

Introducing Ḥalāl to Construction Supply Chains in the United Kingdom's Construction Sector

Mohamad El Daouk

Department of Land Economy, University of Cambridge, Cambridge, UK

Abstract

Purpose – The paper is aimed at introducing ḥalāl supply chain management to the British construction sector, construction supply chains, and supply chain management ('SCM'). Ḥalāl supply chains can optimise British construction supply chains by promoting meticulous, qualitative, and mutually reinforcing systems. The British construction sector has failed to overcome the inimical, inefficient, fractured, and transactional attitudes (collectively, the 'complexities') pervading it and the supply chains beneath it. Construction SCM has been able to introduce change, but with limited profound effect. This is owed to its lack of human agency, proactive quality control systems, as well as other verification and assurance mechanisms. Introducing the Shari'a principles encapsulating ḥalāl food supply chains can offer the input needed to optimise current construction supply chains.

Design/methodology/approach – The paper adopts an integrative general review of the academic literature pertaining to the British construction sector, construction SCM, ḥalāl food supply chains, ḥalāl assurance, and control processes. The extensive literature review is crucial as it will enable introducing '*ḥalāl*' to construction SCM; hence, *ḥalāl construction supply chain management* ('ḤCSCM'). ḤCSCM will then be applied to one of the most recent British-construction-SCM systems to identify how ḤCSCM can complement existing systems.

Findings – The findings indicate that ḤCSCM can further alleviate the complexities thwarting the British construction sector on a supply chain level. This is attributed to ta'rif's tailored identification and traceability processes, iltizām's cross-lateral monitoring processes, and istiqāmah's Shari'a-compliant, assured, and verifiable certification system, all of which complement the existing construction supply chain assurance and control processes in the UK.

Originality/value – The conception of ḤCSCM promotes an untapped area in the academic literature. Academicians and practitioners can transplant ḥalāl principles from the ḥalāl food manufacturing sector into the British construction sector — similar to how construction SCM was founded by principles originating from the manufacturing industry. This paper highlights the shortfalls of construction SCM in British construction supply chains and propounds how ḤCSCM can resolve them.

Keywords – ḥalāl construction supply chain management, ta'rif, istiqāmah, iltizām, assurance

Paper type – Conceptual paper

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1. Introduction

SCM has proven to positively influence, what the [Latham \(1994\)](#) Report deemed, an adversarial, ineffective, and fragmented British construction sector ([Pryke, 2020](#)). Despite SCM's successes, many criticise it for lacking a relational and human dynamic ([Ferne and Thorpe, 2007](#)). Fortunately, ḥalāl SCM can enrich construction supply chains by promoting the missing dynamic aforesaid. Although nobody in the UK is legally bound by a ḥalāl standard, let alone Sharī'a, people are free to abide by any moral and ethical code insofar as such adherence does not contravene the UK's laws ([El Daouk, 2021](#)). In the case of Sharī'a, the essence of the Islamic dogma is vested in the Qur'ān's authority being paramount, guiding every aspect of a Muslim's life, ultimately rendering what is lawful ('ḥalāl') and unlawful ('ḥarām') ([Kamali, 2017](#); [Doi, 2007](#)). Per se, ḥalāl consolidates what is permissible and acceptable ([Wilson and Liu, 2011](#)).

Whilst ḥalāl has become a convenient label associated with consumption, the Qur'ānic principles underpinning it are transferrable beyond the food sector into other mu'āmalāt ('transactions') such as those applicable to the practice of construction and construction SCM ([Rashid et al., 2017](#)). Mu'āmalāt, in a construction supply chain context, applies the concepts of moral obligation, impartiality, liability, and parity ([Rashid et al., 2019](#)). Ḥalāl SCM too applies such concepts, enabling the alleviation of the British construction sector and its underlying supply chains' complexities. At first, ḥalāl construction supply chains might strike as recondite because of the novelty of complementing construction SCM with Sharī'a. Yet, the conception of ḤCSCM can reduce the non-proactive substance in construction SCM by integrating ḥalāl standards on mu'āmalāt, particularly those which enshrine qualitative, verifiable, and virtuous ideals ([Arif and Sidek, 2015](#)).

When transplanted from the food sector into the construction sector, ḥalāl entails delivering products that are safe to use and that have undergone the utmost levels of due diligence, inspection, and assurance to certify continuous Sharī'a-compliance and quality control. This paper opines that ḤCSCM can resolve the common complexities pervading the British construction sector and construction supply chains. Thus, the primary aim is to conceptualise ḤCSCM by conveying how ḥalāl control, assurance, and verification processes can complement construction SCM. To achieve the research's primary aim, three research objectives must be satisfied. The first research objective is to provide a broad and holistic literature review addressing all aspects of the history, benefits, and problems concerning British construction supply chains, construction SCM, and the construction sector. The second research objective is to propound the conception of ḤCSCM, and how it can potentially alleviate the complexities in construction SCM. The final research objective is to analyse where and how ḤCSCM can complement existing British construction supply chain processes to offer potential solutions to the construction sector's complexities.

2. Problem Statement

2.1 The British construction sector: history

During Early Modern Britain (16th–18th centuries), the need to form the British navy, revamp British military infrastructure, and rebuild London following the Great Fire devolved the singular roles of practitioners in the construction sector, enabling other roles such as the architect to emerge ([Bowley, 1996](#)). This devolution in time distinguished architects, engineers, and quantity surveyors from one another. Following the Second World War, large-scale construction took place across new and existing specialisms. Soon, it became impossible to perform building processes individually, paving way for the emergence of distinct building practices and building associations ([Walker, 2007](#)). Fraternal culture thrived in these

associations, eventually resulting in the fragmentation of the British construction sector (Arthur, 2020).

