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THE NECESSITY AND OPPORTUNITY FOR UPGRADING QUANTITY SURVEYING PRACTICES BASED ON THE LESSONS LEARNED DURING THE COVID-19 PANDEMIC: A LITERATURE REVIEW

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ABSTRACT

The COVID-19 pandemic has posed significant challenges to the global construction industry, yet it has presented unprecedented opportunities for adaptation and improvement. This literature review explores the necessity and opportunity of upgrading quantity surveying practices in response to lessons learned during the COVID-19 pandemic. The study delves into the impacts of COVID-19 on the construction sector, highlighting challenges such as project delays, workforce reduction, and supply chain disruptions. Conversely, it identifies opportunities for innovation and resilience, including the adoption of new technologies and flexible working methods. Specifically focusing on quantity surveying practices, the review examines how contractual arrangements, project cost control, and site visits have been affected. Through a meticulous analysis of the literature, the study reveals a pressing need to enhance quantity surveying competencies and embrace digitalisation to navigate future uncertainties effectively. The findings underscore the importance of aligning quantity surveying practices with emerging industry trends and technological advancements to ensure project success and resilience. This study contributes to the knowledge base by shedding light on the necessity and strategies for upgrading quantity surveying practices in response to the lessons learned from the COVID-19 pandemic. Industry practitioners are encouraged to prioritise the evaluation and enhancement of quantity surveying practices to adapt to the evolving demands of the construction landscape. Further, this study is recommended to explore practical approaches for implementing upgraded quantity surveying practices in real-world contexts.

Keywords: *COVID-19 Pandemic; Lessons Learned; Opportunities; Quantity Surveying Practices.*

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1. INTRODUCTION

World Health Organisation (2023) in 2019 declared the outbreak of emergence of Corona Virus Disease 2019 (COVID-19) as a pandemic. Hence, the COVID-19 pandemic has created a global health crisis that has disrupted all industries including the construction industry (Hatoum et al., 2021). This had a significant impact on the progress of multiple industries and the global economy including multiple challenges to the construction industry in both developed and developing countries (Iqbal et al., 2021). Due to the extended duration of construction projects, crises are frequently encountered (Mhaske & Khandekar, 2016). Additionally, the high initial capital investments required make construction companies particularly vulnerable to crises (Fadhil & Burhan, 2021).

The construction industry has faced numerous challenges including project termination, labour impact, job loss, time overrun, cost overrun, and financial loss (Gamil & Alhagar, 2020; Likitha et al., 2023), cancellation or delay of contracts and supply chain shortages (Karimi et al., 2022), employee workforce reduction encountered difficulties in completing project deliverables within the schedule (Ghandour, 2020), increase in claims and disputes in contractual formulas and caused low productivity and an inability to workforce mobility (Husien et al., 2021). Whereas challenges persist, Karimi et al. (2022) demonstrated that the COVID-19 pandemic presented a silver lining for construction companies, as it compelled them to adopt new technologies, increase productivity, build more manufacturing facilities and warehouses, create domestic job opportunities, and utilise advanced manufacturing technologies.

From the perspective of a Quantity Surveyor (QS), the COVID-19 pandemic led to several impacts on professional activities including contractual arrangements regarding project time completion and suspension, project cost control, claim arrangement and negotiations, and project tendering (Hansen et al., 2021). Furthermore, site visits for variation work valuation and interim payment valuation are the most affected practices whereas consultative services such as value management and advisory services were the least affected (Tan & Zainon, 2022). Further, Modiba and Harinarain (2024) highlighted those noteworthy impacts for QSs as alterations in work dynamics, modifications in site evaluations, increased instances of cost overruns, shifts in contract interpretation, and changes in the preparation of monthly payment certificates.

As QS has a crucial and definitive function that impacts project success (Eyiah-Botwe et al., 2015), there is a significant requirement to investigate challenges faced by QSs during the COVID-19 pandemic and there is an existing gap in the construction industry to evaluate upgrading quantity surveying practices. Therefore, a significant gap exists between industry requirements and available studies regarding the challenges faced by Quantity Surveyors (QSs) and the changes made to general quantity surveying practices during the COVID-19 pandemic. Furthermore, no research has yet explored the opportunities and necessity of upgrading quantity surveying practices based on lessons learned from the pandemic.

