



CLAIMS AND DISPUTE CAUSATION A DIGITAL PERSPECTIVE



DECODING COMPLEXITY.

Crux

noun. (kruks)

1. The decisive or most important point at issue.
2. A particular point of difficulty.

CRUX is HKA's integrated research programme providing valuable insight into claims and dispute causation from major capital projects around the world.

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FOREWORD

I am very pleased to introduce CRUX, HKA's integrated research programme, and our first CRUX *Insight* report. Its analysis provides valuable insights into claims and dispute causation for major capital projects around the world on which we have provided claims consulting and dispute resolution services.

The global engineering and construction (E&C) industry is forecast to be an engine for growth in the coming decades, presenting unparalleled opportunities and potential for risk. Greater recognition of the global significance of the E&C industry brings with it increased stakeholder scrutiny.

Capitalisation of Tier 1 and Tier 2 contractors remains on a knife edge with the fallout from some high-profile collapses felt throughout supply chains worldwide. The fitness for purpose of existing procurement and operating models is being questioned. The expectation to deliver more, quicker and for less is asked of an industry that has arguably failed to respond to calls for change for decades.

Disputes can be said to be a litmus test of the health of the industry. Resolving disputes often requires detailed forensic analysis, providing the opportunity to examine the complex web of issues impacting the operations of project stakeholders.

This observational report follows HKA's investigation and analysis into the commonly cited causes of claims and disputes on E&C projects worldwide. As the largest claims and dispute resolution firm in the E&C sector globally, we bring greater depth to the analysis carried out in this field.

We are committed to sharing our CRUX Insights so that they may inform project and industry stakeholders.

TOBY HUNT

Partner and
Chief Business Development Officer

“The expectation to deliver more, quicker and for less is asked of an industry that has arguably failed to respond to calls for change for decades.”



INTRODUCTION

The CRUX integrated research programme was formed to capture both tangible and intangible knowledge across HKA's operations, applying data science to derive value, not just for HKA and its clients, but for the wider industry.

The team collated and analysed data and objective expert opinion on projects valued at more than US\$400 billion where HKA provided claims consulting and dispute resolution services. The headline findings of CRUX *Insight* concern causation complexity.

Our research shows an average of 13 interrelated causation factors per project.

This debunks the simplicity myth which is perpetuated by some market commentators who choose to focus only on headline causes of claims or disputes.

Our research identifies and considers numerous primary and secondary causes, and the interrelationships between them. We believe this approach better reflects the true picture and reveals the underlying constraints impacting the operational performance of the parties, projects and the broader industry.

The team applied the same analytical and forensic expertise used in our claims and dispute resolution services to derive insights. Every project is unique. Yet comparative analysis of dispute causation footprints – the unique combination of points of failure – is possible, given the similarities in how projects are procured and delivered.

To reduce the prevalence of disputes, our industry must better understand, prepare for and manage complexity. Crucially, project stakeholders can use causation footprint analysis to manage risks by proactively identifying likely companion factors to issues as they arise. This provides opportunity to formulate contingencies and mitigate their effects or impact.

Our research programme is being integrated into our company practice. We will continue to analyse our dataset – which will grow – to optimise our service delivery and generate objective value, providing CRUX Insights for our clients and the industry.

We invite you to use this data and future CRUX Insights to help manage risk on projects, understand and manage complexity, kick-start transformation within your organisation, and provide insight into digitalisation in the context of claims and dispute resolution.

Succeeding in challenging times is all the more rewarding.

“To reduce the prevalence of disputes, our industry must better understand and manage complexity.”

INDUSTRY CONTEXT

Governments worldwide have witnessed how digital ways of working have transformed other industries and have created strategies to embrace change within the engineering and construction (E&C) industries.

Information technology is critical to our ability to manage complexity, inform decision-making, improve productivity, and reduce uncertainty, thereby mitigating risk. The days of instinctive decisions in the industry being made on gut feel and experience are numbered.

The forecasted value-add of digitalisation is in the trillions of dollars. Listed companies that fail to embrace technology will over time lose competitiveness, which will be reflected in their share prices. This provides an opportunity for disruptors to digitally enable organisations, improving efficiency and margins before flipping them for sizeable gains at minimal risk.

However, as digitalisation of the E&C economy accelerates, our experts continually see evidence that the increasing volume and complexity of data on projects is outstripping stakeholders' ability to process and thereby derive value from it.

The impacts are profound. The misapplication of technology has negated much of the potential benefit, introducing new, unfamiliar risks, such as information overload or decision paralysis into human interactions within the supply chain.

A key knock-on effect of this is an erosion of executive confidence that technology investment will reap the forecast returns – something that can stifle innovation and only serves to compound the issue.

As information systems have increased, so too has the illusion of control. Disputes all too often expose flawed record-keeping and situational awareness compromised by poor information flow.

To reduce the prevalence of disputes, our industry must better understand and manage complexity. Digitalisation can address this.

“As information systems have increased, so too has the illusion of control. Disputes all too often expose flawed record-keeping and situational awareness compromised by poor information flow.”

MAKING SENSE OF CAUSATION COMPLEXITY

To many it will come as no surprise that change, slow progress and extensions of time are top of our causation rankings. These factors are often the manifestation of numerous interrelated underlying causes.

Rather than focus on the obvious, HKA's digital team has sought to explain the underlying complexity by examining the interplay of forces behind disputes.

Cause and effect can be difficult to deduce on major projects where the interaction of primary and secondary causation is complex.

“When disputes crystallise, the issues in dispute can often be remote from the myriad of primary and secondary causes.”

Are 13 causation factors indicative of the industry?

Where complexity obscures cause and effect, commercial negotiations may often fail, and parties will seek external forensic expertise to decode project and causation complexity.

The high average of claim and dispute causes (seven primary, six secondary) – and the eye-watering maximum of 39 on a single project – reflect HKA's involvement in large and complex projects.

On smaller and simpler projects – which are more numerous – the level of complexity and potential for conflict ought to be lower. However, even here the tendency to attribute disputes to isolated factors may seriously mislead.

When disputes crystallise, the issues in dispute often have a myriad of primary and secondary causes that only become apparent during forensic investigation. Often a dispute relates to the straw that broke the camel's back. Those looking to first understand, then monitor and intervene in future to break the cycle of disputes, must take a broader view.

FORECAST

If digitalisation of the industry accelerates, then maturity should deliver the value forecast but not yet realised. This should translate into greater project and organisational control on the part of clients, which will likely see an increase in negotiated settlements and a lower causation average.

However, as the world's largest provider of claims and dispute resolution services, we expect the causation factor average to remain high.



“It is easy for those focused on delivery to simply assume that the existence of controls directly translates into being in control.”



How is the illusion of control a root cause?