The British construction sector's shortfall did not go unnoticed; as early as the 1940s, Simon (1944) criticised the sector for being too traditional and individualistic, recommending a more collaborative approach involving practitioners from the outset. This narrative was in one way or another relayed in subsequent reports, from Simon (1948), all the way to Egan (1998) (Philips, 1950; Emmerson, 1962; Banwell, 1964; Tavistock, 1966; Wood, 1975; Latham, 1994; Fraser, 2004). Unfortunately, many of the above recommendations are yet to take effect (Pryke, 2020; Pryke, 2012). From these reports, the overarching sentiment is that fragmentation and uncertainty overwhelm the sector's interrelations, emphasising the need for improved efficiency, cooperation, coordination, and control procedures (Wild, 2001). Thus, the modern UK's inheritance of such a sector in a hypercompetitive and ever-changing world has led to an inherently complex sector (Papadonikolaki, 2016).

Landmark construction projects, such as London Underground and Holyrood Parliament, have ignominiously highlighted the inefficacy and feebleness of the construction sector (El Daouk, 2020; Briscoe *et al.*, 2004; Fraser, 2004; Chan *et al.*, 2003). The former ended with extravagant cost overruns and delays, while the latter failed before ever starting, costing well over its originally predicted price. This has rendered the British construction sector impervious to overcoming traditional practices; for example, a lack of supply chain actors' proactive consideration of the supply chain's processes, and such processes' final consumption or use by the client (Aneesa *et al.*, 2015). Construction projects are often one-off, value-oriented, temporary organisations that culminate with the delivery of products in the form of built structures (or 'buildings') (Bakker, 2010). Their temporary and competitive nature often undermines relationship-building among practitioners and thwarts collaborative teamwork, resulting in a highly adversarial environment.

2.2 *Emergence of construction SCM*

Construction SCM emerged from this dynamic to tackle the construction sector's complexities. It also focused on mustering strong relationships and organisational systems such as: partnering (Vrijhoef and London, 2009; Egan, 1998); strategic interdependent governance (Morledge *et al.*, 2009); efficiency; and lateral integration (Aloini *et al.*, 2012). As well as this, the contemporary complexities of the British construction sector have become more complicated because of rapid changes in building practices (Azambuja and O'Brien, 2009). Winch (1998) attributed these complexities to the sector's interconnectedness, unpredictability, and end-user orientation (Nam and Tatum, 1992), meaning that they can simply emanate from a lack of good relationship building with a project's client, contractor, and supply-chain actors (collectively, the 'relevant parties') (Mitchell, 2009); processual complexity (Gidado, 1996); technical complexity (Dulaimi *et al.*, 2002); and transitional complexity (Chien *et al.*, 2014).

2.3 *Existing problems in supply chains relating to assurance, quality, and control processes*

Research has shown that construction supply chain problems are at the forefront of reasons why construction is ineffective (Vrijhoef *et al.*, 2001). Particularly, these problems emanate from the interfaces of different supply chain actors and functions. Construction SCM has shown that treating the construction supply chain as an integrated value-generating chain, rather than a chain consisting of individual activities, is the way to overcome these complexities.

A key issue Vrijhoef (1998) outlines is that there have been numerous attempts at reorienting supply chains in this direction, but with little success. The overarching problems

preventing success have stemmed from an inability to precisely realise client requirements, and the inability to adapt when client requirements change. Another overarching issue is the inaccuracy and lack of congruity between information provided during the preliminary stages of the supply chain up until the completion and delivery of the final product to the customer. In addition, the lack of human input resulting from highly autonomous systems has quashed the ability to tailor the supply chain's orientation, preventing it from delivering optimally according to required plans, contracts, designs, and quality standards.

Additionally, wastage is often caused by supply chain actors' individualistic and myopic practices that fragment the supply chain's functions. This can be summarised through the works of [Higgin and Jessop \(1965\)](#) who concluded that the lack of cohesion in supply chains falls largely on factors that are beyond the reach of individual supply chain actors and functions. Instead, such factors are within the reach of what can govern the supply chain *in toto*. All these examples highlight a need for a common set of values and control processes that need to be implemented through both autonomous and human means. On top of this, [Vrijhoef and Koskela \(2000\)](#) indicate a bigger problem thwarting the chances of overcoming these obstacles. They indicated that the structural and mental implications caused by supply-chain discordances have rendered supply chains innately incapable of overcoming their shortfalls.

[Zeng et al. \(2018\)](#) identify quality management as the key issue resulting in supply chain discordances. They attribute poor quality management to the fragmentation of the supply chain process from its outset where SCM functions are being commissioned separately, up until delivery where SCM functions are separately suspended. Construction supply chains remain problematic in the British construction sector despite all the solutions identified above. Taking all these into account, the overarching issue lies with having a *mutually reinforcing system* based on *mutually reinforcing principles* from the start to the end, verifiable by both supply chain actors and an overwatching authority, all within a recognisable code of moral and ethical conduct. This paper takes the position that there is a need for a holistic and binding code of conduct to vitalise all the aforesaid — something which HCSCM can bring.

3. Methodology

This paper adopts an integrative general review of the academic and professional literature covering the British construction sector, construction supply chains, SCM, and ḥalāl supply chains. Given the conceptual nature of this paper, the methodology will provide an overview and amplification of the literature relevant to the subjects needed to propound HCSCM as a concept. Subsequently, HCSCM will be synthesised in the context of construction SCM. As such, the methodology is appropriate enough only by the amplification of the literature review. For the purposes of this paper, despite ḥalāl generally concerning consumption, ḥalāl will encapsulate the Sharīʿa-observant use and utilisation of products and services in the context of construction SCM, encapsulating Sharīʿa-compliant standards, traceability systems, verification methods, and assurance processes that can be transferred from ḥalāl food supply chains, which are consumption-oriented, to construction supply chains, which are more product/service-oriented.

