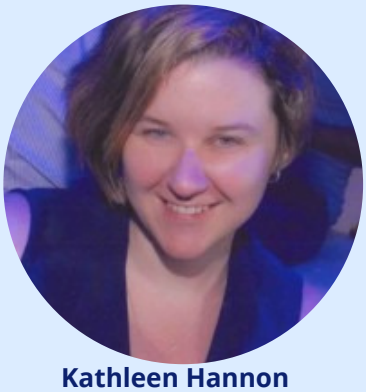

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REPRESENTATION

From employees, professional members and associates of:

Disclaimer

The views, opinions and thoughts expressed by members and contributors to the steering group reflect only the author's views and not that of their employer or professional body.

Cecelia Fadipe
CFBL Consulting

Cecelia is a qualified accountant of 25+yrs, and director of CFBL Consulting, a cost and strategy consultancy specialising in independent cost audits on infrastructure projects and strategy advisory. She has worked across commercial, finance and project control functions. A CIMA fellow and member of AICPAs, sustainability and R&D panel. She is a cost consultant and auditor experienced in the rail, technology, defence, renewable energy and electrification sectors and has led audits on major programmes. She is chair of the multi-disciplinary steering group. Her career in construction spans 20 years and she has worked on high-profile projects such as HS2, Hinkley Point C and Crossrail, and as a result brings a wealth of knowledge and experience to this space.

How is it possible to achieve assurance of cost and value in a period of uncertainty and changing global market forces on infrastructure projects and construction contracts?

Current State - The current state of the global economy is that material and supply price inflation is negatively impacting people, plant and material costs from increasing steel, concrete and skilled labour costs. This is worsened by the growing demand for environmentally sustainable but more costly materials and fuel. These factors are making it challenging for funders, clients and contractors on infrastructure projects and in the construction sector to achieve assurance of cost, revenue and planned value. Furthermore, rising fuel costs are increasing utility, plant and equipment costs and funders and clients perceiving these as major risks are delaying, descoping projects or awarding smaller-sized projects due to budgetary pressures. These further result in lost cost savings from economies of scale and higher long-run costs. Collectively these are decreasing profitability in a sector already operating on relatively low margins and more construction companies are increasingly experiencing liquidity issues.

Supply Chain Price Competition - Forcibly lowering prices in the bidding process to win contracts is continuously driving down prices for clients in the short-term at contract award but makes cost assurance challenging for consultants and contractors. Where it is not possible to be innovative and collaborative in maintaining costs, quality and time, this results in negative behaviours to recoup costs and profits outside of agreed contract terms or attempts to transfer risk later, which should have been priced in the original contract price. We have seen clients also attempting to transfer risks to the contractor as a result of unforeseen budgetary pressures outside of authorised risk contingency levels. We as independent auditors must ensure that the parties adhere to contract terms as intended by the legal contracts. During cost assurance audits, as auditors, we identify issues such as non-complainant costs and disallowed costs not reimbursable under the contract. We also identify costs for unforeseen risks that should be shared between the parties client and contractor as intended by most cost-based or alliance contracts and often flag these as items for discussion and agreement.

Value of Infrastructure Projects - On the face of it, this makes value from the sector appear less profitable and viable for investors, but the role infrastructure plays in fuelling the global economy and providing less volatile investments in the capital markets and the opportunities presented by decarbonisation infrastructure projects are undeniable.

Cost Assurance and Market Forces - From an assurance perspective, these drivers will result in increased supply chain cost transparency and an increased need for governance and assurance regimes that will include audits to bring projects within budget, to achieve expected returns and value from infrastructure investments.

What are the outlook, the pros, and the cons that we will see from increased government demand for supply chain transparency globally?

Outlook - The outlook is that increased government demand for supply chain transparency is expected to continue globally as governments are increasingly recognising the value that transparency brings to the accuracy of supply chain data, particularly as transparency enables the protection of public interest, promotes sustainable business practices, self-governance and actual cost accountability. Increased demand for supply chain transparency will result in greater compliance as auditors will be more equipped to identify and mitigate emerging supply chain risks, on the other hand, risks and legal damages will likely increase from identified non-compliant costs with this increased transparency.

Pros - Increased transparency will ensure that protocols for people, processes, systems and controls are agreed upon early and enhance the auditors' ability to undertake effective due diligence earlier and clients and contractors too will be more equipped to make accurate informed decisions, comply with regulatory requirements and reduce legal penalties. Supply chain transparency in the short term will increase costs for construction businesses as they will require additional resources, technology and expertise to ensure that they can correctly capture, monitor and report on wider supply chain data. Companies that do not have the resources or expertise to comply with increased transparency requirements will be at a competitive disadvantage as data increasingly becomes an invaluable asset.