No management team intentionally allows multiple issues to develop on projects, so what could explain the high causation average?

Many would agree that having procedures and following procedures are two different things. Yet it is easy for those focused on delivery to simply assume that the existence of controls directly translates into being in control.

This illusion of control has wide-ranging implications, as it obscures the interconnection between issues, allowing time for these to develop unnoticed into problems.

Lone issues rarely lead to a dispute between parties, yet when a host of them coalesce and eventually manifest, the combined effect can have a significant impact. This pattern is reflected in the complex dispute causation evident in the findings of our initial investigation.

Differing or biased interpretations of contributory factors often result in 'two sides to the same story' even when the facts relating to the primary issues are established. The resulting entrenchment crystallises disputes when the parties can agree no common ground.

FORECAST

Any acceleration of transformation within the industry will be dependent on balancing time, effort and expenditure between people, process and technology.

As industry awareness in the significance of human factors [people] rises, wider recognition of biases such as the illusion of control should follow. As digitalisation matures and the industry harnesses the data that flows through it, we expect to see improved situational awareness and fewer instances where the illusion of control is a root cause of conflict. We expect this to translate into fewer disputes with less complex causation amongst our clients.

To test for the illusion of control, the perception gap – the difference between perceived and actual situational awareness – will become a key measure. This will be essential for E&C organisations looking to better understand and manage risk.

What can be inferred about control on major projects?

Human endeavour is such that we continue to see rising project size, complexity and therefore risk and cost. This is evidenced by the accelerating trend for ever larger and more costly megaprojects as the delivery model of choice across industry sectors.

Given the rapid digitalisation of the E&C ecosystem, delivery teams are ever more reliant on technology to extend their capability to manage complexity through effective project controls.

There is no doubt that E&C experience is essential for effective and reactive troubleshooting commonly seen within high-performing delivery teams, but this should be enhanced not constrained by technology.

Like executives, project delivery professionals must undergo a data epiphany and accept that, unassisted by technology, they will first be a constraint, and ultimately become redundant, replaced by technologically savvy peers.

The quality, format and fitness for purpose of project records are a good measure of both project control and centralised IT management's understanding of the flow and purpose of data at project level.

Organisations with poorly conceived or onerous controls will be unable to manage risk effectively within the supply chain, providing fertile ground for disputes. This effect is compounded where the illusion of control obscures the interconnection between issues, evidenced by underestimation of causation complexity and overconfidence in the quality and value of records.

Accepting that every E&C project is unique, project controls are largely standardised across portfolios, programmes and projects. The absence of disputes on many projects, within a portfolio does not necessarily indicate that the controls are fit for purpose.

Poor control equates to inefficiency, eroding margins, even in the absence of claims or disputes.

FORECAST

The impact of digitalisation on project controls has the greatest potential to profoundly improve industry performance and stakeholder outcomes.

By first understanding the flow of information, organisations come to understand the transformative nature of 'information liquidity' – the ease with which records, and the data they contain, can be converted into knowledge.

This epiphany arms leaders with the resolve needed to drive through cultural change, catalysing digital transformation, first in their own organisation and then within their supply chain.

By understanding data flow and information architecture, organisations can streamline reporting, making decisions faster and sooner to derive additional value.

Information requirements that include machine-readable formats for data interchange will result in a trickle-down effect, improving data flow throughout the supply chain. This process will accelerate as parties recognise the value of data flow, and such provisions become standard inclusions in contracts.

A balanced approach to people, process and technology during digital transformation is necessary to reduce hidden transactional costs relating to historic record production and keeping. These benefits extend beyond capital delivery into the operational and maintenance phase.

Digitalisation should result in more comprehensive records that improve overall project control. By connecting the decision-maker to the underlying data, situational awareness is improved. This allows informed decisions to be made, reducing the number of disagreements and improving the prospect of settlement in commercial negotiation – in turn reducing the number of disputes.

“Organisations with poorly conceived or onerous controls will be unable to effectively manage risk within the supply chain, providing fertile ground for disputes.”

How important is contract-related causation?

The contract-related causation group intersects with design in respect of the completeness, adequacy or ambiguity in specifications or drawings. It also intersects with behaviour where unreasonable risk allocation distorts behaviour so that it impacts on the commercial outcomes of adversarial counterparts, and as communication breaks down, the parties seek to rely on relevant contract provisions.

Parties then look to formulate their cases using the facts, the contract, and analyses to explain what has happened and obtain relief or remedy. It is at these points that parties look to exploit ambiguity in contracts or the grey area between literal non-compliance and acceptance of deviated practice prior to any breakdown in the relationship.

The most prolific contract-related causation is 'different interpretations of the contract provisions'. Notably, this was not specific to any given sector, region or contract form.

There is a high probability that differing interpretations of contract provisions are rooted in the drafting of contract documents. Together these factors are a strong indicator of poor contract drafting.

FORECAST

Given the nature of dispute resolution, it is probable that contract-related causation will continue to feature highly in future reports.

In the long term, as organisations come to rely more on technology to assist them with the management of projects, we expect to see an improvement in contractual compliance and a reduction in disputes. This will accelerate should smart contracts gain traction.

However, in the short term, the inability to properly administer the contract is a good indicator that there are underlying problems, be that information overload, poor communication, or indeed a different interpretation of the contract. For this reason it will continue to rank highly as a cause of dispute.

As Building Information Modelling (BIM) continues to gain traction around the world there should be an increase in collaboration. The increased information transparency and interaction between supply chain members should flush out ambiguity in project documentation and reduce disputes.

As organisations digitally mature and smart contracts are implemented, the burden of administering contracts will reduce, as will non-compliance. This will result in poor contract administration falling in the overall rankings.

“There is a high probability that differing interpretations of contract provisions are rooted in the ambiguities of contract documents. Together these factors are a strong indicator of poor contract drafting.”



How is behaviour pivotal to avoiding disputes?

Lack of communication is the most frequent secondary cause of dispute. While contract administration is often cited as the primary cause, communication failure ranks higher in the CRUX *Insight* causation table, both as a primary and a secondary cause.

With sub-optimal controls in place and conditions ripe for disputes, good communication is an effective dampener of the pervasive adversarial culture in the E&C industry.

Good communication improves transparency, reduces surprises and facilitates commercial negotiation. Conversely, the entrenchment and lack of communication that typify adversarial culture and mistrust, undermine the rationality that enables projects to be delivered free of dispute.

The significance of both communication and absence of an adversarial culture is apparent in the results, with both featuring among the top 10 factors in the table of Causation Rankings by Type (see page 39). If combined they would top the table by a considerable margin.

The quality of leadership is the next most significant behaviour-related cause of dispute. This is best explained by the fact that project delivery teams typically operate in hierarchical structures. Leaders are therefore culpable for the behaviours of those they manage and for stewardship of culture.