This study aims to review the necessity of upgrading the quantity surveying practices for the future, based on the lessons learned during the COVID-19 pandemic. To achieve this aim, four objectives have been set up i.e., (i) identify challenges and opportunities faced by the construction industry during the COVID-19 pandemic, (ii) identify lessons learned from the COVID-19 pandemic by the construction industry, (iii) review how the COVID-19 pandemic affected the quantity surveying practices, and (iv) identify the necessity and

opportunity to upgrade quantity surveying practices based on lessons learned from the COVID-19 pandemic.

2. METHODOLOGY

A substantial body of literature exists detailing the historical evolution on any subject highlighting its significant sources, which deepens the understanding of related key themes (Saunders et al., 2019). Further elucidating this point, Snyder (2019) emphasised that a thorough synthesis of the literature is crucial for establishing a study's theoretical foundations. Hence, this paper builds upon the findings of a comprehensive literature analysis to gain insight into lessons learned from the COVID-19 pandemic by the construction industry.

To summarise the findings, a meticulous assessment of the literature was undertaken. This involved a thorough literature review encompassing various sources such as books, reports, theses, journals, magazines, and conference proceedings. The purpose was to delineate challenges and opportunities faced by the construction industry during the COVID-19 pandemic, identify lessons learned from the COVID-19 pandemic, and identify the necessity and opportunity to upgrade quantity surveying practices. To ensure a comprehensive synthesis of the literature, search terms such as 'COVID-19 pandemic', 'Quantity surveying practices', 'Opportunities from COVID-19 pandemic', 'Lessons learned from COVID-19 pandemic' were meticulously filtered using prominent search engines including 'Scopus,' 'Google Scholar,' 'Emerald,' and 'Science Direct.'

3. RESULTS AND FINDINGS

3.1 CONSTRUCTION INDUSTRY AND COVID–19 PANDEMIC

The COVID-19 pandemic has forced social, cultural, and economic systems to adjust their routines, structures, and procedures (Rokooei et al., 2023). Furthermore, this had a significant impact on the progress of multiple industries and the global economy including multiple challenges to the construction industry in both developed and developing countries (Iqbal et al., 2021). Furthermore, Ogunnusi et al. (2020) mentioned the effects of COVID-19 pandemic in these special circumstances have had a positive and negative impact, especially on the owners, architects, engineers, and other construction professionals.

In addition, construction is subjected to substantial risks and is exposed to internal and external events (Sfakianaki et al., 2015) and crises are frequently encountered in construction projects because of their time-taken nature (Mhaske & Khandekar, 2016; Srinivasan & Nandhini, 2015) and high initial capital investments in construction projects (Fadhil & Burhan, 2021). In addition, Zheng et al. (2021) highlighted construction is one of the typical labour-intensive industries that has been exposed to risk by the COVID-19 pandemic. Moreover, it has brought severe disturbances to the resources and legislation of the construction industry (Husien et al., 2021). According to Pamidimukkala and Kermanshachi (2021), it has affected workforces and workplaces and changed the working atmosphere.

3.2 CHALLENGES FACED BY THE CONSTRUCTION INDUSTRY DURING THE COVID-19 PANDEMIC

According to Iqbal et al. (2021), projects have been delayed, workforce capacity has been reduced, and economic development has fallen significantly because of changes in the work patterns of various organisations. Similarly, Gamil and Alhagar (2020) revealed impacts including suspension of projects, labour impact and job loss, time overrun, cost overrun, and financial implications. Furthermore, Karimi et al. (2022) identified the cancellation or delay of contracts and supply chain shortages as negative impacts of the pandemic. Similarly, Gammanage and Gunarathna (2022) revealed that, delays in project delivery, delays in material delivery, shortage of material, project suspension, reduction in workforce productivity, health and safety concerns, and regular price escalations as the key elements attributed to impact the project progress.

