

# SOCIAL VALUE IN THE DIGITALISED CONSTRUCTION ENVIRONMENT

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The construction industry has been under increasing pressure by clients to demonstrate its social contribution to the community. This social contribution has been termed as Social Value (SV). Although SV has been explored in non-digitalised construction environments, less is known about how digitalised construction environments can ensure the delivery of SV within a socio-technical systems approach. The aim of this paper is to identify how digitalised construction environments could integrate SV within their processes. To achieve this aim, a comprehensive literature review of the existing conceptualisation of SV in the construction industry is carried out and synthesised into a conceptual framework for integrating SV in the digitalised construction process. The literature reveals that various construction stakeholders conceptualise SV in different ways. SV is commonly shaped by short-term compliance to fulfil the requirement for procuring contracts. Also, there is a lack of common approaches for integrating the delivery process of SV. The conceptual framework demonstrates the importance of early integration of SV in the design phase to identify alternative methods to cogenerate, monitor and communicate SV. Thus far, this study advances the knowledge about how digitalised construction environments can ensure SV delivery. This paper highlights the need for further research to integrate SV in digital construction environments. A future study could validate the framework across the design phase with different construction project stakeholders.

Keywords: BIM, digitalised construction environments, social value, socio-technical

## INTRODUCTION

The construction industry has been under increasing pressure to demonstrate their contribution to the community while carrying out their day-to-day business. The idea of a commercial organisation having some responsibilities to the community beyond making profits has been around for years (Carroll and Shabana, 2010). To drive this social change, the UK Government has put in place a procurement approach called Social Value (SV).

The public sector has adopted SV by encouraging commissioning authorities to procure services considering economic, social, and environmental well-being which benefit the local community (Social Value Act 2012, 2012). SV has gained an outstanding interest among the private industry sector and its stakeholders (Awuzie *et al.*, 2018; Barraket and Loosemore, 2018). In the construction industry sector,

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remarkable work to communicate SV has been carried out by organisations such as UKGBC and Action Sustainability (Supply Chain Sustainability School, 2018; UKGBC, 2018).

Nevertheless, SV literature is still in an early stage of development (Burke and King, 2015; Loosemore, 2016). In the construction industry, SV has been investigated in non-digital environments. For example, Daniel and Pasquire (2019) studied how Lean construction can create SV within the delivery of construction projects. Also, Watts *et al.*, (2019) explored different methods of measuring SV within various stakeholders in the construction industry. Yet, the construction industry is undergoing a digital transformation. The digital transformation of construction aims to ensure that the built environment can harness new technologies and digital connectivity to deliver environmental, economic and social benefits (Centre for Digital Built Britain, 2018). By this means, digital construction will drive up the competitiveness, productivity and new skills of the construction industry, as well as the quality of life and well-being of the society. Therefore, there is an opportunity to align the emerging digital approach of delivering projects with the need to deliver SV.

The aim of this paper is to identify how the digitalised construction environment can leverage the integration of SV to deliver social, economic and environmental well-being to the community. To address this aim, a comprehensive literature review of the current knowledge of SV and how digitalised construction environments can ensure the delivery of SV within a socio-technical system approach has been conducted. The paper is structured as follows; (1) methodology (2) conceptualising SV in the digitalised construction environment and (3) conclusion, future work and limitations.

## **METHODOLOGY**

While there is a large body of research in digitalised construction environments, the current focus on SV is scarce. Therefore, key concepts and definitions in the literature were intentionally selected from relevant sources and relevant citations were followed. The following keywords in searching for papers were used: "Social Value"; "Social Value and Construction"; "Social Value and BIM or Digital Construction or Digitalised Construction Environment"; "Social Outcomes and BIM or Digital Construction or Digitalised Construction Environment"; and "Social Dimension and BIM or Digital Construction or Digitalised Construction Environment".

The search resulted in twenty-two literature sources for SV using Scopus and Google Scholar databases. Key authors and new concepts related to SV were identified. For example, Raiden *et al.*, (2019) have published the first book looking at SV in construction; Loosemore (2016) has carried out significant research in the area of social procurement; both pieces of research have been fundamental in developing SV in the built environment.

Due to the early stage of research development on SV, the search was extended to include grey literature such as government reports and industry publications. The grey literature offered a broad insight into the current debate on SV and digitalised construction environments. In summary, one hundred and sixty-eight publications were collected, of which forty-four documents were comprehensively reviewed.

