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How can digital technology be used to maximise the social value delivered through major infrastructure projects?

by

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Abstract

The primary aim of this working paper is to inform readers as to what opportunities exist to use digital technology to maximise social value through major infrastructure projects. This research looks through the lenses of social value, infrastructure, and digital business, and addresses the gap around the intersection between social value, digital technology, and the infrastructure sector.

This research methodology is a literature research, followed by the collection of qualitative data from 12 interviews, with participants in 12 organisations, during August 2020. The research findings reported in this working paper are structured around 2 questions:

1. What are the opportunities for the use of digital technology in maximising social value?

2. What are the risks and barriers to the use of digital technology to maximise social value?

This research makes 12 actionable and practical recommendations as a contribution to the discussion and implementation of policy in the UK.

1. Introduction

We face an unprecedented challenge in combating the rising temperature of the earth at a time where the pace of change and the fragmentation of society is accelerating globally. This time of challenge also presents a huge and exciting opportunity to significantly shift the basis on which we invest in infrastructure, so that are decisions are sustainable by the widest definition, and contribute to the global wellbeing of humanity, as well as delivering a just transition to a low carbon world.

The shift in policy context with respect to social value, in the last 3 years, is quite remarkable and we have learnt from the COVID pandemic, that governments, and society, can make dramatic and significant decisions when critical.

As the Transforming Infrastructure roadmap to 2030 illustrates in Figure 1, we need to make integrated decisions, at a systems level, considering the relationship between the natural environment, the built environment, and services. The decisions we make must be both aligned with global societal outcomes, represented by the UNSDG's, and on policy that reflects our values as a society.
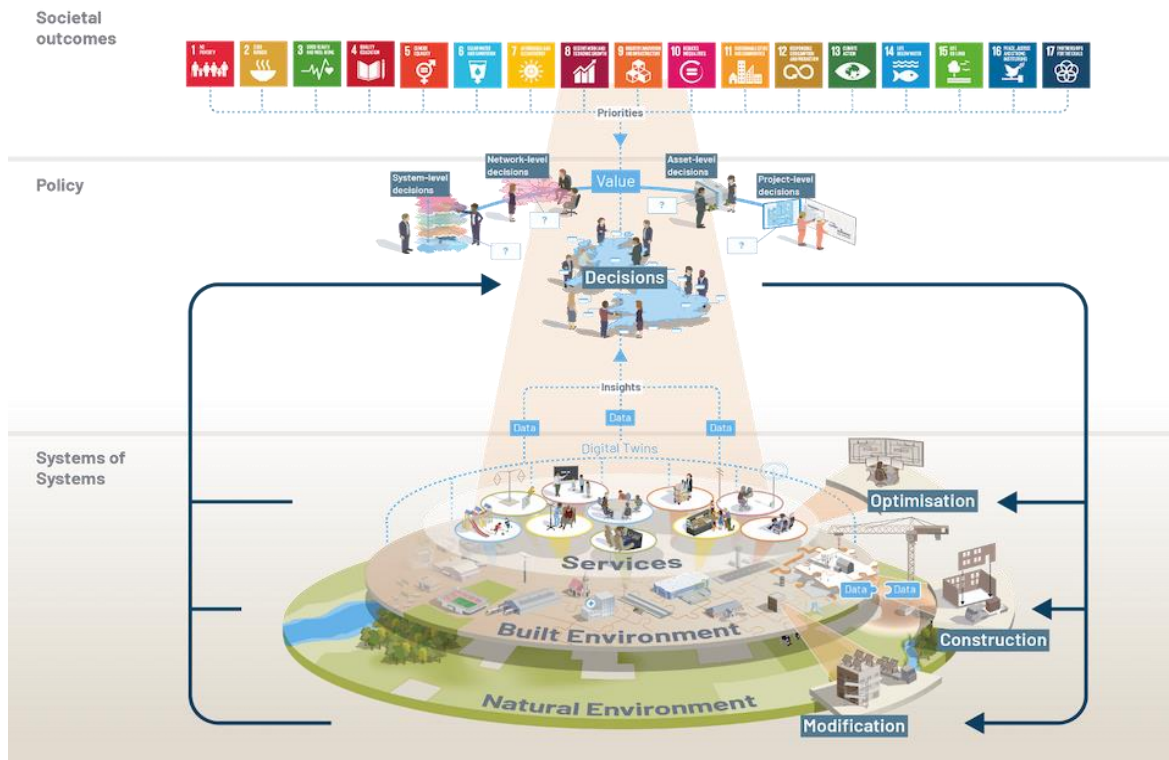
Figure 1 Transforming Infrastructure Road map to 2030

Source: (Infrastructure and Projects Authority 2021)

If the business cases on which we make infrastructure decisions are to have the trust and confidence of stakeholders, we need to improve this engagement and the transparency, visibility, and accountability of those processes. We need to ensure that we can feedback on the outcomes we achieve, including social value, through the lifetime of the asset.

Having identified social, environmental, and economic outcomes for the whole life cycle of our assets, we must then define, capture and visualise the relevant data, and use it to maximise impact and provide feedback to our stakeholders.

Digital technology has been a key driver in innovation and productivity leading to hugely significant reductions in global poverty, and a transformation of global connectivity, not all of it for the good. Digital is now no longer purely an agnostic tool

for human use (Azhar 2021) however it has a critical role to play as an enabler of social value.

The research in this working paper is based on literature research, followed by 12 interviews carried out in August 2020. This working paper focuses on 2 questions:

1. What are the opportunities for the use of digital technology in maximising social value?
2. What are the risks and barriers to the use of digital technology to maximise social value?

12 practical recommendations are made, that can help each of us play our part in the implementation of policy, and responding to emerging issues, using digital to maximise social value on major infrastructure projects.

This working paper was developed from a MSc Dissertation study sponsored by Costain. The purpose of Costain (Costain 2021) is to improve people's lives by helping to: connect and keep the nation moving: keep water clear and flowing: power communities sustainably, and to keep people safe. These research recommendations will inform our smart contracting and consultancy solutions, helping our clients across the UK's transportation, water, energy, and defence sectors improve their business performance, by enabling their infrastructure programmes to be safer, better, greener, faster, and more efficient.

Policy context

The £650 billion infrastructure investment pipeline is critical to the government's achievement of its long-term ambitions for the UK including to level up the country, strengthen the union, meet the United Nations Sustainability Development Goals

(UNSDG), and put the UK on the path to zero emissions by 2050 (Infrastructure and Projects Authority, 2021). The Transforming Infrastructure Performance (TIP) roadmap to 2030 describes a vision that links societal outcomes, defined by UNSDG priorities, with value-based policy, leading to system level decisions, and using the data and technology to see them through (Infrastructure and Projects Authority, 2021). Infrastructure is therefore of significant importance in delivering social value, and digital technology is an explicit enabler of this vision.

HM Treasury Central Government guidance on appraisal and evaluation, commonly termed the "Green Book", (HM Treasury 2018)states that the Treasury 5 case model is the means of developing proposals in a holistic way that optimises the social/public value produced by the use of public resources. The green book update (HM Treasury 2021) addresses social or public value as 'all significant costs and benefits that affect the welfare and wellbeing of the population, not just market effects, for example, environmental, cultural, health, social care, justice and security' and to support the evaluation of these benefits, the Treasury has published supplementary guidance on wellbeing for appraisal, including the recommended standard of a WELLBY standard value of one wellbeing adjusted year of £13,000. (HM Treasury 2021) (Hey, 2021). The effectiveness of these policy changes, will in part, be influenced by the application of digital technology.

The "Construction Playbook" (Cabinet Office 2020a) sets out the requirement that all contracting authorities should have strategies and plans for achieving net zero Green House Gas (GHG) emissions by, or ahead of 2050 for their whole estate and portfolio, including the use of PAS 2080 (HM Government, 2020). The Treasury has now published a revised remit for the National Infrastructure Commission (NIC) that adds a fourth objective of supporting climate resilience and the UK's transition to net

zero carbon emissions by 2050 (McNaught, 2021) this is added to the existing objectives of supporting sustainable economic growth across the UK, improving competitiveness, and improving quality of life.