4. Construction SCM

4.1 Definition and purpose

Defining construction SCM, let alone SCM, is easier on paper than in practice ([Lambert et al., 1998](#)). The concept is shrouded by a nonuniform definition ([Chen and Paulraj, 2004](#)). However, to the best of academic knowledge, SCM involves the repetitional management of a network

of firms, collectively delivering the resources needed to execute the project (Harland, 1996). Construction SCM is the repetitive and *ad-hoc* management of money, information flow, materials, labour, and equipment (Arbulú, 2009; Cox and Ireland, 2002). Construction SCM's existence in the construction sector is owed to the manufacturing sector, whence it came from during the 1990s (Papadonikolaki, 2020). The orientation of construction supply chains is mainly integrative and adapted from manufacturing practices (Dulaimi *et al.*, 2002). Such an adaptation stems from project practitioners wanting to stimulate efficiency and strategically manage the non-contractual relationships of all building practitioners (Morledge *et al.*, 2009).

Construction SCM has the following functions: [1] the integration of the construction site with the supply chain by managing the relevant parties' interrelationships; [2] the delegation of on-site construction processes to the supply chain through prefabrication; and [3] the adaptation of the construction supply chain to the project's specificities by reconfiguring on-site and supply chain interfaces (Vrijhoef and Koskela, 2000). Thus, construction supply chains can be seen as systems that manage interfaces between building processes, humans, firms, materials, and technologies (Kahraman and Oztaysi, 2014).

Although some favour enhancing interfaces via integration (Papadopoulos *et al.*, 2016), it is unclear whether construction SCM can bring about such an enhancement (Hong-Minh *et al.*, 2000). Khalfan *et al.* (2010) found two strands subsisting within supply chain networks: the logistical management of supply chain partners (and their corresponding resources) and the efficacious management of construction production processes (Arthur, 2020). Irrespective of which strand precedes the other, Figure 1 illustrates how construction supply networks that incorporate SCM (as seen in 'Supply Chain 2') are better coordinated, delivering processes more efficiently than those that do not (as seen in 'Supply Chain 1'). This cuts costs, saves time, and delivers according to specifications, strengthening relations between all the relevant parties.

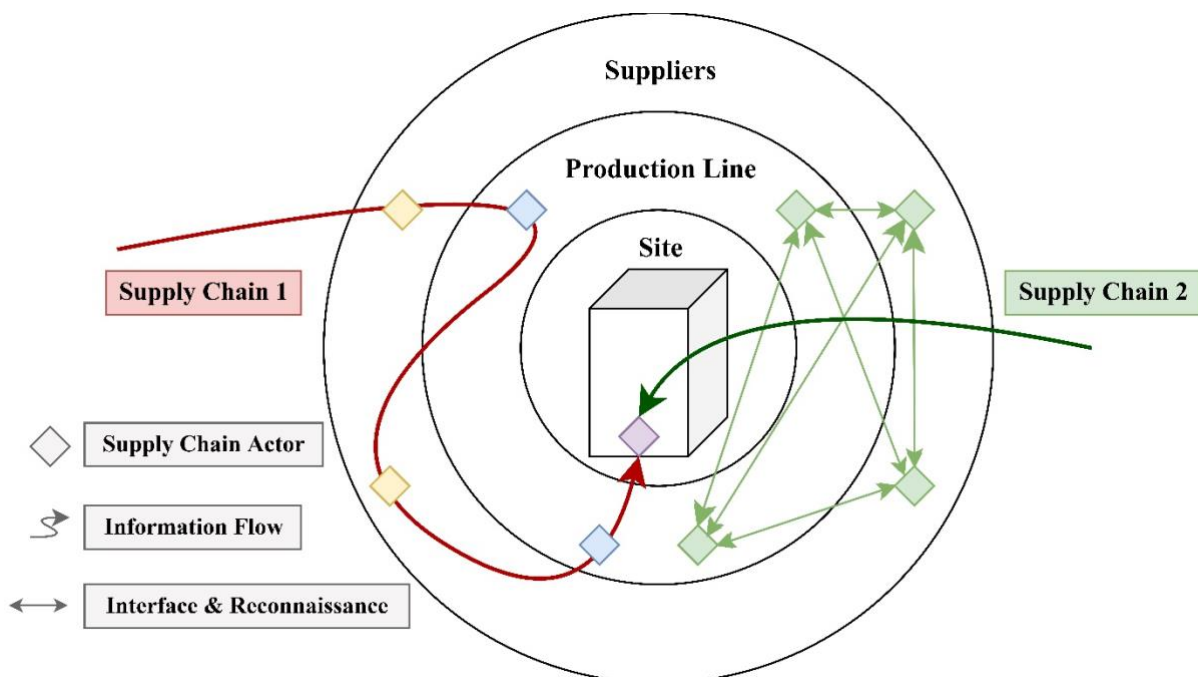


Figure 1. Effect of SCM

4.2 Merits

Construction SCM builds strong and versatile relationships that allow suppliers to conjointly create value, ultimately benefitting themselves and the relevant parties. In the long term, this improves a supply network's responsiveness, enabling project practitioners to perform better on the construction site (Horvath, 2001) and manage the project more holistically (Love *et al.*, 2005). The essence of this dynamic is a well-versed construction supply network enjoying competitive differentiation from other supply networks (Pryke, 2009).