The size and complexity of projects are such that remoteness of senior leadership becomes a risk, with megaproject management akin to running a multi-national company. In such circumstances, leaders are even more dependent on the quality of the information they receive to make decisions.

FORECAST

Communication is impeded when data required for a decision or response is not to hand. As organisations digitally mature we expect to see ever-greater collaboration and improved communication, reducing the prevalence of adversarial culture. This trend will be reinforced by the improved situational awareness that information liquidity brings.

The volume of project data will continue to grow exponentially. If the industry continues to fall behind the technology adoption curve, then the gap between the volume of project data and an organisation's ability to process it will increase. This will result in information overload rising in the causation rankings.

Academia and industry have invested time and effort in looking to reduce the prevalence of disputes. In the past decade the volume of research into project success and points of failure has grown considerably with a notable recent focus on human factors.

Recognising the fallibility of human nature in this arena is an important and necessary step. It should act as a catalyst for wider acceptance of technology to assist in managing complexity and raising awareness of the unconscious biases within the industry.

Whilst overconfidence bias is just one of many biases, we expect to see greater recognition of its role as a root cause of disputes.

A leader's situational awareness and decision-making is dependent on project controls and reports, whose quality, rigour and fitness for purpose remain largely untested. By enabling data-driven decisions the risk-laden practice of making instinctive decisions will be minimised. The quality of decisions will be improved by combining experience and fact.

“Good communication improves transparency, reduces surprises and facilitates commercial negotiation. Conversely, the entrenchment and lack of communication that typify adversarial culture and mistrust, undermine the rationality that enable projects to be delivered free of dispute.”

What is the significance of skills?

In recent years the importance of human factors in project success has caught the industry's attention. The skills grouping reflects the reality – and the growing recognition – that staff competencies are an important factor in claims and dispute causation.

Arguably, the skills grouping has scored highly because the causation factors within it are broad in scope by comparison with other groups. Nevertheless, the prominent position of the group highlights the crucial role of management professionals.

By its very nature, management has a role to play in all causation factors. Accepting that poor managerial skills are a risk, it should concern executives that teams operate in silos, moving between projects and often failing to incorporate best practice.

Misguided loyalty can result in under-reporting of problems, whilst familiarity can lead to overconfidence in the team's ability to recover time, cost or enhance quality. It is not uncommon to find evidence of resistance to continuous improvement and adoption of new technology amongst such teams.

'Claims and disputes' has become its own sub-industry, requiring specialist skills and experience not readily available in the wider E&C industries.

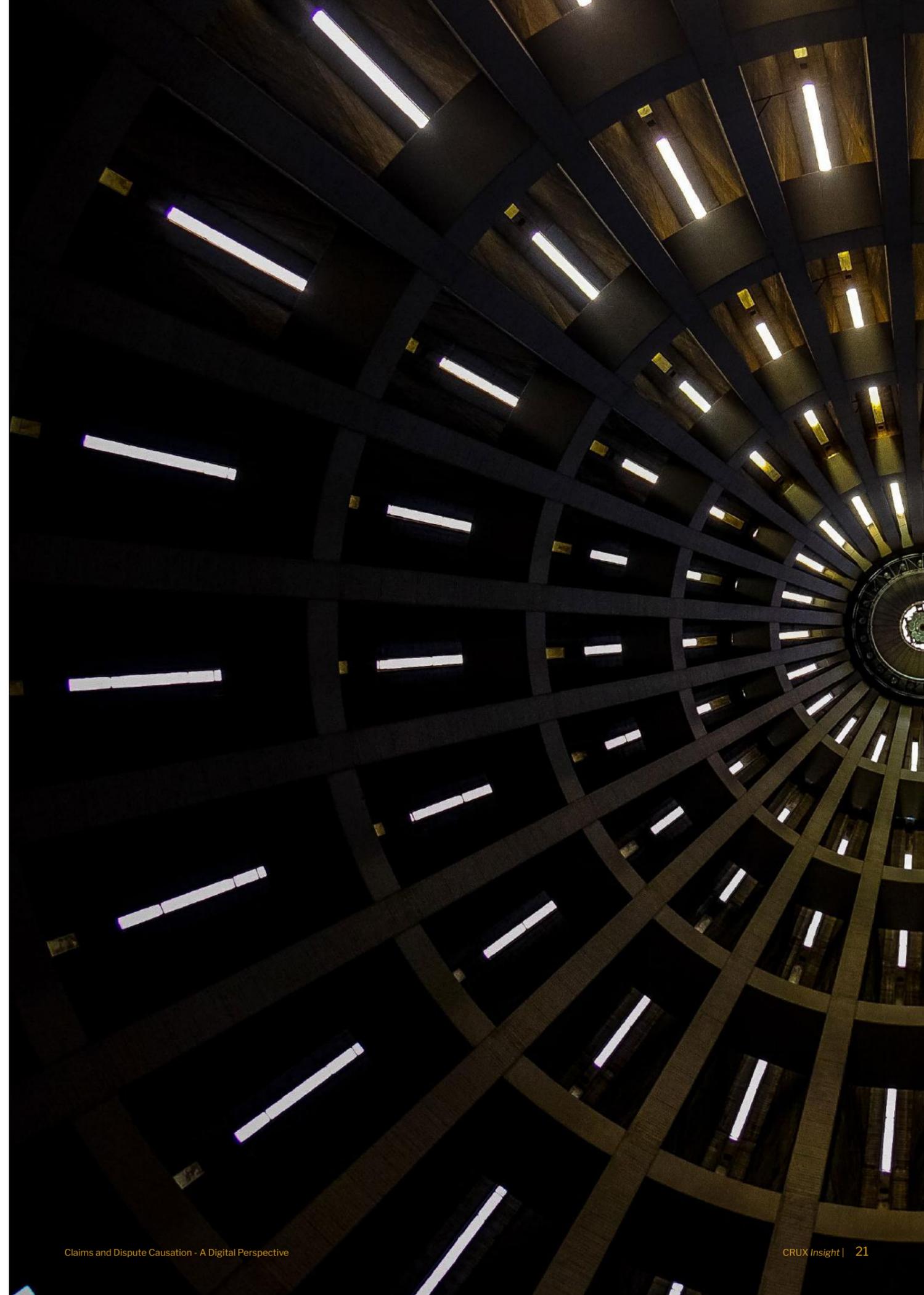
FORECAST

The potential of technology to improve leadership and management is widely underestimated, with many maintaining that it is experience not technology that will drive future performance. Conversely, the World Economic Forum estimates that full-scale digitalisation will achieve 12% to 20% savings, equal to between US\$1 trillion and US\$1.7 trillion annually¹ within 10 years.