The Government issued PPN 06/20 in September 2020 (Cabinet Office 2020b)as a mechanism to enable central government to consider the additional societal benefits that can be achieved in the delivery of its contracts. This represented a shift to an explicit evaluation of social value in all central government procurement. This publication defines social value across a framework of 5 themes and 8 outcomes and defines the data metrics that are to be collected against each outcome. The commitment to social value has been further reinforced in the construction playbook (HM Government, 2020).

Themes		Policy outcomes
Theme 1	COVID-19 recovery	Help local communities to manage and recover from the impact of COVID-19
Theme 2	Tackling economic inequality	Create new businesses, new jobs and new skills
		Increase supply chain resilience and capacity
Theme 3	Fighting climate change	Effective stewardship of the environment
Theme 4	Equal opportunity	Reduce the disability employment gap
		Tackle workforce inequality
Theme 5	Wellbeing	Improve health and wellbeing
		Improve community cohesion

Figure 2 PPN 06/20 Social Value Outcomes

Source: (Cabinet Office 2020b)

All the above builds on the commitment made in the government's 2017 Industrial strategy construction sector deal to embed a 'procure for value' approach in public procurement (BEIS 2019); Construction Leadership Council (CLC) 2018). The CLC

responded to this deal with their report in 2018 on procuring for value. Together these led to the investment in the development of the value toolkit which enables value-based decision making, focused on driving better social, environmental, and economic outcomes (Construction Innovation Hub, 2021). This toolkit uses the global capitals coalition model (Capitals coalition 2022) of 4 capitals of production, natural, human and social, to enable organisations to make holistic decisions that create value for nature, people and society, alongside business and the economy.

If we are, as a society, to make infrastructure investment decisions based on a multi capitals approach, then we must define outcomes and benefits across all these capital areas as well as define what data we will collect to communicate to our stakeholders, whether these benefits have been realised. Digital technology is fundamental to the achievement of these policy outcomes and yet little research exists as to how it can support the maximisation of social value on major infrastructure projects.

New technologies are being created, scaled and implemented at an exponential rate, however the digital maturity of the multiple actors involved in the delivery of infrastructure is only progressing incrementally and this is leading to an exponential gap between the opportunity of digital, and the capability of industry to realise those opportunities (Azhar 2021).

The objective of this research is to help address that gap by informing readers as to the opportunities that exist to use digital technology, to maximise social value on major infrastructure projects. The literature research looks through the lenses of social value, Infrastructure, and digital business, and identifies a significant gap in the research around the intersection between social value and digital business and

an even larger gap with respect to the use of digital technology to maximise social value in the infrastructure sector.

2 Literature Research

2.1 Introduction

The first three sections of the analysis of the literature research focus on social value excluding the application of digital technology. Initially literature related to the evolving definition of social value is examined and this is then expanded to literature that can shed light on how social value can be maximised, including through improved stakeholder management and different approaches to measurement. From this analysis some examples of best practice are identified.

This research then explores some of the key literature related to digital technology in business, and then examines what best practice exists in the use of digital technology to deliver social value, and what opportunities and barriers have been identified.

2.2 The evolution of the definition of social value

Cost Benefit Analysis (CBA) has been the predominant tool used to assess the relative economic merits of projects. An extension that considers the effect of the project on environmental and societal factors is called Social Cost Benefit Analysis (SCBA). This expresses the value of a proposal to UK society for policy appraisal purposes (Dunn 2012). The drawback of CBA. and SCBA. is that these approaches tend to focus on economic costs and benefits (Vardakoulias 2013). This is understandable because projects are traditionally driven by the economic imperative

to generate jobs and growth; social and environmental costs and benefits have often been treated as secondary considerations. The advantage of monetizing social and environmental impacts is that all the influences of the project can be weighed using the same metric. Another difficulty with CBA calculations is that they can overlook indirect impacts that are not tangible or have no market value. Examples of this are enhancements to personal wellbeing' or stronger interconnections between community members (Bichard 2016). Both are elements of social value.

Addressing these concerns, the Social Return on Investment (SROI) approach compliments traditional SCBA through the use of a framework for measuring and accounting for a broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental, and economic costs and benefits (Cohen et al. 2012).

The use of the four capitals model as a holistic mechanism for the implementation of policy objectives including social value has been included in the development and testing of the value toolkit (Construction Innovation Hub 2021) A variety of different approaches to this model are available but the literature does not explain why this particular approach has been chosen, or the distinction between social capital and social value.
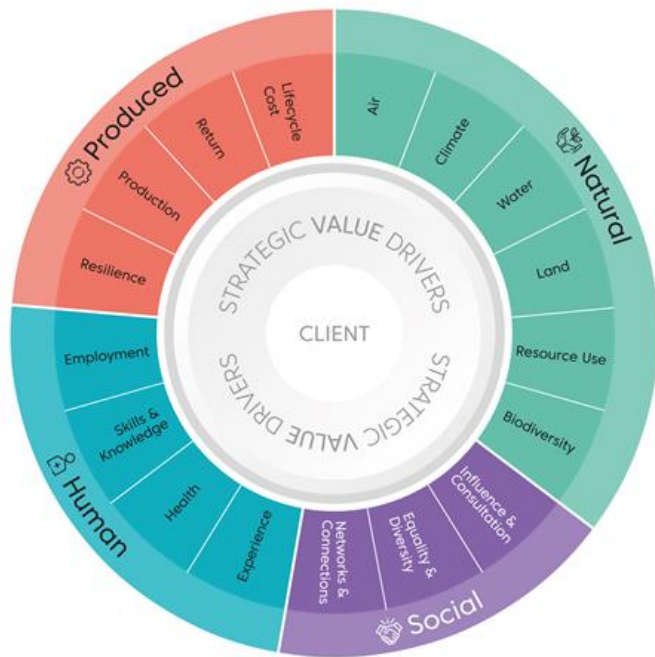
Figure 3: Four capitals model

Source:(Construction Innovation Hub 2021)

Organisations have historically used corporate responsibility as a mechanism for delivering social value. This social responsibility mind-set puts society's issues at the periphery of the business instead of them being at the core. The conversation has now moved on to a more fundamental shift in business culture to embed concepts such as shared value (Social & Human Capital Coalition 2019). Shared value is defined as creating economic value, in a way that also creates value for society, by taking direct account of society's needs and challenges (Porter and Kramer 2011).

The global environmental crisis and the need to reduce carbon (Strauss 2019) has further shifted the debate about the nature of capitalism. Big finance is now beginning to drive a further shift in behaviour globally (Tett 2019). The Covid-19 virus has further accelerated this debate as it has hit those already disadvantaged, for example in lower-paid manual jobs or ethnic minorities, and caused a further

global focus on the role of business (Kirkup 2020). The current UK government's commitment to infrastructure investment, as a mechanism for kick starting the post COVID economy, is being challenged by parliament on these very grounds (BBC 2020).

The world's economic downturn has not held back the growth in Sustainable or Environmental, Social and Governance (ESG). investment. The opposite has happened with latest figures showing sustainable funds have raised just over +€97bn year-to-date, against outflows of -€27.9bn for non-sustainable funds.

A definition for social value in the infrastructure sector, based on the intentions of the social Value Act 2012, has been offered as follows:

> "The act aims to provide additional social benefits to publicly procured construction projects by adding conditions and criteria in the procurement process which provide added value, not in the monetary sense of the word, but as broader impact to the local area. Individuals can be targeted with provisions for training and apprenticeship targets and communities can be targeted in the provision of community facilities and consultations" (Cartigny and Lord 2017,p112).

Social Value UK defines social value as.
> "The quantification of the relative importance that people place on the changes they experience in their lives" (Social Value UK 2020)

Other academic definitions of social value include civic co-operation and social cohesion (Knack and Keefer 1997) and an individual's relationships and social networks, both family and work (Helliwell and Putnam 1995).