In the process of maintaining a competitive edge, construction SCM pushes suppliers to coordinate and uphold internal and external client focuses (Murray *et al.*, 1999; O'Brien and Fischer, 1993). By cementing integration and competitiveness at the heart of the construction supply chain, suppliers collectively become optimal performers, self-committed, and incentivised beneficiaries of the supply chain (London and Chen, 2006; Agapiou *et al.*, 1998; Egan, 1998). In turn, this corresponds to trust, high profitability, conjoint bulk performance, and self-evaluation (Green and Lenard, 1999; Cooper and Ellram, 1993).

Once implemented correctly, construction SCM can yield repetitive quantifiable rewards irrespective of the project's complexity (Al-Kharashi and Skitmore, 2009; Chan and Chan, 2004; Chan and Kumaraswamy, 1997; Mansfield, 1994). The self-sustaining dynamic of construction supply chains provides the financial means for clients to incentivise managing the construction supply chain network and transforming the client role. At this stage, the client becomes a buccaneering risk-taker who brings life to the supply chain (Denicol, 2020).

4.3 Limitations

Oppositely, several academics and practitioners have given discountenance to construction SCM from various perspectives (Fearne and Fowler, 2006; Jahre and Fabbe-Costes, 2005; Bask and Juga, 2001). Some believe it pegs information flow to one focal point, in turn, thwarting competition (Cox and Ireland, 2002). Additionally, the concept's primary function in construction practice is elusive (Briscoe and Dainty, 2005). Also, the concept is yet to receive a narrow, clear, and well-studied definition (Aneesa, 2015; Green and May, 2003; Jones and Saad, 2003; Winch, 2003; London and Kenley, 2001). Critics also highlight the lack of human relations and agency. The focus tends to shift towards building relations based on the aligned interests of firms rather than the collective interest (Fernie and Thorpe 2007).

Moreover, critics have further discountenanced construction SCM because construction supply chains remain succumbed to the desultory traits that pervade the British construction sector. For example, construction SCM has not been able to overpower the adversarial nature of construction practices (Pryke, 2009). Although clients have displayed an inclination towards taking a collaborative stance with their contractors, they have failed to maintain such endeavours for extended periods (Smyth and Pryke, 2008).

5. Halāl SCM

5.1 Halāl SCM in the food sector and in the context of this paper

Halāl SCM is a concept that re-appends conventional SCM to reap its benefits in a Sharī'a-compliant manner. It has momentarily promoted halāl's outreach and ensured its integrity in products and services (Ibrahim and Mokhtarudin, 2010; Lada *et al.*, 2009). Halāl food supply chains have been a critical setting-point from where halāl SCM has been measured and gauged. Halāl food means that the final consumable product was produced in adherence to Sharī'a, which is required to satisfy the spirituality and lifestyle of the consumer/client (Tieman, 2011). In the food sector, halāl principles are mandated by primary Islamic law — i.e., the Qur'ān and

the Sunnah (Mohamad, 2005; Hussaini, 1993). Every produce and conduct are deemed ḥalāl until rendered ḥarām by Sharī‘a (Khan *et al.*, 2019; Wilson, 2012).

Islamic law mandates Muslims to consume what is wholesomely ḥalāl; thus, the extent to which an item is ḥalāl *matters a lot*. This is known as *ḥalāl integrity* which sheds a light on the ‘ḥalāl-fullness’ of every substance, procedure, and finalisation of a ḥalāl product; thus, guaranteeing products are permissibly consumable (Tieman, 2011). *Qua* ḥalāl integrity, ḥalāl trust marks and logos have been tagged on ḥalāl products to make consumers aware that the chosen product is fit to consume (Cheng, 2008). However, ḥalāl trust marks might not necessarily reflect the *ḥalāl-fullness* of how the product came about in whole, which requires more assurance and transparent qualitative methods of ḥalāl certification (Ali *et al.*, 2021; Hosseini *et al.*, 2019; Ab Talib *et al.*, 2015; Wilson, 2014).

Ḥalālan tayyiban corresponds to the *wholesomeness* of ḥalāl food (Khan *et al.*, 2019). The goal of ḥalālan tayyiban is to promote and embellish moral, spiritual, and human values in the process of supplying food (Arif and Sidek, 2015). From this perspective, Sharī‘a compliance is required throughout the product’s lifecycle, from its inception up to its consumption by the consumer. Thus, every aspect relating to a product’s existence must pertain to ḥalāl standards and reflect ḥalāl assurance (Neio Demirci *et al.*, 2016). In addition, the product and its underlying elements must not bear substances that may prove fatal, hazardous, poisonous, and intoxicating to the human body — in other words, it must be free of seriously unhealthy substances (Alzeer and Abou Hadeed, 2016).

Yet, ḥalāl SCM is not limited to the realms of the food sector *per se* because the Islamic principles that muster it apply to every aspect of life. Alserhan (2010) highlighted the relevance of ḥalāl in general services, apparel, accessories, finance, and even medicine (Kasri *et al.*, 2021; Atal *et al.*, 2020; Iranmanesh *et al.*, 2018). Thus, ḥalāl affects all mu‘āmalāt, ranging from corporate to cultural, organisational, and managerial mu‘āmalāt (Wilson and Liu, 2010). In the context of this paper, ḥalāl refers to the permissible and Sharī‘a-compliant verification and assurance processes that can be transferred from ḥalāl food supply chains to construction supply chains. Whilst ḥalāl generally connotes consumption of ḥalāl food, the Sharī‘a principles that facilitate the ḥalāl standard, from the food supply chain’s inception to completion, are also transferrable to construction supply chains. For that, not only does ḥalāl encapsulate the same Sharī‘a-compliant standards, traceability systems, verification methods, and assurance processes that deliver ḥalāl food; it also encapsulates the same processes that deliver ḥalāl building materials, services, and products (Rashid *et al.*, 2019).