With such a large upside, digitalisation will impact strategic human resourcing. We expect demand for digital skills to continue to outstrip supply for the foreseeable future. Through the application of technology, these recruits will unlock the forecasted value and command premium.

“It should concern executives that teams operate like mobile silos, moving as a team between projects and often failing to incorporate best practice.”

¹Source: An Action Plan to Accelerate Building Information Modelling (BIM) Adoption. World Economic Forum, in collaboration with The Boston Consulting Group, February 2018



Why are 3D models a digital maturity indicator?

With BIM gaining traction around the world, established British specifications are being converted into international standards. These require the production, coordination and sharing of graphical (3D) and non-graphical data.

National BIM mandates often relate to public sector procurement but as the construction supply chain matures, private sector clients are realising benefits. In turn, they better understand how to define their own information requirements.

Stakeholders are recognising the internal benefits of digital ways of working, creating a positive feedback loop that accelerates adoption. We therefore expect the availability of 3D models to our expert teams to increase.

Additional value is realised when the 3D model is coordinated with non-graphical data. This includes time (4D) and cost (5D) data. The extent to which organisations incorporate non-graphical data and use it to drive decisions is what makes 3D models an indicator of digital maturity.

The expectation will be that 3D models and connected data are used to inform claims and disputes, with the view of contextualising and better communicating complex issues.

FORECAST

The use of 3D models in the industry at large, and within dispute resolution, will only increase over time as BIM continues to gain traction globally and becomes business as usual.

As many developed BIM providers rely on outsourced services from developing nations, it is likely that these nations will mature more rapidly as they look to avoid the impacts of protracted delay to the adoption of technology seen in the developed construction economies.

As awareness of the value of information models grows, we expect 3D models to be requested and their potential to connect with non-graphical data to be evaluated as a matter of course. This will be reinforced as the dispute resolution community shifts focus to data rather than documents.

With both industry and advisors digitally maturing, it is not unrealistic to expect 70% to 80% of future contentious commissions to have models available within the next five years, reversing the current position.

Legal and dispute resolution practices with the capability to take advantage of their clients' existing digital investments in 3D modelling and connected data will have a distinct competitive advantage.

In this context, complex projects that do not rely on 3D models will quickly become a thing of the past.



“It is only by understanding the flow of data through an organisation or project that advisors can make informed information requests.”

Why does the mantra ‘records, records, records’ need to be brought into the digital age?

The mantra ‘records, records, records’ is as relevant as ever for informed decision-making, dispute avoidance and resolution. Just what a ‘record’ constitutes has changed significantly in past decades, and digitally adverse professionals can compromise supply chain relationships, contractual and legal prospects, and profit margins.

Poor information liquidity often has its roots in past practice where the form, function and intent of paper processes have not been reviewed in a digital context.

Ensuring records are machine-readable and suitably structured enables data from disparate sources to be searched, aggregated and analysed in near real time. During project execution this stands to dramatically reduce the latency in decision-making that results from labour-intensive record preparation.

In addition to the efficiency gain, information liquidity results in meaningful project controls, improved situational awareness, and informed decision-making – all of which assist in the process of managing risk. Therefore, information liquidity is a key risk indicator.

Those issuing information requests should first look to understand the organisation’s information architecture. This ensures the totality of relevant data is considered, including formats that the requestor may not be familiar with. In addition, this maximises the use of structured data, reducing the time and cost of evidencing a claim or dispute. With the judiciary looking to broaden access to justice by driving down costs, a digital makeover of the age-old mantra would be a good place to start.

FORECAST

As experts and advisors become more familiar with digital records it is anticipated that the ‘records, records, records’ mantra will be updated to incorporate data, not just documents.

With so much structured data generated by business systems, those requesting information should first seek to understand the information architecture of the organisation. It is only by understanding the flow of data through an organisation that the administrative burden of record-keeping can be reduced, leading to better, more comprehensive records.

A combination of a greater ratio of structured versus unstructured records and digitally informed information requests should help drive down the cost of claims and disputes.

How can digitalisation result in dispute avoidance by proxy?

The aggregated impact of digitalisation will be dispute avoidance by proxy. The rationale for this is:

- Most causation factors will benefit from the improved situational awareness and information liquidity that digitalisation brings.
- Armed with all the relevant data, an organisation knows which battles to fight and which to retreat from to fight another day.
- Information liquidity addresses multiple causation factors and increases the speed at which change can be processed and informed decisions can be made, as opposed to gut decisions.
- Digitalisation facilitates better collaboration and shifts away from adversarial relationships.

How will digitalisation impact claims and disputes?

Digitalisation will have a positive impact on claims and disputes. The rationale for this is:

- Information liquidity and on-demand access to project data will reduce the likelihood or need for global claims.
- SMEs will utilise technology to improve record-keeping, enhance claim submissions, and reduce write-offs.
- The ability to better evidence or rebut claims with readily accessible data will increase the number of commercial settlements.
- Data-driven decisions will reduce the likelihood of disagreement escalating through formal proceedings.
- Machine-readable formats improve and expedite discovery.
- More structured data will reduce the time and cost of preparing records for analysis.
- Digitalisation enables the coordination of numerous records into a single medium to improve understanding and presentation of complex issues.
- Directly connecting dispute resolvers with data removes the burden of information requests.

CRUX SUMMARY FINDINGS

This section presents the causation data collected from 257 commissions, with a total project capital expenditure (CAPEX) in excess of US\$400 billion.

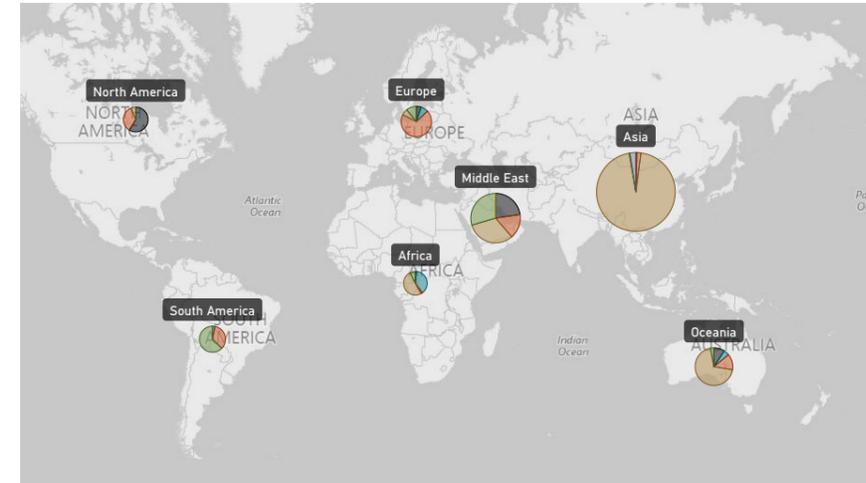
These projects were selected as representative of the sectors and regions in which HKA operates.