### **Conceptualising Social Value in the Digitalised Construction Environment**

#### *Social Value background*

According to the literature review, SV has evolved around three main themes. 1) Morality and ethics that explores the theoretical foundation of duty-based ethics that

broadly support the SV agenda (Raiden *et al.*, 2019). 2) The importance of the social efficacy and the sense of community (Cartigny and Lord, 2017). Finally, 3) Theory of value in which authors such as Choi *et al.*, (2018); Wood and Leighton (2010) and Burke and King (2015) discuss SV in terms of generating benefits to society by ensuring "value for money" in the delivery of services. Value mainly refers to the worth the end-user put on some product or service (Husted *et al.*, 2015).

Moreover, SV is related to and indeed overlaps with different concepts. For example, Cartigny and Lord (2017) discuss the background and similarity with social capital and sense of community. Other authors such as Daniel and Pasquire (2019), and Watts *et al.*, (2019) explore the relationship between SV, corporate social responsibility and shared value. These concepts are tied to the triple bottom line of sustainability (social, environmental and financial) and agree on the enhancement of the social dimension to generate improvements in the community. Nevertheless, each concept emphasises different aspects. For example, Social Capital focuses on networks and how communities can work together to generate positive impacts (Paranagamage *et al.*, 2010). In the case of corporate social responsibility, Carroll and Shabana (2010) define it as the social commitment of business to contribute to the economic, legal, ethical, philanthropic expectations of society. The concept behind shared value is to integrate social issues into the capitalistic economic mechanism to extend benefits for both business and community (Porter and Kramer, 2011). This means a business can gain economic returns and create value simultaneously. Porter and Kramer (2011) identify three ways by which organisations can create shared value: "by reconceiving products and markets; by redefining productivity in the value chain and by enabling local cluster development".

Corporate social responsibility and shared value intend to contribute to society and create value while doing business, but there are differences with the SV perspective. The main differences are that, corporate social responsibility and shared value refer to contributions that are mainly aligned with the organisational business model (top-down approach) (Daniel and Pasquire, 2019; Watson *et al.*, 2016). Whereas SV refers to identifying specific needs of the community (bottom-up approach) and collaborating with multiple stakeholders.

#### *Social Value Act 2012*

Lately, the UK Government has been promoting social procurement practices by adding SV criteria in the services they commission and procure. This is enforced by the Public Services Social Value Act 2012. The Legislation Public Services Social Value Act (2012) came into force on 31 January 2013. The Social Value Act 2012 requires all public authorities to consider economic, environmental and social well-being "value" in the services they commission and procure, and it applies to all local authorities. The Act extends to England; its application is limited in Wales and does not extend to Scotland or Northern Ireland.

The Social Value Act (2012) has been challenging to implement due to the lack of guidance and methods of measuring social value (Awuzie *et al.*, 2018; Cabinet Office, 2015). The Cabinet Office (2015) review on the SV implementation revealed three significant barriers for the Social Value Act 2012. First, the awareness among organisations of the Social Value Act 2012 act shows contrasting understanding among stakeholders; second, there is inconsistency in the practice of SV frameworks; and third, the lack of developed tools to measure the SV.

### Social Value Definition

The concept of SV is considered a "recent" term. Diverse definitions and vocabulary terms have emerged in the developing of knowledge of SV across various disciplines, such as rail safety (RSSB, 2018); the National Themes, Outcomes and Measures (TOMs) (National Social Value Taskforce, 2019); construction industry (Supply Chain Sustainability School, 2018; UKGBC, 2018); housing association (HACT, 2016); among others. However, the conceptualisation of SV is vague and has a lack of agreed definition and vocabulary. After a comprehensive review, definitions on SV reinforce the Legislation Public Services Social Value Act 2012. SV refers to maximising soft outcomes which are difficult to measure, such as mental well-being and social skills (Wood and Leighton, 2010). Most documents highlight the relative importance (value) that people place on changes that happen in their lives (Cartigny and Lord, 2019; Opoku and Guthrie, 2018; Social Value UK, 2011). These changes are mainly triggered by the activities of any organisation and secured through the procurement process (Loosemore, 2016).

