Insights into the New Zealand prefabrication industry

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Aim of the research

1. To gain a deeper insight into the realities of using prefabricated construction methods

2. To analyse the government initiatives and regulatory framework to facilitate prefabrication

3. To discuss the benefits of prefabrication and client preferences

Introduction

- New Zealand has a housing shortage of around 40,000; Auckland is the major contributor to this shortage with 30,000 needed (Kiernan, 2019)
- The construction industry is struggling to meet the demand for housing through traditional building methods
- Effective and efficient alternative construction methods such as prefabrication need to be explored to address issues of housing affordability
- Prefabrication has been successfully used in countries such as Sweden, the United Kingdom and Japan

Overview

- The prefabrication industry started in New Zealand in 1833 with the dispatching of pre-cut frames for the early settlers' houses (Bergdoll and Christensen, 2008; Chiu, 2012; Toomath, 1996)
- The most notable contemporary prefabrication factory in New Zealand was started in 1955 by De Geest Construction which supplied complete and componentized houses (Scofield, Potangaroa, and Bell, 2009)
- The uptake of prefabrication in New Zealand has been significantly slow with an uneven distribution across the country; around 70% of prefabrication manufacturers are located in the North Island (Moradibistouni, Vale, and Isaaks, 2018)

Overview

- Legislation and government policies are being developed to make prefabrication more mainstream (Ahamad, Azman, and Hussin, 2012)
- The biggest hindrance has been the lengthy delays in getting design approvals for prefabricated buildings; different TAs' requirements for prefabricated housing can vary significantly (Burgess, Buckett, and Page, 2013)
- The MultiProof initiative was launched by the New Zealand government in 2010 to fast track building consents for standard, multiple-use building designs (Kennerly, 2019)

Perceptions around prefabrication

- Prefabricated design and construction is stereotypically perceived as bland, inflexible and lacking individualization
- Flexibility of design can ensure a greater enthusiasm towards prefabrication (Blismas and Wakefield, 2009)
- Last stage design changes should be discouraged as this may create challenges for construction companies who are using prefabrication (Goulding and Nadim, 2011)
- Growing recognition of the potential of prefabrication in increasing construction efficiency and performance, cost reduction and subsequent reduction in environmental impacts (Burgess, Buckett, and Page, 2013; Chen and Samarasinghe, 2020)

Future developments

- New Zealand is challenged by a smaller consumer market and volatility to international macroeconomic conditions
- The local market has a limited number of companies that offer state of the art, desirable prefabricated homes
- Shortfalls within the supply chain lead to high material costs and marginal savings (Mirus, Patel, and McPherson, 2018)
- Slow uptake, greater research and development is needed to propel this industry

Research design

Research approach
Face-to-face surveys

Data collection methods
Questionnaires, followed by
Face-to-face, semi-structured interviews