HKA clients include the full spectrum of built-asset stakeholders, including public and private sector owners, operators, funders, insurers, architects, engineers, contractors and subcontractors.

The regions and values

REGION	PROJECT CAPEX TOTAL (US\$)
Asia	204,357,790,104
Middle East	100,789,504,471
Oceania	58,887,617,658
Europe	33,371,939,458
South America	17,981,530,600
North America	13,107,376,500
Africa	9,343,512,000
TOTAL	437,839,270,792

>HKA Sector ● Buildings ● Industrial ● Infrastructure ● Oil & Gas ● Power & Utilities ● Technology ● Various



The causation count

Across the 257 commissions, a total of 3,043 causes were identified.

On average, there were 13 underlying causes per dispute, dispelling the notion that focussing on individual causes would assist those seeking to avoid and reduce the prevalence of E&C claims and disputes.

With an average of seven primary and six secondary causes, our survey unveils the complexity of causation.

DESCRIPTION	CAUSATION COUNT
Average no. of causes per dispute - all projects	13
Average no. of primary causes - all projects	7
Average no. of secondary causes - all projects	6
Maximum no. of causes - single project	39
TOTAL NO. OF CAUSES	3,043

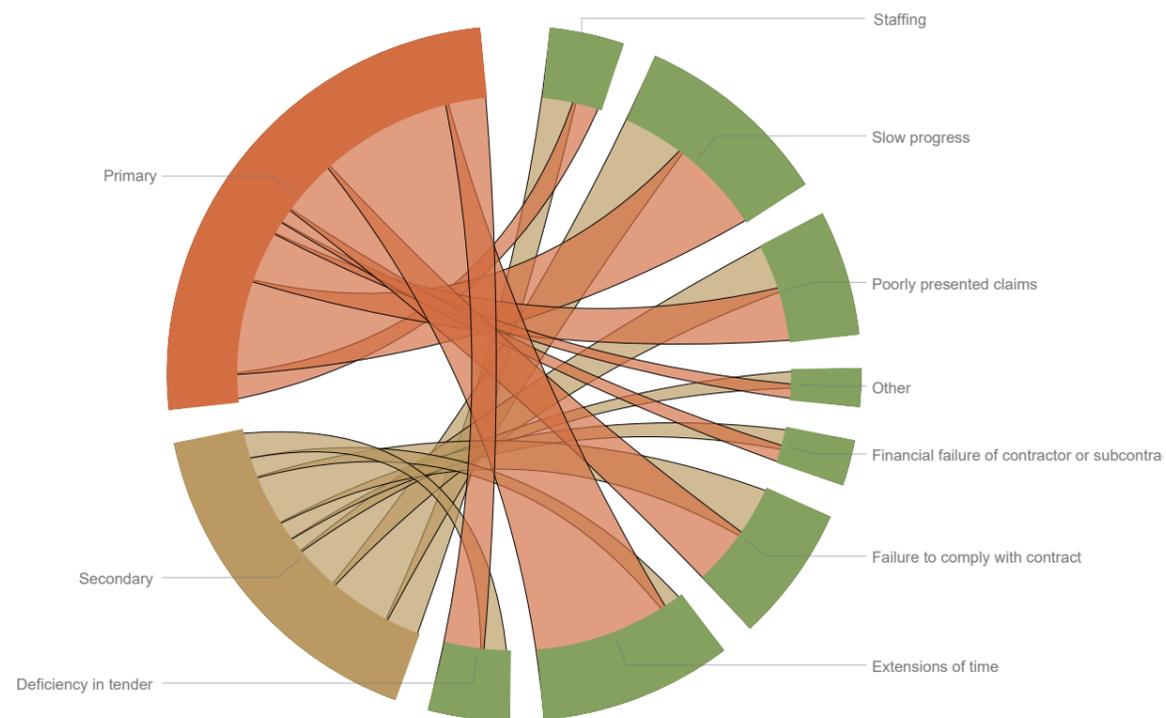
The causation groups

CAUSATION GROUP	COUNT AS PRIMARY CAUSE	COUNT AS SECONDARY CAUSE	TOTAL CAUSATION COUNT
Contractor	373	241	614
Design	328	176	504
[Poor] Skills	262	223	485
Owner	334	139	473
Contract	199	175	374
Behaviour	167	193	360
Other Causation	132	101	233
TOTAL	1795	1248	3043

“Across the 257 commissions, a total of 3,043 causes were identified.”

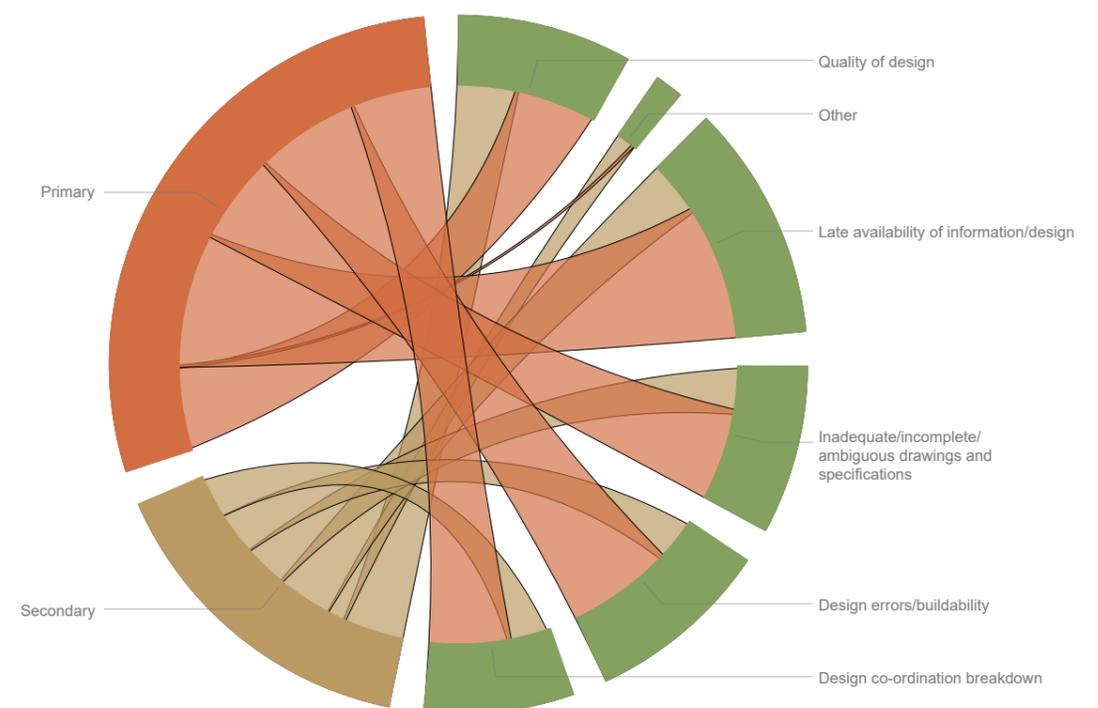
Group #1 Contractor

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Contractor	373	241	614
Slow progress	81	55	136
Extensions of time	115	18	133
Failure to comply with contract	50	44	94
Poorly presented claims	45	41	86
Deficiency in tender	34	22	56
Staffing	22	29	51
Financial failure of contractor or subcontractor	14	17	31
Other	12	15	27