From the construction industry perspective, the definitions of SV highlight the positive and negative impacts a project can bring to the community including internal and external stakeholders (Awuzie *et al.*, 2018; Raiden *et al.*, 2019). Table 1 presents three definitions from a construction perspective that have emerged from this review.

Table 1: SV definitions

Source	Source Type	Definition	Focus
Daniel and Pasquire (2019)	Academic Publication	SV is the benefit a community and its inhabitants obtain in terms of social, economic and environmental well-being from companies or organisations conducting business around the community.	Lean approach
Raidén <i>et al.</i> , (2019)	Academic Publication	The "Social Impact" any construction organisation makes to the lives of the internal and external stakeholders affected by its activities, including those working in the industry and in the communities in which it operates	Explore and context
Supply Chain Sustainability School (2018)	Industry Publication	SV means the direct, positive impacts for people and communities that can be created by going beyond 'fit for purpose' built environment design and creating socially sensitive infrastructure or architecture.	Guidance

One distinction of the construction industry is that the work process is undertaken within projects—a temporary endeavour, and with many different stakeholders at different stages. Therefore, considering the definitions in Table 1, this paper agrees that SV refers to the broader impacts in terms of social, economic and environmental well-being that a community (internal/external stakeholders) obtains by the activities of an organisation or project (Daniel and Pasquire, 2019; Raiden *et al.*, 2019).

### Social Value in the Construction Industry

The construction industry has a massive impact on communities. The creation of SV can occur during each stage of project-life cycle (Raiden *et al.*, 2019; UKGBC, 2018). To date, a number of studies demonstrate that SV is intensely focused on the construction phase (Sainsbury *et al.*, 2017; Supply Chain Sustainability School, 2018). This is because the SV policy has been aimed primarily at the social procurement of the asset in the form of job creation and training and local growth.

In order to create and maximise SV, social organisations have produced their own SV toolkits/publications to advice how to deliver SV. Notable examples include UKGBC (2018), Supply Chain Sustainability School (2018) and RSSB (2018). The growing numbers of frameworks, guidelines and toolkits emphasise the need to:

- Identify the needs of the community (bottom-up approach).
- Involve stakeholders.
- Plan and program development.
- Embed SV in procurement.
- Develop or chose a measurement framework to assess and monitor.
- Report and communicate the changes to learn and improve.

Two frameworks are the main references for driving SV in the UK. The TOMs framework (National Social Value Taskforce, 2019) and the Social Value Bank (HACT, 2016) aim to provide a minimum standard to embed social into procurement and management processes.

Despite positive results in other sectors (Social Enterprise UK, 2018), Burke and King (2015) revealed a slow uptake on SV in the construction industry. The study identified that SV adoption by local authorities had been inconsistent, with up to 75% of local authorities have not embedded SV in their procurement strategies, and less than 10% have an SV policy. Similar, Cartigny and Lord (2018) found that the SV Act 2012 has not impacted on public infrastructure projects in England. The frequency on the contracts considering SV is quite low. Only a few contracts contained specific SV award criteria, and those criteria are weighted around 5-10%.

### **The Role of Digitalised Construction Environments to Unlock Social Value**

Digitalised construction environments comprise the process of using digital technology for producing and managing information of the digital asset (Craveiro *et al.*, 2019). Digitalised construction aims to improve the delivery and operation of the built environment. The potential range of digital technology in the construction industry is considerable. Digitalised construction environments include, but are not limited to, Building Information Modelling (BIM), digital twins, augmented reality, virtual reality, sensors, building surveying, autonomous vehicles, drones, robots, advance materials, additive manufacturing, artificial intelligence and internet of things (CITB, 2018; Craveiro *et al.*, 2019).

Within digitalised construction, BIM is identified as a significant enabler in the digital transformation. BIM can be defined as a set of an interacting social-technological process aiming to produce and manage information in digital format to improve collaboration among the stakeholders throughout the life-cycle of a building; (Demian and Walters, 2014; Eastman, 2011; Succar, 2009). The socio-technical approach prioritises the improvement of 'social' and 'technical' at the same level (Mumford, 2006). At the heart of digitalised construction are the people along with information, clear processes and their interaction with technology (CITB, 2018; Oesterreich and Teuteberg, 2019). Therefore, it is particularly important to create the right conditions for digital innovation and skills to unlock the SV of digitalised construction.