Measuring social value, and the data and insights that follow, enable the scaling of company social value programmes and importantly the communication of those programme with investors. Effective measurement can increase investor trust in the

social value delivered and make the opportunity both tangible and more attractive. (Porter et al. 2012).

2.3 What are the current challenges in maximising social value for infrastructure projects?

Eight challenges to the delivery of social value have been identified and these are summarised in Table 1.

Item	Challenge
1	Lack of policy uptake
2	Effective stakeholder engagement
3	Role of contracting strategies in the delivery of social value
4	Difficulties in measurement
5	Costs of methods
6	Lack of consistency of definition
7	Lack of trust
8	Systems complexity

Table 1: Challenges to the delivery of social value

The first challenge identified is the **lack of policy uptake** within procurement. The policy journey on social value started in earnest with the publication of the Social Value Act in 2012. Lord Young reviewed the uptake of the act in 2015 and concluded that the inclusion of social value within procurement was relatively low. For the construction sector the act had most impact on Scotland and Wales as in England social value practice was more established (Cartigny and Lord 2019).

The second challenge is **effective stakeholder engagement**. Citizens, in particular local stakeholders to the project, are expected to suffer some negative impact on their lives. This is in effect a negative social value, in exchange for the greater good, the argued benefit of any infrastructure project is always controversial. How the project deals with this is critical, for example by paying compensation to those impacted (Schweizer et al. 2014). Often stakeholder are not consulted early enough,

and they do not understand why the project is being built, and What's In It For Me (WIIFM) along with having an understanding of the impact of the project on their choices (Schweizer et al. 2014).

The third challenge is **the role of contracting strategies** in cascading social value through to the supply chain. The effectiveness of the different types of contracts used to procure infrastructure can have a significant impact on the behaviour of those implementing the social value that has been specified on a project. For example, on a contract in Nigeria, where the relationship between the infrastructure client organisation and the supply chain was direct (Engineering, Procurement and Construction Management or EPCM form of contract), the contract was more effective in delivering the specified social value than when a contracting organisation undertook that role (Engineering, Procurement and Construction or EPC form of contract) (Awuzie and McDermott 2016).

The fourth challenge is the **difficulties in measurement** of the wider impacts on society, such as health and community stability when assessing a project. The tools used in the measurement of social value outcomes, i.e. the responses from people when asked to evaluate the value of experience goods, are not reliable (Fujiwara and Campbell 2011). For example, the focusing illusion of 'proportion dominance' leads people to give greater value to information with numbers or proportions such as 50% (Dubourg et al. 1997). The 'presentism heuristic' results in peoples' view of the future being dependent on their current circumstances. This means whether people have just eaten or are hungry will reflect their responses about their future need for food (Fujiwara and Campbell 2011).

This difficulty of reliable measurement leads to a fifth challenge of the **cost of methods**. The Experience Sampling method (ESM) and similar techniques, using interview to assess experience, are the gold standard for well-being evaluation. However due to the cost of the methods in 2011 they were not used widely and instead the less accurate 'life satisfaction' type data was used. The focus groups and interviews required for stated preference techniques are costly and time consuming, and also require pre-tests, and in 2011 the cost of a single sample was between £25,000 and £30,000 (Fujiwara and Campbell 2011).

A sixth challenge identified is the **lack of consistency of definition,** the same definition of social value does not fit the wide variety of sectors (CBI 2020). A seventh challenge was an increasing **lack of trust** from the public in the manner in which decisions are made (Schweizer et al. 2014).

The eighth challenge identified is the **systems complexity** in which social value operates and the multiple layers, criteria and subsystems impacting on social sustainability performance, and the complexity of then identifying the influence of individual stakeholders within this network (Doloi 2012).

2.4 What are the current non-digital approaches to improve social value?

The research findings with respect to non-digital measures to improve social value are listed in Table 2.

Item	Measure
1	**Use of policy and contracting**
2	**Upskilling of procurement professionals**
3	**Improve stakeholder engagement**
4	**Improving the measurement process**
5	**Dealing with complexity**

Table 2: Non-digital measures to improve social value

Following on from the identification of key challenges, the literature search has looked at the current non-digital approaches to improving social value. These are well aligned with the challenges already identified. The first two approaches identified are the **use of policy and contracting** and the **upskilling of procurement professionals**.

The use of policy links directly to the embedment of social value into procurement and contracts. The key tools in the specification of social value are the policy and procurement mechanisms of government and clients. Business has called for a national policy statement every 5 years to enable the specification of social value to align with updated national targets (CBI 2020).

The lack of take up of the provisions of the social value act led to the Cabinet Office announcing that all major procurement would specifically evaluate social value and that 4000 of the governments buyers would be trained in its specification (CBI 2020).

The 3rd approach is **improving stakeholder engagement** which links into the importance of public awareness of the delivery of social value. Early engagement with local stakeholders leads to the social value outcomes and objectives for a particular project incorporating what has been described as 'Citizen knowledge' (Schweizer et al. 2014).

The 4th approach identified is **improving the measurement process**. Measurement of social value takes place across a spectrum of qualitative and quantitative approaches with organisations using both internal and external approaches to social value. The CBI analysed the variety of mapping approaches used by organisations using 2 axes for comparison as shown in figure 4.
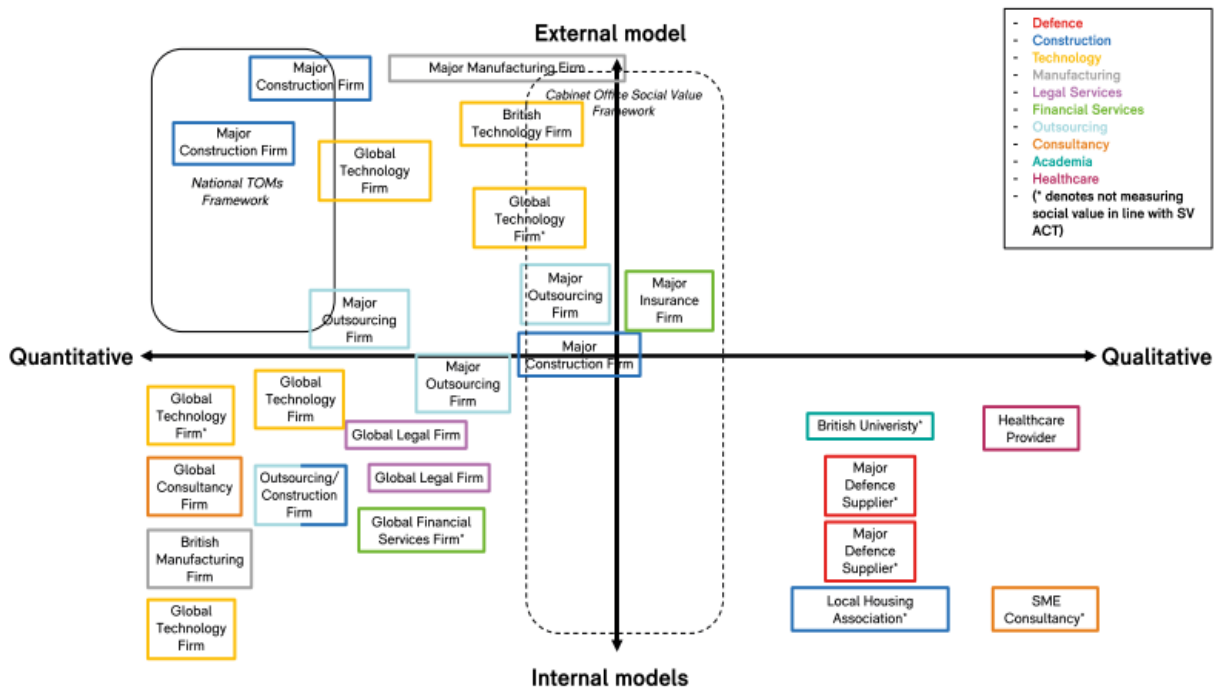
Figure 4: Mapping methods

Source: CBI 2020,32

The vertical axes plots whether organisations are using their own internal model of social value or are using an external model provided by an external body, framework or system. The research illustrated in figure 4 shows that the majority now use an external model. Multiple firms are mapped in some sectors, for example defence. The horizontal axis shows whether the organisations are emphasizing qualitative or quantitative and this shows a greater emphasis on quantitative date from business, whereas the public sector, and academia are more likely to look at qualitative data. Infrastructure is primarily represented by the construction organisations and are positioned, on average in the top left segment i.e., the focus is on quantitative methods at the expense of qualitative, and more likely to use external models than

internal. Is this an example of the proportion dominance identified by (Dubourg et al. 1997)?