Cons - There will be increased governance and a reluctance to disclose data related to supply chain activities defined as commercially sensitive such as pricing and sourcing data that provides a competitive advantage. This will make transparency difficult and will lead to administrative and legal risks. Using technology such as blockchain, sensors and cloud-based systems may help increase compliance and create a more transparent supply chain. This technology will provide real-time data and analytics as information can be tracked end to end from product design to raw materials and end customers. Technology will improve sustainability across the supply chain from the tracking and reporting of carbon emissions and water usage, inform stakeholders about actual carbon costs and their impact on the environment. This will increase accountability for businesses and make it easier for funders to make informed investment decisions and for businesses to improve ESG KPIs and decarbonise.

Supply Chain Transparency and Cost Assurance - A highly visible supply chain will improve risk management, governance and cost assurance. This is because auditors will be able to identify and flag potential risks more easily helping project leaders mitigate them early. Leveraging technology to achieve this will result in an initial upfront cost but allow for increased automation, help streamline processes and reduce errors. As the use of technology increases, risks, legal complexity and uncertainty will also likely increase, as businesses will need to navigate new compliance protocols and new legal regulations, which could inadvertently lead to more complexity increased administrative burden, increased risks such as data breaches and cyberattacks and costs if not well managed.

Claire R. Smith
Eversheds Sutherland

Claire is a lawyer specialising in construction and engineering disputes with experience in litigation, adjudication, mediation, and domestic and international arbitration. Claire acts for employers, contractors, and subcontractors across a wide range of projects including large-scale infrastructure projects, energy, utility, oil, and gas supply projects. Our global teams operate seamlessly to deliver the commercial know-how and strategic alignment that clients need from their advisers to help further their business interests. We shape our advice to the unique circumstances and challenges of each project and ensure the right people are in the right places to offer insight and certainty every time – from the day-to-day to complex, multi-jurisdictional transactions.

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

In the current climate, it is important that projects put in place the most appropriate contractual structure to drive the right behaviours and encourage transparency and robustness across the supply chain. This can be achieved by adopting a more collaborative form of contract, which includes obligations of good faith and promotes the early identification and management of risks (e.g. NEC, FIDIC & JCT). This encourages the parties to work together and brings greater transparency to events that cause delay or additional cost. Contracts which incentivise the parties and reward good behaviours, such as target cost contracts, can also help to ensure the interests of the parties are aligned and build resilience across the supply chain.

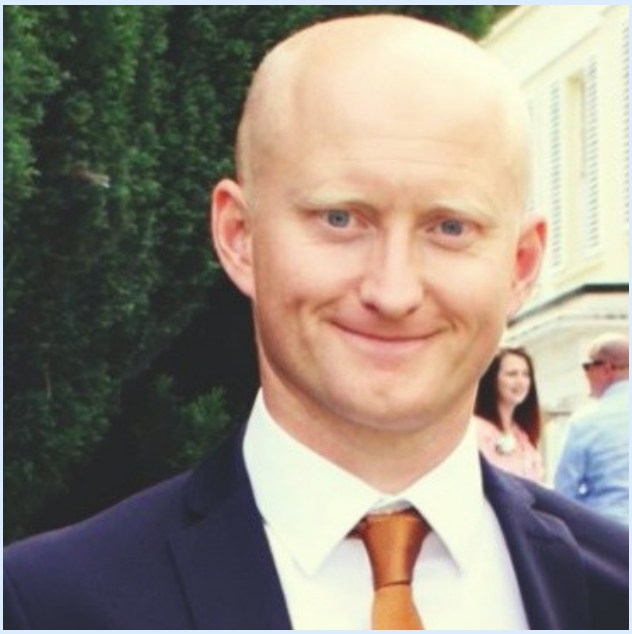
Another option is a partnering or alliancing contract structure, which has more of a holistic approach, creating a multi-party relationship between the employer and the wider supply chain. The aim is for the parties to work together with the common aim of delivering a project, rather than one individual bearing a particular risk or responsibility. Ultimately no contract is without risks or issues, and whilst the structure is important, selecting the right team, actually using the contract and promoting the right approach to manage such risks and issues is key.

Leveraging technology, what will an effective, highly visible supply chain look like and what benefits and challenges will this present for the parties?