Digitalised construction has already changed how sustainable construction is conducted. However, the adoption of digitalisation for sustainability is still strongly focused on specific dimensions. Chong *et al.*, (2017) stated that research on BIM adoption for sustainability mainly focuses on the use of BIM-based tools for energy consumption (environmental-economic). Similarly, Santos *et al.*, (2019), highlighted that the terms most used in BIM literature for sustainability are energy efficiency (economic-environmental), green building (environmental), and safety (social).

Digitalised construction can unlock SV in two main areas: (1) For the external stakeholders (the users of the asset), digitalisation can provide better designed places that people value and provide community well-being. For example, Micolier *et al.*, (2019) proposed an agent-based model (Li-BIM) that simulates occupant behaviour and their indoor comfort to design better buildings. (2) The delivery of the digital asset delivery process, which impacts the working relationship among the internal stakeholders. Blay *et al.*, (2019) confirmed the need for social solutions to mitigate BIM management challenges, such a lack of skills.

### Proposed Framework

The conceptual framework (Figure 1) aims to integrate SV in the digitalised construction process. Although the findings emphasis the need to establish a conceptualisation of SV, a practical framework should be flexible enough to adapt to different scenarios. This practical SV framework must start by including the needs and perceptions of various stakeholders (bottom-up approach). Then, this framework can be embedded within a standardised digitalised construction environment process (top-down approach). Consequently, this process will generate a balanced/hybrid approach.

The framework is organised in three main blocks. The first block summarises a conceptualisation of SV in digital construction environments which is developed based on four key steps identified in previous SV literature and frameworks (Cabinet Office, 2012; Raiden *et al.*, 2019; Social Value UK, 2011; UKGBC, 2018):

1. Early involvement of stakeholders, including both internal and external stakeholders (community) to provide a clear view of their needs and to identify SV outcomes.
2. Adding SV in planning and designing will define the SV scope and establish a common language among various stakeholders
3. Procurement for value as a primary way to ensure the delivery of SV. Procure for value instead of cost and time.
4. Monitor and report to take timely decisions, adapt and improve. However, SV is challenging to assess due to the nature of its soft outcomes.

In the same block, the language of SV and how it can be identified in digitalised construction environments have been synthesised. The literature review highlights that SV refers to impact on social, economic and environmental well-being (positive and negative) that a project can create for the community. From the different SV frameworks, (National Social Value Taskforce, 2019; RSSB, 2018; UKGBC, 2018), the impacts that the digitalised construction can potentially create are selected. Finally, these impacts have been categorised into six groups.

The second block connects with established frameworks and standards for digitalised construction environments, such as the RIBA 2020 Plan of Work, UK BIM Framework and the ISO 1950 series (BSI, 2018; RIBA, 2020). RIBA 2020 Plan of Work organises the process to complete the design and construction of an asset in eight stages. The UK BIM Framework specifies an approach for implementing BIM and digital technologies by (1) deploying digital techniques; (2) taking advantage of new and emerging digital construction technologies and manufacturing processes; (3) using information in real-time to transform the built environment; and (4) understanding how the digital built environment can improve the quality of life for citizens. ISO 19650 part 1 recommends concepts and principles in support on how to

manage building information. ISO19650 part 2 supplies the requirements in the delivery phase of digital assets. The UK BIM Framework and the ISO 19650 series are the foundation for developments around the National Digital Twin (Centre for Digital Built Britain, 2018).