A relatively new approach is increasing in popularity globally (Helliwell et al. 2019)and this is the 'life satisfaction' approach also closely related to happiness economics (Layard and Ward 2020). This approach assesses the value of non-market goods by their impact on people's wellbeing or happiness. Central to the life satisfaction technique is that direct measures of wellbeing, such as happiness, better represent the value people place on non-market goods (Fujiwara and Campbell 2011).

The 5th approach identified is the approach to **addressing complexity**. An example is the use of frameworks. The defining and specifying of social value leads to the delivery by a whole range of organisation, across complex supply chains, where networks and trust are key ingredients of successful delivery (Cartigny and Lord 2017). There are at least 10 frameworks in use covering measures including supply chains, skills, the environment, diversity and Inclusion, employment, innovation, and exports. A further mechanism for dealing with the complexity of national governmental policy objectives and the needs of local communities involves the splitting of social value allocations between local and national needs (see Figure 5). In this example 5% of the 10% weighting for social value is allocated to National priorities, further split into sustainability and employment and skills, and the other 5% is tailored to local specific themes or metrics.
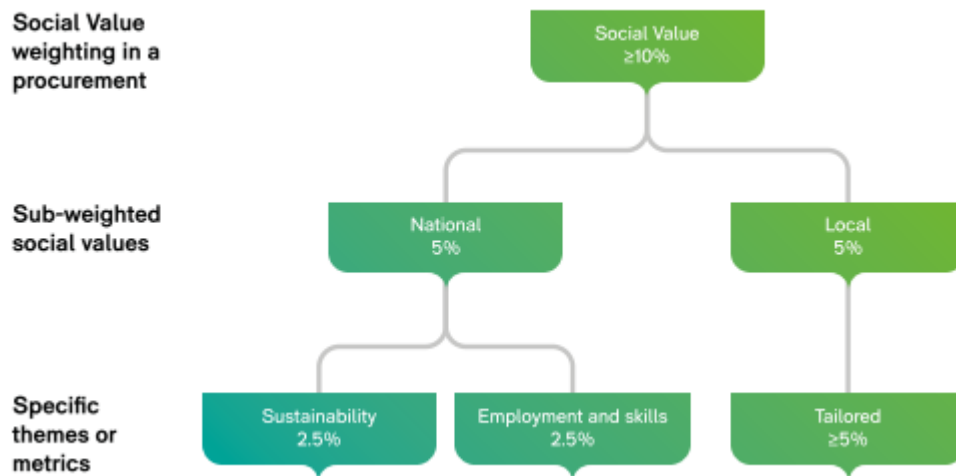
Figure 5: Value allocation model

Source: CBI 2020, 43

2.4 Digital business and its application to social value

The research findings with respect to digital business and its application to social value are listed in table 3

Item	Measure
1	**Web based numerical proxies**
2	**Surveys and social analysis**
3	**Social media to measure behaviours**
4	**Virtual reality**
5	**Personal digital Assistants**

Table 3: Digital applications in social value

Over the last 25 years digital technologies, including social media, Enterprise 2.0, big data, and artificial intelligence (AI), have been a major source of productivity growth. Digital maturity remains low, on average only at 20% of its potential, for incumbent firms across industry. Leveraging the platform economy can achieve close to 10% profit growth momentum in EBIT in five years (McKinsey global Institute 2009). In a 2009 survey 69% of respondents reported that their companies have gained measurable business benefits from enterprise 2.0 (McKinsey global Institute 2009).

The emergence of web 2.0 technologies such as Facebook, Wikipedia and the Emerging Social Software Systems (ESSP) of enterprise 2.0, have the potential to transform the ability of organisations to collaborate, and generate ideas on an emergent basis, through increasing the number of strong and weak relationship ties among people (McAfee 2009).

Because of these recent technological changes, companies need to re-assess the balance between minds (human intellect) and machines (robotics and AI), between products (goods and services) and platforms (e.g., Uber), and between the core (business capabilities) and the crowd (global internet of people). The second element of each of these has in the last few years become much more capable and powerful and essential to business success (McAfee and Brynjolfsson 2017).

The infrastructure sector and government have recognised the transformative power of digital whose benefits could be worth £30bn a year by 2030 (ICE et al. 2018). However there is limited focus on social outcomes and the five big ideas related to digital for construction (Agarwal et al. 2018) did not feature social value.

There are two web-based tools providing **web based numerical proxies** that have been accredited by Social Value UK for use in measuring social value, and many non-accredited tools. The Social Value Portal (SVP) and The Social Value Engine (SVE) are accredited. In addition to the above tools, one of the most widely used measurement tools is the National Themes, Outcomes and Measures (TOMs) excel tool.

The second digital measure is **surveys and social analysis** tools to remove the bias that may be introduced by interviewers (Fujiwara and Campbell 2011).

The third is the use of **social media to measure behaviours** through mining the digital traces that people leave behind through their interaction with the internet (Zhang et al. 2011). A framework for assessing the social value of open data initiatives in three countries: the UK, Tunisia and Italy (Viscusi et al. 2014), provides some insight into how digital data such as 'likes' can be assessed and related to social value. For example, they argue that 'downloads' are a better outcome than 'likes' as they indicate that something of value has been provided to an individual, where as a 'like' is an expression of appreciation at a moment in time.

The fourth is **virtual reality** to simulate environmental changes for participants, to counteract the difficulties of hard-to-get repeat data when using stated and revealed preference methods for public goods. Virtual reality survey tools can narrow the gap in the difference between willingness to pay (WTP) and Willingness to Accept (WTA) for environmental goods (Fujiwara and Campbell 2011).

The fifth usage example is **personal digital assistants** to capture the participants reported feelings in real time through the day (Kahneman and Krueger 2006) as part of the experience sampling methodology (ESM). In order to remove reliance on people expressing a judgment on the impact on their wellbeing of a particular public good or material item (Cziksentmihalyi 1990).

2.5 What are the opportunities, and barriers for the use of digital?

The research findings with respect to the opportunities and barriers for the use of digital are listed in table 4.

Item	Measure
	Opportunities
1	**Embedment of social value in a digital Twin**
2	**Tools to target social value more effectively**
3	**Platform for consistency of measurement**
4	**Distributed ledger technology (DLT) to build trust**
	Barriers
1	**Digital literacy**
2	**Dark net activity**
3	**Data protection**

Table 4: Opportunities and barriers in the use of digital

The opportunities identified are **embedment of social value in a digital twin** (National Infrastructure Commission 2018) incorporating social value data as the project transitions from delivery to operation. (Construction Innovation Hub 2020). A digital twin is a virtual model of the physical asset that can be used to capture, model, represent and manage the physical infrastructure. In this case the model would capture the impact of the asset on society, over its lifetime, providing important feedback to stakeholders. **Targeting social value more effectively** using a digital tool with a two tier approach that includes national and place based targets (CBI 2020). Employers are looking for social value frameworks that are iterative and constantly improving.

The third opportunity is a **platform for consistency of measurement** that could enable business to be more effective at delivering real outcomes within their local context. This platform would include a menu approach, such as the National TOMS, and would also create a mechanism for innovation as well as reducing the resources needed to carry our social value measurement on smaller contracts. The fourth opportunity is the use of **Distributed ledger technology (DLT) to build trust** in

data and records, subject to suitable security systems and governance (Lemieux 2016).