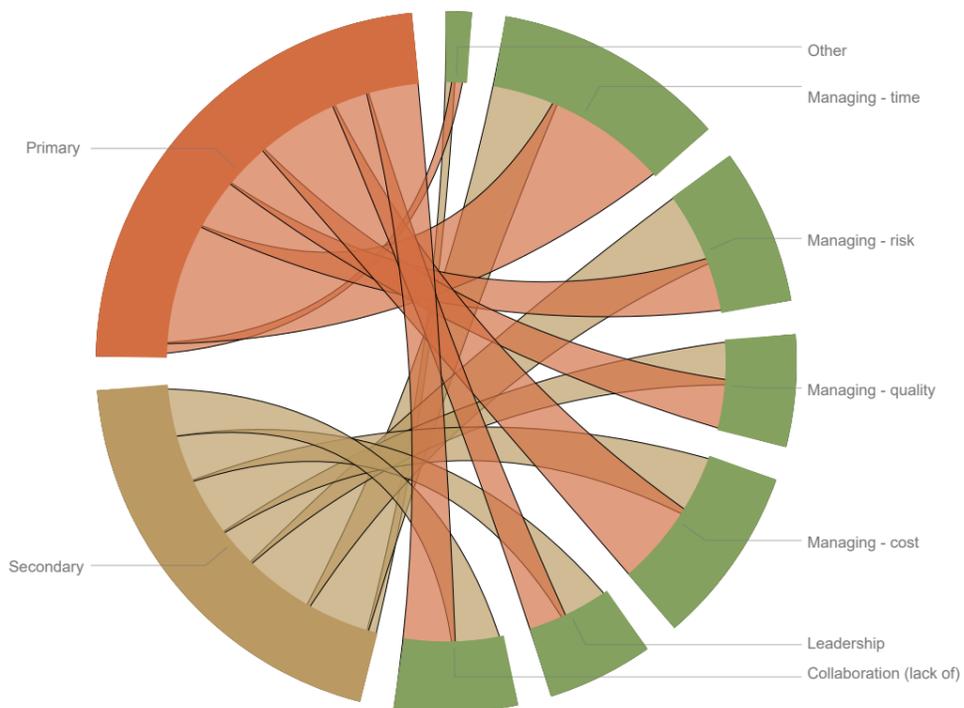
Group #2 Design

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Design	328	176	504
Late availability of information/design	89	37	126
Design errors/buildability	70	29	99
Quality of design	53	40	93
Inadequate/incomplete/ambiguous drawings and specifications	60	30	90
Design co-ordination breakdown	53	27	80
Other	3	13	16



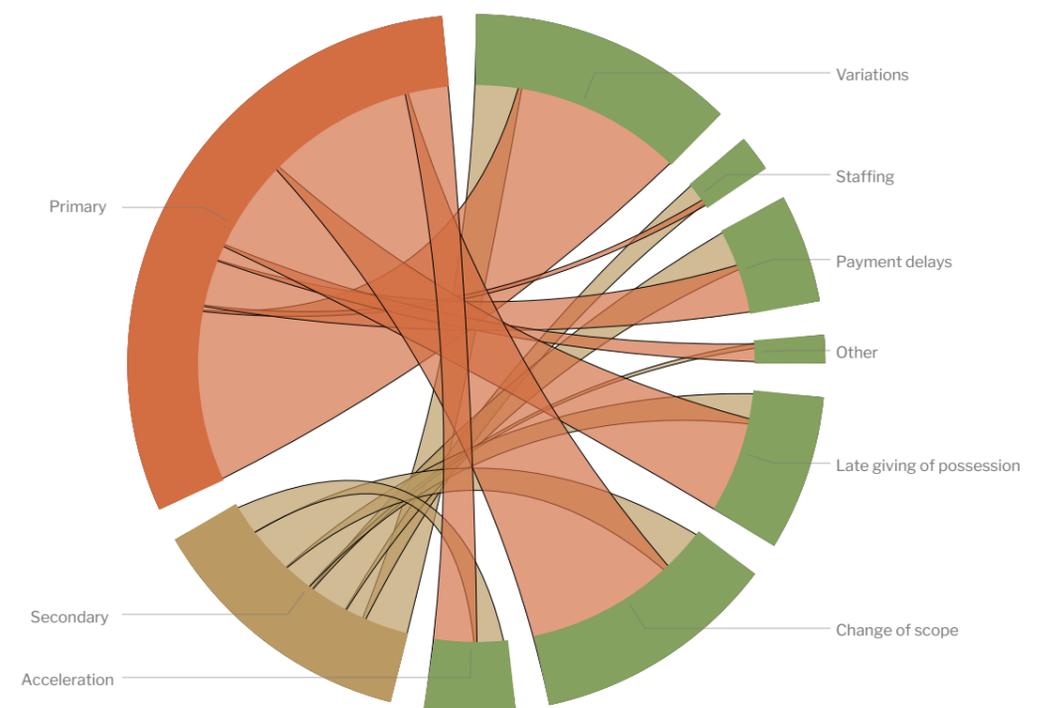
Group #3 Skills

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Skills	262	223	485
Managing - time	79	42	121
Managing - cost	54	39	93
Managing - risk	34	47	81
Collaboration [lack of]	33	31	64
Managing - quality	31	27	58
Leadership	24	31	55
Other	7	6	13