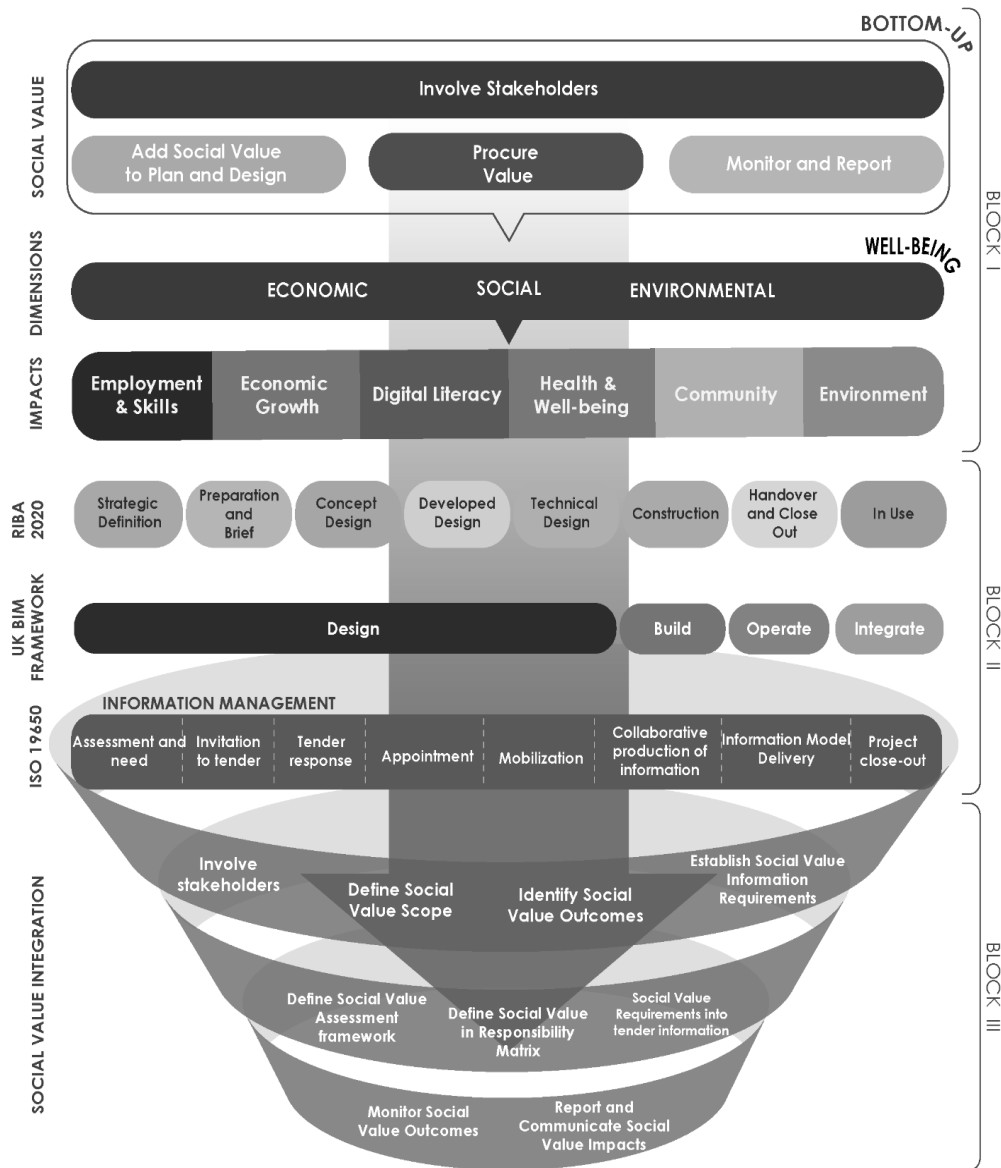


Figure 1 Social Value in the digitalised construction environment framework (first version)

Finally, the third block contains nine proposed steps that integrate SV in digitalised construction environments. These nine steps have been deduced from academic publications, guidelines, and frameworks embedding SV, digitalised construction and information management processes (BSI, 2018; Cabinet Office, 2012; Raiden *et al.*, 2019; RIBA, 2020). This is a conceptual integration of SV and digital construction environments; further work is being carried out with construction project stakeholders to validate the framework and assess its feasibility.

## CONCLUSION

This paper presents a comprehensive literature review of the concept of SV. The paper offers the opportunity to identify/describe how SV can be integrated into the digitalised construction environment. This paper presents a framework that integrates

SV in the context of digitalised construction; focusing on information management because of its relevance to digitalisation in construction.

There are some noteworthy limitations. The concept of SV is in its infancy, and it is possible that other terminologies being used were not included in the search. Also, the literature review focused on identifying published SV perspectives which have not been covered in current construction frameworks; thus, some emerging digitalised construction aspects may not have been integrated into this framework. The development of this framework is part of an ongoing PhD research. Therefore, it is expected to expand and validate the proposed framework with internal stakeholders in further studies. These studies will include other digitalised construction impacts and defining specific SV outcomes is required.

This paper creates an awareness of SV in digital construction environments. The result of this research enhances the understanding of SV in the digital construction environment and offers its first conceptualisation.

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