The first barrier identified is **digital literacy**. If the use of mobile technology and apps is to be used with participants it is essential that skills and access are addressed in tandem (Mervyn et al. 2014). This barrier is very significant in the use of digital with stakeholders and needs to be addressed practically, in any intervention, with mitigations in place to capture the voice of those who are digitally unengaged. The risks of **dark net activity** and **data protection** have all been identified as risks to the implementation of DLT in infrastructure (Li et al. 2019) and also apply to the use of digital in social value.

2.7 Conclusions from literature research

A critical appraisal of the literature leads to the conclusion that there is a significant lack of research into the intersection between digital technology and social value. The consequence of this is that social value is not being maximised. This is in part due to the rapid pace of technology, and the lag in the equivalent academic research, but additionally a lack of integrated cross-discipline research into social value.

The majority of the literature identified is in the intersection between social value and infrastructure, see figure 6. Limited literature has been identified on the use of digital technology for social value. The focus of this research is to address the even more significant gap in the intersection between social value, digital technology, and infrastructure.
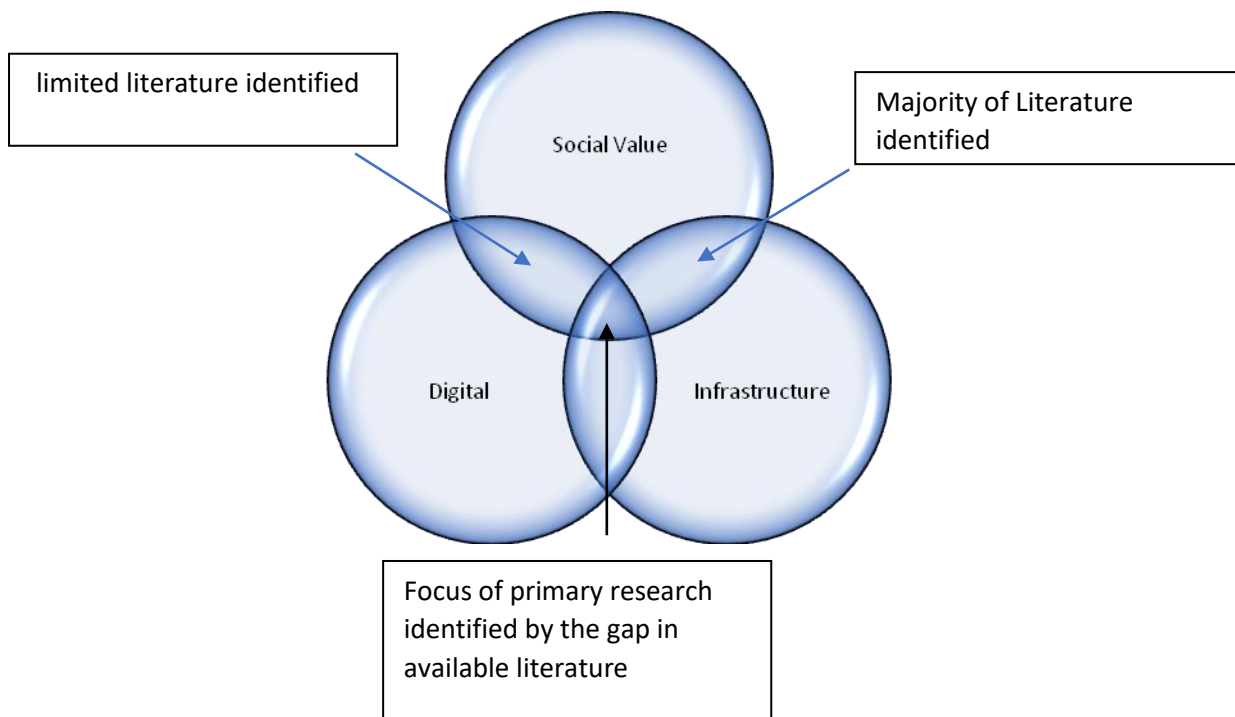
Figure 6: Literature research summary

3 Research methodology and strategy for enquiry

3.1 Theoretical basis of approach

The research is qualitative and gains its meaning from the words and non-standardized data from the interviews, which have been recorded using video and then auto transcribed. The process of coding and conceptualising meaning from the transcripts was simplified by the semi structured approach, this led naturally to a common structure and shape to the interviews. The inductive approach has led to a rich and deep understanding of the response to each of the research questions.

3.2 Ethics and mitigation of bias.

To mitigate interview bias and error, and ensure an ethical approach, given the role of the researcher in relation to the participants, all participants were external to the researcher's organisation and outside of any contractual or commercial relationships

with one exception. The information provided to the participants made clear the arrangements of the research and the dual purpose of the interviews in both informing the research and contributing to the consultancy knowledge of the participant. The researcher was aware of his own bias, in believing digital technology had an important role to play in social value and avoided leading questions. However, it is recognised that bias cannot be eliminated entirely.

3.3 Selection of participants

The participants selected for the research are outlined in Table 5.

Category	Category Descriptor	Participant coding	Nos completed
1	**Social value leaders or specialists** within organisations, legal, management consultancy, Contractor, SME.	A, B, C, D, E	5
2	**Technology leaders** operating in social value	A	1
3	**Asset Owners** responsible for the delivery of social value on major infrastructure projects	A, B	2
4	**Project managers or social value practitioners** responsible for the delivery of social value on major infrastructure projects	A	1
5	**Policy influencers** and makers	A, B, C	3

Table 5: Participants

The selection of interviews was structured to get a wide spectrum and perspective of participants. It was made clear that whilst the focus of the research findings was related to the infrastructure sector in the UK, the scope of the interview included global understanding of social value across all sectors.

The research interviewed a total of 12 participants in the five categories that are listed in Table 5. The participants are coded by their category for example 1 and designation A, B,C,D or E. This coding is then used to attribute quotes on an anonymous basis. The participants were selected to include contributions from within and outside infrastructure, from both corporate and project level perspectives and to include those with a digital focus and those without.

The largest category is social value leaders and specialists within a range of organisations both within and external to the infrastructure sector. There was a single participant in categories 2, For Technology Leader, and 4, for a project manager or social value practitioner. In the category of asset owners, which were all Infrastructure, there were 2 participants and in the category of policy influencers or makers there were 3 participants.

The research findings are then tabulated, and the participant coding is used to identify where a specific participant interview had provided evidence contributing to that finding. The level of evidence for each finding is then illustrated through a colour coding with purple used to identify very strong evidence (5 or more participants), blue to reflect strong evidence (4 or more), green to reflect good evidence (3 or more participants) and yellow to reflect some evidence (2 participants). Orange reflects findings based on one single piece of evidence

It is recognised that this spread of participants will have influenced the research, however the reliability of the findings is supported by the deep holistic and contextual knowledge of the interview candidates who have considerable credibility within the social value sector as a whole. Based on the outlined methodology the researcher

considers the findings can be generalized to the infrastructure sector as a whole and the construct is valid.

 All the interviews were carried out between 1st and 20th of August 2020 when the COVID – 19 lockdown restrictions were beginning to be eased. Interviews were carried out digitally using TEAMS and video recorded using STREAMS with the video on for both the participant and researcher.

4 Research findings

4.1 What are the opportunities for the use of digital technology?

4.1.1 Digital opportunities for defining and specifying social value

The research identified six opportunities with respect to the digital definition and specification of value and these are shown in table 6

Item	Definition and Specification Opportunities	Participants	Evidence
1	Mapping systems complexity	5B, 4A,2A,3A	Very strong
2	Context relevant interventions	1B,5B,4A	Good
3	Improved skills and sharing best practice	1C ,4A	Some
4	Mandating requirements	5C,5A	
5	Improved understanding of value	5B	Single
6	Digital understanding of the social value of natural assets	5C	

Table 6 Digital opportunities for defining and specifying value.