In addition, Ghandour (2020) revealed because of employee workforce reduction difficult to complete project deliverables within schedule. Hence, according to Parameswaran and Ranadewa (2022), impacts are divided into eight categories i.e. (i) resources-related issues, (ii) project management issues, (iii) quality issues, (iv) financial issues, (v) contractual issues, (vi) safety issues, (vii) technology-related issues, and (viii) other issues. Al-Mhdawi et al. (2023) demonstrated impacts including workforce-related issues, supply chain disruptions, and legal and contractual implications. Khalafallah et al. (2022) demonstrated impacts into categories of project finance, construction materials and equipment, labour, contracts, and rental properties. Figure 1 illustrates a summary of literature findings on challenges faced by the construction industry during the COVID-19 pandemic.

3.3 OPPORTUNITIES FROM THE COVID-19 PANDEMIC TO THE CONSTRUCTION INDUSTRY

The word ‘crisis’ in Chinese means both risk and opportunity (Tunji-Olayeni et al., 2019). According to Alsharef et al. (2021), the challenges COVID-19 pandemic provided numerous opportunities for the construction industry.

Similarly, Karimi et al. (2022) demonstrated that COVID-19 pandemic had a silver line for construction companies as forced to adopt new technologies, increase productivity rate, build more manufacturing and warehouses, create domestic job opportunities, and utilise more manufacturing technologies by applying 3D printing, modularisation, and prefabrication, buildings will have more open floor plans, increased ventilation, and active air purification systems. Furthermore, Parameswaran and Ranadewa (2022) demonstrated that the COVID-19 pandemic was both a disaster and an opportunity for Sri Lanka's construction sector. It created a platform for the sector to interact with the digital world, leading to innovative and diverse uses of technology. This technological integration may significantly change the direction of construction even after the pandemic subsides. Considering the above facts, Figure 1 illustrates a summary of literature findings on opportunities from the COVID-19 pandemic to the construction industry.

3.4 LESSONS LEARNED FROM COVID-19 PANDEMIC BY THE CONSTRUCTION INDUSTRY

All construction works are not office-base while the digitalisation of the world, professionals are expected to enhance innovative technology to improve productivity by

using virtual working, adapting technology tools, workspace management, additional design considerations, planning with unforeseen circumstances including contingency plans, and the reduction of on-site work with prefabricated elements (Ogunnusi et al., 2020). Furthermore, Likitha et al. (2023) revealed that technology and digital solutions can help to recover firms from challenges including construction project management software used to resolve labour shortage issues through proper scheduling, low productivity rates, and safety issues.

Similarly, Karimi et al. (2022) demonstrated, that the adoption of new technologies helps to increase the productivity rate. In addition, a sense of urgency was imposed on construction professionals by the COVID-19 pandemic which established an effective requirement for the digitalisation and virtual execution of numerous industry processes and operations (Elrefaey et al., 2022). In addition to that, construction companies that used value engineering have effectively navigated the crisis's aftermath by coming up with alternatives to overcome obstacles that have minimally affected the progress of projects (Almuaybid et al., 2022). Furthermore, Bennett and Mayouf (2021) revealed that value management is primarily implemented as a cost-cutting solution, and key stakeholders need to be integrated. Furthermore, Abidi and Irshad (2020) recommended virtual and physical working of a mixed method as the best solution. Furthermore, Ogunnusi et al. (2020) recommended to reevaluating the option of strict office work to the possibility of 'Work From Home' (WFH). Figure 1 illustrates a summary of literature findings on lessons learned from the COVID-19 pandemic by the construction industry.

3.5 SIGNIFICANCE OF QS TO THE CONSTRUCTION INDUSTRY

The QS serves as a financial administrator for construction projects, responsible for estimating costs, material quantities, and project timelines. Coordinating with various teams working on the project is essential to this role and helps ensure that targets are met (Royal Institute of Chartered Surveyors [RICS], 2024). QS is a key stakeholder in construction because of its professional involvement in managing, planning, and delivering projects and because QS plays a crucial, primary, internal, and definitive function that impacts project success (Eyiah-Botwe et al., 2015). Moreover, Agha and Ogbonna (2022) demonstrated that QSs are construction economists who plan cost-effectiveness throughout the pre-construction to post-construction stages. Further, every phase of a construction lifecycle, including feasibility, design, construction, extension, refurbishment, maintenance, and demolition, is essentially performed by QSs (Olanrewaju & Anahve, 2015; Salleh et al., 2020).

