

Annual Benchmark Report 2021

March 2022

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Forewords

The growth of the Digital Twin Hub (DT Hub) over the last two years has exceeded all our expectations as numbers have leapt from an initial group of six to an amazing 3,400 members, representing more than 1,600 organisations from over 77 countries across the globe.

The DT Hub has become a vibrant meeting place for people wherever they are on their digital twin journey and the ‘go-to’ place for anyone wanting to find out more about connected digital twins. It has been a game-changer, showing the real need and desire for this DT community, and that collaboration, connection, and knowledge exchange are vital if we are to achieve our goal of connected digital twins across the built and natural environments.

This current year is the most important yet as we transition the DT Hub from its home with the Centre for Digital Built Britain (CDBB) to an industry/Catapult partnership housed at the Connected Places Catapult. CDBB will have completed its mission through the National Digital Twin programme, creating the world-leading platform and community that is the DT Hub, and ensuring that it is now ready for an exciting new phase of innovation and knowledge exchange.

I am hugely proud of the whole team and would like to thank everyone who has contributed knowledge and expertise for their incredible dedication and commitment. The ground-breaking projects and community initiatives in this report build on our guiding principles and set an example for what can be achieved by the connected digital twin community.

We celebrate these achievements and look ahead to an era that will extend cooperation, coordination and collaboration across sectors and inspire even greater progress towards our vision of enabling people and the planet to flourish together for generations.



Alexandra Bolton
Executive Director, Centre for Digital Built Britain

Forewords

This has been another great year with the DT Hub community continuing to expand, more than doubling in size and retaining its globally unique diversity of asset owner/operators, service providers, industry stakeholders, academia, international and policy members. Knowledge sharing and discussion have never been easier – tools, spaces and forums exist to share experiences, challenges and learnings.

The continued widespread support of weekly Gemini calls, and the debates they provoke, are a tangible demonstration of the appetite to explore and test best practices and our understanding of what good looks like.

Through engagement within and beyond the community, we have already seen a national transformation in the understanding and recognition of the role that digital twins, and the interoperability of their data, play in meeting global challenges.

The creation of the Community Council and Community Champions are the drivers for the next chapter in the DT Hub’s evolution. There will be many technical elements to creating a national digital twin, but we must not lose sight of the fact that the end game is to create better outcomes for people and nature. The DT Hub community offers a way for those who create, use and benefit from digital twins to shape and input to the process. The council will be critical in ensuring that the voice of the community is captured and heard, internally and externally.

We recognise that it is only in embracing and sharing insights, aspirations, concerns and experiences that we can accelerate socio-technological change. The community – members, organisations, partners, and wider network – represents the most fantastic catalyst for the expansion of digital twins in the built environment and beyond.

We will work to inspire and enable members to feel more confident to share and engage with the Hub, building on the increasing amount of community-led activity and knowledge produced this year. As the knowledge grows, we will want your feedback on ensuring it is always available in the most accessible format.

We are looking forward to working with you to explore how the council can improve member experiences and are eager to hear your views.

Community Council Co-Chairs



Ali Nicholl
Head of Engagement, IOTICS



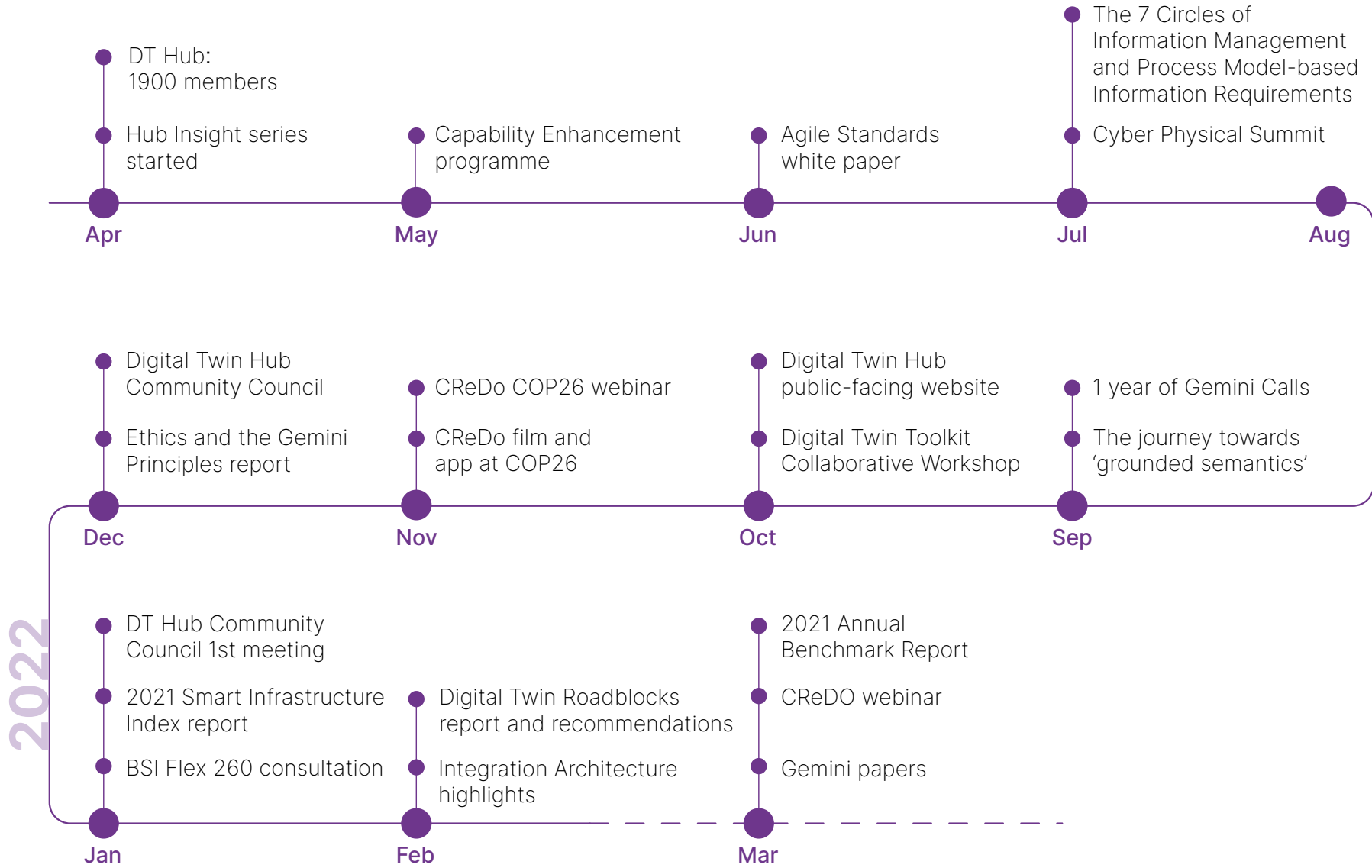
Melissa Zanocco
Head of Programmes, Infrastructure Client Group

Introduction

As the DT Hub approaches its second-year anniversary, we would like to share our progress and learnings. During this year, the community hasn't just grown in number, it has evolved and matured to become a vibrant and rich community of knowledge and knowledge sharing.

The DT Hub has also grown in diversity, attracting a greater number of international members, and engaging with sectors outside the built environment to share and exchange learning on digital twins. It has strengthened its resources and engagement with stakeholders and become more user friendly.

Most significantly, we have fulfilled our goal of enabling DT Hub members to take ownership of the direction of the community, with the creation of the Community Council.