Social value was identified as a complex system and digital technology provided a great opportunity to better understand and capture the level of complexity that exists. It was noted that often practitioners missed the process of identifying what people would most benefit from, before launching activity.

There was strong evidence of the opportunity to use digital in **mapping systems complexity.** Digital technology can help inform the interconnectedness of social value, so that an environmental piece of work, also considers the educational and employment value, and the difference in social value in different geographical locations. Changes and trends can then be mapped. This understanding can then help in spreading the geographical social value of programmes.

> *"To define value, we need to bring all the data together to understand the interactions within the system and across multiple layers. Once we start integrating these systems and layers there is huge potential for future scenario mapping."*
>
> *5B*

Understanding local community collective needs at system level is integral to defining social value, it is not easy to compare engagement in Hackney, with engagement in Islington, even though the two London boroughs are next door to each other. Some mechanism of segmenting the data is essential as well as some element of standardization.

Participants also identified the opportunity of **improved understanding of value** through the publication of a values framework which provides the opportunity of a potential standardization in the framework approach by developing a digital value tool around a multi-capitals model. This was identified in the literature research (Construction Innovation Hub 2020).The aspiration is for this model to be used on all £65B of government infrastructure investment, by clients, contractors, and their supply chain. The value toolkit has been published for testing and uses the global capital coalitions 4 capitals model as a basis for the tool.

The values toolkit begins to address the identified need for an agreed national process, over the whole of the UK. It is important, however, that the model is sufficiently flexible to accommodate different approaches to a multi-capital approach by different clients, for example the focus on intellectual capital in the alternative 6 capitals model, and the need for the value of culture to have a greater visibility, as is the case for the Welsh futures model.

A participant also identified the opportunity of the use of virtual and enhanced reality to build the **digital understanding of the social value of natural assets**. For example, when you see a tree, you are aware of its impact in increasing air quality and improving local amenity value. This approach has the potential to be expanded into other areas, for example, enabling line managers to understand the value of a previously unemployed individual securing a job, or a road user to understand the impact of driving over the speed limit on carbon emissions.

There was strong evidence related to the use of digital technology to improve **context relevant interventions.** GIS can be used on a local, national, or even global areas, to map and understand the issues and impacts on communities that infrastructure should be addressing. Digital technology can then clean up the insights from the available data, help to understand the needs of the local area, and inform the thinking and planning of interventions. VR allows you to get much more realistic responses from people as they can be immersed in the real context and specifiers have more reliable information on what interventions will be most effective. This correlates with findings in the literature (Fujiwara and Campbell 2011).

There was some evidence related to the **Improvement of skills and sharing best practice.** Five years ago, digital training was only at 5% of what it is now, digital has a role to play in educating people in social value and in enabling communities of people who are delivering projects to collaborate and share good practice.

> *"The biggest thing digital can help us do, is to educate people to specify and procure better, in terms of delivering more sustainable outcomes"*
>
> *1C*

There was some evidence of an opportunity to use blockchain and smart contracts in allowing commissioners to **mandate requirements.** Forcing through conditionality and enabling them to know if they have made the right decision during procurement and planning,

> *"If and when policy (planning) requires you have absolute security and attribution, in order to make local decisions that are 100% accurate and secure, then I think blockchain has a role to play"*
>
> 2A

4.5.2 Digital opportunities for the <u>delivery</u> of social value

This research identified six opportunities with respect to the digital delivery of social value and these are summarised in Table 7

item	Delivery Opportunities	Participants	Evidence
1	**Improve stakeholder engagement**	1C,2A,3A	🟩
2	**Improve Diversity and Inclusion**	1C	🟧
3	**Wider organisational contribution**	1B	🟧
4	**Increased global reach and responsibility**	1A	🟧
5	**Increased anonymity online**	1A	🟧
6	**Digital twins**	5C	🟧

Table 7 Digital opportunities for the delivery of social value

There was good evidence of an opportunity of **improved stakeholder engagement.** This includes the opportunity to engage 'citizen scientists' in reporting on social value assets, for example trees, and the use of gaming techniques to simplify and incentivise the process, instead of asking what size is the tree? you ask the participant in the survey to answer the question, 'can you hide behind it?' accepting participants come in different shapes, this gives you an indication of the girth of a tree without the need for actual measurement.

A model needs to be developed that gives the local community a continual voice, rather than a series of disjointed conversations, and incorporates social value. 'A conversation about the place you live in'. It needs to use existing social channels, including images and video, because that is where the conversations are happening. The conversation needs to be rich enough to provide the data different organisations need, but also provide a shared understanding of needs, from a community point of view, rather than individual needs.

Community engagement in the future is going to have collaborative platforms as part of it. One of the interesting areas is how you join up digital platforms with face-to-

face meetings, or other person interaction, and how you collect data across those different touch points in a way that's consistent and interoperable.

One participant identified that AI has the potential to **improve diversity and inclusion,** and digital reporting could be specified for recruitment processes, to pick up trends and patterns, and inform the recruitment process.

Another participant identified that digital technology could enable the understanding of the **wider organisational contribution** of organisations. There is currently a gap in the understanding of commissioners, in the wider social value delivered by organisations, outside of their specific contractual commitments.

One participant identified the use of digital technology for the delivery of social value results in **Increased global reach** for all organisations. We have now found ways to address some inequality digitally and virtually, can we now do counselling? and mentoring and credit support using digital platforms? And can we now begin to address those areas where inequality is greatest without the need for the transport. Perhaps we can start to reach parts of the world that we thought were unreachable? In turn this has a consequence that we may feel a greater sense of responsibility to address these global needs, because we now can.

However, can you create the sort of depth of relationships needed to make behavioural change over digital?

"I think we have learnt that in the past 3 months, that digital is not a perfect substitute for physical relationships, but it is a lot less worse than we thought, and can be 70% to 80% as good, but you can do five times as much for zero carbon."

1A

"We have talked about fear … before April 2020 I think about half of people would have said you can't do it, people won't open up, you can't build relationships, that social value. is by definition, about people, and digital is the antithesis of people. I think we are over that."

1A

The same participant also identified **increased anonymity** as a specific benefit of digital with respect to situations where organisations are seeking to address abuse. A digital meeting could be safer for the victim than a physical meeting, as they may be able to engage in their home location using a mobile phone, rather than leave the premises for a meeting, in which case the abuser may find it easier to spot what is going on.

A participant also identified the concept of a **digital twin** of infrastructure as an opportunity. The models used need to be wide enough to embrace the social value impact of the asset. The operation and integration will be a big driver of how we can measure and demonstrate social value, and this should in turn feed into the national digital twin programme.

4.1.2 Digital opportunities for the <u>measurement</u> of social value

With respect to the measurement of social value, the research identified six opportunities with respect to the digital technology and social value and these are summarised in Table 8.

item	Measurement Opportunities	Participants	Evidence
1	**Improved management information**	1C, 1B ,1A ,5C, 3A,3B	
2	**Increased transparency**	1D ,1E,5B,5A	
3	**Improved decision making**	5C ,2A, 3A	
4	**Improved presentation of data**	5A, 2A	
5	**Cascading accountability**	5A	
6	**Reduce cost**	1A	

Table 8 Digital opportunities for the measurement of social value

The research found very strong evidence of the opportunity of digital technology to provide **improved management information** on social value. Digital is the way that management information is collected, stored, and used to make informed decisions. Digital will have the most impact where the 'Data Voice' is used to inform decisions and understand what is working well at every level of the supply chain. The use of handheld devices to capture and report social value in real time is one example. Digital data capture will provide a more coherent picture, evidence for future investment, and allow the monitoring across different facets such as climate change and population growth. The monitoring needs to be flexible to capture benefits and disbenefits and not just to prove an original hypothesis.

