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# **PREFABRICATED HOUSING IN AUSTRALIA: IDENTIFYING THE FINANCIAL BARRIERS**

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## **ABSTRACT**

*Offsite-manufacture is considered to be the panacea to challenges in traditional construction methodology. Envisaged to address the contemporary issues of housing affordability and shortage in Australia, a great amount of research and promotion is put in by academia and government into prefabricated housing. Despondently, the sector's growth is comparatively lower due to a multitude of reasons and lack of financial backing from financial institutions appears to be consequential. The aim of the research is to identify the factors for the perceived aversion of banks and lenders towards prefabricated housings and to draw pathways to address them in order to develop a robust business model for promoting sustainable growth of the branch in Australia.*

**Key words:** Offsite Manufacture, Prefabricated Housing, Residential, Financial Institutions, Business Model.

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## **1. INTRODUCTION**

Prefabricated Construction is currently one of the most researched areas in the Civil Engineering community. In Australia, a substantial amount of investigation is happening in the stream by key agencies such as the Australian Research Council, which depicts the criticality of the field. Furthermore, Offsite Manufacture is the 7<sup>th</sup> vision in the Construction 2020 of CRC for Construction Innovation which predicted a high likelihood of its occurrence in the next 5-15 years. The high relevancy of the prefabricated construction is its protracted potentiality in contributing to overall improvement of the traditional construction process. [1].

Key augmentations anticipated from OSM to the traditional construction practices include enhanced quality control, reduced waste generation, better cost prediction, superior project coordination, improved health & safety conditions and sustainability. Despite the extensive advantages enlisted OSM is still in the nascent stage in the country, accounting for only 3% of the global market [2]. Various reasons such as lack of technical skills, higher upfront cost, social stigma, fragmented supply chain and so forth have been attributed to the minimal penetration of the prefabricated construction in the market. Evidentially lack of funding from

the financial institutions is a recurring drawback associated with PFH in Australia in various literature.

Even though the dearth of financial backing appears to be a persistent challenge to the sector across literature, little or no research has been administered over the issue. In any construction project, the capital flow is the element that essentially realizes the drawings and plans into tangible structures. Accentuating to residential sector in Australia, a strong reliance is exerted upon the financial institutions. On December 2011, the total outstanding mortgage Australia accounted to AU\$1.2 trillion [3]. Taking into account this dependency of the residential sector on the financial sector, it is essential to draw attention towards monetary backing that prefabricated housing may receive from these fiscal institutions.

## **2. OBJECTIVE AND SCOPE**

The research intends to identify in detail the reasons for the perceived aversion of financial institutions towards supporting PFH, through which germane suggestions may be put forward to generate a robust business model which can address the issues. The study could thus help in bridging the present chasm across the PFH and financial bodies and fill the knowledge gap existing in the current research on PFH.

## **3. LITERATURE REVIEW**

### **3.1. Off-site Manufacture**

Off-site manufacturing (OSM) is a construction technique in which prefabricated and standardized components/modules are manufactured in a controlled factory environment (either on- or off-site), transported, erected, and assembled into the on-site structure [4]. In Australia, OSM is further classified as Non- Volumetric Preassembly, Volumetric Preassembly and Modular Buildings. The research intends to focus on prefabricated housings, which essentially deals with the construction of residential buildings employing the OSM technique. Comprehensive research is put into the field by the nation to address the severe distress in the housing sector experienced along the decades. OSM is identified to contribute to detached houses and high-density multi-residential complexes, due to its potential for producing a high volume of high-quality products [5]. Perceived benefits such as overall time savings, cost cut down, quality improvement, environmental sustainability and enhanced team co-ordination make OSM the key vision for the up gradation of stagnant construction industry [6, 7]. It is envisioned to have 20,000 more jobs and 30\$ billion growth in the sector, by progressing to 5-15% market share in the construction industry by 2025 [8, 9].

### **3.2. State of Art Prefabricated Housing in Australia**

There is a disquieting shortage of statistics on prefabricated housing in Australia, such that national data available is not enough to initiate a debate [10]. Unavailability of formal data is would be a serious roadblock to the research [11]. OSM take up is sluggish and industry adaptation is small due to various reasons [2]. Consequently, the state lags far behind Sweden, Japan and Singapore where the majority of construction is accounted to off-site manufacture. As suggested by researchers, the risk-averse culture of the industry may be a significant reason towards the thumbs down to the technology [12]. Lack of an apex body, fuzzy regulations and codes, a paucity of incentives and cynical attitude from the public all contributes to the meagre penetration of OSM. The proliferation of prefabricated construction is also hampered by the unavailability of skilled labours, high initial cost, fragmented supply chain, lengthened lead time and severe hostility from the financial institutions which deprive funding for the novel approach [5, 11, 12, 13, 14]. Taking into account these factors, the anticipated growth of OSM requires a strong-arm from the industry and research sector.

### 3.3. Residential Sector in Australia

There exists a robust enthusiasm for the society towards securing an own home. In the words of Philip Lowe, Governor of the Reserve Bank of Australia (RBA), the home is the largest single asset for the majority of people. More than 67% of the total housings in Australia are owner-occupied dwellings [15] and the residential building sector contributes fairly to the country's economy (47 billion AUD 2010-2011) [16]. The proportion of standalone/detached house is around  $\frac{3}{4}$  of the total housing and the rest adds up due to semidetached or duplex houses, row or terrace houses, townhouses, project homes, flats, units, and apartments [ABS 2011].

