

Role and importance of data and technology in quantity surveying and cost management practice

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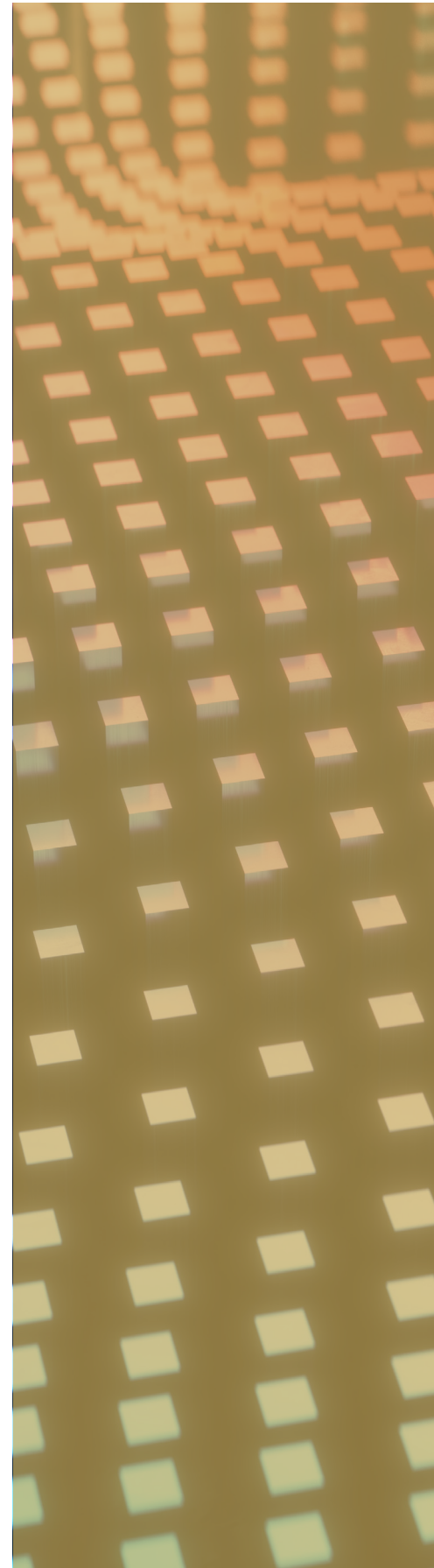
Forewords

In the ever-evolving landscape of today's global economy, artificial intelligence (AI), data analytics and digitalisation are driving transformative change at breakneck speed. In the face of this rapid advancement, quantity surveyors and cost management professionals can no longer afford to stand idle while the digital and AI revolution emerges around them. As the role and importance of data and technology in these fields gains momentum, harnessing the power of these tools is now more crucial than ever.

This comprehensive report delves into the heart of this transformation. As the global focus shifts towards addressing climate change, skills shortages and achieving better social outcomes, quantity surveyors and cost management professionals must rise to the challenge and take on an important advisory role by utilising digital tools, AI and data rather than resisting. By integrating data, information management processes and digital tools into daily practice, these professionals can provide invaluable guidance to project teams and clients navigating the complexities of a world in flux.

Through an extensive global online survey, focus groups and individual interviews, this report uncovers the current state of data and technology usage in the quantity surveying and cost management profession. The findings reveal a crucial need for greater adoption and integration of digital tools such as building information modelling (BIM), common data environments (CDE) and AI. Although progress has been made, the research indicates that many professionals are still relying heavily on spreadsheets and traditional methods, with emerging tools like AI, digital twins and blockchain still experiencing low usage levels.

The potential benefits of embracing data and technology are vast, with respondents expressing strong agreement that quantity surveyors and cost management professionals can enhance their project advisory functions using these tools. By incorporating data-driven processes into their core functions, project professionals can achieve enhanced progress monitoring and control, greater cost certainty and more realistic and reliable cost targets.





This adoption is not without its challenges. The cost and effort required, cultural resistance to change and low return on investment are barriers that must be overcome to fully harness the power of AI, data and technology. As the report suggests, focusing on education, training and professional qualifications can drive adoption levels and help the industry forge a path towards a brighter, more innovative future.

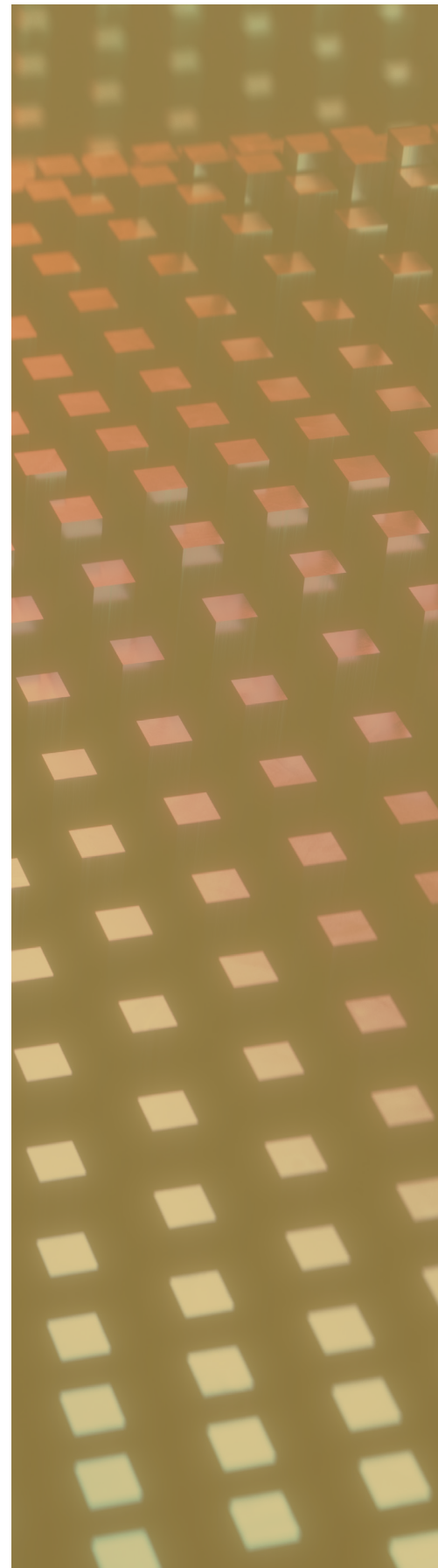
It is important to ensure that project professionals understand that data analytics skills are essential and just as important as being proficient in desktop programmes and spreadsheets.

As we continue to navigate the rapidly changing world around us, it is paramount that quantity surveyors and cost management professionals keep pace with the digital and AI revolution. By embracing data and technology, these professionals can unlock their true potential and play a significant role in shaping the future of their industry.

I trust this report will provide invaluable insights and guidance for all those seeking to take part in this exciting journey.

James Garner

Senior Director at Gleeds | Global Head of Data, Insights & Analytics | Data IQ 100 2023 | BSc (Hons), FRICS, RITTECH, AMBCS, Chair of Project Data Analytics Taskforce





The construction industry has been encountering considerable uncertainty due to the economic downturn and the growing complexity and low carbon demands of construction projects. To confront these challenges, industry professionals are exploring new methods of working, and the role of quantity surveyors and cost managers has become even more critical. These professionals are responsible for ensuring the financial stability of a project through tasks such as cost estimation and project control. They are also expected to extend their role beyond traditional functions and engage in activities such as measuring social value, implementing environmental, social and governance (ESG) principles, adopting whole-life and whole-asset thinking, and calculating carbon footprints across various projects and assets.

In this context, the significance of data and technology in QS and cost management practices cannot be overstated. Quantity surveyors must incorporate data and technology into a model-centric and data-driven process to remain competitive and deliver value to their clients. These processes provide the opportunity to make informed decisions, reduce costs, enhance efficiency, promote sustainability, and ultimately deliver better value to clients. Therefore, it is crucial for quantity surveyors to leverage data and technology to integrate their status into these processes. However, the potential of data is not being fully realised, as many quantity surveyors still rely on spreadsheets.