There was strong evidence of the opportunity of digital technology to deliver **increased transparency.** Enforcement of delivery through penalties does not often have the consequences intended. Transparency can be more effective in enforcing performance and delivery against promises made. An example from the literature is the publication of achievement against KPI's (CBI 2020). Greater visibility of what social value has been delivered through government procurement will be beneficial to stakeholders. Transparency can also assist a business, that did not win the

contract, to understand why, and drive-up best practice sharing as part of competition. It allows both positive and poor behaviours to be called out.

Emerging Social Software Platforms (ESSP) can be used to facilitate open and collaborative discussions around social value. Transparency can be enabled through a range of different digital tools to a much wider audience, on demand, than any non-digital application.

"It's not until you give us a crisis that we respond, all funding and delivery organisations now should be taking that potential and finding good proportionate data rather than going, it's too expensive"

1A

There was good evidence of the opportunity of data, and data insights, to **improve decision making.** For those businesses delivering public value, such as water companies, digital will enable public value, for example through less customer interruptions via localised leakage detection.

Current measurement does not encapsulate everything that needs to be measured and tracked, and digital technology can enable that process and make the data transparent and accessible. Analytics will be useful in shifting the focus from owners, clients, and operators to the impact on users, society and local communities, including capturing the local conversation through social media.

AI will become increasingly how we interpret and use data, and to enable benchmarking to make informed choices, not only on individual projects but across a

portfolio or estate. It will enable us to understand the system level performance of digital twin infrastructure.

There was some evidence of the opportunity of digital technology to enable the **improved presentation of data** using both quantitative and qualitative data in dashboards, and the use of infographics and video. There may be opportunities to expand existing systems, such as stakeholder management systems, to capture elements of social value.

A participant identified the opportunity for digital technology to be used to embed accuracy and support for the contract management process, and to address the problem of failure to deliver on promises. DLT, Blockchain and smart contracts have the potential to **cascade accountability** through the supply chain.

A participant also identified that, prior to digital, cost has been a barrier to measuring social value, as practitioners made the judgement that they would prefer to spend £10,000 on delivery than on evaluation. However, the use of remote techniques and digital surveys to **reduce cost** means that you can do an evaluation with primary data, at much lower financial and environmental cost.

4.6 What are the risks and barriers in using digital technology?

The research identified 14 risks and barriers to the use of digital technology of which two had strong evidence, four had good evidence, and there was some evidence for a further five. The final 3 were mentioned by individual participants. These findings are shown in Table 9.

Item	Risks and barriers to the use of digital technology	Participants	Evidence
1	**Systems proliferation**	1C,5A,3B ,2A	
2	**Fear of social media**	1A, 1D, 3B,5C	
3	**Lack of understanding of data**	1E, 1D,2A	
4	**Limitations of current tools**	1A,1B,5B	
5	**Legal constraints to information Sharing**	4A, 3B,1D	
6	**Digital understanding and skills**	2A,3B, 5B	
7	**Digital security**	3A,3B	
8	**Not an organisational priority**	1C,1B	
9	**Wrong behaviours**	1B,4A	
10	**COVID – 19**	1D,1A	
11	**Risk of exclusivity**	5A,4A	
12	**System complexity**	5B	
13	**Siloed approaches**	5C	
14	**Digital poverty in society**	1B	

Table 9 Risks and barriers to the use of digital

There was strong evidence of **systems proliferation**. Five years ago, there were no systems on the market, but now there is a plethora, these systems have been developed without any British Standard, however a new standard entitled BS8950. Social Value -Understanding and enhancing - Guide' was published on the 2nd December 2020. (BSI 2020) and no doubt these systems will begin to reflect at least some of that standard. The choice of system can often be influenced by personal experience rather than objective selection. The more systems in use, the less consistency and opportunity for comparison.

There was strong evidence that a **fear of social media** is preventing the use of social tools, in particular Facebook, for social value purposes. This is driven by reputation, and concern about both the legality and ethics of using these tools as reflected in the quotes below. Since these quotes the global level of concern has accelerated significantly, the whistle blower Frances Huagen has provided evidence to add to these concerns (D'Urbino Luca 2021) and Facebook has rebranded as meta. None of these factors make the use of Facebook for good, any easier, and many would argue against it.

"I think it's on a knife edge, whether people would say Facebook creates any social value"

1D

"I think we are scared of Facebook analytics, we don't know how to use it and its social media and Cambridge Analytica, therefore it is bad. So, using any of that for good seems like the wrong place to start for some people, but I think there is a lot of potential"

1A

There was good evidence of a **lack of understanding of data** as a key barrier and risk. Organisations need to first work out what they want to achieve with the data, what data is needed, for what purpose and what restrictions and obligations will apply. They then need to ensure they have all the permission for the use of that data. This is a balance between having flexibility and securing the agreement of participants who may be nervous about sharing their data. Organisations need to

think through the legacy and compliance issues and be aware that just because you can do something, does not mean that you should.

> *"People don't really understand data from a legal perspective. They think data is a bit of a free for all, they think they own data, but they don't. The truth is, no one owns data, there are rights, restrictions and obligations that apply."*
>
> *1E*

There was good evidence of the **limitations of current tools** that tend to be more suited to quantitative data, AI and good data need to bring insights and not take the thinking out of the process. The tools also need to be flexible and evolving and there is a fear of getting locked into a system and not being able to change. The existing systems still do not fully replace the interaction and networking that is possible when you are physically present.

> *Blockchain was supposed to allow us to link every component of a computer with its supply chain and know that no one was harmed in the process. However, that only works if you can be confident that the data being put into the bottom of the chain is correct, and of course it is impossible to change once it gets in, so that's why, in the world of human rights, blockchain is not seen as a silver bullet.*
>
> *1D*

There was good evidence of the **legal constraints to information sharing** as a barrier that can prevent collaboration or be used as a reason not to collaborate. Whilst transparency may be a goal, that can be in conflict with people's reluctance to share their data.

There was also good evidence that **digital understanding and skills** are a barrier not only in the implementation of social value but much wider and across the supply chain. Participants in the research were open about their own limited knowledge in digital and recognised that reflected a wider lack of understanding. Also identified was the centralised nature of IT skills.

"There is something to be looked at with respect how organisations are structured with respect to IT. It tends to be a central function, centralized and hidden away kind of space. We do not have local (digital) competence and capability."

1B

There was some evidence of **digital security** as both a risk and a barrier. We now know that foreign actors can interfere in nation state activities, and local protest groups can hijack information for their own purposes, so we need to have mechanisms in place to sense check information. People can be nervous about the use of new technology, is it secure, is it safe, where is the data stored and who will have access to it?

There was some evidence that **wrong behaviours** are a key barrier. For practitioners this includes not being prepared to use digital tools, such as TEAMS, to engage with the community stakeholders, in part because of the consequence of having to be always available, as the constraint of geographical location is removed. For the accountancy and audit profession the focus remains on managing risk and not on making a positive difference. The legal profession can be perceived as overall too risk adverse and creating barriers to collaboration which could enable the delivery of greater social value. Finally, there is the risk adverse nature of the

construction industry where there is a reluctance to try anything that has not been proved.

There is some evidence of a **risk of exclusivity** as many of the web based tools generate their revenue via licensing arrangements, and that can be a significant cost, on major programmes, if you include all of the supply chain. Consequently, there is a diversion of funding from the delivery of social value, for example funding to support local charities, to the licensing costs. The alternative is to restrict access and make the product exclusive, however this leads to a reduced level of ownership and potential under-reporting. SMEs are concerned that they may not be able to adopt technologies to the same extent as larger companies and this could create an imbalance. There needs to be an awareness that anything that is mandated or strongly encouraged, by policy makers or a sector, needs to be non-exclusionary.

There was some evidence that **COVID–19** is a barrier to social value because many companies are just trying to survive. Panic is a barrier to realising the strengths of digital. This is an opportunity to re-focus and re-position to deliver greater social value and design interventions based on the strengths of digital**.**

The following risks and barriers were mentioned by individual participants.

Siloed approaches, or the incessant desire to go it alone, reinforced by established custom and practice, are barriers to digital technology being used in social value. What is needed is a common approach that feeds into a balanced score card, and which provides a wider definition of value.