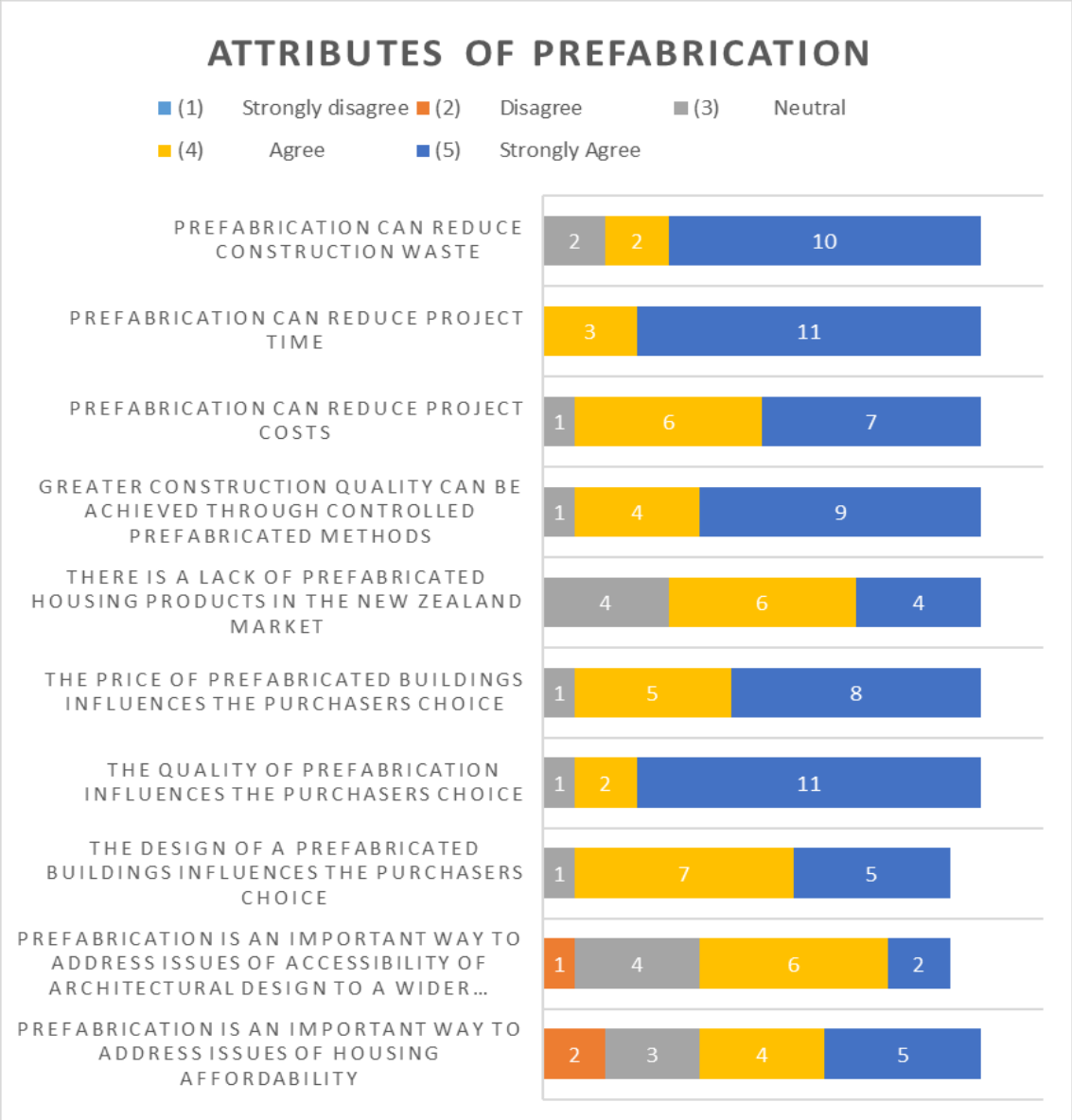
Research sample
Purposive – 14 industry professionals from 7 NZ based prefabrication companies

Research findings

Demographic data

- Position within the prefab industry –
  3 architects/designers, 3 project managers, 3 quantity surveyors and 5 sales/marketing professionals
- Years of experience within the prefab industry –
  9 (1-3 years), 3 (3-5 years), 2 (5-10 years)
- Types of projects the participants worked on –
  all 14 worked on residential but 4 worked on both residential and commercial prefabricated buildings
- Average project value – 100-500k, 500k-1m, 1-2m, 2-10m
- Auckland had the most prefabrication projects underway
- A stronger prefabricated presence in the North Island compared to the South Island

Research findings
Questionnaire results



Research findings
Questionnaire results

Strong agreement within the industry that prefabricated methods:

- Reduce project time
- Reduce construction waste
- Greater construction quality can be achieved through controlled prefabricated methods
- The quality of prefabrication influences the purchasers' choice
- Prefabrication can reduce project costs
- The price of prefabricated buildings influences the purchasers' choice

Research findings
Interview results

Drivers of prefabrication

- Current legislation is the biggest hindrance to the slow uptake of prefabrication in New Zealand
- Lack of customer knowledge and confidence in prefabrication
- More investment, training and R&D need enhancing
- More positive marketing and education around the technology are needed
- Need for overseas skilled labour to help drive the industry

Research findings
Interview results

Current state of development of the NZ prefab industry

- Targeting offshore markets would provide more brand exposure and access to more international suppliers who offer more competitive pricing
- Limited pre-finished products available in the market; panelised systems undergoing development
- Upscale of manufacturing with larger factories is needed to improve the industry
- Improving speed and delivery of prefabricated projects is essential
- More design freedom and flare are needed

Research findings
Interview results

Benefits of prefabrication

- Reduced cost and project time
- Ability to design around available material sizes creates less waste
- Building in a controlled environment, with no influences from the weather
- Minimal onsite disruptions

Research findings
Interview results

Factors influencing clients' decisions

- The design and size of homes are determining factors for clients when choosing between conventional or prefabrication methods
- Clients are willing to make sacrifices around design if there were time and cost saving benefits
- Time and cost are the most influential factors which lead to people choosing prefabricated homes

Conclusions and recommendations

- Prefabrication has great potential in the New Zealand construction market
- The benefits of prefabrication far outweigh the negatives
- Reduction in time, costs and wastes, better quality materials, and faster build time due to controlled environments
- Potential for prefabricated homes to become a market leader in providing affordable housing in New Zealand with appropriate government legislation and robust council processes, extensive marketing and education around the quality of available products
- Central and Local government as well as the residential construction industry need to invest in R&D of prefabricated methods of construction

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