To address this issue, Glodon, in collaboration with RICS, conducted a comprehensive study that included global surveys, focus groups, and individual interviews. The study aimed to better understand the current attitudes towards data and technology usage in the quantity surveying and cost management profession.

We believe that this paper is essential to the digital transformation of the industry. It provides valuable insights and recommendations on how quantity surveyors can leverage data and technology to remain competitive, provide value to their clients, and expand their role beyond traditional functions.

Pierpaolo Franco, Vice President
Glodon





Executive summary

Data and technology are becoming increasingly important in quantity surveying and cost management practice. However, anecdotally, data and technology usage levels are perceived within this domain to be low. As external drivers such as addressing the climate crisis, skills shortage, and better social outcomes increase in importance, the advisory role that quantity surveying and cost management professionals can play is becoming crucial. These professionals can enhance their services by advising project teams on these global issues using appropriate data, information management processes, and digital tools.

Model-centric and data-driven work processes and practices present a significant opportunity for quantity surveying and cost management organisations to add on to their traditional functions of cost estimation, value-based procurement, cost prediction, and project controls. They can increase participation in other functions such as environmental, social and governance (ESG) principles, designing and measuring social value; implementing whole-life and whole-asset thinking; and carbon footprint calculations across projects and assets.

To understand these issues, RICS and Glodon conducted a global online survey, a series of focus groups, and individual interviews in Australia, New Zealand, Singapore, Hong Kong, the UK, and Canada. The aim of the study was to understand the current thinking around data and technology usage in the quantity surveying and cost management profession. The research team conducted the study in Q4 of 2022. Figure 1 presents a summary of the current state of play concerning the use of data and technology. Findings presented in this report are based on views and opinions of the respondents and study participants.

In addition to gathering demographic information of the respondents, the study focused on:

- 1 gauging the use of software for estimation and quantification
- 2 the usage level of other digital tools
- 3 perceived benefits of data and technology at an individual level
- 4 perceived benefits of data and technology at an organisational level and
- 5 drivers and barriers to adoption.

Regarding the central question of using estimating and quantification software, only 39% of the respondents reported using these tools in conjunction with building information modelling (BIM) and common data environment (CDE). Related to this, 66% of the respondents also reported using spreadsheets on all their projects. Emerging digital tools such as artificial intelligence (AI), digital twins, and blockchain currently have a lower-than-expected usage level, with 65% of the respondents not using these. The respondents ranked data analytics as the third most used digital tool.



Respondents strongly agreed that quantity surveying and cost management professionals could take on more project advisory functions using data and technology. Approximately 90% of the respondents also agreed that quantity surveying and cost management professionals could lead (30%) or support (60%) the workflows pertaining to decarbonising the built environment. There is a consensus among respondents that using data and technology can benefit their core function of fast and efficient quantification, quantity validation and verification. Professionals can better consider benchmarks and historical data, market conditions, and inflation using digital tools. This leads to enhanced cost certainty, enhanced progress monitoring and control, and realistic and reliable cost targets. Respondents agreed that cost and effort needed, resistance to change, and low return on investment are the barriers that must be overcome by the industry to enhance the usage of data and technology. On the other hand, focusing on education, training, and professional qualifications can drive adoption levels. A focus on data and international standards that provide a schema for representing life cycle costs and carbon emissions data, such as the International Cost Management Standard (ICMS) can also improve adoption levels.

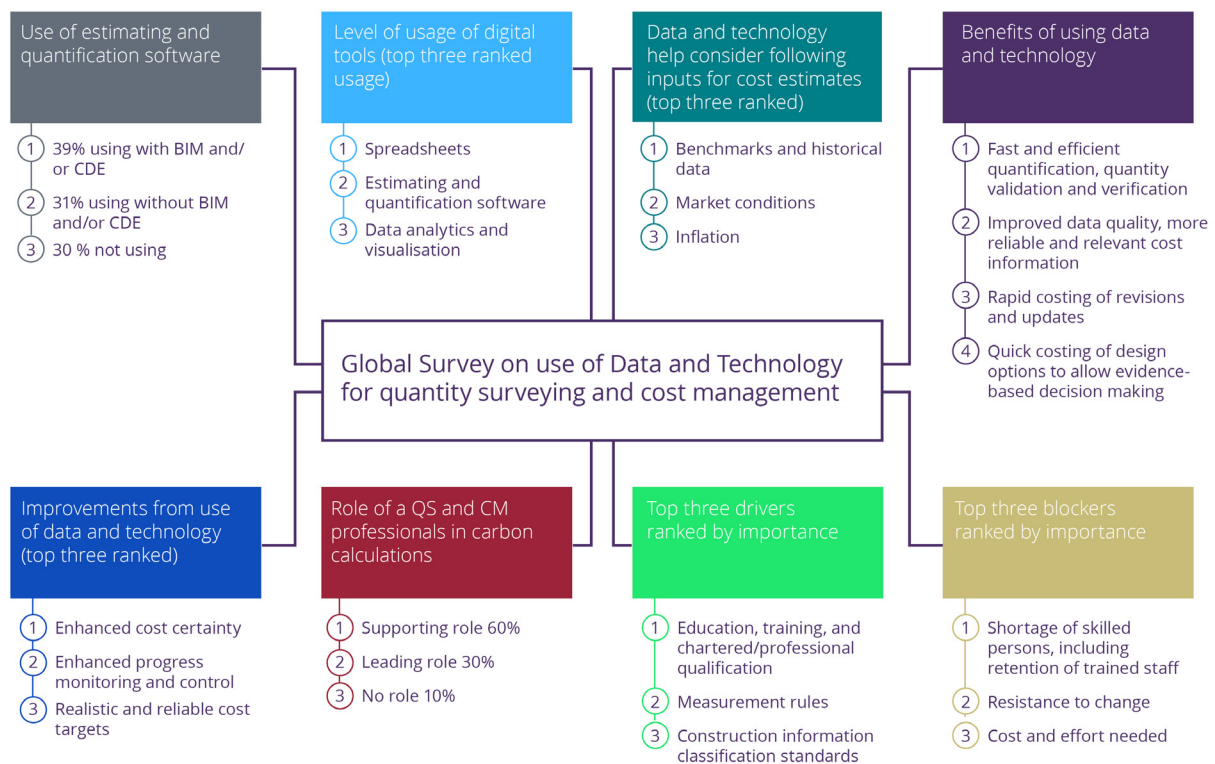


Figure 1: Summary of survey responses and focus groups

The use of digital tools by the quantity surveying and cost management profession has already made considerable progress. However, more needs to be done. For example, to address the impact of external pressures, the profession must move even faster to reap the benefits of BIM and CDE. The speed of the digital transformation journey must be enhanced to keep pace with the upstream workflows, especially design workflows. RICS professionals, namely chartered quantity surveyors, can play a significant role.



1 Introduction

RICS and Glodon, with the aim to understand the current state of play of data and technology usage in the quantity surveying (QS) and cost management (CM) profession, conducted a global online survey and a series of focus groups and individual interviews in Australia, New Zealand, Singapore, Hong Kong, the UK, and Canada. The primary data via the survey and focus groups were collected by the research team in Q4 of 2022. The study sought the opinions of professionals about the pace and impacts of digitalisation in quantity surveying and cost management practice.