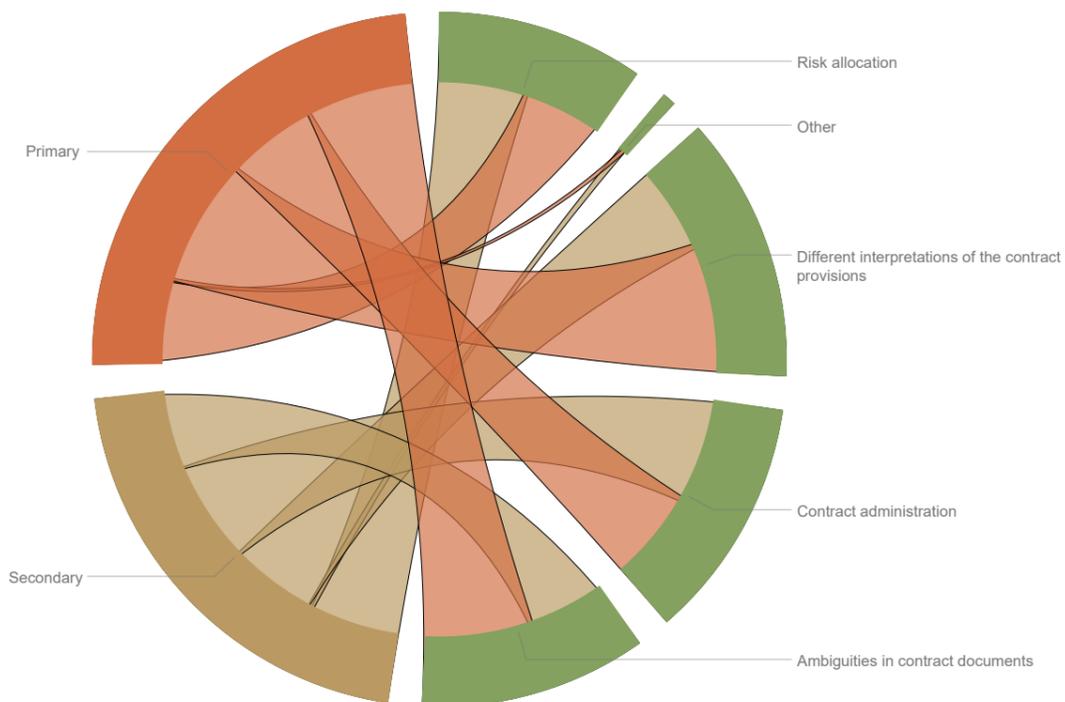
Group #4 Owner

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Owner	334	139	473
Variations	107	29	136
Change of scope	95	30	125
Late giving of possession	60	19	79
Payment delays	30	25	55
Acceleration	27	19	46
Staffing	4	14	18
Other	11	3	14



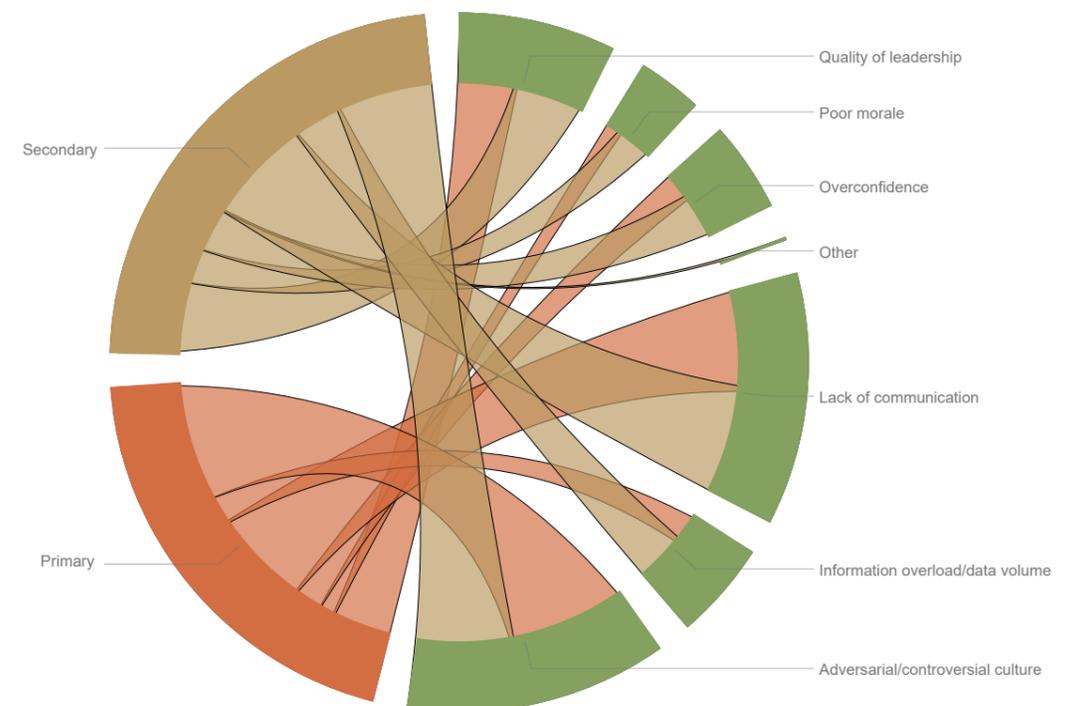
Group #5 Contract

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Contract	199	175	374
Different interpretations of the contract provisions	62	42	104
Contract administration	45	50	95
Ambiguities in contract documents	52	37	89
Risk allocation	38	43	81
Other	2	3	5



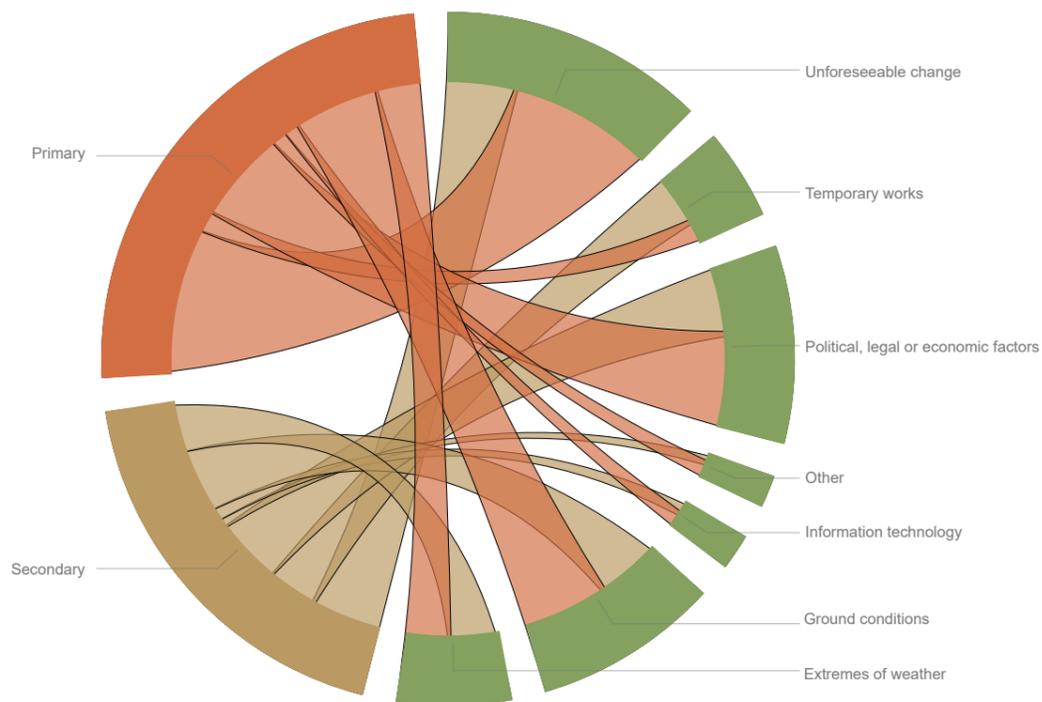
Group #6 Behaviour

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Behaviour	167	193	360
Adversarial/controversial culture	56	46	102
Lack of communication	47	51	98
Quality of leadership	28	33	61
Information overload/data volume	14	24	38
Overconfidence	14	21	35
Poor morale	8	17	25
Other		1	1



