

EVALUATING THE USE OF MODERN METHODS OF CONSTRUCTION FOR THE PROVISION OF AFFORDABLE HOUSING IN DEVELOPING COUNTRIES

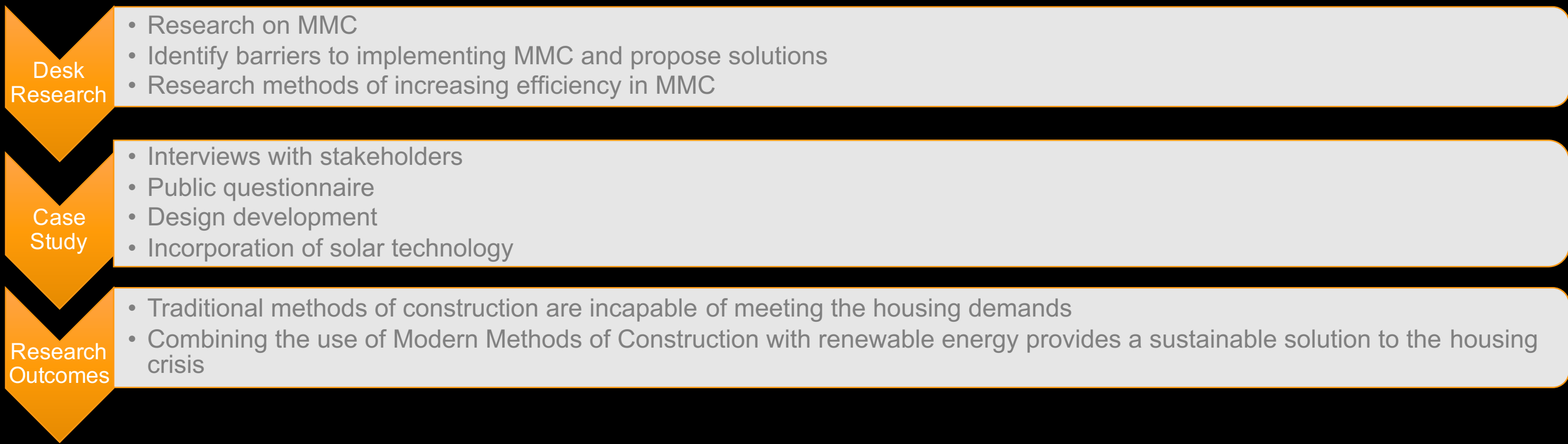
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INTRODUCTION

This dissertation focuses on investigating the use of Modern Methods of Construction (MMC) for the provision of sustainable, affordable housing in developing countries. The methods used in MMC include Off-Site Manufacturing (OSM) techniques, which include the use of panellised units, volumetric (or modular) units and hybrids of the aforementioned methods.

METHODOLOGY



SUSTAINABILITY AND MMC

Sustainability in construction is the practice of creating structures and using processes that are both environmentally responsible and resource-efficient throughout a building's life-cycle. MMC has a direct effect on at least five out of six sustainability indicators, shown below:



The primary construction material addressed in this dissertation is Timber. The use of timber frame construction has produced construction times that are typically 30% shorter than equivalent projects constructed using traditional methods of construction and buildings with 34% less embodied carbon than equivalent masonry structures.