Community

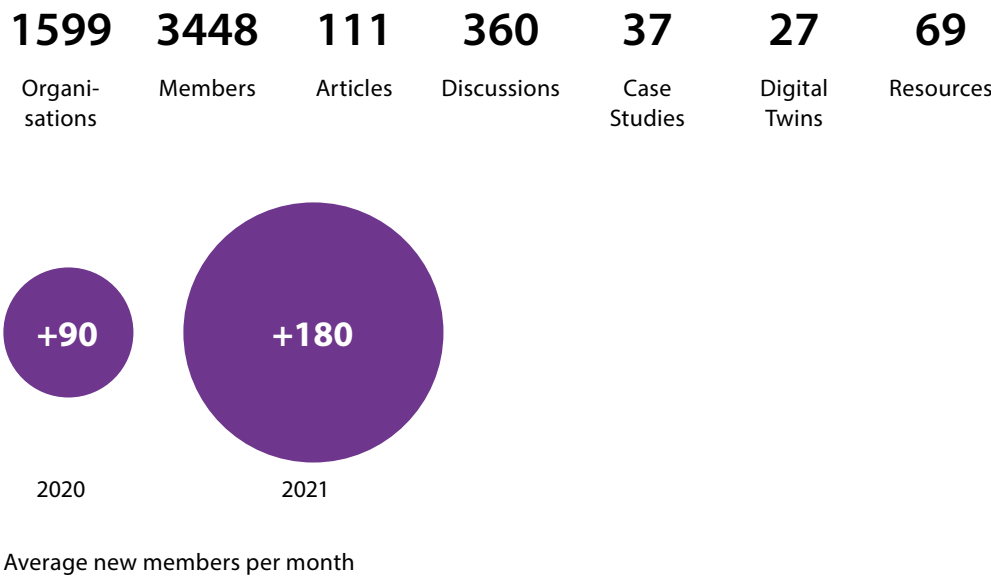
The first year of the DT Hub was about establishing a core group of members from industry, academia and policy to pool knowledge and collaborate. It was about getting the right building blocks in place.

This second year has focused on deepening the engagement of members, facilitating more opportunities for collaboration, and enabling representation across all sectors and industries through the Community Council.

Rapid growth

By organisation and member numbers, we are now the largest online community worldwide dedicated to digital twins. At the end of the last financial year, we had nearly doubled our membership and are seeing a similarly positive growth rate as we approach this one.

The DT Hub is fostering international collaboration, and benefits from having members from over 77 countries. As well as our developing international reach, we have seen increasing interest from other national digital twin initiatives which we have welcomed to the DT Hub to share emerging best practice and standards. Learning and sharing across borders has enabled us to set industry standards and be emulated in other parts of the world.



An engaged community

Community Council. As membership grows, it is important that the DT Hub reflects the needs of its members. DT Hub Community Council members:

- Influence the strategic direction of the community.
- Engage directly with peers and the DT Hub core team.
- Provide feedback on a range of new initiatives and shape ideas.
- Become visible as recognised leaders in the community.

The Council’s first few meetings in 2022 showed members’ enthusiasm and an incredible willingness to contribute and drive engagement in the community.

Welcome session. The DT Hub runs a monthly welcome session for new members to show them how to make the most of the community. It includes an introduction to the DT Hub and the National Digital Twin programme, plus a walk-through the website with key features and tips.

Gemini call. Each Tuesday we host a weekly call to report on the latest activity across the programme. We celebrated one year of the Gemini call in September 2021 alongside a tally of 45 Gemini calls. We are also delighted to see the average number of participants has increased to around 80 per call with over 600 attending at least one call.

Feature focus presentations. In 2021, we introduced feature focus presentations as part of the Gemini call. These allow members to present a short showcase of their work to the community to share knowledge, create connections and stimulate discussion. They have proved incredibly successful, and there is continuous demand for an opportunity to present. We have realised additional value by making recordings available via our media pages.

Town hall events. These take place every other month on the Gemini call and allow members to have a regular ‘ask us anything’ format event with the National Digital Twin programme team.

Collaboration on challenges. The DT Hub ran a series of three online workshops on the theme of DT Roadblocks to drill down into some of the challenges to digital twin adoption. Participants identified 105 roadblocks, demonstrating a real need for collaboration in solving the issues. These were distilled into five common problem spaces: Vision and Value, Governance and Guidance, Need and Want, Data Issues, and Readiness.

The facilitated workshops used design thinking methods which enabled participants to unpack and explore issues in depth, and we used DT Hub Gemini calls and online conversations for further exploration of the outputs from each session. New, powerful ideas were generated by deliberately mixing a diverse group of people and disciplines to get different perspectives and encourage cross-fertilisation between sectors.

Community Response workshop. The DT Hub repeated the workshop held in 2021 to gather feedback from the community. We are always interested in what is working, what isn’t, new ideas and how to make improvements to both the user experience and the platform. (See Appendix 1)

Gemini Papers. The community has played an important role in shaping and reviewing the Centre for Digital Built Britain (CDBB)’s Gemini Papers – a suite of papers which consolidate the shared learnings of the Centre and the National Digital Twin programme from the past four years. The papers bring together the consensus viewpoint of the digital twin community and layout the blueprint for connected digital twins for the future.

International reach. The community has grown internationally, and the DT Hub team has made connections with overseas organisations working on similar national initiatives including: the Australia and New Zealand Digital Twin Hub led by Smart City Council; a group of Italian organisations interested in setting up a DT Hub in Italy; and the Swedish National Digital Twin initiative through the Swedish Digital Twin Cities Centre. This internationalisation is also reflected in the Community Council.

Retrospective

Since the last report, we have seen the establishment of the Community Council, an improved onboarding experience for new users, rapid growth in overall membership and the Gemini calls going from strength to strength.

There is still scope for improvement and potential to increase community engagement, where more content is driven by members, including submissions to the registers and discussions in the forum. We are also looking at ways of increasing community diversity and inclusion. It is accepted that having a community driven platform takes time and effort, but initiatives in place are looking extremely encouraging.

Looking forward

Community leadership. The Community Council will drive diversification into new sectors; encourage organisations to have greater representation from their staff and establish new networks to bring specialist groups together. The link between the Gemini call and the community will be further strengthened by encouraging discussion after calls have finished and keeping the conversation going in-between.

We have also established a network for Community Champions. This connects our most enthusiastic community members with the Community Council and will increase overall engagement within the DT Hub. We welcome interest from members who would like to join this network – find out about becoming a Community Champion.

As we begin a new year, our focus is on international reach and ensuring there is real diversity of membership, both demographically and in terms of industries and sectors.

“Amazing session this morning – thank you all, so great to share ideas with everyone.”