Survey respondents were asked to share their thoughts on various aspects of data and technology usage through 14 survey questions:

- 1 **Demographics questions:** The first four questions gathered information about the respondents and the organisations they represent:
 - *(Question 1):* Are you an RICS member?
 - *(Question 2):* How many full-time employees are in your organisation?
 - *(Question 3):* Select your primary region of professional practice.
 - *(Question 4):* What is your organisation's primary service areas (multiple answers)?
- 2 **Usage and degree of adoption:** Respondents were asked two questions to judge the degree of adoption of digital tools. First, they were asked about the usage of estimating software and then they were asked to state the usage level of other digital tools and technologies in their organisation.
 - *(Question 5):* Are you currently using estimating and quantification software in your QS and CM practice?
 - Yes, we are currently using estimating and quantification software with building information modelling (BIM) and/or common data environment (CDE)
 - Yes, we are currently using estimating and quantification software without BIM or CDE
 - No, we are not using estimating and quantification software.
 - *(Question 6):* What is your usage level of the following digital tools in your quantity surveying and cost management practice projects (on a scale ranging from 'all projects' to 'no projects')?
 - spreadsheets
 - estimating and quantification software
 - building information modelling (BIM)
 - common data environment (CDE)



- data analytics and visualisation
- artificial intelligence and advanced computational tools
- blockchain and smart contracts
- drones and laser scanning
- site logistics and inventory management software
- digital twins for financial modelling.

3 Benefits of data and technology to professionals: Respondents were asked two questions focused on how they perceived data and technology helped them as professionals.

- *(Question 7):* By using data and technology, QS and CM professionals can enhance their advisory role (from 'strongly agree' to 'strongly disagree'):
- *(Question 8):* What is the role of a QS and CM professional in carbon calculations (embodied and operational carbon over the life cycle) for projects and assets?
 - leading role
 - supporting role
 - no role.

4 Benefits and improvements of data and technology to the organisation: Respondents were asked to state their level of agreement with the benefits to their organisation.

- *(Question 9):* Rank the following benefits of using data and technology in QS and CM workflows:
 - fast and efficient quantification, quantity validation and verification
 - rapid costing of revisions and updates
 - quick costing of design options to allow evidence-based decision making
 - improved data quality, more reliable and relevant cost information.
- *(Question 10):* Data and technology helps my organisation give better consideration to the following inputs in my cost estimates ('strongly disagree', 'disagree', 'neutral', 'agree', 'strongly agree'):
 - market conditions
 - inflation
 - procurement strategy
 - benchmarks and historical data
 - modern methods of construction
 - contingency, i.e., known unknowns/identified risks
 - management reserve, i.e., unknown unknowns/unidentified risks.



- *(Question 11)*: Rate the improvements that result from the consistent use of data and technology in your QS and CM practice ('strongly disagree', 'disagree', 'neutral', 'agree', or 'strongly agree'):
 - enhanced cost certainty
 - enhanced schedule certainty
 - realistic and reliable cost targets
 - realistic and reliable time targets
 - improved collaboration between project team members
 - enhanced progress monitoring and control
 - effective risk management
 - reducing the total cost of ownership
 - improving sustainability
 - avoiding disputes and claims.
- 5 **Adoption Drivers**: The respondents were asked to rank (using an importance scale of 'very high', 'high', 'medium', 'low' or 'very low') the following key drivers that lead to the adoption of data and technology:
 - *(Question 12)*: Rank the importance of the following to the quantity surveying and cost management practice:
 - cost and carbon classification standards such as ICMS
 - construction information classification standards such as Uniclass, UniFormat, SfB, and NRM
 - international standards for BIM, such as the ISO 19650 series, including national annexes
 - interoperability standards such as the Industry Foundation Classes (IFC)
 - measurement rules for estimating, cost planning, procurement, and life cycle costing
 - education, training, and chartered/professional qualification.
- 6 **Adoption Barriers**: Contributors were asked to rate the following barriers (from 'not a barrier', 'minor barrier', 'moderate barrier' or 'major barrier'):
 - *(Question 13)*: Rate the barriers that you think hinder the use of data and technology in quantity surveying and cost management practice.
 - cost and effort needed
 - resistance to change
 - low return on investment
 - lack of availability of data
 - lack of data standards



- improper use of construction information classification systems
- disciplinary silos
- shortage of skilled persons, including retention of trained staff
- no demand or financial support from clients
- BIM and CDE are only geared towards design.

7 **Open-ended question:** The respondents were asked to provide feedback on anything the survey missed or provide open-ended suggestions concerning the subject of the study.

For the focus groups and individual interviews, the following prompts were used to drive discussion and exchange of ideas:

- What types of data and digital tools do you use in your quantity surveying and cost management practice? Beyond quantity take-off software, do you use any data analytics tools in your work?
- How important is information management to your practice? How do you share information and collaborate with other project team members and stakeholders?
- So far, what are your experiences with digital tools and data analytics in your quantity surveying and cost management practice? What are your plans for digital transformation?
- What is missing in the currently available digital toolset for quantity surveying and cost management practice? How can the profession help fill these gaps?

Responses from the online survey were analysed using a spreadsheet tool. The data received from the open-ended question and focus groups were analysed using text analysis tools. Findings from the analysis are presented in the following sections of this report.





2 Findings

2.1 Demographics of respondents

67% of the respondents were RICS members, while 32% were non-members. The respondents represent a good mix of organisation sizes, with 36% of the respondents working for organisations with over 1000 employees and 16% working for organisations with 10 or fewer employees. Figure 2 shows the membership and organisation size information of the respondents.

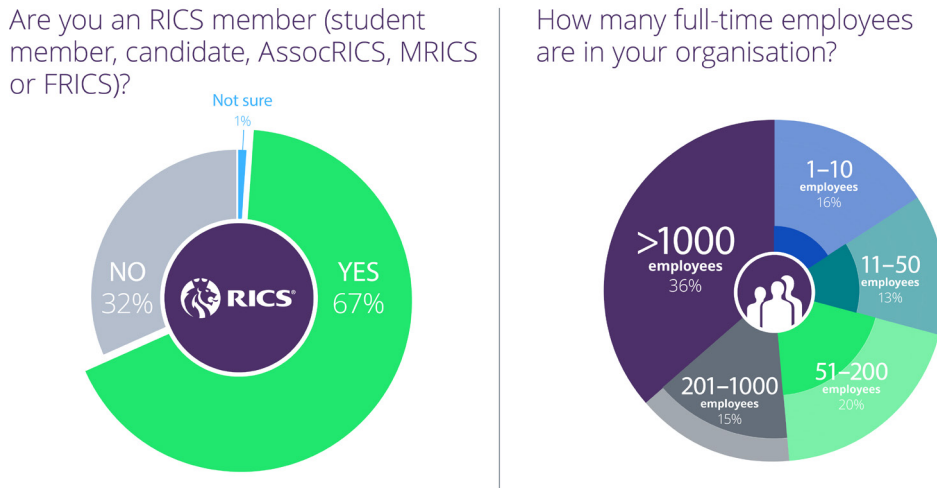


Figure 2: RICS membership and organisation size

In Figure 3, responses from various regions are shown. Most respondents represent the Asia Pacific region, with 37% selecting it as their primary region of professional practice.

Where is your primary region of professional practice?

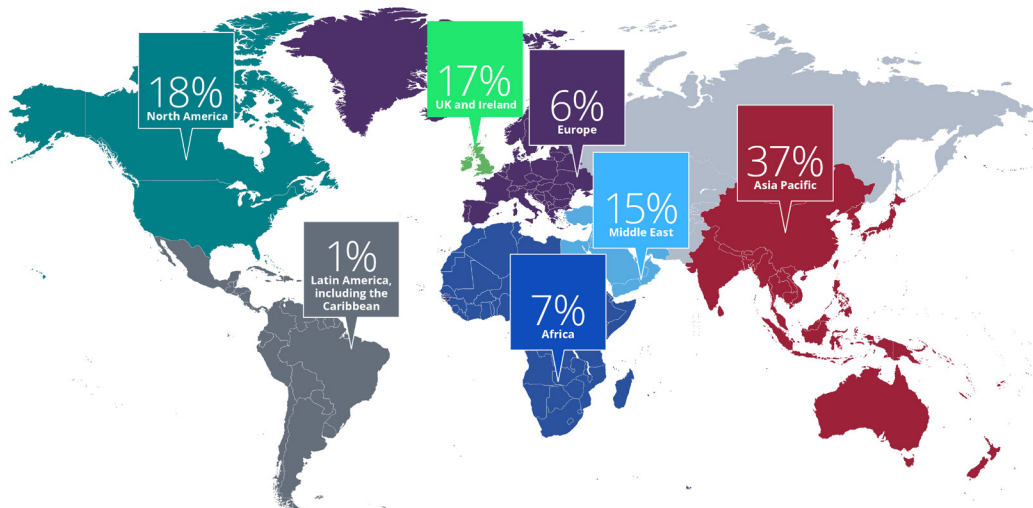


Figure 3: Regional responses



In Figure 4, the service areas selected by respondents are shown. The top three services selected by respondents are:

- 1 cost management and quantity surveying
- 2 commercial management, project controls, and contract management and
- 3 value-based processes (value engineering).