Hence, in a construction context, ḥalāl can be re-appended to promote construction supply chains that diligently deliver clean and safe building products and services that are considerate of Sharī‘a’s ethical, equitable, qualitative, and environmental standards. Like the food customer, the project client is guaranteed a product that is tailored to their needs all whilst the supply chain observes Sharī‘a and complies with the Islamic ‘aqd (Ar. ‘contract’) directing the entire production process. This stretches from the raw materials’ input, through the product/services’ final use in the construction project, and up until the utilisation of the delivered project by its end users.

5.2 *Ḥalāl integrity and ḥalāl supply chain implementation*

There are key supply chain procedures essential for maintaining ḥalāl integrity throughout the product’s lifecycle. The first procedure, usually at the inception of the product lifecycle, is to outline the substances and practices which are by Qur’ānic mandate ḥarām. In the case of food supply chains, this may be anything ranging from pork to intoxicants, carrion, and blood

(Regenstein, *et al.*, 2010). For example, consuming pork is strictly prohibited in Islām (Qur’ān, 2:173, 5:3, 6:145, 16:115). In the case of construction, procuring a product via usurious means or by using dangerous high-risk raw materials may also be rendered ḥarām owing to the financial and health risks posed to the end client.

The act of this early definition stage is what the author terms *ta’rīf*, (Ar. ‘project definition’). *Ta’rīf* defines the supply chain’s front-end to identify and rule out materials and anything that may contain, become, or lead to an outcome deemed ḥarām — whether that may be a health, physical, or moral nullity. The second procedure is to prevent existing ḥalāl processes from mixing with and incorporating ḥarām processes (Tieman, 2011). This is the commitment of suppliers to maintaining Sharī’a compliance and to deliver a ḥalāl product that is fit for purpose — all without having offended Sharī’a throughout the product’s lifecycle. The author terms this *iltizām* (Ar. ‘commitment’).

The third procedure is to ensure that the managerial and logistical human input used to produce the ḥalāl product does not bear ḥarām substance (Selim *et al.*, 2019). This can range from how the supply chain is financed, to how the supply chain actors are treated, how the ḥalāl products are stored, and how the products are delivered at their final stage before being sold or outsourced. In *fuṣṣha* (or ‘literal Arabic’), the term that conjoins compliance and integrity in each process is ‘*istiqāmah*’. *Istiqāmah* ensures the supply chain remains *mustaqīm* (Ar. ‘correct’ or ‘right’) until completion. *Istiqāmah* of ḥalāl products from their inception to their consumption is a good means to establish a mechanism ensuring holistic ḥalāl supply chains by virtue of retrospective and continuous ḥalāl assurance, traceability, and verification. Thus, ḥalāl SCM complements Sharī’a- integrity and compliance (Mohamad *et al.*, 2020).

5.3 Challenges

Ḥalāl SCM face challenges in guaranteeing ḥalāl product assurance, owing to how difficult they are to design, handle, and manage (Tieman *et al.*, 2012). The challenges can stem from uncertainty in the supply chain and/or consumers’ lack of knowledge of the ḥalāl product’s manufacturing process (Vanany *et al.*, 2019). These can be subdivided into: pre-emptive challenges (Kamali, 2010); credibility challenges (Bonne and Verbeke, 2008); and uncontrollable societal standards (Pointing *et al.*, 2008). It is generally accepted that Muslim consumers lack the information necessary — or are rather not given complete information — to know with absolute certainty what has occurred throughout the production, preparation, storage, transportation, and delivery phases of the ḥalāl product (Tieman, 2006; Bonne and Verbeke, 2008). Ḥalāl supply chains are becoming more complex with the increase in globalisation, technology, and competition, raising further concerns over ḥalāl integrity (Zailani *et al.*, 2010). Considering this, immediate cutting-edge solutions are needed to put ḥalāl integrity *on par* with the changes described above. Otherwise, such challenges can undermine and thwart ḥalāl assurance processes to an extent where it would undermine the product’s ḥalāl-fullness *in toto*. In an illustrious sense, these challenges have enshrouded an already shrouded ḥalāl supply chain, making ḥalāl product assurance significantly harder to uphold than in times past (Abdul *et al.*, 2009).

Ḥalāl credibility is paramount to the consumer, or else there would be no use to having the product in the first place. The susceptibility of such credence demands a transparent and proactive approach to constantly revise and reassure ḥalāl integrity. However, ḥalāl credibility is expensive to maintain and rectify, making ḥalāl supply chains innately susceptible to consumer doubt (Havinga, 2011; Kamali, 2010). Save the aforesaid, managing and maintaining ḥalāl supply chains are also costly undertakings. There is a constant need to balance between

global change and the supply chain's *istiqāmah*. These challenges cannot be resolved using conventional methods (Tiemān *et al.*, 2012). Instead, a strictly Sharī'a-compliant but flexibly versatile approach is needed to satisfy consumer requirements whilst upholding ḥalāl product assurance and being able to adapt to the ever-changing world.

6. Conception of ḤCSCM

6.1 Definition and scope of ḤCSCM

ḤCSCM is the Sharī'a-compliant flow management of construction-project related resources, processes, and the network of firms executing them, from the conception of a project until its final delivery to the client. ḤCSCM encompasses the Sharī'a compliance and integrity of both vertical and horizontal supply chain processes, through three operational procedures: *ta'rif*, *iltizām*, and *istiqāmah*. The relay of information in ḥalāl construction supply chains is at the heart of maintaining ḥalāl integrity because it helps identify the specific points at which a supply chain process may cease to be ḥalāl, and therefore, ḥarām. Figure 2 illustrates how ḤCSCM complements and optimises conventional construction supply chain processes.