Deploying new and innovative technologies on infrastructure projects is likely to have a huge benefit on improving efficiency, and transparency and encouraging proactive behaviours in the supply chain, at the same time as meeting sustainability challenges. Using an integrated IT network and contract management software on a project, so that there is one compatible platform, encourages the sharing of information in real time and allows parties to deal with issues and manage risks proactively and pre-emptively.

The use of 3D modelling (already widely adopted in the build environment industry) and virtual and augmented reality tools also increases efficiencies and reduces errors, allowing the supply chain to visualise and walk through a project. This can greatly assist with the interface and coordination of design, and allow modifications to be made before orders are placed and risks to be identified early.

To be most effective, using new technologies and digitalisation will need the commitment and buy-in of all parties – this can be challenging when there are smaller businesses involved and cost is a factor. If investment in and the embracing of digitalisation comes from the top of the chain, it should benefit the project as a whole. There can also be other challenges such as the risk of business interruption or data leaks, so projects need to have adequate contingency plans and data protection policies in place across the supply chain.



Tom Leach
Southern Water

Tom is the Head of Commercial Management at Southern Water. He is a chartered surveyor and manager of commercial, contract, and audit teams for large infrastructure clients and contractors. Specialising in the commercial management of construction contracts, claims, and disputes, He demonstrates a solid track record in infrastructure markets with experience in major energy, water, aviation, transport, and communications networks.

What are the likely and unlikely impacts and risks that you are experiencing due to inflation and other market forces on UK/global infrastructure contract costs?

Client perspective

The extent of inflationary pressure has caused challenges to contract obligations drafted in the pre-excessive inflation era. For long-term framework agreements, the client may have allocated the risk to a contractor with perhaps an indexed measure of inflation being the only remedy.

General indexed measures such as CPI have proved insufficient to cover contractors' cost exposure in the real world of construction. The basket of goods in construction has been more adversely affected. The impact has been on solvency risk and continuity of supply which helps neither party.

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

Linking back to the inflation risk: where contract remedies have been wholly insufficient causing performance or continuity issues, those parties to a construction contract are potentially better off utilising partnering behaviour to achieve modifications to the contract which strike a more sustainable level of risk.

Jim Mcluskey
Vinci

Jim is a Qualified and experienced Commercial Manager and Chartered Quantity Surveyor specialising in large value complex major infrastructure projects. He has been working on major infrastructure projects since 1995. on negotiation and resolution of final accounts. He is driven by the challenge of complex infrastructure projects and solving contractual problems. He manages commercial teams on large scale providing mentoring and leadership to assist staff development. Jim has significant procurement experience on major multi £m projects. He is result focused and driven to deliver commercial objectives with high integrity. He has experience as a contractor and in client organisations with a track record of working closely with clients to achieve mutual objectives.

What are the likely and unlikely impacts and risks that you are experiencing due to inflation and other market forces on UK/global infrastructure contract costs?

Inflation is understandably causing some clients budgetary issues in terms of their spending forecasts and predictions which may require them to review their funding provisions and spending affordability going forward.

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

If the scope and design is developed to a complete / final stage, this helps the supply chain provide a more robust price. Design and Build contracts are not helpful in this regard. If time permits then a fully scoped and detailed design aids better and robust pricing which leads to more accurate cost control, forecasting and predictability.

How can collaboration create opportunities to resolve current and emerging supply chain challenges on infrastructure projects?

Early engagement and collaboration really benefits major projects particularly if key supply chain members can be included. ECI contracts including framework agreements are now common place. Projects can benefit in terms of cost and programme benefits during this phase. This in turn assists the supply chain in fixing their costs and commitments at an earlier stage.

Imran Akhtar
Turner & Townsend

Imran is an experienced chartered accountant (ACA) providing Cost and Commercial Assurance services to a variety of major infrastructure clients with prior experience in external and statutory audits from working at the U.K National Audit Office. He is currently U.K lead and global SME for Cost Assurance service development and delivery within Turner & Townsend global provider of consultancy services within the construction industry.

How is it possible to achieve assurance of cost and value in a period of uncertainty and changing global market forces?

Adopting a collaborative approach between project owners and their supply chain is critical, particularly given the issues facing the industry. The adoption of open book contracts continues to increase in frequency given the complexity and scale of programmes and projects. These contracts require the supply chain to provide access to their data and information to demonstrate compliance and performance. Project/programme owners should implement an assurance and audit regime that properly utilises this environment to gain progressive assurance of their supply chain's contractual compliance and performance. The methodology deployed should be focused on supply chain controls, systems and processes to build a detailed understanding of the challenges being faced and the ways to best navigate these. The use of a varied and qualified 'lines of defence' approach will further strengthen the ability of owners to de-risk delivery.