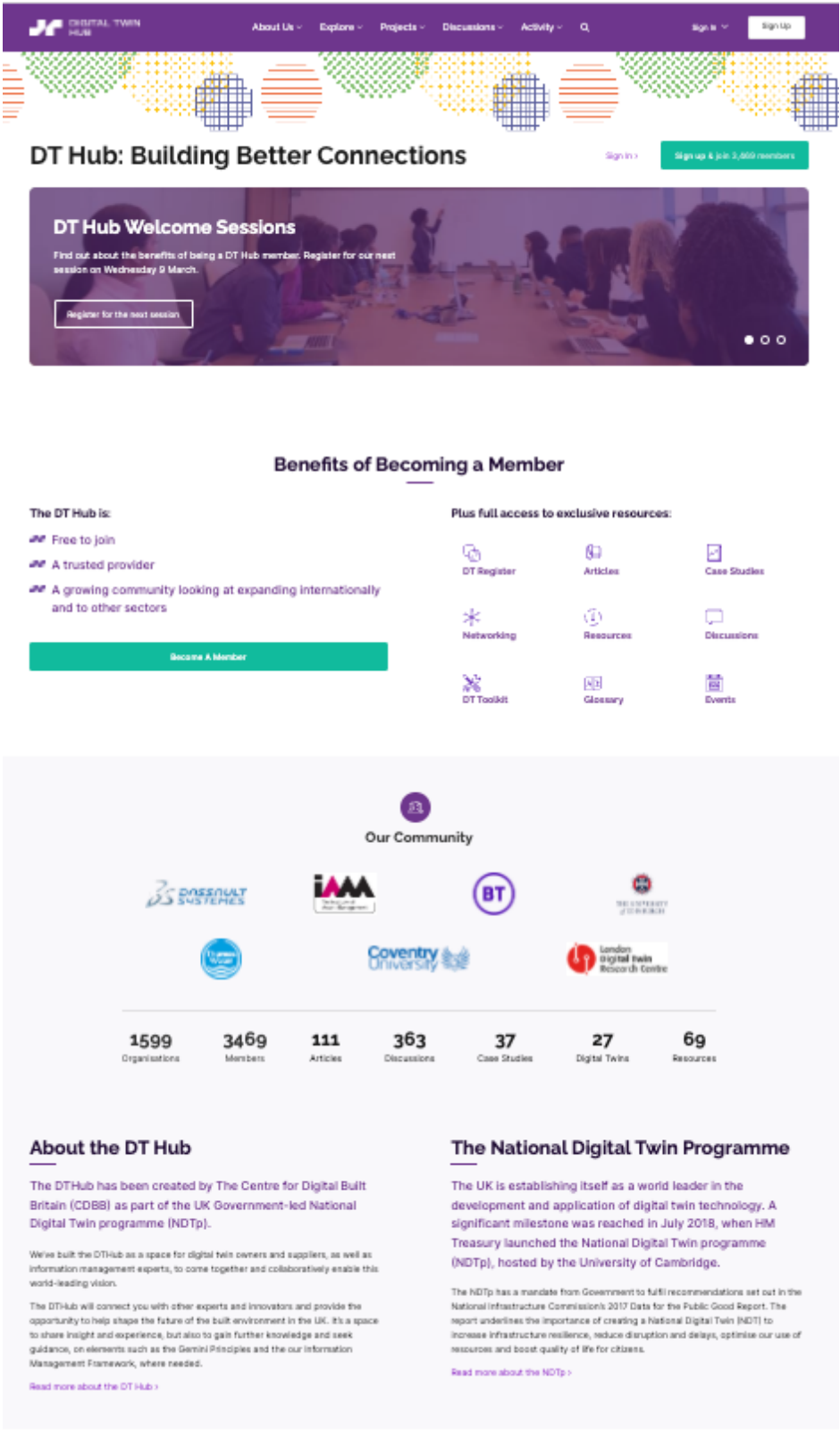
Leia Mills
Satellite Applications Catapult

Platform

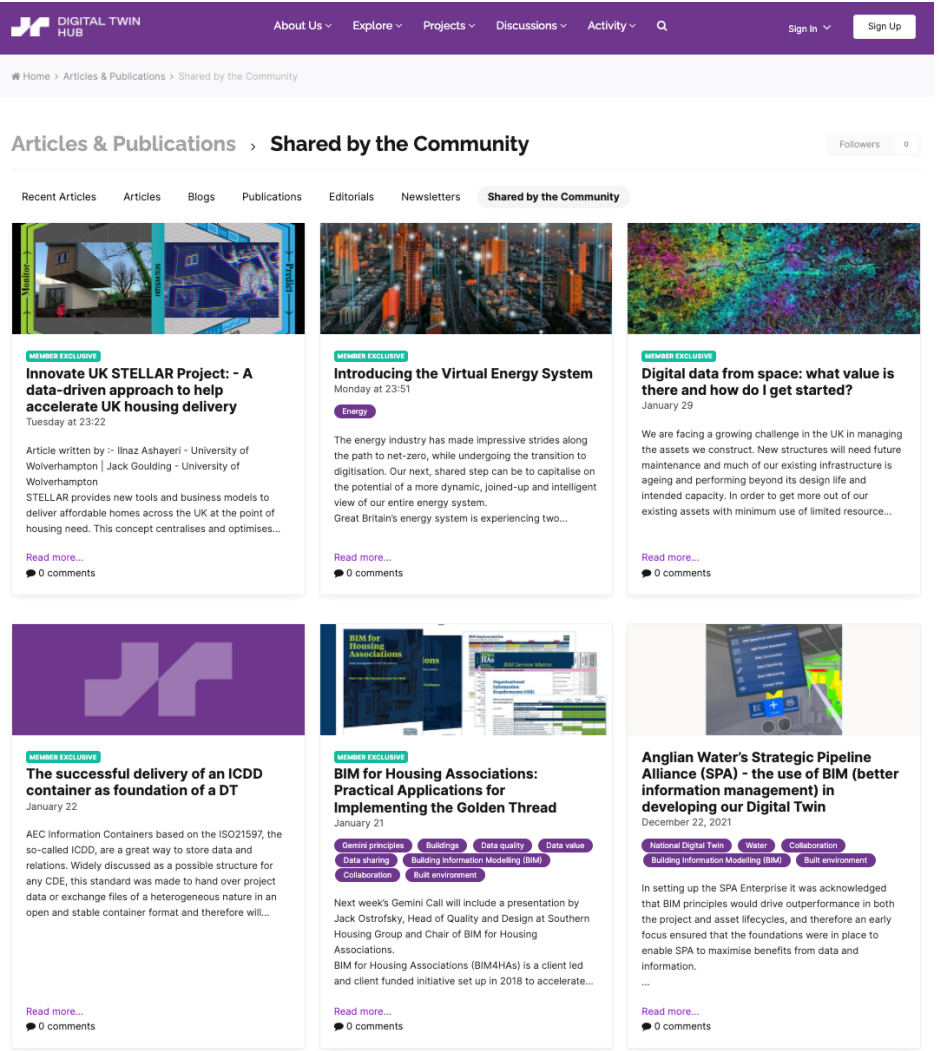
This year, we delivered an evolutionary redesign of the DT Hub website, reflecting its purpose as the place where knowledge around digital twins converges.

Our aim was to provide a platform suited to the needs of a fast-growing multi-sector and multi-national audience where access to and sharing of content are pivotal. While the site retains its valuable collection of member exclusive content, we have created a public-facing home page and enabled public view of useful content from the National Digital Twin programme, along with a snapshot of member activity. The web refresh allows us to promote the community more widely and attract new members.

One of our achievements is an enhanced user experience, with a special focus on the onboarding stage. This runs alongside a visual index to facilitate access to resources and knowledge, using the taxonomy developed and regularly updated by the team. We have also redesigned the media, supplier register and case study sections and link this content to relevant discussions and other material on the DT Hub. An improved network functionality gives subcommunities a dedicated space for focused conversation on specific topics.



Public facing website



Members' contributions

Retrospective

Our focus was to design and deliver new functionality to the website to enable visitors to engage with public content. Initially, our growth was supported by people and organisations already aligned to the purpose of the DT Hub, but by opening up engagement opportunities we have allowed prospective members to gain a better understanding of the platform and community before they join.

Delivering this vision required a major redesign of the platform with a focus on the user journey from the first visit, to signing up and becoming a member. We have received excellent feedback, and a comparison of metrics demonstrates an increased number of visits from new and returning users.

Looking forward

Future development of the website will be influenced by the community, and we will act on feedback from initiatives including the Digital Twin Roadblocks and Community Response workshops. We look forward to sharing our platform enhancement roadmap.

“It’s great to find such a myriad of strategic, technical, and academic resources relating to digital twins in a single location; many of which have been submitted by DT hub members!”

