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COVID UNCERTAINTIES AND MODERN METHODS OF CONSTRUCTION (MMC): WHAT EFFECT ON THE UK HOUSING INDUSTRY

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Abstracts.

Background: The COVID-19 pandemic has affected world economies, the construction industry and everyone. Problems such as housing supply in the UK might also have been affected as a result.

Aims: This study explores the uncertainties in the housing industry in the UK, the uncertainties created on MMC products and the impact these have created in the supply of housing under the pandemic.

Method(s): Secondary research data was collected through literature review and their findings compiled. Inductive reasoning was utilised to create new knowledge.

Results: The pandemic has affected the construction industry and resulted in reducing housing supply. Although advantages of MMC are widely recognised, the adoption rate is low.

Keywords: Government Policies, Housing Construction, Modern Methods of Construction (MMC), and Residential Building Construction.

INTRODUCTION

COVID-19 is a global disease caused by a new strain of coronavirus (Peter and Aruna 2021). The pandemic has caused a lot of havoc, unanticipated death and economic devastation in the world and the UK. Since the World Health Organization (WHO) announced COVID-19 outbreak as a pandemic, many countries have declared a complete national lockdown after a sharp rise in infected cases (Gamil and Alhagar 2020).

As activities within the construction sector are conducted mostly face to-face, for instance, attending meetings for procuring projects, selecting the ideal contractor, supplying personnel for executing the job, delivering materials to site, undertaking the construction on site and/or in factory in the case of pre-fabrication, the movement restriction imposed by the UK Government at the end of the first quarter of 2020 has considerably affected the commencement of new projects as well as progress on existing projects, resulting in a 35.7% fall in total construction output, with new housing output recorded a significant 52.3% reduction in the second quarter of 2020 (ONS 2021).

Prior to the pandemic, there was already a growing concern about the provision of affordable housing and equating residential building demand and supply in the UK (Ferm et al. 2021). Housing shortages has been a problematic and contentious issue, particularly in low affordability and high population density areas such as London. The fall in new housing supply, in both public and private sectors, as impacted by the pandemic has further exacerbated the housing shortage problem. Projects in progress suffered from extension of time under force majeure (usually an act of God, which in this case, force majeure classification may need to be questioned), whilst creating bundles of legal disputes that would need to be resolved in months and years to come. Cost escalation due to shortages in material supply and rising freight costs, as well as higher labour and staff costs due to movement restrictions was another concern.

There is a possibility for the problem to be partly mitigated by the increase in the adoption of modern methods of construction (MMC) in housing delivery. In a report prepared by Taylor (2015), health and safety executive (HSE) of Construction Engineering Specialist Team, it concluded that clients using MMC production techniques find that UK manufacturers with state-of-the-art manufacturing technologies in modern highly automated factories realise benefits include: reduction in waste materials, shorter build times, controlled built environment, made-to-order capabilities, less noise, dust and local disruption, fewer workmen on site, creation of employment in areas away from the building site, economies of scale (reduced cost), computing and traceability of components, technological (greater accuracy and tolerances), reduction in site accidents and ill-health, predictability and quality assurances in terms of durability and whole life costing. However, with the pandemic restrictions in place, it is doubtful if the adoption of MMC was disrupted and whether the expected benefits could be realised.

This study therefore intends to explore the uncertainties created by COVID-19 in the mostly traditionally built housing industry in the UK, the uncertainties created on MMC products and the impact these have created in the supply of housing at the back of the high demand.

LITERATURE REVIEW

Modern Methods of Construction (MMC) and the UK Building Industry

In the context of housing, modern methods of construction (MMC) is defined by the National House Building Council as a collective term used to describe a number of construction methods differing from “traditional” methods such as brick and block (Ofori-Kuragu et al. 2021). Goulding et al. (2013) stated that manufactured construction, offsite production, offsite construction, offsite manufacturing, industrialised building systems and modern methods of construction (MMC) are terms that can be used interchangeably in a literature to describe prefabricated construction.

Zurich’s and the generally accepted insurance industry have an alternative definition of MMC as: a construction process that can encompass the use of composite new and traditional materials and components often with extensive factory produced sub-assembly sections and components. This may be in combination with accelerated on-site assembly methods and often to the exclusion of many of the construction industry traditional trades. The process includes new buildings and retrofitting, repair and extension of existing buildings” (Zurich 2014).

The importance of adopting MMC has been considered across the construction industry. RICS (2018) acknowledges that the UK construction sector is a strategically significant part of the UK economy, representing 8% of GDP and 9% of employment with £150 billion invested yearly through the public and private sectors. Also, MMC in the UK has been estimated to have a market of £6bn, equivalent to be less than 6% share (Taylor 2010) in UK construction industry that contributes approximately 8% of the country’s Gross Domestic Product and has over 250,000 enterprises, with an annual turnover of £100bn (ONS 2012), but despite all these benefits and supportive global initiatives, the uptake and pervasiveness of MMC is much slower than expected (Goulding, et al. 2013).