What are the outlook, the pros, and the cons that we will we see from increased government demand for supply chain transparency globally? - Auditor / Finance

Outlook: There is an increasing requirement to use open book contracts due to the complexity, scale and duration of programmes/projects. Whilst some hybrid models have been or are being used that integrate fixed price or lump sum elements the majority of works will be undertaken against contracts where the supply chain has to provide transparency of their records. Additionally, due to the size and complexity of the project/contracting, environment, there is an increase in open book environments being adopted into more levels of the supply chain (e.g. Tier 2 and 3).

Pros:

- These environments provide an opportunity for the programme/project owner to get real-time and up-to-date information on the actual cost of goods, materials and supplies during delivery to feed into future pricing, change management and also into the owners/clients' wider project delivery environment.

- Open book environments are typically more collaborative and allow for innovative ways of working to be established that drive efficiencies in cost, schedule and change management.

- The implementation of a progressive audit and assurance regime will provide certainty to the supply chain of agreed costs stabilising their cash flow and avoiding any significant disallowed costs or disputes later in the project.

Cons:

- Open books contracts require additional administration which ultimately will result in a higher people cost during the contract lifecycle.

- Whilst tier 1 suppliers may have open book arrangements this typically converts to lump sum arrangements further down the chain which ultimately limits the level of detail and data able to be collected.

Shy specialises in construction and engineering law and his practice covers project advice and acting in a dispute related to UK and international projects. His experience covers litigation, arbitration, adjudication, and ADR and he has advised on all main forms of contract, including NEC, JCT, and FIDIC. He is a fellow of the Chartered Institution of Civil Engineering Surveyors. He is a visiting lecturer at King's College London and the University of Stuttgart, a member of the NEC Contract Board, and a council member of the UK Society of Construction Law.

Shy Jackson
BCLP

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally? -

Using the appropriate standard form contract will save on transaction costs, but avoiding the need for specific advice on extensive bespoke amendments and amending any existing procedures to ensure staff understand the effect of any changes to standard forms. In addition, risk allocation in standard forms is based on what is seen as a fair balance and if that is maintained then it should make it easier to price risk and have more certainty as to how the contract is meant to operate. In addition, the standard forms can be used to encourage better contract management in terms of early warning and effective use of the programme, mechanisms which are becoming more common in standard form contracts such as NEC4. Imposing and encouraging the use of such systems should not only improve transparency but should help to identify and resolve issues earlier and avoid unnecessary escalation. A key point is that forms of contract that seek to actively prevent disputes will be beneficial to both parties and reduce unnecessary costs.

Leveraging technology, what will an effective, highly visible supply chain look like and what benefits and challenges will this present for the parties?

Technology has the potential to transform how the supply chain is managed, automating many of the processes such as ordering items and also enabling tracking of any equipment so it is clear when, for example, a façade module has left the manufacturing plant, when it is expected to arrive and confirming delivery which can then be used to release payment. One well-known example is how Walmart Canada used blockchain to reduce payment disputes with its large number of freight carriers, while also achieving operational efficiencies. This meant that only 1% of invoices had discrepancies that had to be resolved, with the previous figure being over 70%.

At a more simple level, technology will mean a move away from paper-based subcontracts with a small number of original copies stored in different locations, to virtually executed versions that are kept on the cloud. This will provide for greater transparency as it will be very easy to share a copy of the contract but in addition, the digital nature of such contracts will allow the easy extraction of key data across a large number of subcontracts. This will make it easier to track and compare commercial terms and other information, which should make it easier to monitor performance and identify areas for improvement.

Such a change, however, will not happen overnight. Clients and main contractors will need to identify what systems work best for them and then take the necessary steps to implement them, which is likely to require the involvement of the supply chain. They will also need to ensure that their systems are capable of being adapted so that they can fit into whatever systems are required. This will require investment in technology by all parties but there is also the risk that each client or main contractor will develop their systems, which will put a burden on the supply chain that is likely to find that they are implementing different processes on different projects, which will be a challenge to manage effectively in addition to the usual issues that experience has shown come up when new systems are being used and the process is slowly developed before it can be regarded as optimised. This is therefore an area that is very suitable for industry discussion and ideally the development of an accepted standard or a protocol with common principles to minimise inefficacies. In effect, such a system is similar to the implementation of BIM and may well be capable of being integrated so it would be beneficial to look at how BIM has developed and what lessons can be learnt.