System complexity is a barrier to making progress as the interconnectedness of everything makes it difficult to demonstrate causality and attribution. Having said that people lack confidence in the simpler linear cause and effect models. Some of the

more complex systems, that claim to provide, for example, predicted social value for different road routes, take insufficient account of the wider decision-making process.

Digital poverty in society is a barrier, not everyone has access to technology, and levels of literacy are variable, so digital methods will never reach everyone in need.

> *"Digital is an enabler of social value, but the case is yet to be made as to whether digital actually increases the social value delivered or enables the delivery of social value more effectively and efficiently."*
>
> *4A*

5 Conclusions including limitations and future research.

The working paper findings are aligned with the two questions posed in the introduction and overall, these findings answer the title of this research 'How can, digital technology be used to maximise the social value delivered through major infrastructure projects?

An extension of the research, to tap into a more global picture of the use of digital technology for social value, and to use a much wider sample base would be beneficial.

Further integrated research into the four horseman of the optimist: capitalism, technology, public participation and responsible government and their collective contribution to 'dematerialisation' (McAfee 2019), and the link with social value would be of interest.

For those digital systems that are being developed there will be a need to track their progress and implementation. Given the pace of technology there is a need to continually track new technology and explore its potential to maximise social value.

The use of digital technology in stakeholder management, and the impact on social value, would also be beneficial area for further research.

Government and industry are already responding to the challenges identified with an acceleration in policy focus, an increase in the embedment of social value into contracts and leveraging the benefits of sustainable finance. Digital technology is an enabler to social value and needs incorporation into policy and can then be used to drive requirements through the supply chain.

There has been an increase in the availability of definitions for social value including the publication of Procurement Policy Note (PPN) 06/20 taking into account of social value in the award of central government contracts (Cabinet Office 2020c) which provides a framework of definition within public sector procurement . However, the definition needs to be sector and context specific. Social value should not be viewed in isolation and current practice takes insufficient account of the beneficiaries. Additionally it is important to recognise that if we restrict our definition of social value to that value added over above the commission itself, as defined in PPN 06/20. We fail to effectively consider the social value of the infrastructure asset itself.

The following definitions are therefore proposed for Infrastructure;

Intrinsic social value: This is the social value 'belonging naturally and essential' to an asset. This social value needs to be considered at optioneering stage, as part of the development of the business case, and balanced with environmental and economic benefits. The value toolkit (Construction Innovation Hub 2021) provides

one mechanism to support this process. This social value will be embedded into the technical specification of the asset. Two examples of this are the Tideway project and the intrinsic value that the super sewer has in cleaning up the River Thames. A second example is a water process plant, and the social value of improved water quality to the local community. In both cases the intrinsic social value of the asset is an important part of 'Why' the asset is being built.

Extrinsic social value: This is social value that is over and above the intrinsic value of the asset and is not essential to the functioning of the asset. To give 2 examples, on the Tideway project, volunteering in the local community delivers social value, but is not essential to the delivery of the project. For a water treatment works, this could be the increase in the technical capability of local people because of employment in the delivery or operation of the asset. Extrinsic social value from a procurement perspective for the public sector is defined in PPN 06/20, although that document only takes the definition as far as inputs and outputs and does not effectively address impact.

The following overall definition for social value in the infrastructure sector is proposed:

> Social value for infrastructure assets is both the intrinsic, and extrinsic impact of the asset, on the wellbeing of society, throughout the asset's lifecycle
>
> Jeremy Galpin

Many of the challenges facing the industry identified in this research, can be addressed with the application of digital. This includes improving measurement,

accountability, and knowledge. However, if digital technology is to be used to its full benefit, then the industry will need to overcome the barriers of system proliferation, a lack of understanding of data, fears over the use of social media and of digital security, and address digital poverty amongst stakeholders.

There is strong evidence of the current use of digital measurement of social value, but concern over the use of simplified methodologies and an over reliance on quantitative data. The monetized metrics used are not investable.

There has been a significant shift is the use of digital engagement and consultation with stakeholders and some developments in the use of AR and VR to change the public perception of value. There is a significant opportunity to improve stakeholder engagement, using digital apps and mobile, and integrate that improved engagement with social value measurement, reducing the cost of analysing real outcomes using primary data.

Digital technology is the only way to map the complexity of social value and maximise context relevant interventions. There is an exciting opportunity to use digital technology to improve management information, through the creation of a platform that will capture the 'data voice' in real time. Leveraging transparency and collaboration using ESSPs and the use of AI and analytics and machine learning will improve decision making.

In response to these findings, this research makes the following 12 recommendations for the infrastructure sector to fully realise the benefits of digital technology in maximising social value.

"When you start asking the questions you realise without digital, we can't really move this forward, but there are quite a few barriers in the way."

Source 1D

6. Research Recommendations

Recommendations 1 to 5 relate to policy implementation and the definition and specification of social value. Recommendations 6 to 9 relate to improving the measurement of social value using digital technology. Recommendations 10 and 11 relate to using digital technology to enhance stakeholder management through the delivery of social value, and recommendation 12 relates to upskilling of managers.

Recommendation 1

An up to date, context specific, definition for social value in the infrastructure sector, should be agreed and embedded into policy and practice.

Recommendation 2

A holistic approach to the implementation of social value. Using a digital framework, based around a multi-capitals model, for the achievement of policy objectives on major infrastructure projects (Construction Innovation Hub 2020). This approach needs to be embedded into the whole life cycle of the asset including planning.

Recommendation 3

Policy makers should specify social value requirements that cannot be delivered without the use of digital tools, for example, real time management information on outcomes. Policy should be system agnostic, flexible for different sectors and incorporated into all stages of the project lifecycle.

Recommendation 4

Policy makers should consider interventions to address market failure that has led to systems proliferation, siloed approaches, and system exclusivity.

Recommendation 5

Develop an ethical and methodological framework of good practice for the use of social media to maximise social value.

Recommendation 6

A standardized digital framework of social value metrics is developed for the infrastructure sector and recognised by government. The metrics should incorporate both qualitative and quantitative data and the impact on stakeholders. These metrics are developed together with regulators and the financial sector to move to investable metrics linked to societal wellbeing.

Recommendation 7

Embed social value data into digital twin development, enabling better decision making on social value across the whole life cycle of infrastructure assets.

Recommendation 8

Explore the use of Distributed Ledger Technology (DLT) commonly termed blockchain, to increase transparency and drive accountability in the maximisation of social value.

Recommendation 9

Leverage digital tools, including Artificial Reality (AR), Virtual Reality (VR), and apps on mobile devices, to make the collection and measurement of primary outcomes data, context relevant and proportionate to the benefits.

Recommendation 10

The industry builds on the shift to digital, in engagement and consultation with stakeholders, to design standards for a new normal

approach, using a blend of digital and face to face to increase understanding and build trust.

Recommendation 11

Digital tools, including Emerging Social Software Programmes (ESSPs such as TEAMS), Artificial Intelligence (AI) and mobile devices, are used to enhance stakeholder engagement and present the 'data voice' in real time, creating a continual transparent conversation around 'place'. Integrated with social media and using the wisdom of crowds to improve decision making.

Recommendation 12

Upskill managers, using digital learning, to maximise social value including contracting, accountability and management processes, risks and opportunity of data management, and digital security.

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Appendices

Appendix 1: Acronyms

Acronym	Meaning
CBA	Cost Benefit Analysis
SCBA	Social Cost Benefit Analysis
SROI	Social Return on Investment
ESG	Environmental, Social and Governance
UNSDG's	United Nations Sustainable Development Goals
EPCM	Engineering, Procurement, Construction and Management (professional services)
EPC	Engineering, Procurement, Construction (design and build)
WTP	Willingness To Pay
WTA	Willingness to Accept
ESM	Experience Sampling Methodology
ICO	International contracting organisation
ESSP	Emerging Social Software Platform (Facebook, Wikipedia, Uber)
WIFM	What's In It for Me?