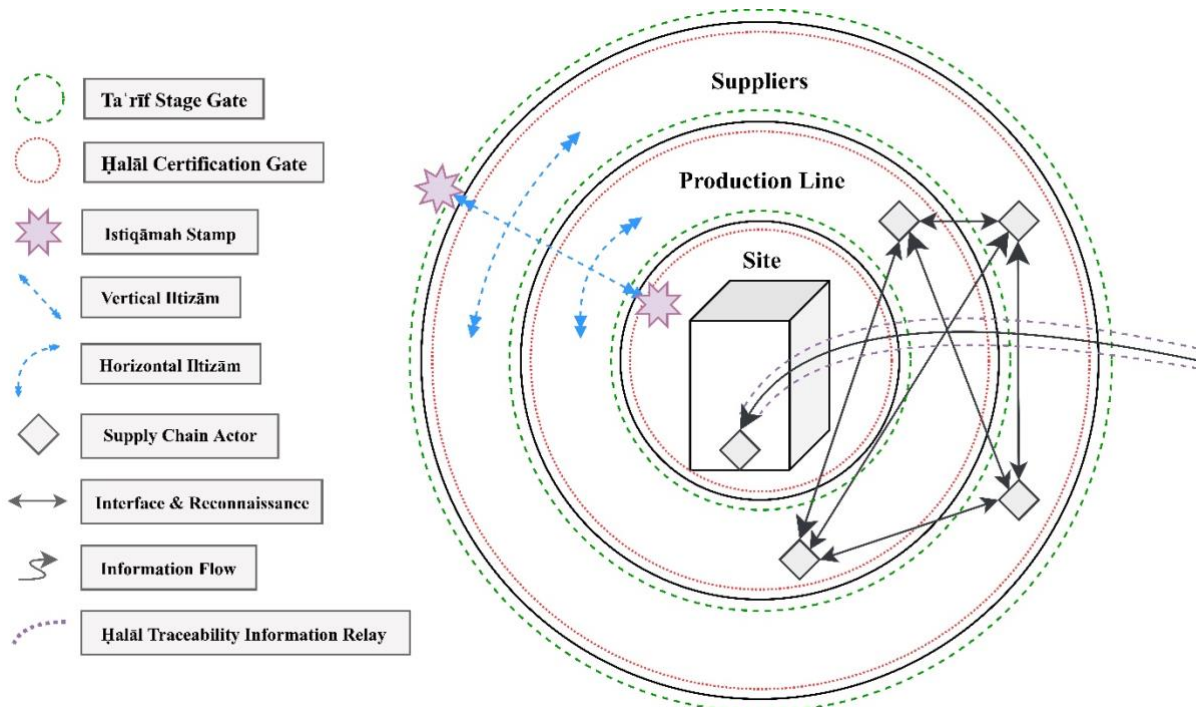


Figure 2. ḤCSCM's unique attributes

Five principal attributes differentiate ḤCSCM from both construction SCM and ḥalāl food SCM; these are the: –

1. use of a ḥalāl-tracing log to track, manage, and provide the client with information of each process in the supply chain and project — this enables ḥalāl traceability information relay;
2. replacement of project *stage gates* (Grönlund *et al.*, 2010) with *ta'rif stage gates* — this enables front-end definition during each stage;
3. use of ḥalāl certification to certify each stage of the supply chain rather than certifying only the final product;
4. implementation of cross-lateral inspections via *iltizām*; and
5. the permanent *istiqāmah* stamp at the end of the product's lifecycle.

To implement these, there need be pre-arranged agreements between the *supply chain's coordinating authority* ('SCCA') and the relevant parties. The contract would stipulate the

ḥalāl standards and the *conduct of Shari‘a compliance* (‘CSC’) required to honour them. The first step in promoting trust among the relevant parties is when a SCCA is elected, which promotes consensus among supply chain actors.

6.2 *‘Aqd*

The contract is critical for outlining the terms and conditions that will effectuate ḤCSCM. In the UK, Shari‘a is not recognised as a binding legal system; therefore, Shari‘a principles can be effected by contract insofar as the relevant parties apply them out of goodwill and that such principles do not breach the law (El Daouk, 2021). Alternatively, they can use legal terminology that corresponds to Shari‘a principles such as *alternative investment bonds* for *ṣukūk*, which is a legally recognised term. The contract is also essential for implementing Shari‘a’s requirement for kinship. The Qur’ān states that “*the believers are but brothers, so make settlement between your brothers. And fear Allah that you may receive mercy*” (Qur’ān, 49:10). Positive behaviour and collaborative stances are at the essence of ḤCSCM. The contract can stipulate these by mandating fair risk management and less contentious dispute resolution methods, such as reconciliation. To further implement collaboration, the contract should also incorporate an incentivisation mechanism such as a *murābahah*-based subcontract. Other methods can include financial incentivisation by the client and good workmanship by the relevant parties. Rewards are measurable against completing work under time and cost. Hence, the Shari‘a-enshrined contractual element of ḤCSCM alleviates the adversarial nature of project practitioners through equity, moral will, and incentivisation. The enshrinement of fair, ethical, and incentivised contracts is something that the British construction sector welcomes, as seen in Fraser (2004), but is yet to take full effect.