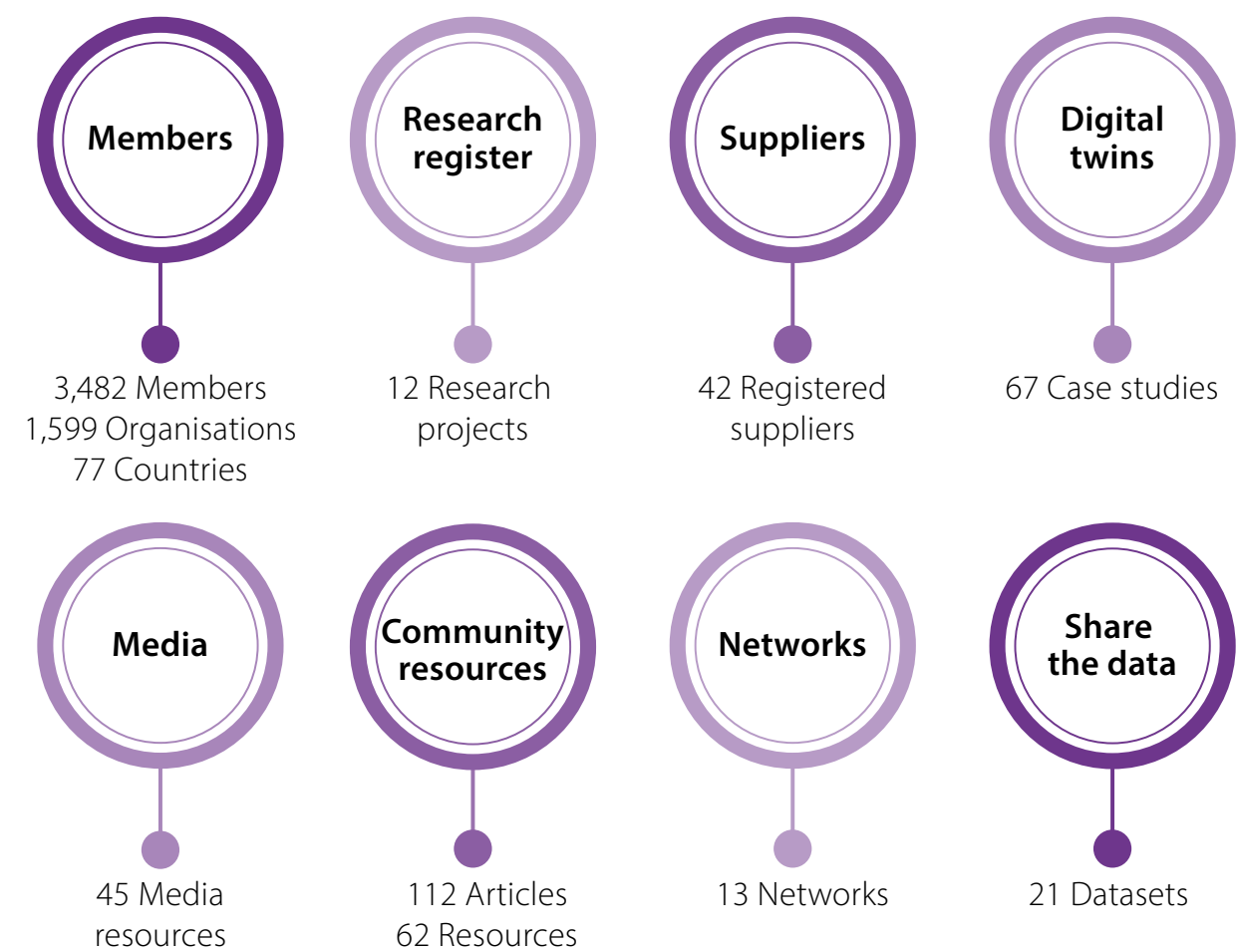
Dan Rossiter
FCIAT

Knowledge

Our aim in 2021 was to increase the overall volume of knowledge on the site and ensure it was surfaced and promoted, as well as being relevant to the community's interests and needs. Thus, the DT Hub has become a unique platform, widely recognised as the 'go to' place for anyone interested in digital twin adoption.

The DT Hub is actively encouraging members to share and publish resources, best practice and examples for the DT Hub case studies register, on Gemini calls, in the media section, blogs, discussion forum threads and more. Members have responded positively, generating valuable and practical resources. There is now a rich pool of content from members and the National Digital Twin programme alike.

Improved access. We have used the knowledge taxonomy to support and increase accessibility to resources on the website through the visual index; a unique entry point to resources on the DT Hub filtered by topics of interest.



Retrospective

With the increase in available content, comes a need to make it more accessible. We have been able to do this by improving the search function and ensuring consistency in the tagging system and in the layout of similar contents. Monthly welcome sessions for new members have also played a key role in highlighting website features and functionalities, and demonstrating how to contribute to knowledge sharing.

A new central data-sharing facility provides a self-sufficient environment for members to enter case studies and provide resources. Yet, knowledge sharing is still in its early stages and we will need to work closely with members, in particular the Community Council and Community Champions, to develop strategies to increase confidence and understanding of its value.


Looking forward

Emphasis in the coming year will be on community led knowledge creation and in strengthening the knowledge management cycle, i.e., how we create, curate, use and improve the knowledge on the DT Hub for the benefit of members.


We intend to increase the value of knowledge sharing by working with the community to find the most effective ways to empower the knowledge creators and to support the knowledge collections on the platform.

Visual Index


We've hand-picked some key subjects to help you navigate the various content across the site. Click a subject below to explore more.




Discovering Digital Twins




Learning From Others




Leveraging Technology



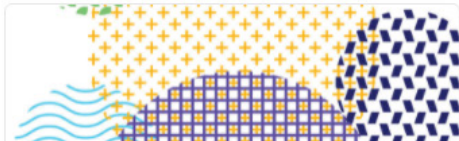
Setting Standards




Developing Skills & Capabilities




The IMF & Connecting Digital Twins



Understanding the National Digital Twin programme (NDTp)



Research



Delivering Outcomes

[Home](#) > [Subjects](#)

Latest Activity

“The DT Hub is a great resource, and a good place to find case studies to learn from. I really appreciate the effort made by the DT Hub team to listen our feedback and to keep improving the platform.”

William Markiewicz
UCL

Digital maturity and the Smart Infrastructure Index

In early 2022, we completed our second [Smart Infrastructure Index survey](#) to measure digital maturity across the community. The DT Hub version of the Smart Infrastructure Index includes core questions that assess maturity across the asset lifecycle, with an extension focusing on digital twins in the context of the National Digital Twin programme.

The objectives were to:

- Better understand the maturity of our members in relation to both digital transformation and digital twins.
- Explore relationships between digital transformation and digital twins.
- Compare and contrast DT Hub members with broader Index metrics.
- Draw comparisons between the DT Hub's asset owner / operator members and the wider community.
- Understand progress among the asset owner / operator members
- Inform future areas of focus for the DT Hub and the National Digital Twin programme.

The Index generated personalised reports including a score and targeted recommendations. It also aggregated members' scores and produced insights for a report about digital maturity in the journey towards a National Digital Twin.