Only 23% of the respondents selected sustainability, including carbon emissions calculations, placing it in the bottom five services selected by the respondents.

What are your organisation’s service areas (select all that apply)?

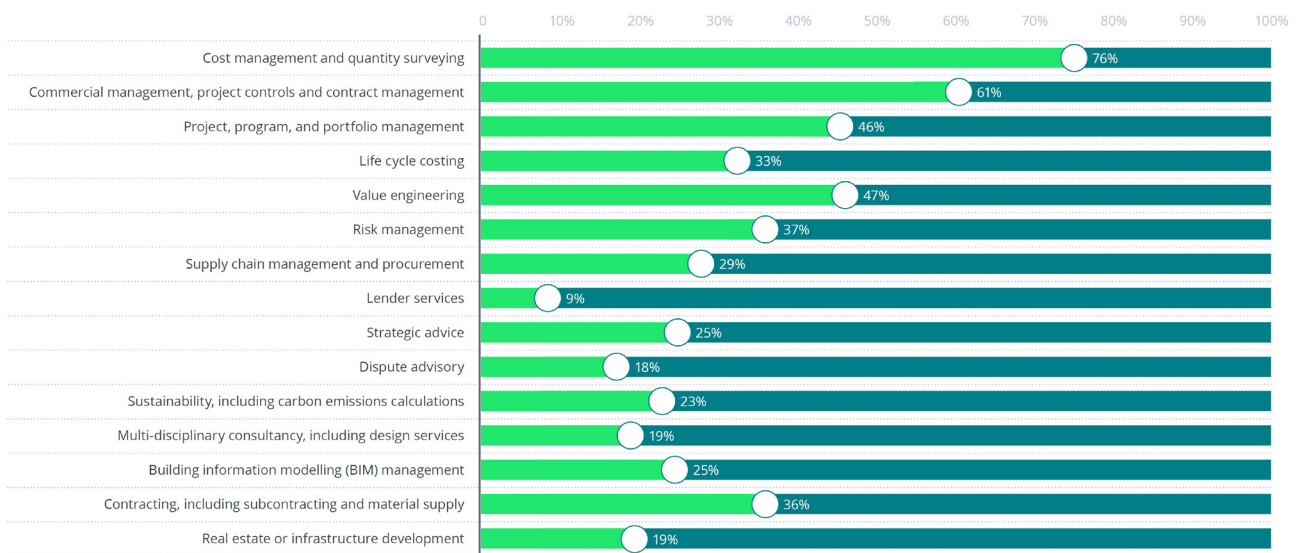


Figure 4: Service areas of organisations

2.2 Usage and degree of adoption

Several digital technologies are now available for use in quantity surveying and cost management workflows. However, their level of use varies according to the functions performed by the organisations and the workflows adopted for these functions. A key driver is the use of estimation and quantification (QTO) software in conjunction with BIM and CDE.

To assess this variation in usage, the respondents were first asked about the usage of QTO software linked to the use of BIM and CDE. Only 39% of the respondents use QTO software with BIM and CDE, while 31% use QTO software without BIM and CDE. Disappointingly, 30% of the respondents do not use QTO, presumably relying on spreadsheets and other non-purpose-built digital tools. Figure 5 shows the usage level of estimation and quantification software.



Are you currently using estimating and quantification software in your quantity surveying and cost management practice?

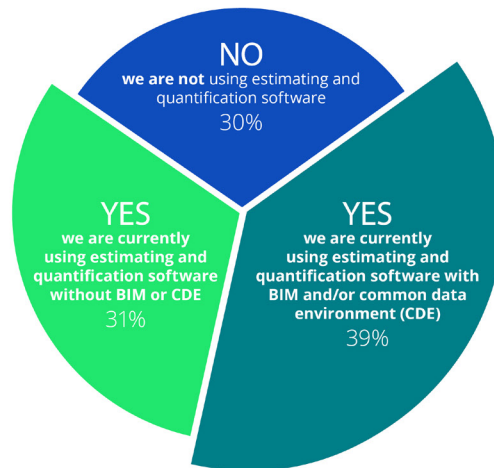


Figure 5: Use of estimation and quantification software

Next, the respondents were given a list of digital tools and asked to state how many of their projects (ranging from all projects to none) their organisation consistently uses these tools in quantity surveying and cost management practice. 66% of the respondents reported using spreadsheets on all their projects, with only 3% stating that they do not use spreadsheets at all. 77% of the respondents reported not using 'blockchain and smart contracts' on their projects, with only 4% reporting usage on all their projects. Figure 6 shows the usage level of the digital tools.

However, even for the digital tools with the most consistent usage level across all projects, a high proportion of respondents still reported using digital tools on less than half or none of their projects. For example, despite having the third most overall reported usage of 'data analytics and visualisation', over a third of the respondents reported no usage.

Considering that QTO, BIM, and CDE can play an increasingly important role in quantity surveying and cost management practice, responses to the usage of these three tools requires a careful study. These responses provide a mixed picture. On all or most of their projects, only 57% use QTO, 23% use BIM and 23% use CDE. This is consistent with the findings in Figure 5. Three digital tools with very low usage were blockchain and smart contracts, digital twins for financial modelling, and artificial intelligence and advanced computational tools.



What is your usage level of the following digital tools in your quantity surveying and cost management practice?

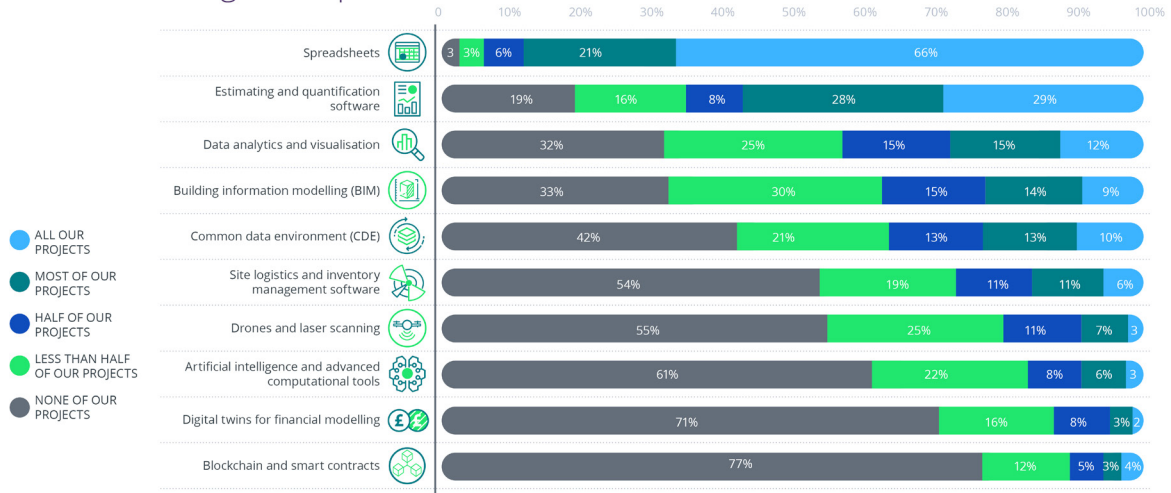


Figure 6: Usage level of digital tools

Table 1 shows a ranked list of digital tool usage based on the weighted average score of the responses. The table also shows the gap in usage, defined as the difference between high usage and low usage (high usage is the sum of all responses reporting ‘all our projects’ and ‘most of our projects’, and low usage is the sum of all responses reporting ‘less than half of our projects’ and ‘none of our projects’). The gap or difference signifies the bias towards using the listed digital tools. Spreadsheet’ and estimating and quantification software are the only tools with a positive bias towards usage, while the remaining eight digital tools have medium to high negative bias. The low usage levels of building information modelling (BIM) and common data environment (CDE) is especially concerning because these two digital tools are central to data and information management, which drives the use of the remaining digital tools. This is also highlighted by the usage levels for data analytics and visualisation.