During the past decade and since the mid-2000s, several companies in Scandinavia and the UK have developed and brought to market new concepts based on building systems and process innovations, knowledge and inspiration have been transferred from Japanese house-building companies that successfully apply industrialisation principles (Lawson et al. 2014), referring to industrialisation in the housing industry. Despite an increasing demand for housing and wider concerns over the need to improve performance, the industry seems to be reluctant to adopt MMC due to current barriers, relating to a perceived higher capital cost, complex interfacing, long lead-in time and delayed planning process, though strategies recommended are centred on changing peoples' perceptions, improving procurement, providing better cost data, tackling planning and regulations, encouraging political levers and providing practical guidance (Charlson et al. 2021).

These narratives are gradually changing with the residential building industry and UK Governments recent pronouncements on MMC due to the combination of severe housing demands and market failures in terms of cost, quantity and quality, with the Government recently including MMC in major housing strategy announcements, recognising that it has the potential to speed up delivery, improve productivity and modernise the sector (Pamment 2019). Furthermore, the reason for such confidence being placed on MMC can be attributed to three key elements reflecting the three principles driving the sector deal: Digitisation, Manufacturing and Performance

(Harries et al. 2021). With an overall strategy established, it is expected MMC could be integrated into the UK house building business processes (Pan et al. 2012).

COVID-19 and the Uncertainties created in the UK Residential Building Industry including MMC Products

The pandemic has posed the greatest challenge in living memory worldwide and its impact on our life, our society and the global economy is likely to last for years to come (Mace 2020). The uncertainties created by the pandemic in the mostly traditional in-situ residential building industry including MMC products are numerous and stems from the lockdown and the lack of face-to-face interactions and collaboration among construction professionals. During these uncertain times, there are fears that key skills are lost, new recession might happen, and the economic growth would slow down with employers now dealing with significant cash flow and financial concerns, site delays and shortage of materials (Stride et al. 2020) and labour. Mace (2020) concurs those other uncertainties that accrued from COVID-19 includes: (a) the risk to project and programme delivery whilst adopting new safe working practices; (b) reduction in productivity and output due to the constraints of keeping social distances and working within restricted space on site; (c) reduction in managing the supply chain capacity. Any, if not all of the mentioned factors will inevitably impact on project delivering time scale which will be noticeable at the tail end of the project schedule. These might therefore lead to an extension of time whilst in other instances it could be an issue that might have to be dealt with liquidated and ascertain damages. It is for this reason, that everyone and/or firm in the construction industry must exercise caution to avoid legal consequences on the already fragile relationship among clients, construction team members and the contractors.

The use MMC, with their factory manufacturing characteristics and the above-mentioned factors, was seen to be affected because of the lockdown and social distancing measures in place. Forecasts by Construction Products Association's (CPA) expect changes brought in by the pandemic to the UK economy, and the uncertainty around consumer confidence and unemployment rates, could hinder construction industry activities returning to pre-Covid growth rates, with 2021 construction output expected to be 6.4% lower than pre-Covid levels (Pbctoday 2020). Furthermore, the CPA summer scenarios still foresees construction output in 2020 to fall by 20.6%, with the worst affected sectors including private housing at 33% reduction and commercial at 29% (Pbctoday 2020).

METHODOLOGY

The purpose of this study is to provide a better understanding of current trajectory on uncertainties due to COVID-19 and Modern Methods of Construction (MMC) including their potential impact on the supply of residential housing in the UK. It is an exploratory study aimed at providing context, overview and future direction of the uncertainties caused by COVID-19, MMC and the UK residential housing supply. The study relied solely on secondary research data compiled through literature review and findings realized from the sources. The study uses inductive reasoning (Creswell and Clark 2017) to create new knowledge as lot of the issues been investigated are hinged upon what is to transpire in the future. To use deductive resonating in this case would have proved difficult as the literature review contained many generalizations

surrounding the prospects of the industry, due to the uncertainty (Seidu et al. 2020) induced by the pandemic.

RESULTS AND ANALYSIS

The study relied on findings available on Google Scholar and Science Direct to discover what has been published on issues surrounding the UK demand and housing supply, the MMC and the uncertainties caused by COVID-19 in the UK residential building industry. Table 1 provides a summary of relevant research work on the subject matter, though with very limited information available on the impact of COVID-19 crisis and the survival of construction industry, prevention, and treatment of COVID-19, MMC, managing the impact and risks of COVID-19 in the UK construction industry etc.