Kathleen Hannon
Scottish Water

Katy is an experienced Quantity Surveyor with a demonstrated history of working in construction/contractor/client-held roles within the construction industry. Skilled in negotiation, tender optioneering, value engineering, contract drafting and administration (NEC & JCT), change control, dispute resolution, auditing cost and commercial Compliance, and other aspects of commercial management. She is a chartered surveyor working towards an LLM in Construction Law from the University of Strathclyde to reinforce existing experience and knowledge.

What are the likely and unlikely impacts and risks that you are experiencing due to inflation and other market forces on UK/global infrastructure contract costs?

The shift in market forces and inflation may lead to unexpected tensions in a variety of ways including difficulties in securing materials, skilled personnel, time pressures as well as budget pressure. It can also make information gathering more difficult due to increased uncertainty. Open communication, transparency and a focus on risk management/planning can assist in relieving tensions to an extent however due to the nature of the risks affecting the market, a short-term view may not be sufficient, longer term planning is also needed with the flexibility to adapt.

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How can collaboration create opportunities to resolve current and emerging supply chain challenges on infrastructure projects?

The benefits of collaboration are varied and include access to a wider knowledge base and network. This could be particularly beneficial for monitoring and actioning global risks as it provides all parties with access to more information on the progress/extent of these risks. Supply chain pressures due to global challenges may be felt across the industry but may be more acute in certain areas in the short term, medium term or may have longer-term impacts.

Collaboration allows for the sharing of this information to assist in risk mitigation and decision-making to secure long-term sustainability/protection. In this way, all parties can protect their interests as well as the continuity of the projects against known or unknown risks and combine their knowledge, expertise and networks to mitigate potential risks at a business level as well as at a project level.

Gary is an experienced construction, and commercial consultant. His specialism includes dispute resolution, Quantum, and Delay analysis, contract administration, construction law, subcontract management, reporting, cost control, and change management.

Gary Bone
Blake Newport

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

In terms of helping the supply chain to be resilient and sustainable (i.e. sustaining as a business and able to meet demand), the keyword is “help”. The contract itself cannot ensure resilience and sustainability but it can contain mechanisms and remove unnecessary barriers to ensure cash flows quickly and subcontractors and suppliers remain profitable, all things being equal.

Whereas in the recent past inflation, clauses were sometimes inserted but little attention was actually given to them because the UK and general global rates of inflation were generally low and stable, there is/should be much greater focus on their operation, suitability of the mechanism to the task at hand (i.e. which indexation should be used) and timing of when it is applied. Sometimes published indexes are months behind in terms of reflecting the reality of the market and due to current volatility, that can be fatal to some suppliers. The most used standard forms all have inflation clauses that can be added, but are they suitable to the specific trade/supplier and volatility of the market they operate in?

Now more than ever, the speed at which funds can move down through the supply chain could make a difference in whether the entire supply chain survives during the project. Liquidations and receiverships can have huge programme and financial implications to all parties involved in a project. Contract terms can be agreed for innovative payment mechanisms, such as project bank accounts, quick payment terms and not withholding retention unless absolutely necessary (is retention actually fit for purpose today?).

On cost reimbursable contracts, are cost audits being regularly held and in accordance with how often the contract dictates? Can these be made more regular if costs are being disallowed for a long time because of the regularity of the audits? Can the parties agree quickly at the start of projects which costs will be disallowed and which will not and then work collaboratively going forward to ensure costs are not disallowed “pending review”?

Elliot Patsanza
Ridge & Partners

Elliot has over 30 years of experience providing specialist pre and post-contract commercial and project management services in the built environment across multiple sectors that include: infrastructure, residential, office, leisure, and mixed-use development projects. His pre-contract areas of specialism include development due diligence and feasibility assessment, value engineering, cost planning, procurement strategy development, contract form selection, and contract drafting. Post Contract: proven in-depth experience in leading large project and commercial management teams to deliver high-value, key complex programmes.

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

- Use of unamended international industry standard forms such as the NEC4 suite of contracts promotes certainty of commercial risk allocation in the supply chain. The use of amendments (Z clauses) should be kept to a minimum as this reduces certainty within the supply chain.
- Well-planned and thought-out use of procurement strategies and pricing forms (option A-F) can further promote a resilient supply chain.
- Sharing commercial risk through the use of option C/D target cost for example and ensuring risk is appropriately allocated to the party best placed to manage and handle it. Specifying sustainable outputs and outcomes within the contract, which are measurable should be applied in contracts to drive sustainable infrastructure developments.
- All forms of contract should instil a structured approach that focuses on downstream supply chains and ensure they operate and source their labour and raw materials by best practice and sustainable globally accepted norms.

What are the outlook, the pros, and the cons that we will we see from increased government demand for supply chain transparency globally?