Rank based on weighted average score	Digital tool	Weighted average (scale 5 = high, 1 = low)	Gap between high usage and no usage (%)
1	Spreadsheets	4.45	81%
2	Estimating and quantification software	3.32	22%
3	Data analytics and visualisation	2.51	-29%
4	Building information modelling (BIM)	2.37	-40%
5	Common data environment (CDE)	2.28	-40%
6	Site logistics and inventory management software	1.96	-57%
7	Drones and laser scanning	1.78	-70%
8	Artificial intelligence and advanced computational tools	1.68	-74%
9	Digital twins for financial modelling	1.50	-81%
10	Blockchain and smart contracts	1.44	-83%

Table 1: Gap in usage levels



2.3 Benefits of data and technology to professionals

Respondents were next asked to state their level of agreement with the following two statements using a scale from 'strongly agree' to 'strongly disagree':

- By using data and technology, quantity surveying and cost management professionals can enhance their advisory role
- What is the role of a quantity surveying and cost management professional in carbon calculations (embodied and operational carbon over the life cycle) for projects and assets?

Figure 7 and Figure 8 show the responses received to these two questions. 48% of the respondents 'strongly agree', and 38% 'agree' that as a professional using digital tools, they can advise the project teams. Only 6% of the respondents 'disagree' with the statement. There is a debate about the role of quantity surveying and cost management professionals as technicians versus advisers. The profession's future depends on striking the right balance between completing technical tasks and providing project teams and clients with independent advice on the financial aspects of projects. This was a recurring theme during the focus group sessions and feedback provided by respondents in the open-ended question. This issue is discussed in later sections.

When asked about the role of quantity surveying and cost management professionals in carbon calculations, 60% of the respondents agreed that they could play a supporting role, with 30% suggesting that they could take a leading role. Quantity surveying and cost management professionals aspire to play an essential role in decarbonising the built environment sector, but other studies conducted by RICS may not fully support this. For example, the [RICS sustainability report 2022](#) shows that only 45% of the respondents measure embodied carbon and only 30% measure operational carbon in their projects and assets. Similarly, the [Digitalisation in construction report 2022](#) shows that 70% of respondents reported low usage of digitalisation in carbon footprint calculation benchmarking and reporting. Digital twin usage was ranked the second lowest in usage terms, which is in line with the findings of the RICS [Digital twins from design to handover of constructed assets](#) report. With the launch of ICMS 3, which provides an integrated taxonomy for life cycle costs and carbon emissions, there is an uptick in the adoption level of the standard.



By using data and technology, quantity surveying and cost management professionals can enhance their advisory role

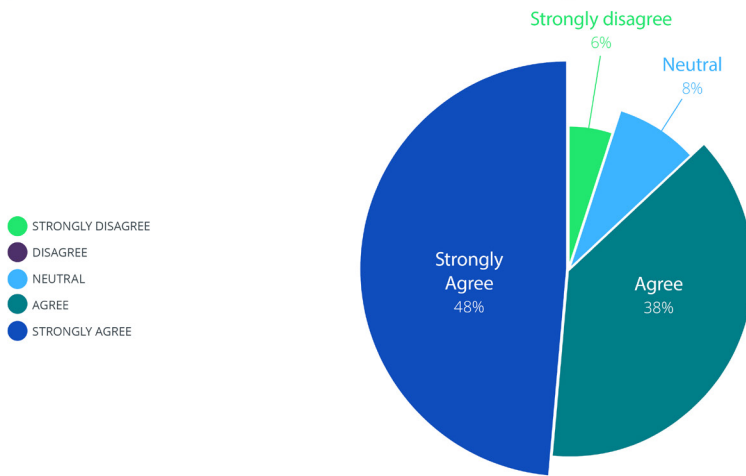


Figure 7: Digital tools promote the advisory role

What is the role of a quantity surveying and cost management professional in carbon calculations (embodied and operational carbon over the life cycle) for projects and assets?

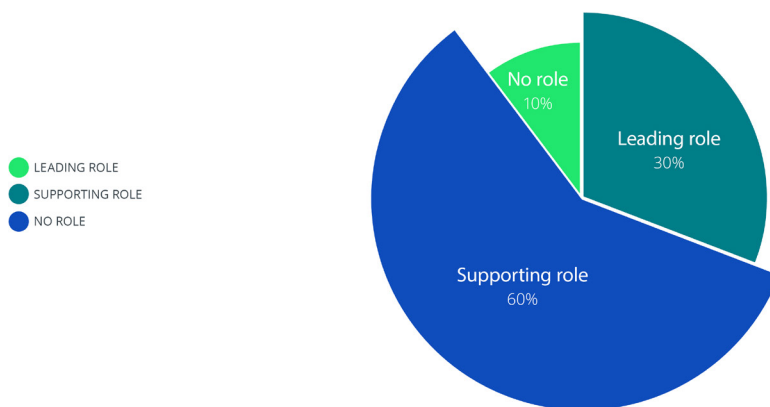


Figure 8: Role of quantity surveying and cost management professionals in carbon calculations

2.4 Benefits and improvements of data and technologies for organisations

Through a set of three questions, the respondents were asked to provide input relating to the benefits of data and technology at the organisational level. First, they were asked to rank four perceived benefits of data and technology to quantity surveying and cost management workflows (see Figure 9). Respondents ranked ‘fast and efficient quantification, quantity validation and verification’ on top, with 70% of respondents ranking it as their first or second choice. ‘Quick costing of design options to allow evidence-based decision making’ was ranked lowest, with 61% of the respondents ranking it as their third or fourth choice.



Rank the following benefits of using data and technology in quantity surveying and cost management workflows

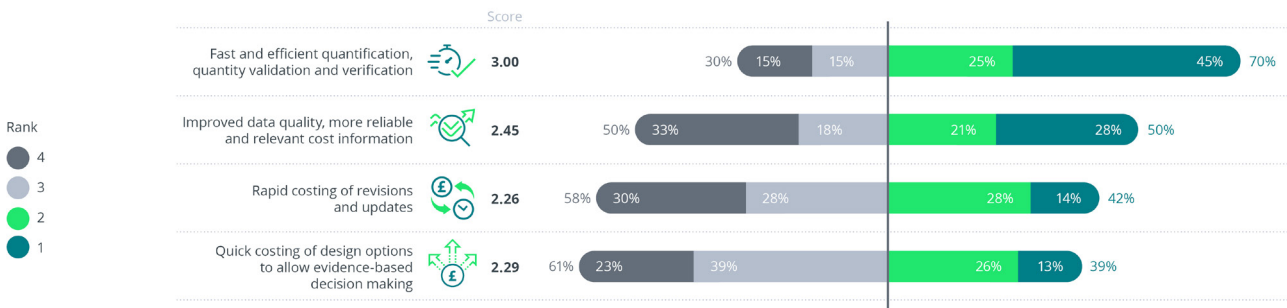


Figure 9: Ranking of benefits of data and technology to workflows

Question 10 of the survey asked respondents to assess the role of data and technology in considering key inputs to cost estimates (using a scale from 'strongly agree' to 'strongly disagree'). Figure 10 shows the results of this question arranged by the weighted score. 76% of the respondents either 'strongly agree' or 'agree' that by using data and technology, their organisation can better incorporate 'benchmarks and historical data' in their estimates. 'Management reserve, i.e., unknown unknowns/unidentified risks' (a weighted score of 3.76) and 'contingency, i.e., known unknowns/identified risks' (weighted score of 3.86) received the lowest scores based on the responses.