Currently, there is momentous distress in the residential sector due to an arduous price hike. Within the decade, median house price has increased by more than two-fold in the Australian capital cities, which shelter around one-third of the total population [17]. Furthermore, the underlying demand for housing is continuously outpacing the supply as per the National Housing Supply Council Reports (2011 and 2012) [15]. First home buyers depressingly find it difficult to huddle initial deposit and service the mortgage due to the property price hike. Extensive migration into the country has also supplemented to the increase in housing demand [18]. Responding to the situation, more than two-thirds of non-homeowners are uncertain whether they would be able to afford a home in their lifetime [19]. The residential sector could be severely afflicted unless innovations do not intervene to address the gap in housing price and affordability [20].

Intensifying the issue of affordability is the hostile status quo in the home loan sector. The housing sector is expected to be having a shortfall of 466,000 houses by 2020 [21]. Australia just falls behind Norway and New Zealand among the 16 developed countries in the vulnerability of household debt [20]. As per studies conducted, \$ 1.4 trillion worth of home loans are outstanding in Australia and less than half in the country own the property without a mortgage [15]. From the view of lenders and household, home loans are one among the populous retail financial market accosting to about \$1.2 trillion [22]. In the state of Victoria, 33.5 per cent of the inhabited private housings were mortgaged [19]. In consideration of dependency of the residential sector over the mortgage system, post-GFC; subprime loan market & the non-bank sector has contracted rapidly. Affordable housing sector involving small-scale builders are facing new barriers to securing financial support [23]. Loan conditions are more stringent with a thorough check on pre-sales and asset portfolio of builders. Besides the construction industry is generally not on the good books in terms of risk analysis in comparison to sectors like finance and insurance [24].

### 3.4. Financial Issues for Prefabricated Housing

PFH is foreseen as an elite solution to home affordability, by virtue of its enhanced construction speed and cost reduction capability. It also conjectured to reduce the carbon footprint of the construction industry and pave the way to a sustainable mode of building structures. Bearing in mind other issues faced by OSM, mentioned in prior, the antipathy of financial institutions towards prefabricated homes has not appreciably changed since the outset of the industry. Literature identifying pros and cons of OSM has recurrently mentioned on the deficit in funding for the projects. As suggested in research, financing is a critical step to meet up the demand for housing [23].

Majority of the stakeholders involved in OSM concurred to the lack of support from the financial institutions [11] Due to the uncertainty in durability and market volume; the banking sector had been reluctant to provide financing for OSM and consequently identified funding to be a major barrier in Australia and internationally [25]. Lenders are concerned with non-traditional construction, posing a challenge to prefabricated construction [4] and researchers

suggested loosening up of loan conditions was essential for the better promotion of OSM [26]. In most instances the client ended up making 100% payment before the modules left the industry, leaving them without a tangible asset [27]. This would be drawing an ominous picture in the minds of financial institutions. OSM requiring entirely new cash flow arrangement and payment terms need to be accepted by ever orthodox industry players [6]. It was pointed out that the antagonist attitude of banks towards funding the projects to be greatest obstacles to the penetration of modular construction technique [28]. There is a high possibility for the need of a reversal of existing funding models in the industry for accommodating high initial costs of off-site construction projects [12]. This may not send out a positive message to the inherently conservative funding institutes. The literature also suggested a probable compromise to the quality of products (which is highlighted to be the key advantage for PFH) due to lack of funding. As aforementioned reversing of cash flow model may occur on the introduction of PFH as, traditional construction was not this capital intensive and relied upon end user commission to finance the work [29]. In China, lack of vivid picture on prefabricated construction hindered developers from investing monetary resources on the sector [4].

The 'big four banks' (Commonwealth Bank of Australia (CBA), Westpac Banking Corporation (Westpac), Australia and New Zealand Banking Group (ANZ), National Australia Bank (NAB)) in Australia contribute to the 80 per cent of the residential financing in the country [23]. Anecdotally, the big four has not entered into the PFH sector. Post GFC lending institutes have tightened their guidelines in financing residential development. They demand a fitter track record, increased pre-sales, and other reliable equities to issue loans. PFH being in its nascent condition in the country, it would be a herculean task for the providers to demonstrate a successful track record and towering pre-sales record. Credit rationing & increased underwriting standards post-GFC and scantiness of success stories in neo sector also drives the lenders further away from financing on PFH schemes. South-East Asian countries were strong growth in the OSM was observed, apparently incentivized the sector [29]. Whereas, the pieces of literature reviewed coincide with the fact that the nation lags behind in providing incentives to the sector explicitly [4, 30]. Financing is indispensable to any property development as a greater number of developers rely on external funding [31]. Thus dearth of financial support to PFH could be a draconian challenge to its long-term growth.

#### **4. CONCLUSIONS**

The fiscal issues identified were appendages to researches conducted on various aspects of PFH, but none with the focal point towards financial institution prospect. Australian residential sector, evidently heavily reliant on mortgage and currently in high distress from affordability, needs to put the spotlight on the financial support for PFH. The research intends to shed light on the present outlook of the financial institution on PFH, to identify the impediments that hold the lines for banks and other lending institutes from funding these projects and to draw viable suggestion/solutions to generate a robust business model which can address the same. The outcomes of the research would help to clear the deck for prefabricated construction, which is considered as a panacea for the issues in traditional construction.

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