In addition to that, quantity surveying is one profession that has seen unprecedented demand recently due to its expanding potential for service diversification and adaptability (Oladotun & Edosa, 2017). Furthermore, Abidin et al. (2014) identified that QSs have traditionally provided cost-estimating services but have recently expanded to offer more diversified services. According to AIQS (2005), QSs are now involved in estimating, cost planning, cost management, procurement management, contract administration, feasibility studies, asset financial management, and all activities related to the financial operations of a project. According to CIQS (2023), those tasks can be completed by QS employed by the contractor or by the client, and they can work from an office or on-site. According to Dada and Jagboro (2012), core competencies that QSs should have been; project management, contract administration, computer literacy, building engineering, information technology, economics, measurement/quantification and knowledge of

civil/heavy engineering works and risk management. Furthermore, Chandramohan et al. (2022) highlighted skills including claim management, financial management, Building Information Modelling (BIM) coordination, carbon accounting and data management.

3.6 QUANTITY SURVEYING PRACTICES AND THE COVID-19 PANDEMIC

The practice of architecture, which primarily relies on networking, interaction, coordination, and site visits, was severely impacted by the COVID-19 pandemic (Abidi & Irshad, 2020). For instance, the reduction of direct supervision of project managers adversely affected the junior contractors' productivity and failed to complete the project deliverables because project managers rarely visited the site and worked from home (Ghandour, 2020). Furthermore, that caused changes in the working atmosphere in terms of the lack of a safe environment in the workplace, heavy workloads, home situations, and concerns about job stability often contribute to anxiety, depression, and even suicide (Pamidimukkala & Kermanshachi, 2021).

Similarly, the COVID-19 pandemic had an impact on professional quantity surveying practices including contractual arrangements regarding project time completion and suspension, project cost control, claim arrangement and negotiations, and project tendering (Hansen et al., 2021). Further, site visits for variation work valuation and interim payment valuation are the most affected quantity surveying practices due to the pandemic whereas consultative services such as value management and advisory services were the least affected (Tan & Zainon, 2022). Modiba and Harinarain (2024) highlighted those noteworthy impacts for QSs as alterations in work dynamics, modifications in site evaluations, increased instances of cost overruns, shifts in contract interpretation, and changes in the preparation of monthly payment certificates.

3.7 NECESSITY AND OPPORTUNITY TO UPGRADE QUANTITY SURVEYING PRACTICES

Present changes in projects due to the COVID-19 pandemic in the form of changes in organisation structure, work culture, technological application, and project objectives (Hansen et al., 2021). The quantity surveying profession is significantly changing in the construction industry and with the changes in construction practices, it is required to change the competencies of QS (Hassan et al., 2011). According to Abidi and Irshad (2020), professionals can upgrade by learning novel skills and techniques of working for future benefits, a new method of working will provide optimisation of resources while maintaining quality and recommended virtual and physical working of mixed methods as the best solution. Furthermore, with the digitalisation of the world, professionals are expected to embrace innovative technology to increase productivity while planning for the threats and opportunities provided by risk management is critical (Ogunnusi et al., 2020). Figure 1 illustrates a summary of literature findings on the necessity and opportunity to upgrade quantity surveying practices.