Data and technology help my organisation give better consideration to the following inputs in my cost estimates

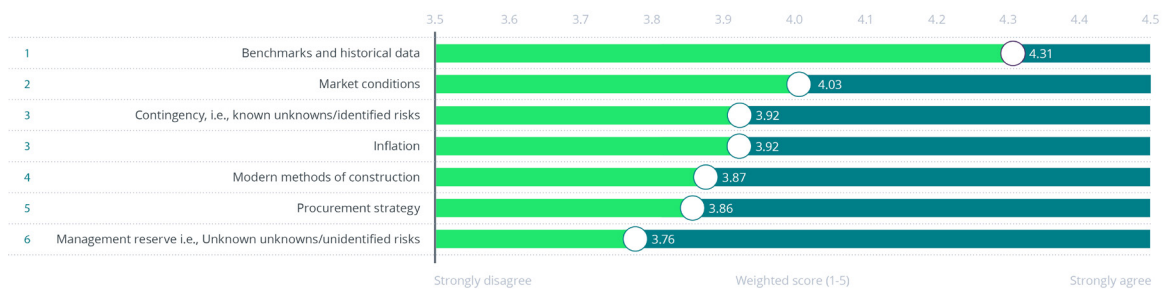


Figure 10: Role of data and technology in considering inputs to cost estimates



In Table 2 and Figure 11, the responses to the question on improvements resulting from the use of data and technology are shown.

	Strong agreement	Strong disagreement	Positive bias
Enhanced cost certainty	86%	2%	84%
Enhanced progress monitoring and control	81%	4%	77%
Realistic and reliable cost targets	83%	5%	77%
Improved collaboration between project team members	76%	5%	71%
Enhanced schedule certainty	75%	4%	71%
Effective risk management	72%	4%	68%
Realistic and reliable time targets	70%	5%	65%
Avoiding disputes and claims	59%	11%	48%
Reducing the total cost of ownership	57%	8%	49%
Improving sustainability	58%	9%	49%

Table 2: Difference between strong agreement and strong disagreement

The top three improvements resulting from the use of data and technology are:

- 1 enhanced cost certainty (weighted score of 4.20 and a positive bias of 84%)
- 2 enhanced progress monitoring and control (weighted score of 4.09 and a positive bias of 77%)
- 3 realistic and reliable cost targets (weighted score of 4.07 and a positive bias of 77%).

The lowest improvements were seen in the following:

- 1 improving sustainability (weighted score of 3.68 and a positive bias of 49%)
- 2 reducing the total cost of ownership (weighted score of 3.68 and a positive bias of 49%)
- 3 avoiding disputes and claims (weighted score of 3.70 and a positive bias of 48%).

Regarding the improvements, the quality of data being used for budgets plays a significant role as high quality verified data can provide better cost certainty but poorly managed or categorised data does not improve cost certainty. It is concerning that improvements in sustainability are ranked amongst the lowest three. There is clearly a gap between perceived benefits and the role that quantity surveying and cost management professionals aspire to in this area (see Figure 7 and Figure 8), perhaps explained by low usage levels (see RICS' [Sustainability report 2022](#) and RICS' [Digitisation in construction report 2022](#)). With a significant emphasis on decarbonising the built environment, this is an area that needs further consideration. Sustainability is going to be driven by the owners needs and requirements. Currently Qs advise on cost options to improve sustainability but typically they do not play a lead role.



Rate the improvements that result from the consistent use of data and technology in your quantity surveying and cost management practice.

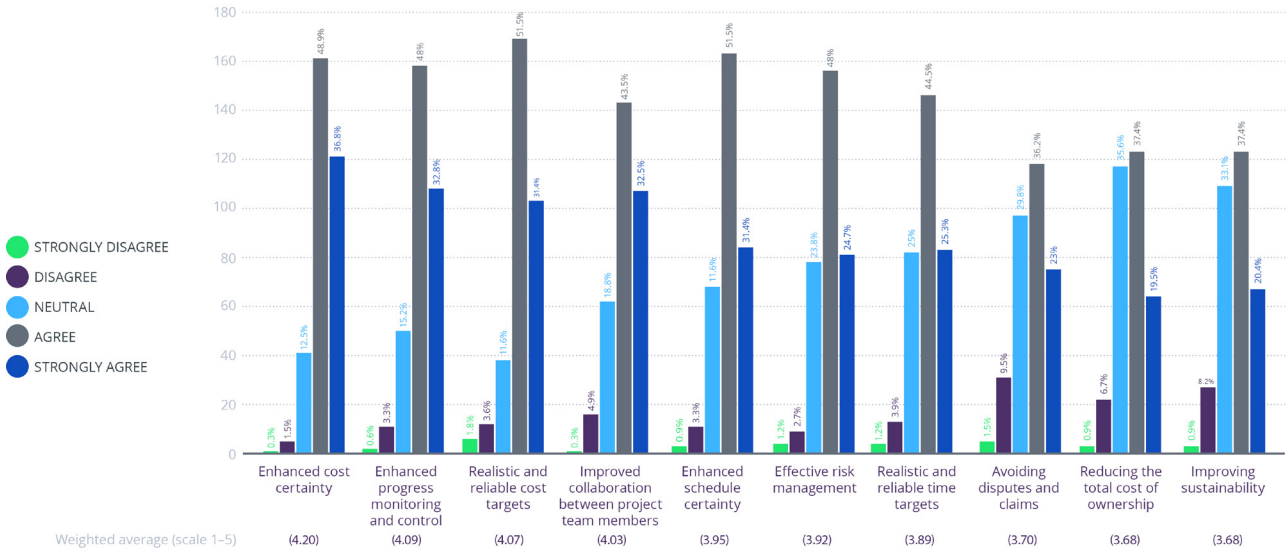


Figure 11: Improvements that result from the consistent use of data and technology

2.5 Adoption drivers

Given the mixed picture of the adoption of digital tools, it is crucial to understand the drivers that encourage greater use of them. The respondents were asked to rank (using an importance scale of very high, high, medium, low, and very low) six key drivers leading to data and technology adoption. Figure 12 provides a summary of the responses received. Using a weighted average score, these drivers were ranked. The top three drivers are:

- 1 education, training, and chartered/professional qualification (score 4.2)
- 2 measurement rules for estimating, cost planning, procurement, and life cycle costing (4.18)
- 3 construction information classification standards such as Uniclass, UniFormat, SfB, and NRM (3.67).

International standards for BIM, such as the ISO 19650 series including national annexes, interoperability standards, such as the Industry Foundation Classes (IFC), and cost and carbon classification standards, such as ICMS, were considered lower in importance by the respondents.



Rank the importance of the following to the quantity surveying and cost management practice.