- Higher service levels from supply chains as they will all deliver in alignment with similar quality standards, accreditations and audit regimes.

- Optimum use of resources as openly shared data enables the market to identify areas of low demand and re-allocate resources to areas of high demand.

- Resource optimisation- Low wastage as resources are allocated and distributed to areas where they are mostly required.

- Supply chain transparency leads to higher trust levels with the end customers. It also reduces unrealistic expectations from the customer as they have access to the supply chain process.

- Openness will generally result in more resilient supply chains as clients learn about where their products come from and how they are delivered. This will enable them to have robust risk management and mitigation processes for when issues arise.

Cons

- Supply chains are a complex network and it is increasingly becoming difficult to track every input and supply chain tier. Globalisation has made the tracking of goods difficult.

- The demand for openness can at times lead to unintended consequences of stifling innovation as there are reduced incentives to reward firms that invent different processes and products.

- Enforcing supply chain transparency on a global scale can also lead to increased costs as firms invest in aligning with legislation and standards as well as tracking, and monitoring their supply chains.

- Transparency may leave certain businesses vulnerable to possible attacks and damages in areas such as espionage, trade secrets, cyber-attack, market intelligence risks.

Charlotte Hughes
DLA Piper

Charlotte is a Senior Associate in the Construction and Engineering Disputes team at DLA Piper, specialising in contentious construction and engineering matters for national and international Employer and Contractor clients. Acts on behalf of claimants and defendants across numerous dispute resolutions. Her Experience includes delay, prolongation, breach of contracts claims, defects liability claims, concurrent delay, payment disputes, and termination and insolvency advice in relation to construction contracts, often involving complex technical and contractual issues and multiple parties across numerous jurisdictions.

How can the different forms of infrastructure contracts best help to govern more resilient and sustainable supply chain practices globally?

Ascertaining the best contractual framework, based on the needs of the Employer and supply chain collectively, is vital to governing more resilient and sustainable supply chain practices – there is no 'one size fits all' approach. Planning, assessing and implementing the best framework at the outset of the supply chain relationship, preferably on a collaborative basis, to select a specific form that suits all parties, and the nature of the project(s) is key. This requires initial due diligence in the supply chain to understand their key concerns about the management of risk and cost, as well as horizon scanning to consider which form will best serve future projects. Such information will then enable the drafting of 'template' contract amendments on future contracts, which can be reissued with minimal further input to increase sustainability and resilience (through cost savings and reassurance through the familiarity of terms). Such practices will enable a project team to better endure uncertain market forces, through a deeper understanding of the contractual framework across the supply chain.

Leveraging technology, what will an effective, highly visible supply chain look like and what benefits and challenges will this present for the parties?

Taking cost-reimbursable/target cost projects as an example, in theory, it should be possible to have an integrated cost system where parties are given restricted access to supplier cost data for payment and allowable cost audit purposes. Layer project bank accounts on top and it could be possible to have an ongoing audit/payment cycle that is instantaneous. AI, machine learning and integrated smart measurement systems can even reduce the human interactions in the process which then enables human focus elsewhere. This will allow subcontractors, contractors, consultants and ultimately clients to 'drill down' through the supply chain to view costs incurred at any time. Coupled with cost, the project bank account allows Cost/Income Analysis to be undertaken to ensure that, at the project level, the financial health of suppliers can be monitored.

That all sounds somewhat utopian and there are many reasons why this would be difficult or impossible. Data protection laws would make it difficult for multiple parties who may have a genuine interest in the granular detail of labour costs to be able to check them. Plant and equipment may be on site, but is it being used to provide the work, or is it just parked in the corner of the site gathering dust? The reality of integrating accounting systems into a project system is unlikely. Who is going to police it and allow access to it? Will there be a realisation that some suppliers are making uncomfortably high margins? What does that mean the next time the parties contract?

The human effort may come at different points. Ensuring the raw data is entered and allocated correctly for example. This ensures the output can be trusted. When it comes to calculating payment, are there changes that need to be assessed under the contract which dictates the payment or the pain/gains share? Ultimately it may boil down to what the parties and the law are willing to tolerate which sets the level of automation, but the more that can be automated from a financial point of view allows the focus to be on delivering the work and not worrying about where the next payment is coming from or whether a fair price is being paid.