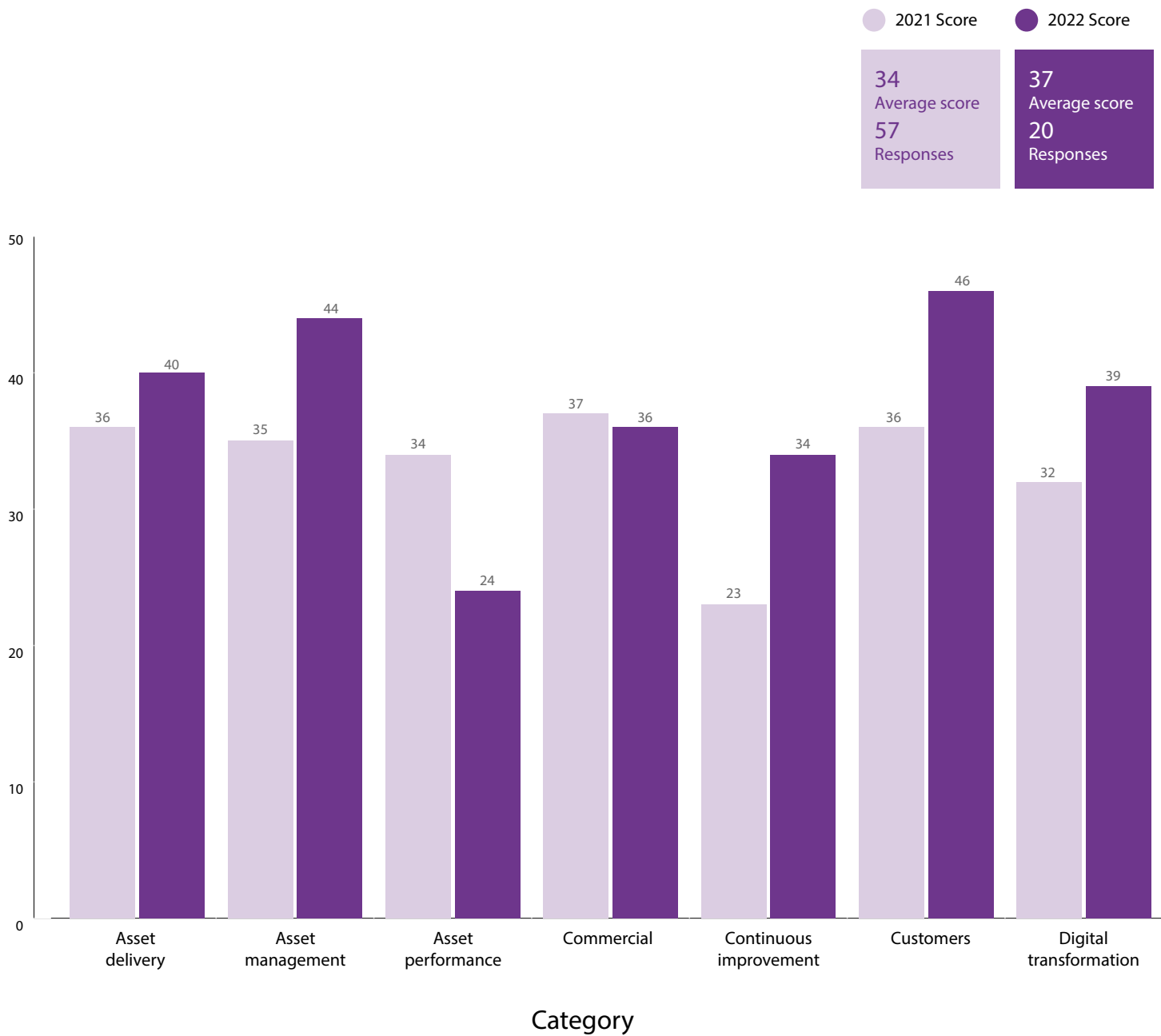
Summary of findings

There were 57 responses to the Index in 2021 (up nearly three-fold from 2020). Whereas in 2020 these responses came exclusively from asset owners / operators, in 2021 the survey was sent to the wider DT Hub community. While this increased the reach of the survey, it also influenced the scoring. The overall digital maturity score for the DT Hub community was 37.3 in 2020 and it decreased to 33.6 in 2021. When looking at scores for asset owners / operators only, this decrease in digital maturity score was still evident, however, it was far less significant, with average score of 37.1 in 2021.

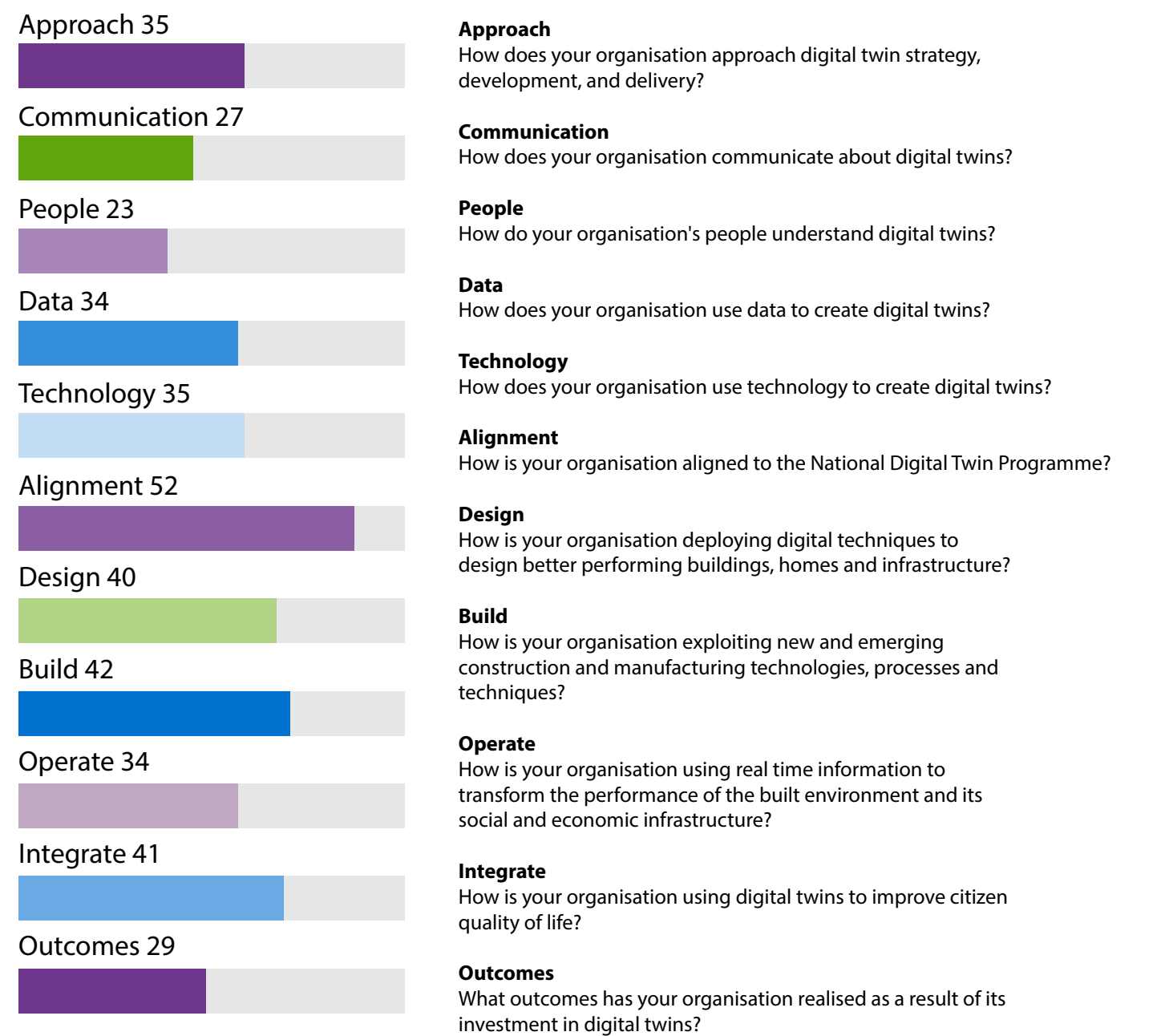
Despite decreases in digital maturity scores, overall digital maturity of the DT Hub community's member organisations has not necessarily dropped. There are two key factors which lead us to this conclusion. Firstly, that the demographic of respondents has changed, with the survey being sent to vendors and academia as well as asset owners / operators; and secondly, that the DT Hub community was much smaller than it is now, with far fewer organisations and these were more likely to fall into the category of 'early adopters' of digital/digital twins.