- VERY HIGH
- HIGH
- MEDIUM
- LOW
- VERY LOW

Weighted average (scale 1-5)
 1 VERY LOW
 5 VERY HIGH

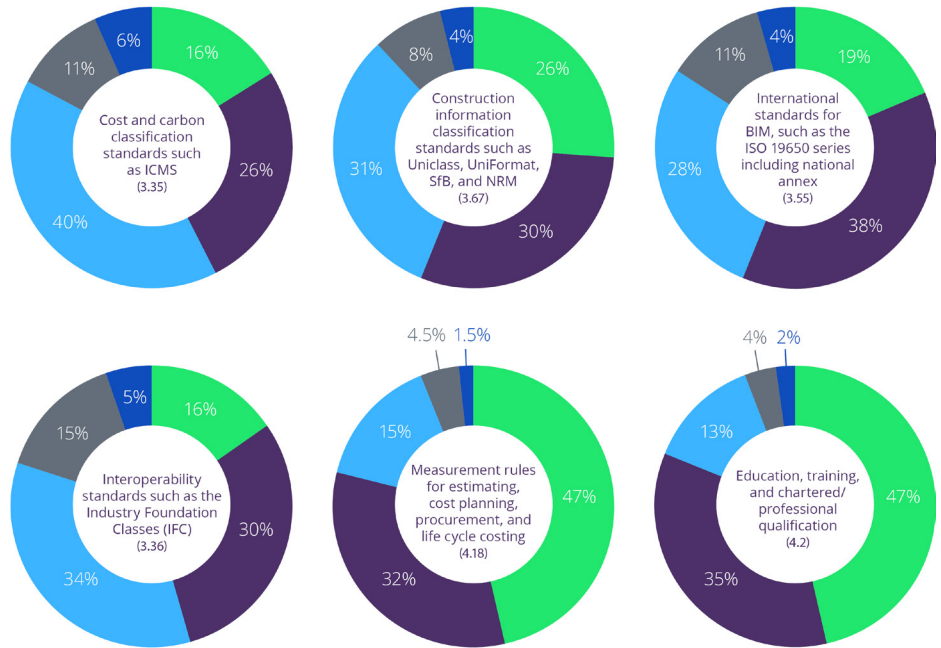


Figure 12: Drivers to the adoption of data and technology

2.6 Adoption barriers

The gaps highlighted in the adoption levels lead naturally to an examination of the barriers to adoption cited in the survey responses. The survey asked respondents to rank ten blockers using a major, moderate, minor scale, not a barrier, and no opinion.

Figure 13 lists these blockers with 'shortage of skilled persons, including retention of trained staff' as the highest-ranked blocker and 'low return on investment' as the lowest-ranked. 'Resistance to change' and 'cost and effort' are also cited as significant barriers. Table 3 shows the ranking of barriers based on the percentage responses as a 'major barrier'.

	Major barrier
Shortage of skilled persons, including retention of trained staff	55%
Resistance to change	49%
Lack of availability of data	41%
No demand or financial support from clients	40%
Cost and effort needed	40%
Lack of data standards	40%
Disciplinary silos	36%
BIM and CDE only geared towards design	33%
Improper use of construction information classification systems	28%
Low return on investment	21%

Table 3: Major barriers to adoption



Rate the barriers that you think hinder the use of data and technology in quantity surveying and cost management

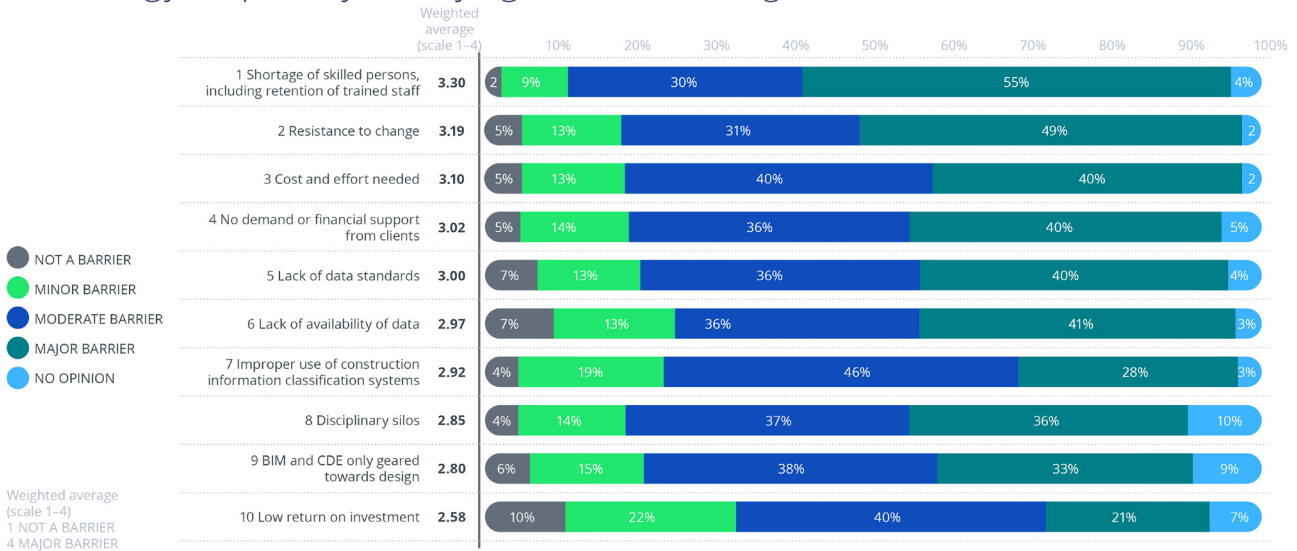


Figure 13: Barriers to adoption of data and technology

2.7 Open-ended question

15% of the respondents provided optional feedback using the open-ended question that prompted them to highlight anything missed or provide suggestions pertinent to the study. These responses were analysed using basic text analysis techniques. Figure 14 provides a hierarchy map of the themes collated from the text provided by respondents. Three main themes, namely, technology factors, economic factors and cultural factors were identified. Topics highlighted by respondents within themes were manually mapped. Each theme and its respective subthemes are colour-coded on the map; the size of each block representing a subtheme is proportional to the number of times the respondents highlighted the subtheme.

Several respondents highlighted the limited adoption of BIM in quantity surveying and cost management practice. A key issue highlighted in this respect relates to the specific information requirements of the quantification and cost-planning processes. The respondents suggested additional guidance on this issue and updating RICS standards. The respondents also listed initial investments, keeping pace with technological changes, training and lack of awareness.

Some respondents highlighted the importance of a balance between the role of quantity surveying and cost management professionals in data collection and collation, data analysis and interpretation. All three elements are important and are reflected in the responses for question 7, i.e., 'By using data and technology, QS and CM professionals can enhance their advisory role (from 'strongly agree' to 'strongly disagree')'.

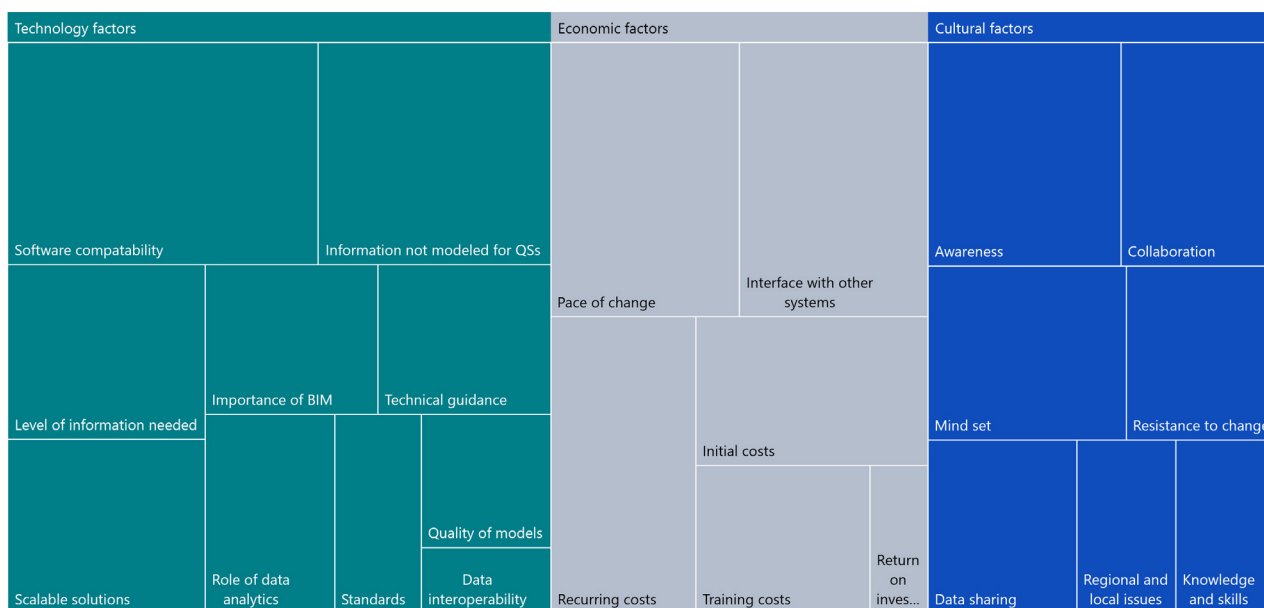


Figure 14: Themes from the open-ended questions

2.8 Focus groups

A series of focus groups and individual interviews were conducted in Australia, New Zealand, Singapore, Hong Kong, the UK, and Canada (see Table 4).