Martin Perks
National Highways

Martin Perks is a highly accomplished professional with a diverse range of skills in the construction and business sectors. As a visiting professor at Birmingham City University and a Chartered Surveyor (FRICS), he possesses expertise in quantity surveying and project commercial management. Martin serves as a Board Director of Lean Construction Institute UK and is a member of the Institute of Collaborative Working (MICW). Additionally, he chairs the VOX Datavista Group as a NED. With a PgCert in Research Practice, Martin is a business performance coach and is currently training to become a life coach. His specialties include sustainable procurement, lean construction thinking, and asset management.

What are the likely and unlikely impacts and risks that you are experiencing due to inflation and other market forces on UK/global infrastructure contract costs?

As a client, inflation and other market forces can have both likely and unlikely impacts and risks on infrastructure contract costs. Such as:

Likely Impacts and Risks:

- Higher Costs: If inflation and other market forces are causing prices to rise, it is likely that the cost of the infrastructure contract will also increase. Generally, while prices rise the funding envelope does not, causing commercial tension. This may cause clients to be trading without funds to meet their obligations under the contract.
- Delayed Projects: Inflation can cause delays in infrastructure projects as contractors may have to renegotiate sub-contracts and supply agreements due to increased costs. This can result in delays to the delivery of the infrastructure project, which can have negative impacts on achieving benefits.
- Reduced Quality: Inflation can lead to cost-cutting measures by contractors, resulting in lower quality infrastructure being delivered to the client.
- Under the UK Greenbook used to determine the BCR for public expenditure the value of benefits is not inflating at the same rate as construction costs. This can jeopardise the viability of marginal value schemes.
- Rapid inflation causes tension in target price schemes without the flexibility within the contract mechanism to adjust the target price for indexed inflation. As historic inflation has been low, most target price contracts have excluded this optional clause.

Unlikely Impacts and Risks:

- Lower Costs: While inflation can cause prices to rise, it is possible that other market forces such as increased competition driven by a shrinking market or efficiency gains can offset the increase in costs. This could result in lower infrastructure contract costs for the client.
- Limited Access to Contractors: If market forces result in increased demand for infrastructure services, it is possible that there may be limited access to contractors. This can result in higher contract costs or delays in finding a suitable contractor.

- Currency Fluctuations: If the infrastructure contract involves international suppliers or sub-contractors, currency fluctuations can impact the cost of the project. This can result in higher costs if the client's currency weakens against the supplier's or contractor's currency.

Overall, as a client, it is important to monitor inflation and other market forces that can impact infrastructure contract costs. It is also important to work closely with contractors to mitigate risks so that the infrastructure project is delivered on time, on budget, and to the desired quality.

How can collaboration create opportunities to resolve current and emerging supply chain challenges on infrastructure projects?

Integrated Project Delivery (IPD) is a collaborative approach to project management that involves all parties working together as a cohesive team. In the context of infrastructure projects, IPD can create opportunities to resolve current and emerging supply chain challenges from a client's perspective. Here are some ways that IPD can foster collaboration and overcome supply chain challenges:

- Early Involvement: IPD involves all parties in the project from the early planning stages. This enables stakeholders to identify potential supply chain challenges early on and develop strategies to overcome them. By involving all parties in the early stages, IPD can help to prevent issues from becoming bigger problems that can impact the project's timeline, cost, and quality.

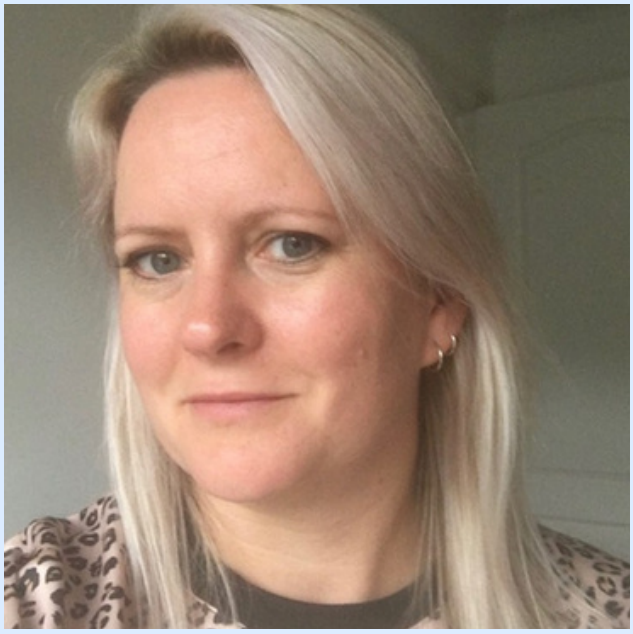
- Shared Goals: IPD encourages all parties to work towards shared project goals. This includes aligning interests and incentives to ensure that everyone is working towards a common purpose. By establishing shared goals, IPD can help to overcome potential conflicts and create a collaborative culture that supports supply chain success.