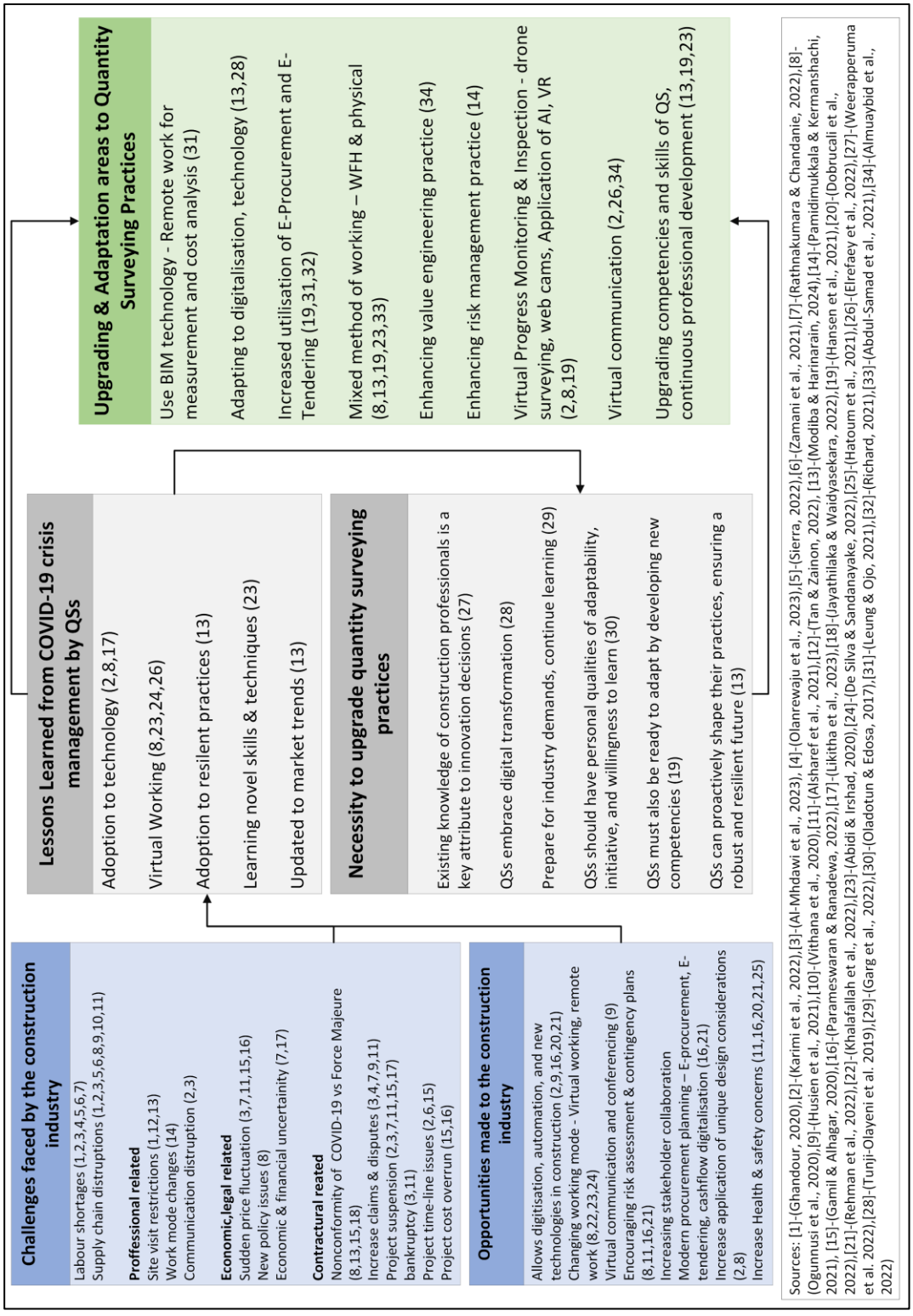

Figure 1: Summary of literature findings

In there, Weerapperuma et al. (2022) revealed that the existing knowledge of construction professionals is a key attribute to innovation decisions and attributes of relative advantage, compatibility, complexity, trialability and observability are affected by those innovative decisions. Hence, according to Tunji-Olayeni et al. (2019), QS needs to adopt Information and Communication Technology (ICT) to remain relevant in this digital age. Following the COVID-19 pandemic, prospective future professionals should be prepared to meet the demands of the construction industry while continuing their independent lifelong learning to achieve worldwide acceptability (Garg et al., 2022).