The Smart Infrastructure Index: Category comparison



Comparing the DT Hub community to the baseline SII measures [2020]



Standards and BSI Flex 260

One of the core objectives of the National Digital Twin programme and the DT Hub has been to support the development of standards to encourage and enable consistency and compatibility in approach with the built environment sector.

Work began with the Standards roadmap developed by the British Standards Institute (BSI) to explore the existing standards landscape and define a route charting subsequent standards opportunities. Standards are typically seen as offering clarity and consistency – but the methodology traditionally used to develop them does not necessarily offer agility.

Building on this groundwork, the DT Hub, National Digital Twin programme and BSI produced the visionary ‘Agile standards white paper’, exploring the benefits of developing standards that are more dynamic, flexible and agile in the context of connected digital twins.

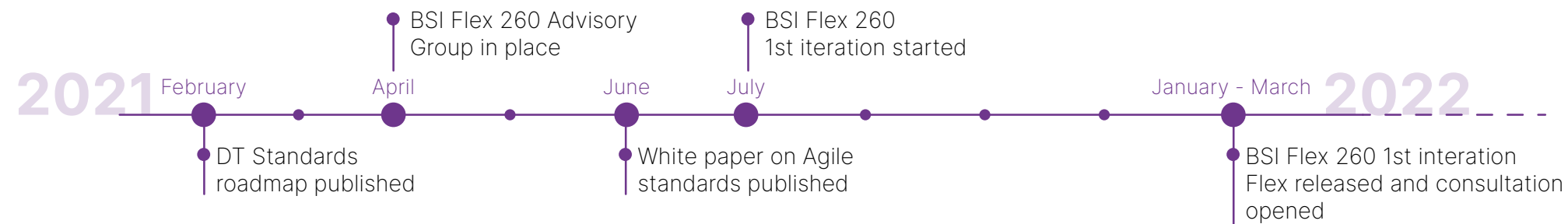
Testing BSI Flex 260

The next step was to trial the agile standardisation product (BSI Flex) so that both national developments (as part of the Information Management Framework) and international developments (as part of work being done by ISO/JTC 01/SC 41) could be incorporated.

The BSI Flex 260 standard allows for iterative modification as technologies develop, lessons are learned and practical experience is gained across domain and geographies. Given the complexity and cross-domain nature of this area, it also provides the opportunity to realign with associated standard work. Such incorporations will take place by way of future iterations of the BSI Flex. The Flex could be used as base documentation for the development of an international standard.

Version 1 of BSI Flex 260 ‘Built environment – Digital twins overview and general principles’ has been released to enable industry to engage with the initial content and submit feedback. Comments will be reviewed to inform the future direction of the standard.

Standards timeline



Projects

As a direct result of the Gemini calls and other engagement initiatives, members have instigated projects and taken the lead on what would be of most benefit to the community.

These are examples of where members came together voluntarily through the DT Hub to deliver knowledge for the good of the whole group:

DT Toolkit project

In response to member requests for support in making a business case for digital twins, we put together a team of volunteers who used their experiences and skills in this area to publish a practical toolkit to help the community on their digital twin journeys. They approached it from different perspectives – consulting, technology development, legal and academic – to ensure it was as comprehensive and useful as possible.

The [DT Toolkit](#) takes users through each step of the digital twin journey: what organisations need to consider, what digital twins can be used for, case studies, a business case template to use and a clear roadmap of how to implement a digital twin. It has now been downloaded over 1,600 times.

DT Toolkit collaborative workshop

Following on from the success of the toolkit, an additional guide was created for members to help them create the foundations of a business case for a digital twin by running a [DT Toolkit collaborative workshop](#) in their organisation. These workshops are designed to accelerate the digital twin journey using the insights and recommendations from the DT Toolkit. The DT Hub worked with Axis, a digital collaboration platform, to create three free DT workshop templates incorporating best practice facilitation techniques. To date, 105 workshops have been started by platform users.

The following projects were run by the National Digital Twin programme to investigate and share insights on topics crucial for the progress of state-of-the-art digital twins and connected digital twins. The programme is grateful to the community for its collaborative effort.

Skills framework

The DT Hub community flagged that a key challenge in developing digital twins is finding people with the right skill sets. To address the issue, experts from the community and the DT Hub came together with the Construction Innovation Hub to publish the [Skills and Competency framework](#).

This well-received resource helps individuals, organisations and training bodies understand the roles and competencies needed to support building digital twins. It draws on expertise and evidence from within the community, through conducting various interviews to identify the distinct roles needed and what they involve. It prioritises the skills needed, not just on the technical side, but also on the business and commercial side.



Ethics

The [Digital Twins: Ethics and the Gemini Principles report](#) is the result of academic and industry research into the ethics of connected digital twins in relation to the Gemini Principles, combined with insight from three workshops with members of our community.

This work is intrinsic to the National Digital Twin programme and the foundation for future discussion.

With the excitement for digital technologies and innovations comes the responsibility to ensure they are ethical and sustainable. This is particularly true of the National Digital Twin programme which is based on the premise of ‘data for the public good’ [National Infrastructure Commission: 2017].

From its inception, the National Digital Twin programme has been guided by the Gemini Principles, a unique set of values that are the conscience of the NDT. Together with our community, we have used the Gemini Principles to inform the research and development of standards and toolkits, guidance and demonstrators, towards enabling ‘an ecosystem of connected digital twins.’

Led by Sopra Steria, the community examined the ethics of connected digital twins with the Gemini Principles as a reference point. The report throws light on the key ethical considerations as we move towards making connected digital twins a reality.

CReDo

The Climate Resilience Demonstrator (CReDo) project launched in autumn 2021 to develop a specific example of connected digital twins across water, power and communications infrastructure. The objective of the demonstrator was to inform and supplement the decision-making process relating to a range of network assets by connecting asset owners from different industries and showing interdependencies.

Work saw the connection of infrastructure data with climate projection data, flood modelling, flood and site data, to create a unified map to highlight areas of interest, working towards flood impact modelling.

The CReDo team published a striking [film and interactive app](#) to show how the model can make a difference, and in March 2022 hosted a show-and-tell webinar to relay [project methodologies and report findings](#), lessons learned, next steps, and insight on the real value of connected digital twins to our everyday lives.



Digital Twin Roadblocks recommendations

The DT roadblocks workshop series showed that the community can begin to overcome a shared set of roadblocks when working on specific questions in teams, rather than in silos where they may simply share best practice or sell solutions to each other.

While DT Hub has already published material on key blockers, it will be important to get the best value out of this knowledge through communications and learning programmes.

In the longer term, given the weight and profundity of blockers identified in the workshops, there needs to be greater cooperation and coordination between organisations at a national level.

There are seven next steps resulting from the workshop series as follows, in suggested order of priority:

Form a digital twin accelerator programme. The DT Hub would benefit from moving from ‘open sharing’ to ‘active collaboration’, therefore seeking or pooling resources for practical programmes on individual blockers. This would seed an accelerator programme encompassing all the elements of open innovation challenges – a challenge platform, prize challenges, hackathons, investments, and commercialisation/scale-up services.

Review the community platform. The DT Hub has significant value for its membership, its unique selling point being a domain focused on digital twins and the built environment while overlapping with most other sectors. The platform itself has clearly developed organically to the extent that navigation is compromised, and some members do not appear to be aware of the resources contained within it. A platform service design programme is recommended, with the resulting blueprint used to redesign the platform and community to incorporate better collaboration capabilities.