#	Region/Country	Type
1	Southeast Asia	Focus group (five experts participated)
2	Hong Kong	Focus group (four experts participated)
3	UK	Focus group (six experts participated)
4	Australia	three individual interviews
5	Canada	four individual interviews

Table 4: Focus groups and interviews conducted

Four open-ended questions or prompts were used to drive the discussion and seek input from the participating experts. A summary of the discussions is provided below and illustrated in Figure 15:

- Types of data and digital tools:** As technology adoption has increased, quantity surveying and cost management firms face increased pressure to adopt these tools. With specialised digital tools for every aspect of the project, firms end up adopting many such tools, for example, several hardware and software tools are used for site monitoring and project controls. Partly due to these reasons, follow-on challenges exist such as limited data reuse, interoperability and internal digital tools not being compatible with external tools. Some medium and larger quantity surveying and cost management firms have developed internal software platforms that make the connection between client-facing project data and internal workflow data more seamless, but an integrated system does not exist.



- 2 **Role of data analytics:** Most experts highlighted the importance of and increased reliance on dashboards and data analytics. These are very important both for internal and external audiences. Data from disparate systems and sources are being collated, analysed and presented on dashboards for better decision-making. Several experts also highlighted the increasing importance of benchmarking historical data. There were additional discussions about data and tools for market intelligence, pricing and risk modelling. There is a significant reliance on internal databases and benchmarks.
- 3 **Importance of information management:** While BIM and CDE came up in the discussions several times, there were mixed feelings about their usage. Several experts highlighted challenges pertaining to a lack of standards, limited information sharing and data and information not being provided. The experts generally accepted that paying attention to information management and making upstream actors aware of the information needed by quantity surveying and cost management workflows downstream is now more critical. Sharing information and collaborating with other project team members and stakeholders remains challenging.
- 4 **Digital transformation:** This is important for most organisations, however, due to the fragmented nature of the technology ‘stack’, organisations do not see measurable benefits. Most experts feel a need to take a platform or ecosystem approach in which new features or apps can be acquired or developed continuously. Experts felt the need to keep the authoring tools and data separate so that the apps in the platform or ecosystem could readily use that data. This will allow secure links between project-specific external and internal organisation-wide systems.
- 5 **Role of professional bodies:** Most experts felt that professional bodies like RICS have a significant role in defining the future roadmap of the use of data and technology in quantity surveying and cost management. Existing standards, especially those that outline the process and information requirements in a model-centric environment, should be updated and widely circulated to enhance awareness and understanding. RICS members also have a significant role in defining the profession’s future and influencing the skills and competencies of new and current professionals working in this domain.

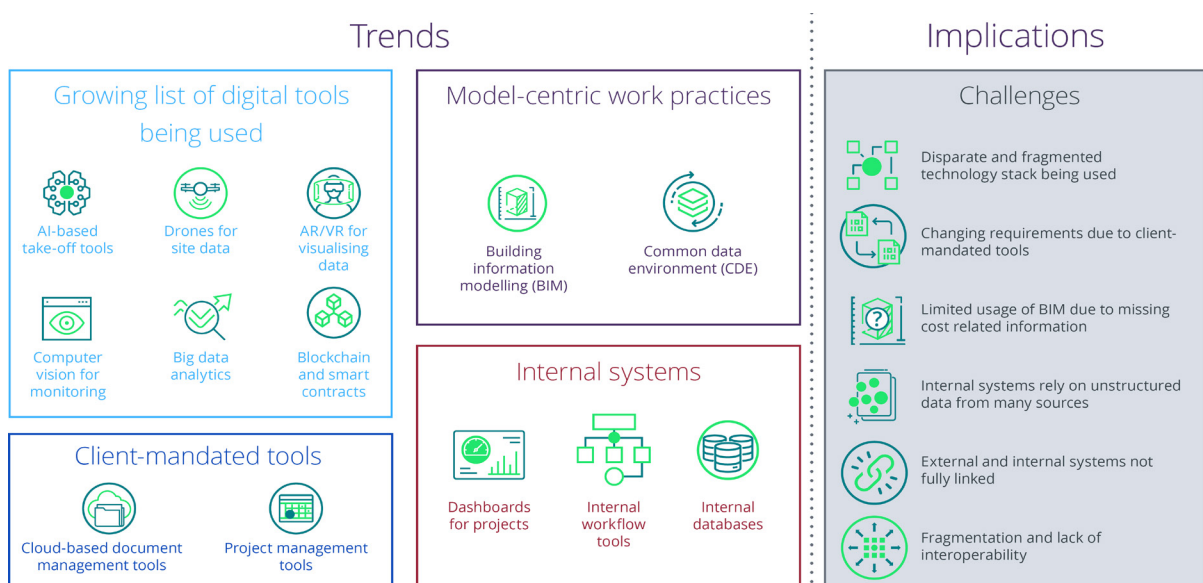


Figure 15: Summary of focus group findings



3 Conclusions

Data and technology remain a vital part of the toolkit in quantity surveying and cost management practice. There is renewed attention on this topic due to the accelerated adoption of digitalisation caused by recent global challenges. As upstream processes shift towards using model-centric and data-driven workflows, quantity surveying and cost management professionals are taking notice, and it is important to measure and monitor the progress being made in their use of digital technology. This report captures the current state of data and technology use and other linked measures of adoption in 2022. The report is based on an online survey, expert interviews and focus groups.

Responses to the survey questions on using estimating and quantification software show that only 39% of the respondents use estimating and quantification software in conjunction with BIM and CDE. 30% of the respondents do not use estimating and quantification software, and the rest use it without BIM and CDE. From the interviews and focus groups, it became clear that the level of information needed for quantity surveying and cost management workflows is not fully included in the models prepared by design teams. The experts suggested developing a playbook that outlines the information needed at various project stages to integrate their workflows into the model-based design workflows.

Unsurprisingly, when respondents were asked to rank from a list of other digital tools, spreadsheets were still ranked as the top digital tool. Ranked two and three were 'estimating and quantification software' and 'data analytics and visualisation.'

Stemming from these findings are these high-level recommendations:

- 1 Using information management practices, develop a playbook documenting the 'level of information need' and information deliveries for quantity surveying and cost management work processes and practices.
- 2 Enhance quantity surveyors' and cost management professionals' skills and competencies framework to reflect the importance of digital tools, analytics, and decarbonisation.



- 3 Connect and map cost classification standards with other construction information classification systems to overcome fragmentation in the current processes and practices.
- 4 Develop strategies to promote model-driven and data-centric work practices that enhance collaboration across the value chain.

4 References

[Cost prediction](#), 1st edition, RICS professional standard, 2020.

[Digitalisation in construction report](#), RICS research report, 2022.

[Digital twins from design to handover of constructed assets](#), RICS World Built Environment Forum report, 2022.

[International Cost Management Standard \(ICMS\)](#), 3rd edition, ICMS Coalition, 2021.

[New Rules of Measurement](#), 3rd edition, RICS practice information, 2021.

[Sustainability report](#), RICS research report, 2022.

[Whole life carbon assessment for the built environment](#), 1st edition, RICS professional standard, 2017.



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