Group #7 Other

CAUSATION GROUP > TYPE	PRIMARY	SECONDARY	TOTAL
Other	132	101	233
Unforeseeable change	45	22	67
Political, legal or economic factors	29	21	50
Ground conditions	27	20	47
Extremes of weather	14	15	29
Temporary works	7	16	23
Information technology	5	4	9
Other	5	3	8



Causation Rankings by Type

CAUSATION TYPE	PRIMARY	SECONDARY	TOTAL
Slow progress	81	55	136
Variations	107	29	136
Extensions of time	115	18	133
Late availability of information/design	89	37	126
Change of scope	95	30	125
Managing - time	79	42	121
Different interpretations of the contract provisions	62	42	104
Adversarial culture	56	46	102
Design errors/buildability	70	29	99
Lack of communication	47	51	98
Contract administration	45	50	95
Failure to comply with contract	50	44	94
Quality of design	53	40	93
Managing - cost	54	39	93
Inadequate/incomplete specifications	60	30	90
Ambiguities in contract documents	52	37	89
Poorly presented claims	45	41	86
Other [across all groupings]	40	44	84
Risk allocation	38	43	81
Managing - risk	34	47	81
Design co-ordination breakdown	53	27	80
Late giving of possession	60	19	79
Staffing	26	43	69
Unforeseeable change	45	22	67
Collaboration	33	31	64
Quality of leadership	28	33	61
Managing - quality	31	27	58
Deficiency in tender	34	22	56
Leadership	24	31	55
Payment delays	30	25	55
Political, legal or economic factors	29	21	50
Ground conditions	27	20	47
Acceleration	27	19	46
Information overload/data volume	14	24	38
Overconfidence	14	21	35
Financial failure of contractor or subcontractor	14	17	31
Extremes of weather	14	15	29
Poor morale	8	17	25
Temporary works	7	16	23
Information technology	5	4	9
TOTAL	1795	1248	3043

WHAT'S NEXT FOR CRUX?

Causation complexity is all too often underestimated.

Understanding complexity can only be of benefit. With an average of seven primary and six secondary causation factors across the 257 commissions, the data indicates the need for a holistic approach to dispute avoidance.

The body of dispute-related literature is vast but its focus on headline causation has contributed to this underestimation.

All commissions reported primary and secondary factors, demonstrating the importance of their consideration. The relationship between these factors should be analysed going forward, which requires causation categories and factors to be rationalised and defined.

Additional data is required to increase confidence and ensure statistically significant conclusions. A proactive approach to progressively capturing data and insight will improve reliability.

Value can be drawn from the data from different perspectives. Subject matter experts should analyse and comment to assist the array of industry stakeholders.

This report presents the initial stage of the ongoing CRUX research programme.

The next steps that HKA is undertaking to enhance business intelligence and improve industry understanding of causation are as follows:

Expert commentary

HKA will continue to release expert commentary on causation. This includes:

- Practical insight from our hands-on experience working on local and international projects, different sectors and stakeholders.
- Insight from expert witnesses called upon to forensically examine projects and decode complex issues.

Refine causation ontology

HKA will rationalise and define causation factors and groups to reduce subjectivity and improve reliability, as well as to provide a platform that allows relationships to be explored.

Progressive data and insight capture

HKA will incorporate the collection of causation data and insight into its global commission management process, validating it contemporaneously. This will increase the dataset on a progressive basis, estimated at between 300 and 500 projects each year.

HKA as an authority

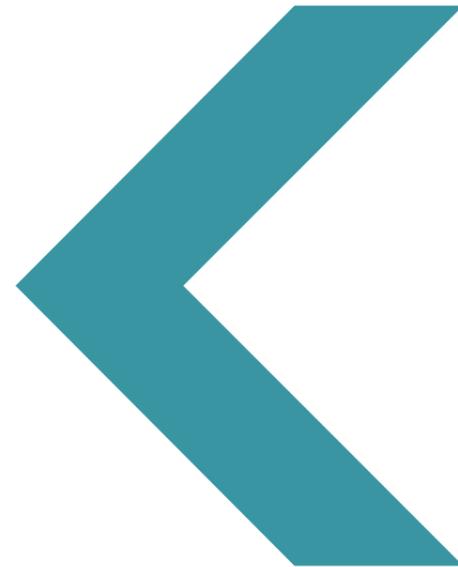
Over the last 40 years HKA has been at the forefront of claims and dispute resolution services in support of the world's most challenging and iconic projects.

In coupling industry expertise and experience with academic credentials, we have both the technical knowledge and objectivity to decode project complexity. As a world-leading provider, and *Who's Who Legal Construction Expert Witness Firm of the Year 2018*, HKA has a client and project portfolio that is second to none.

As the largest provider of E&C dispute resolution services globally, over 50 of our experts contribute best practice as Fellows of 19 professional bodies, with 17 Doctorates in fields including law, engineering, civil engineering, construction management and Building Information Modelling (BIM).

Over 250 have furthered knowledge in their respective areas of practice through Masters programmes, either taught or research, in areas as diverse as business strategy, behavioural economics, change management, and health and safety.

“Over the last 40 years HKA has been at the forefront of claims and dispute resolution services in support of the world's most challenging and iconic projects.”



ABOUT HKA

HKA is one of the world's leading providers of advisory, consulting and expert services for the construction, manufacturing, process and technology industries.

We anticipate, investigate and resolve project challenges. HKA understands the pressures associated with delivering successful projects, whatever their size and complexity, wherever in the world.

As trusted independent advisers, consultants and experts, HKA finds solutions amid uncertainty, dispute and overrun, and provides the insight that make the best possible outcomes a reality for public and private sector clients worldwide.

With over 960 professionals operating in 42 offices in 20 countries, we have a footprint in every continent. We provide our clients with local knowledge whilst drawing on our global experience from around the world. We are uniquely placed to provide clients with the benefits of seamless access to support for the entire life cycle of projects.

960

professionals operating in

42

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countries



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