6.3 *Ta‘rīf*

Ta‘rīf is a horizontal supply chain procedure, which emphasises defining the construction project, and how it will be devised in a Shari‘a compliant manner. It takes effect before procuring the initial suppliers, during the production line, and once the supplies are utilised on-site, making it a prerequisite to ḥalāl certification before a process can proceed to the next one. At the outset, the SCCA will then launch an online ḥalāl-tracing log or registry (accessible to the relevant parties) that holds a record of every action, document, liaison, and certification carried out therefrom. The log will track the information flow throughout the supply chain and index it to quantify each action taking place. Ta‘rīf improves project stage-gates (Grönlund *et al.*, 2010) which originally required an amount of knowledge to accrue before parties can transit to the next project stage, often leaving out the supply chain unconsidered. *Ta‘rīf stage gates* require both retrospective knowledge and reconnaissance to accrue to transit throughout the supply chain (and the building project). To do this, ta‘rīf requires the relevant parties to plan the feasibility of the supply chain, in addition to an equitable risk plan to have the best course of action where something goes wrong. The retrospective element here requires a manned monitoring person from the SCCA to continuously monitor the supply chain.

The first phase of ta‘rīf is called the *knowledge phase*, which requires an early bill of quantities to itemise the resources, suppliers, and labour needed to execute the project from the start of the supply chain until the full completion of the project. The second phase is the *reconnaissance phase*, in which an efficient, economical, and low-risk critical path for the supply chain must be found. Ta‘rīf is important because it mitigates as much uncertainty as possible upfront by itemising and quantifying the time, cost, and ḥalāl quality of the supply chain and the project, which is a CSC. This overcomes the pre-emptive design and managerial challenges associated with both ḥalāl food and conventional construction supply chains.

Implementing taʿrīf by satisfying both phases would ensure ḥalāl integrity with great certainty at the supply chain's front and back ends, relieving the credibility issues raised in supply chains. This enables the supply chain to be effectively managed by the SCCA, reducing inefficiency, and increasing integration; thus, alleviating the inefficacy associated with construction SCM and the British construction sector.

6.4 *Iltizām*

Once taʿrīf has been effected, the SCCA can implement iltizām, a cross-lateral process that ensures horizontal and vertical processes are being carried out in accordance with the approved plan. An example of a horizontal process is gathering calcium aluminates, calcium silicates, and water from suppliers. The vertical stage will be when these resources are passed to the production line to produce cement, which in turn will be transported on-site. Iltizām requires that no supplies, or the means through which they are acquired (such as interest-bearing loans), are ḥarām. The SCCA is required to observe the cross-lateral processes and approve anything that is ready to move to the next supply chain stage by way of traceable ḥalāl certification. The nature of iltizām is a proactive one, whereby the SCCA is entrusted by the relevant parties to impartially, meticulously, and Sharīʿa compliantly manage the supply chain to the best of its ability, bolstering trust and certainty. Both ḥalāl food and construction supply chains tend to lack proactive management because of the supply chain processes' structure, and the lack of information.

The compound effect of taʿrīf, followed by iltizām, ensures a responsive management of the supply chain that has strict records of how the project is executed. In addition, iltizām rewards suppliers for under-time and under-cost completion of tasks. The incentivisation of supply chain activities entices suppliers to work harder, cooperate, and find conjoint efforts to work more effectively to reap their joint rewards. Ultimately, these mechanisms alleviate fractured and self-individualistic attitudes. Incentivisation also transforms transactional attitudes to relational ones, whereby relevant parties focus on transacting with a view for a collective profit; not an individual one. Contemporary supply-chain performance measurement systems are cost-focused and non-inclusive leading to systematic risks going unrecognised (Pryke, 2020; Tieman, 2011). Iltizām overcomes these limitations by appending performance to incentivised rewards, and by cross-laterally using the ḥalāl log and registration system to trace every activity; hence, a *mutually reinforcing system*.

6.5 *Istiqāmah*

Istiqāmah retrospectively traces the SCCA's log to confirm that past processes and upcoming processes concur with the approved Sharīʿa-compliant project plan (the taʿrīf). This enables istiqāmah to constantly review previous and current processes and log the results online with a provisional istiqāmah stamp with its unique identifier. The identifier gives access to the specific bi-product's history and its intended purpose. During the project and its supply chain, the stamp identifies to the client that everything, up to a specific given date, has been proactively revised for Sharīʿa-compliance purposes; thus, delivering transparent and traceable ḥalāl project/product assurance. When things go wrong in ḥalāl supply chains, it is expensive to rectify and maintain the supply chain's progression and ḥalāl integrity concurrently because of poor traceability mechanisms. Istiqāmah traces the relevant processes involved in every activity incrementally, avoiding the challenges aforesaid.

Hence, when a mistake occurs, the SCCA can trace everything up until the activity's error and know precisely what must be rectified without impacting the supply chain's critical path. The SCCA can also make the risk plan from the taʿrīf phase of avail to re-route the supply

chain to a temporary alternative path until the error is rectified. When the project is completed, a final and permanent *istiḳāmah* stamp is issued — it too having its own identifier. In addition, access to the *ḥalāl* tracing log is handed to the client and the project's beneficiaries; hence, *wholesome ḥalāl product assurance*. The permanent stamp's unique identifier should provide how the product was originally created, developed, and utilised in its final form.

7. Contribution of ḤCSCM

7.1 UK systems used to resolve supply chain problems

One initiative that has been introduced to combat the problems in supply chains, assurance, and control processes, as outlined in the Problem Statement is the British Standards Institution's ('BSI') Identify (BSI, 2022). This assurance and control system puts safety and customer risk at the forefront of its objectives, aiming to provide an interoperable system comprising of a digitised product verification and identification service. BSI Identify is the only programme of its kind that can currently issue manufacturers with unique and individual construction product identification numbers using a digital object identifier ('DOI') and a universal persistent identification number ('UPIN').