Leverage the convening power of the DT Hub for engagement with others. With more than 3,000 members, the DT Hub is at the centre of a powerful network of common interest. There is potential to engage and partner with other public bodies and companies as the digital twin ally.

Lead on the development of vision and value for digital twins. As this is the key problem space, CDBB and the DT Hub would provide value to the community and digital twin sector in creating deeper insight and practical techniques for creating a vision for digital twins.

Evaluate and progress the Strategy Jam ideas. The ideation process generated 192 ideas across the problem spaces, with Readiness, Data Issues, and Governance and Guidance generating the most ideas. These ideas are ready to be evaluated and progressed.

Introduce a problem-solving toolkit. There is an opportunity to create a tangible and useful product to help members overcome digital twin blockers, widening the scope of the existing Digital Twin Toolkit.

Conduct a meta-analysis. There is further information to be gained from comparing this research with other findings and DT Hub resources. A gap analysis would review the content and outputs of three years of previous research and map any existing blocker solutions. A dynamic analysis would compare this research with results from previous workshops.

Retrospective

The community responded positively to taking part in these projects and we are grateful for all input. The Community Council is enthusiastic about generating ideas and supporting the development of future community led projects.

The projects worked very well and produced interesting outcomes that can be built on. It is worth noting that they require energy and resources to make them a success.

More work still needs to be done to empower the community in the production of knowledge for its own benefit.

Conclusion and recommendations

2021 has marked a pivotal point in the evolution of the DT Hub as detailed throughout the Benchmark report, which presents a clear demonstration of progress and growth.

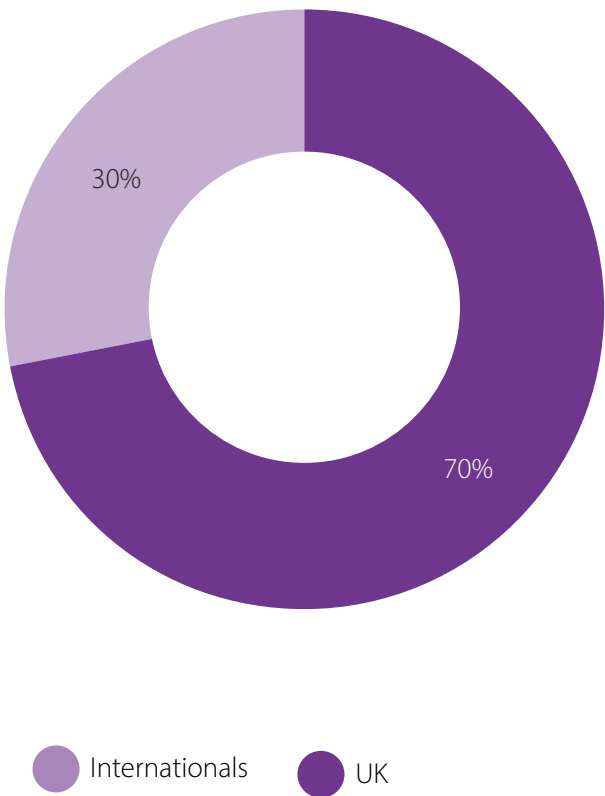
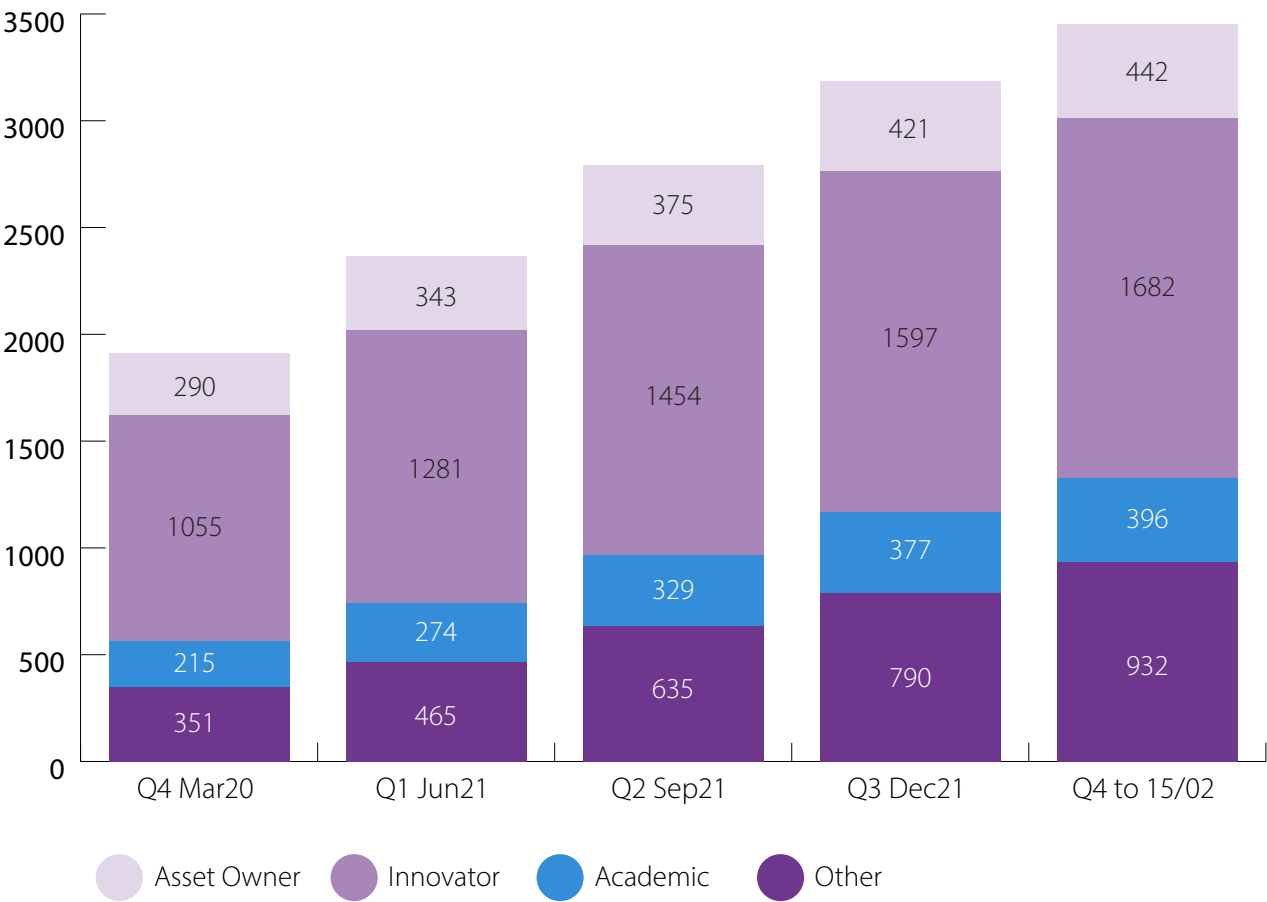
Importantly, the report marks the closing phase in which the Centre for Digital Built Britain (CDBB) has acted as the host and home of the DT Hub. CDBB has provided an innovation nexus in which the DT Hub has been able to grow and develop with deep integration with industry, academia and government, and provided all the foundations necessary to enable the Hub to continue to move forward and flourish.

As with previous years, the critical measure of success is the value that the DT Hub has managed to deliver to its community, and collecting community feedback to provide some retrospective thoughts is essential. Simon Evans, Delivery Team Lead for the National Digital Twin programme and Associate Director at Arup, has led a number of community centric initiatives for the programme including a Community Response workshop to elicit exactly this information without the DT Hub delivery team being present. The core outcomes of this session are presented in Appendix 1 – Community response.