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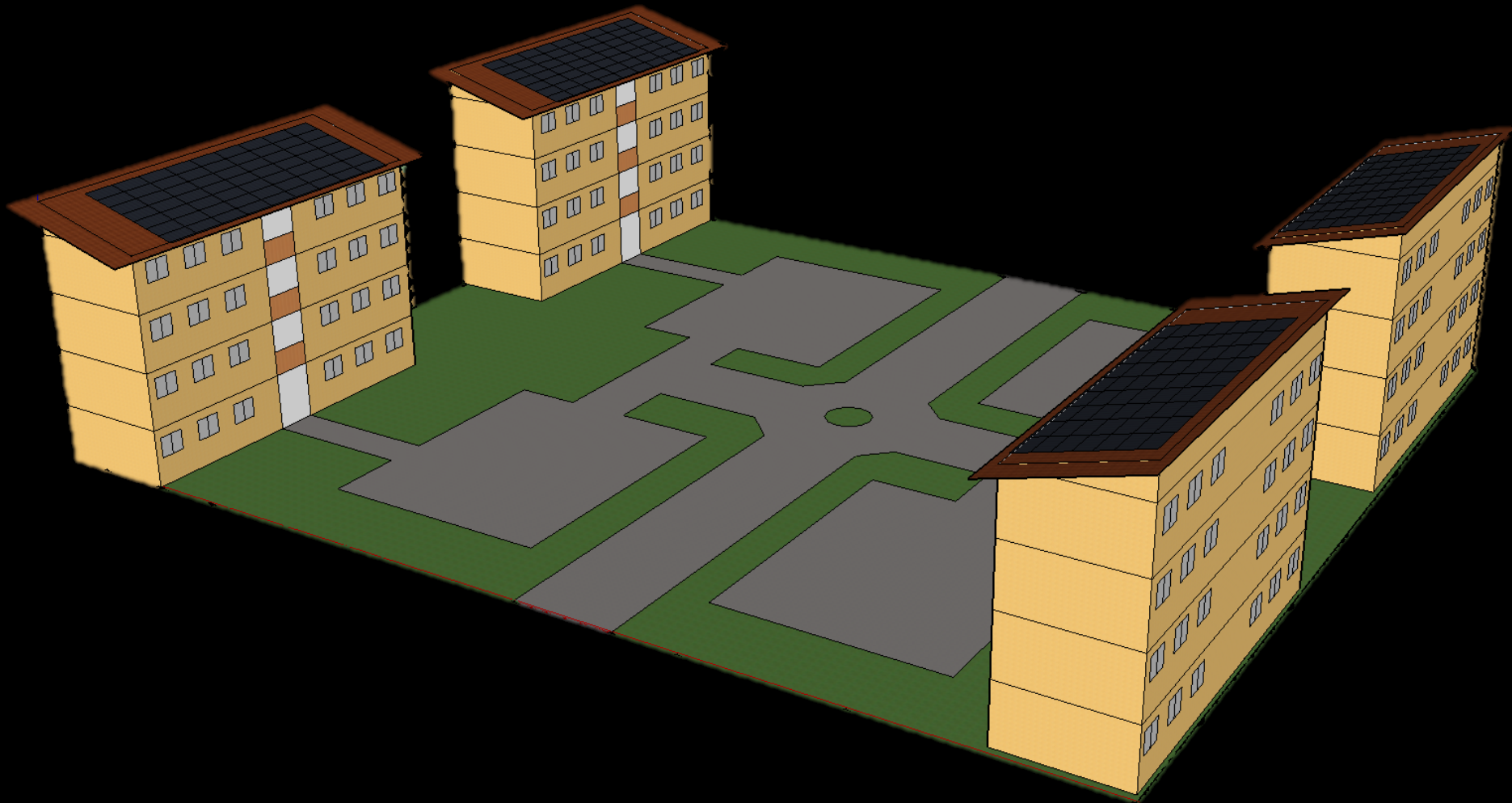
MMC SUPPLY CHAIN OPTIMISATION

The supply chain is essentially all the different phases involved in the life-cycle of a building constructed using MMC. From the research conducted, two methods to increase supply chain efficiency and reduce waste are applying Lean Theory in Construction and using Building Information Modelling (BIM) to enhance collaboration

CASE STUDY: LAGOS, NIGERIA

Lagos is geographically the smallest state in Nigeria, but is the most populous city in Africa, with a population estimated to be 21 million people. In Lagos: the housing gap is currently estimated to be 2.55 million homes, 60% of inhabitants live informal settlements, 80% of inhabitants rely on diesel generators, 40% of inhabitants have no access to the power grid and the average household pays between £0.20 - £0.31 per kwh for alternative sources of power, in comparison to £0.21 in the UK. Based on the information from the research, survey responses and interviews, the proposed design for this case study is 4-storey blocks of both 2- and 3-bedroom flats, shown in Figure 1. The solar system is designed to support the lights and low-consumption appliances. The average consumption used was 4.9 kwh.

FIGURE 1: PROPOSED DESIGN FOR LAGOS



CONCLUSIONS

Closing the housing gap requires the use of alternative methods of construction. From the research and discussion contained within this report, it is clear that the traditional methods of construction are too slow and inefficient to cope with current or future housing demands. Off-site techniques in MMC are well established and the saving and benefits of using them for construction are well documented. An increase in the use of MMC has great potential to reduce the pressure on the housing market in developing countries.