- Collaborative Contracting: IPD involves a collaborative contracting process that incentivises all parties to work together towards shared goals. This includes creating a contract that rewards collaborative behaviour, such as sharing risks and rewards. By creating a collaborative contracting process, IPD can help to foster teamwork and create opportunities for all parties to work together to overcome supply chain challenges.

- Open Communication: IPD requires open and transparent communication between all parties involved in the infrastructure project. This includes regular meetings and frequent updates on project status. By promoting open communication, IPD can help to identify potential supply chain challenges early on and develop strategies to overcome them.

- Continuous Improvement: IPD fosters a culture of continuous improvement. By working together collaboratively, all parties can learn from each other and implement best practices that improve the supply chain process. Continuous improvement helps to enhance the project's overall efficiency, reduce costs, and ensure better outcomes.

In summary, IPD can create opportunities to resolve current and emerging supply chain challenges on infrastructure projects from a client's perspective. By fostering collaboration, establishing shared goals, using a collaborative contracting process, promoting open communication, and supporting continuous improvement, IPD can help clients overcome supply chain challenges and deliver infrastructure projects on time, on budget, and to the desired quality. As a client, it is essential to embrace IPD and encourage all parties involved in the infrastructure project to work together collaboratively towards shared goals.



Charlotte Edwards
Atkins - SNC Lavalin

Charlotte is a Commercial Manager at Atkins SNC Lavalin with 15 years of industry experience on complex major civil projects, working for contractor organisations such as Costain, Bam, Kier, Mace, and Atkins. She has worked as both an estimator and a commercial manager and brings with her experience significant contributions to the steering group. She is currently working on the East-West Rail Alliance as the Atkins commercial lead.

How can infrastructure projects globally best mitigate against risks of contract price increases in a volatile inflationary period?

Contract options and risk adverse subcontracting can mitigate price increases between the supply chain and projects. The element that is not as predictable is the effects of industrial action that are affecting the rail sector. The effect of these as a compensation event is not fully known and are difficult to estimate.

What effects pros and cons, are we likely to see in future from increasing global demand for supply chain collaboration?

Consultants, contractors, and the supply chain are communicating with each other on the performance, best practice, health and safety issues, “Black box” thinking. This is via mediums like LinkedIn, collaboration committees (this multi-disciplinary steering group), professional institutions and the relationships being formed across companies on site. The benefits include driving industry standards, innovation, and performance within the industry.

The con to this increasing trend is that companies, could be blacklisted because of one event or project through word and mouth. SMEs are struggling to be included in tenders based on experience, ability to achieve the tender requirements or required specifications being requested. This is in addition to the gigantic projects that are currently engulfing valuable resources, driving rate increases, increasing obligations and standards, making it progressively difficult for all those on the side lines of major infrastructure to compete.

Dr Anywhere
Bam Nuttall

Dr Anywhere is currently the Rail Division Commercial Manager at BAM Nuttall Ltd in West Sussex, UK a position he has held since November 2006. Prior to this, he was the Managing Quantity Surveyor at Faithful and Gould in London for a year, and before that, he worked as a Senior Project Surveyor at Davis Langdon & Everest in London for almost three years. He has over 30 years of experience In the construction Industry, having served as the Chief Quantity Surveyor at Costain Zimbabwe for over 12 years.

How can infrastructure projects globally best mitigate against risks of contract price increases in a volatile inflationary period?

- Involve the contractor early in the process including key supply chain partners
- Early involvement of the contractor and supply chain including designers will result in potential design solutions that, wherever possible, avoid materials that are the subject of high inflationary pressures, e.g. if steel prices are rising steeply globally then designers will be inclined to adopt design solutions that avoid steel materials and look at alternative materials that may not be the subject of too many inflationary pressures;
- Work pipeline visibility and stability enabling early and bulk purchasing of key materials thereby limiting exposure to inflationary pressures.

What effects pros and cons, are we likely to see in future from increasing global demand for supply chain collaboration?

Pros

- Increased focus on problem resolution as opposed to escalation of conflicts/disputes;
- Enabled learning across supply chains leading to good practice propagation across supply chains which may translate into cost/time efficiencies and increased productivity in the construction sector;
- This may also promote and encourage innovation across the supply chain

Cons

- May promote collusion among and between supply chains;
- Decision-making may be complex given the potential that so many parties may need to be consulted leading to issues with ‘decision-making by committee
- Competitive edge and tension may be lost
- Potential damage to some supply chain branding and reputation