To ensure that the needs of the community are adequately addressed by the delivery team, the Hub established a Community Council which, amongst other responsibilities, will act to enforce a degree of accountability onto the programme following the Community Response workshop recommendations. The Community Council comprises 12 members and in its inaugural meeting, Ali Nicholls and Melissa Zanocco took on the roles as Co-Chairs. They are currently drafting the Terms of Reference for the council, and we are very pleased that they have set out their aspirations for the DT Hub in the Foreword to this report.

Our 2020 Benchmark report was an important milestone to establish the baseline and guide the direction for the development of the DT Hub. Based on its recommendations, in 2021 the DT Hub focused on community growth and diversification and finding new ways to improve engagement and promote knowledge sharing. 2021 also presented the opportunity to assess and measure progress, and to put in place processes for continuous improvement.

Member growth



Conclusion and recommendations

This year also validates the emphasis we have placed on engagement, sharing knowledge, networking, working collaboratively, and building a sense of community. Our aim was for DT Hub members to take the lead in driving topics for discussion and creating content – they have generously and enthusiastically responded, working to deliver invaluable resources for the community.

To enable easier sharing of those resources, we have focused on improving the platform and regularly updating it with useful and engaging content. It has made the DT Hub ‘the’ destination for knowledge and learning on digital twins.

We have also worked to better understand the needs of our community, through initiatives such as the DT Roadblock workshops, which laid out clearly what challenges still need addressing. Discussions between our members progressed to the forum after the workshops concluded, demonstrating the level of engagement and a high level of interest.

Membership has become more diverse, including a broad spectrum of asset owners, innovators, academia, and international members. As the membership has grown, so has the need for additional staff and we have added several new roles to the team to improve community and product management.

As we move further into 2022, our goals are to:

- Empower the community through the Community Council and Community Champions programme.
- Increase diversity and open to new sectors.
- Enhance user experience.
- Improve accessibility to contents.

“2021 has been a fantastic year for the DT Hub, fostering an ever-growing and vibrant digital twin community where industry can gather and exchange ideas around a collective aim – facilitating the creation of an ecosystem of connected digital twins.”

Simon Evans

Arup and Gemini Call Chair for the National Digital Twin programme

Appendix

Appendix 1 – Community response

We asked the community to conduct an independent review of the DT Hub, evaluating its focus and activities over the past year. This response was gathered through an online Miro workshop facilitated by Simon Evans from Arup.

The workshop was held on 11 February 2022 and was attended by 25 members of the community. The attendees represented the various communities within the DT Hub including asset owners, innovators, and academia. All attendees are active members of the DT Hub and so the response is considered to be a fair representation from the DT Hub community.

The attendees were asked to comment on the positive outcomes and areas for improvement for the DT Hub, its community, knowledge, and software platform.

What was good

- **Engagement.** There are many channels and forums for continuous engagement with the community, such as the weekly Gemini calls, online events, and new members' sessions. These have been useful for sharing knowledge, encouraging collaborative working and keeping the community engaged.
- **Community.** The hub brings together a unique and diverse mix of asset owner/operators, service providers, academia, and industry. This broad base of expertise and experience facilitates greater knowledge sharing and collaboration. The newly formed Community Council also gives the community a voice in its direction.
- **Content.** The availability of rich media, such as reports and white papers, the discussion forum, and the repository of published papers has been useful for building knowledge and awareness with digital twins.
- **Cross-sector.** This year there has been a greater expansion and inclusion of sectors beyond the built environment, particularly assisted by the Gemini call presentations. This cross-sector view and insights have been beneficial and well received.

What could have been done better

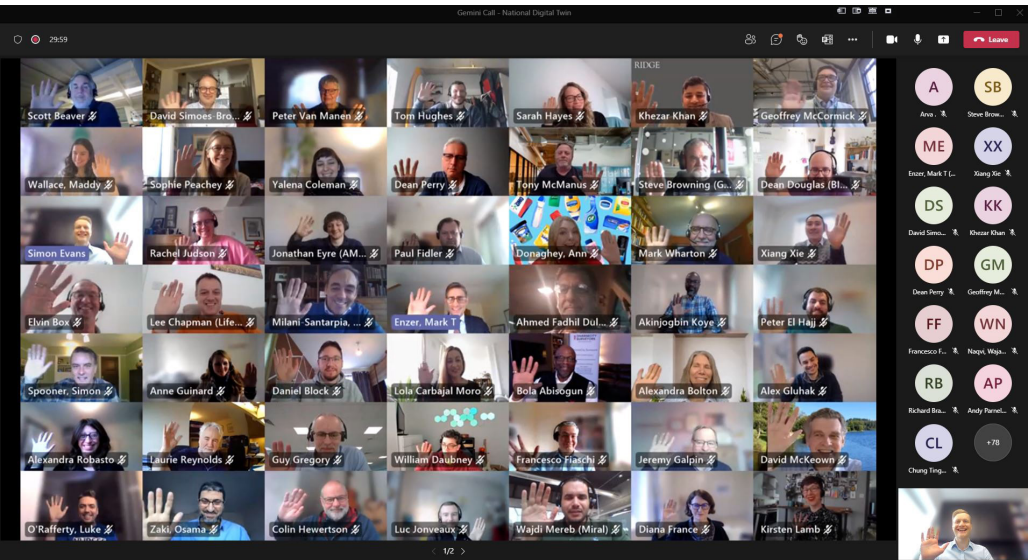
- **Volume of active members.** The community has continued to grow, though the actively engaged members represent a small portion of the +3000 total members, which is also quite a small number in relation to the built environment sector.
- **Appeal to non-technical audiences.** Understandably, the focus of the content and discussion is towards practitioners and technical audiences who are engaging with digital twins individually or on behalf of their organisations. There is less focus towards the non-technical audiences, and senior stakeholders, whose knowledge and awareness should be increased as they are the likely budget holders for digital twin programmes and initiatives.
- **Rose-tinted glasses of examples.** The knowledge and case studies are typically of a positive nature, showing how success was achieved, stakeholders were bought-in, and tangible outcomes were delivered. There are less accounts and discussions from members that show the pains, challenges, limitations, failings, and learnings of digital twin programmes and initiatives. This perspective would be more beneficial for knowledge sharing and learning.
- **Clear brand and identity.** The DT Hub has increased in brand strength over the last year, though sometimes the conflation of CDBB, the NDTp and the DT Hub causes confusion.

Ideas to improve

- **Continuous improvement on content accessibility.** There has been great work done to make the content accessible, and the DT Hub should continue to iterate and improve on this, especially as the community and content grows.
- **Digital twin conference or summit.** The community presentations and knowledge shares are always very well received. The DT Hub should consider hosting a conference or summit, online or in-person, where members of the community are invited to speak. Whilst there are many “conferences” in this space, the DT Hub’s brand and reputation would facilitate a valuable platform for knowledge sharing.
- **Templates and tools.** Building on the successes of the DT Toolkit, the DT Hub should consider creating more templates and tools that can assist the community in developing their digital twin projects and initiatives.
- **Openness.** The DT Hub should continue to provide greater volumes of ‘open-access’ material (where registration is not required) as a means of providing wider knowledge sharing.

Recommendations for next year

- **Continue the Gemini calls.** These weekly calls have been a focal point of the community, providing a regular cadence of updates and information. The DT Hub should look to maintain these going forward, and continue to iterate and improve them.
- **Conscious stepping up.** As the DT Hub enters the next phase of its journey it should take the opportunity to consciously take a stronger role as the driving force and community for digital twins.
- **Space for senior leaders.** There should be greater, proactive, engagement with senior leaders and policy makers, and active targeting of key stakeholders who are not currently involved or engaged in the community.
- **Platform of knowledge.** The DT Hub should continue to provide a platform for knowledge sharing and exchange, focusing on the discussion not on consensus, as the breadth of potential digital twin implementations means there could be many right answers.



DT Hub team and collaborators

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