Furthermore, Adindu et al. (2020) concluded that, due to changes in the construction industry aimed at obtaining a competitive advantage, current and future quantity surveying practitioners must adopt proactive leadership roles. Quantity surveyors around the world must deliver advanced leadership in both traditional and multidisciplinary practices to stay competitive. Hence, QSs should possess personal qualities such as adaptability, initiative, and a willingness to learn. They should have core skills including the ability to present clear information within a group, self-management, critical analysis, and effective listening. Furthermore, QSs must be competent in process skills such as computer literacy, commercial awareness, prioritising, negotiating, acting morally and ethically, and coping with ambiguity and complexity (Oladotun & Edosa, 2017). Furthermore, QS is crucial for key stakeholders' resilience initiatives hence, in between all these unpredictable situations, quantity surveying professionals must also be ready to adapt by developing new competencies (Hansen et al., 2021). Furthermore, the COVID-19 pandemic has already changed the world, not only because of the pandemic itself but because of the long-term effects of the world's reaction to the pandemic (Harper et al., 2020). Hence, Modiba and Harinarain (2024) concluded that by understanding the challenges and adaptations brought about by the pandemic, QSs can proactively shape their practices, ensuring a robust and resilient future for the profession. QSs must stay updated with industry trends, market conditions, and regulatory changes. Adaptability to new circumstances is critical to resilience, and developing strong communication skills, especially when working remotely, is essential.

4. DISCUSSION

The COVID-19 pandemic has affected whole industries negatively worldwide and the construction industry is not exceptional. Consequently, the whole construction industry and its activities were severely affected such as project suspension, supply chain disruption, labour material equipment shortages, productivity declined, project cost and time overruns, and sudden changes in prices (Ogunnusi et al., 2020; Ghandour, 2020; Gamil & Alhagar, 2020; Gammanage & Gunarathna, 2022). Further, professional practices were also severely affected such as restriction on-site access, affected working modes, and traditional practices were not suitable to resist negative impacts. QS as a construction professional whose traditional practices were also severely affected COVID-19 pandemic including site visits, and progress monitoring while affection to those traditional practices, tends to increase practices of value management, risk management and BIM technologies. Additionally, changing their working mode from strict office environments to work-from-home, virtual meetings, and inspections is crucial due to new trends in the construction industry influenced by global technological advancements and opportunities arising from the COVID-19 pandemic. Hence, the COVID-19 pandemic-imposed opportunities on the modern world in addition to challenges.

Such as automation, digitalisation of construction, increased application, and adoption of new technologies of BIM, webcams, drones, modification of health and safety rules and practices, virtual working modes, virtual conferencing, and communication such as Zoom, MS-team platforms, enhancing additional risk management, value management and contingency plans. As a result, those modern practices, tend to change and adopt new professional practices from their traditional practices such as avoiding strict office work while optimising resources and quality of work. With the influence of the COVID-19 pandemic, there is an opportunity to upgrade quantity surveying practices with integration into traditional quantity surveying practices and construction professionals must adopt new trends to increase productivity of construction activities. Hence, the COVID-19 pandemic offered the necessity to upgrade quantity surveying practices for future use and the need to redefine quantity surveying practices significantly.

5. CONCLUSIONS

Accordingly, the literature analysis first discussed challenges and opportunities faced by the construction industry during the COVID-19 pandemic. Then, the discussion pointed to lessons learned from the COVID-19 pandemic by the construction industry. Further, how the COVID-19 pandemic affects quantity surveying practices was discussed. Finally, the necessity and opportunity to upgrade quantity surveying practices were highlighted based on lessons learned from the COVID-19 pandemic. This study contributes to the knowledge in terms of the upgrade quantity surveying practices. Further, the following key contributions to knowledge are made through this research study.

- A detailed literature review on the challenges and opportunities faced by the construction industry during the COVID-19 pandemic was presented by referring to previous research studies in a particular area.
- Since there was no detailed discussion on lessons learned from the COVID-19 pandemic by the construction industry as well as the necessity and opportunity to upgrade quantity surveying practices, the findings of this study contribute to knowledge in that area.

The outcome of the research would be beneficial for industry practitioners to upgrade quantity surveying practices was highlighted based on lessons learned from COVID-19 pandemic. Considering that important outcome, the following recommendations can be made.

- As it was highlighted, prior concern should be given to upgrade quantity surveying practices. Therefore, industry practitioners are encouraged to give more prominence to identify the necessity and opportunity of upgrading their practices.
- This study provides a preliminary analysis of literature focusing on upgrading quantity surveying practices based on lessons learned from COVID-19 pandemic necessity and opportunity globally. The next step in this study would be to conduct a detailed survey on how to practically upgrade quantity surveying practice.

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