Table 1: Summary of relevant research work on COVID-19 and MMC in Construction

Research Title	Research Focus	Source
Prevention and treatment of COVID-19	COVID-19	Peter and Aruna (2021)
The impact of pandemic crisis on the survival of construction industry	COVID-19	Gamil and Alhagar (2020).
Impacts of COVID-19 on protected and conserved areas	COVID-19	Waithaka et al. 2021
Emerging problematics of deregulating the urban	Government Policies	Ferm et al. (2021)
Critical success criteria for programs in China	Construction Procurement	Yan et al. (2019)
Offsite construction	Modern Methods of Construction (MMC)	Goulding et al. (2013)
<i>Design in modular construction</i>	MMC	Lawson et al. (2014)
A critical review of the impacts of COVID-19 on the global economy and ecosystems	COVID-19	Ibn-Mohammed et al. (2020)
Independent Review of Affordable Housing Supply	Government Policies	Supply (2019)
Modern construction management.	MMC	Harris et al. (2021)
Managing the impact and risks on construction industry	COVID-19	Mace (2020)
Construction News	COVID-19	Pbctoday (2020)

FINDINGS AND DISCUSSIONS

The findings show there are clear and considerable uncertainties in the construction industry including the residential building sector, caused by the pandemic (COVID-19). The pandemic has not only had a devastating effect on the building industry, but on the world economy (Mace 2020) and has changed our daily life, most especially our face-to-face human interaction either as individuals or as a group which is also a major characteristic of how residential buildings are procured. The data/evidence shows that the pandemic has delayed the completion of most construction work due to the effect of the national lock down, social distancing and their consequential effect within the residential building industry resulting in the inability to supplying personnel for executing the job, inability to deliver materials to site and undertaking construction on site and/or in factory environment in the case of MMC. This has inevitably led to most constructors' inability to deliver on the agreed time scale which should have resulted in extension of time resulting from the pandemic if treated as force majeure (an act of God), though this school of thought is being questioned by most clients seeking liquidated and ascertain damages, hence creating a lot of legal technicalities still pending to be resolved in the near future (Trakic et al. 2021).

Findings indicate that the latest forecasts consider changes brought on by the pandemic to the UK economy and the uncertainty around consumer confidence and unemployment rates could prove significant to construction industry activity returning to pre-Covid growth rates with 2021 construction output expected to be 6.4% lower than pre-Covid levels (Pbctoday 2020). Despite the advantages of MMC addressing the social distancing and skills shortage issues under the pandemic by requiring fewer site operatives (Ostime 2020), and an increasing demand for housing and wider concerns over the need to improve performance over the years, the building industry seems to be reluctant to adopt MMC. This may be due to barriers relating to a perceived higher capital cost, complex interfacing, long lead-in time and delayed planning process (Yu et al. 2020), though strategies recommended are centred on changing peoples' perceptions, improving procurement, providing better cost data, tackling planning and regulations, encouraging political levers and providing practical guidance (Charlson et al. 2021). These narratives are gradually changing, with recent government pronouncement on MMC in major housing strategy announcements, recognising that it has the potential to speed up delivery, improve productivity and modernise the sector (Pamment et al. 2019, Welsh Government 2020). The reason for such confidence being placed on MMC can be attributed to three key elements reflecting the three principles driving the sector deal: Digitisation, manufacturing and Performance (Harries et al., 2021).

Furthermore, finding has shown that key skills are lost, new recession might happen, and the economic growth would slow down with employers now dealing with significant cash flow and finance concerns, site delays and shortage of materials and labour (Stride et al. 2020). Other uncertainties that accrued from COVID-19 includes: (a) the risk to project and programme delivery whilst adopting new safe working practices (b) reduction in productivity and output due to the constraints of keeping social distances and working within restricted space on site (c) reduction in managing the supply chain capacity (Mace 2020).

CONCLUSIONS

The COVID-19 pandemic has devastated the world, resulting in national lockdown in the first quarter of 2020 in the UK from the resultant effect of social distancing, introduced as a means of controlling and minimising the effect of the pandemic. Though consequentially, it has negatively affected the world economy, caused a lot of havoc, unanticipated death and economic devastation in the world including low productivity within construction and the UK residential building industry.

There has been growing concern with providing affordable housing and equating residential building demand and supply in the UK. This combined with COVID-19 has further devastated the procurement of residential buildings by escalating costs due to site delays, shortages in supply and delivering of building materials and personnel to get the work executed (supply chain), combined with employers now dealing with significant cash flow and financial concerns.

This study further exposed us to understanding that the uptake and pervasiveness of MMC has been much slower than expected, but recently some Government policies include MMC in major housing strategy, recognising that it has the potential to speed up delivery, improve productivity and modernise the sector. Although this indicates a positive change in the situation, continual support from the Government and broadening coverage of the policies are needed to accelerate the adoption of MMC in the facilitation of housing delivery.

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