BSI Identify comprises of five key stages to deliver its overall system. First, BSI Identify acquires an idle UPIN, which is subsequently made available for issuance to supply chain actors. The second stage entails issuing the supply chain actor their UPIN. This is a unique, durable, and trackable identifier that will be identifiable throughout the supply chain, and after it is incorporated into its final structure or service (BSI, 2022). The assigned UPIN is then stored in BSI Identity's registry where the unique identifier will permanently last. Thirdly, supply chain actors can use their UPIN to label their products. Lastly, supply chain actors can refer others to their specific roles and products by sharing their UPIN using RDID, QR, or NFC codes, enabling consumers and construction project practitioners to access the product's information and updates to source any relevant information they may seek.

7.2 Drawbacks and how ḤCSCM can complement existing processes

BSI Identify is a well thought and designed control process incorporating cutting-edge identification systems (BSI, 2022). Despite this, the lack of proactive human input and a unified set of ethical mindset and conduct can even render products such as BSI Identify discordant with the needs of contemporary construction supply chains (Vrijhoef *et al.*, 2001). Unlike *ta'rif*, the system lacks a mechanism that predefines where a product will be outsourced to and provides no prerequisites concerning matters of health and safety requirements, other than those set out the by the government. This thwarts the ability to tailor identification and traceability processes to the specific needs of the client or project at hand. Therefore, quality, price, and speed are goals that cannot be optimally prioritised.

BSI Identify helps in maintaining reconnaissance throughout the supply chain laterally by ensuring that the tagged product is being used as originally intended and remains on its designated tracks. However, it does not offer a cross-lateral process like *iltizām*, impeding the supply chain from a holistically integrated compliance system. Upon the product reaching its completion, BSI Identify maintains a record of the product; however, this solely relies on the supply chain actor taking initiative to revise and update their records. This does not guarantee that the register will always have the most recent and accurate information. As such, it does not offer *istiḳāmah*'s proactive retrospective log, which assures a continuously updated and verified identification registry by both the supply chain actor and the SCCA.

Overall, BSI Identify is a very good system. However, as outlined in the Problem Statement, there yet remains a lack of a mutually reinforcing system... a limitation epitomising

the complexities faced by the British construction sector externally and the assurance, quality, and control complexities within construction supply chains internally. In addition to the aforesaid, Sharī‘a, as a life-encompassing source of guidance, promotes recognisable, ethical, and moral codes of conduct that are not available in conventional processes. Although the UK is a secular nation, the nation has generally become aware of basic Sharī‘a principles, and this can be seen in the UK’s finance and property laws which indirectly refer to Islamic forms of transactional contracts and arrangements (El Daouk, 2021). Considering that, the construction sector, like the food, finance, and legal sectors have not been averse towards Sharī‘a principles insofar as it does not contradict UK laws. Therefore, ḤCSCM is not necessarily a concept that would strike as recondite to the British construction sector.

8. Conclusion

8.1 Synopsis

This paper conceptualised ḥalāl SCM in the context of construction by highlighting the positive contributions that ḤCSCM can make to the British construction sector and its supply chains. This has been conveyed through an extensive review of the academic literature on the British building sector, construction SCM, and ḥalāl food SCM, integrating the three topics to draw common problems that are yet to be alleviated, and finally applying ḤCSCM in a theoretical form to conceptualise how it may resolve the complexities. Concurrently, this paper conceptually highlights how construction SCM can benefit from ta‘rīf, iltizām, and istiḳāmah in future practice. The paper also offers an insight into the most up-to-date processes used to enhance British construction supply chains, and how ḤCSCM can further optimise such processes through the newly propounded ta‘rīf, iltizām, and istiḳāmah models.

8.2 Contribution and theoretical implications

This paper contributes three new theoretical concepts to ḥalāl SCM: ta‘rīf, iltizām, and istiḳāmah. These three concepts were derived from resolving the inconsistencies found in the British construction sector, construction SCM, and ḥalāl food SCM, as demonstrated in the extensive-integrative literature review. These three concepts also complement the positive attributes of ḥalāl food and construction SCM; thus, highlighting the two-way contribution that ḤCSCM, and its versatile processes, can bring to existing supply chains. The underlying contribution of this study is showing the reader that most problems associated with supply chains can be resolved by improving and adapting existing processes to contemporary needs. An example exhibited was ta‘rīf stage gates’ capitalisation on conventional project stage-gates. This paper also contributes an unusual perception of ḥalāl SCM from a construction perspective, which may entice scholars to verify, annul, or expand on this paper’s theories.

8.3 Limitations and future research

The limitations of this paper lay the foundation for future research. In light of COVID-19, it was difficult to interview suppliers and project practitioners to back up the benefits of the concepts theorised. Thus, the research was based on existing literature on supply chain from JIMA and other scholarly sources, the author’s knowledge in supply chains, and the author’s experience in applying Sharī‘a in the UK, all of which may not necessarily grasp the reality of implementing ḤCSCM in the turbulent British construction sector. The paper highlighted the benefits of ḤCSCM without delving into its drawbacks. Having conceptualised ḤCSCM, the first logical port of call for future research is to study ḤCSCM, and empirically/qualitatively validate its merits and drawbacks against other existing systems and processes. Lastly, ta‘rīf,

iltizām, and istiqāmah, as conceptualized from the extensive-integrative literature review can be empirically tested and commissioned to gauge their practical use in SCM.

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About the author

Mohamad (Muḥammad) El Daouk, LLB, LLM, MSc (Lond), is a Doctoral Candidate in Land Economy and Property Law at the University of Cambridge. He is also an Associate Tutor of the University of East Anglia in International Construction Law and Dispute Resolution. Muḥammad is the corresponding author and can be contacted at: me477@cam.ac.uk.