

EXAMINING THE PRODUCTIVITY IN THE NZ CONSTRUCTION INDUSTRY

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Abstract

Construction productivity is a primary driver for economic growth. Understanding the factors that contribute to productivity will lead a country to prosperity. The trend for construction productivity in New Zealand is that it has remained stagnant over the past 12 years. For an accurate assessment on construction productivity and the factors contributing to it the elements and steps taken throughout the construction process need to be assessed. Through a literature review of both international and New Zealand based papers establishment of the main contributing factors were narrowed down. Primary qualitative data collection was then undertaken using experienced construction Project Managers and Site Managers working within the construction industry to provide their thoughts on the factors established as part of the literature review. The results from the interview analysis provide evidence for several areas of concern in relation to construction productivity. For some of these contributing factors the issues appear systemic and will require a paradigm shift if we are to influence the industry, for others small initial design, through planning and procurement and into execution.

Keywords: Construction Productivity, Supply Chain, New Zealand

1. Introduction

The construction industry in New Zealand is a \$30 billion plus industry, generating approximately 6% of GDP [1]. Construction productivity is a vital part of any countries' economy. As numbers of studies have been commissioned to look for ways to improve productivity and hence the strength and level of confidence in a country's economy [2]. However, construction is a large industry with a lot of moving parts, leading to the difficulty when it comes to assessing productivity. Meanwhile, there is no defined method for measuring productivity as there are many factors to consider [3, 4]. The purpose of this paper is to convey the evidence on the performance of the construction industry in relation to productivity. Productivity will be reviewed in terms of how productivity growth has performed to date and how construction industries productivity is now. The paper also includes comparisons between the New Zealand construction industry with other countries' industries within The Organization for Economic Cooperation and Development (OECD).

Various factors of construction productivity should be considered when looking at productivity as a whole in the New Zealand construction industry. These factors include, but are not limited to: employment skill levels, supply chain, design, labors costs, management and project planning.

2. Literature Review

Productivity in construction is a dynamic and wide ranging. Construction itself is broad and covers the building of infrastructure, housing and commercial builds [5]. The construction is a vital part of any growing economy contributing 6%, 7.6% and 9.7% to the New Zealand, Australian and European GDP respectively [1, 4, 6]. However, uncertainty in workloads leading to ineffective planning and reluctance to invest in staff and resources has had a substantial impact in New Zealand's ability to develop growth in productivity within the construction industry [2, 7]. In addition, New Zealand is an isolated country with the exception of Auckland, has a relatively sparse population spread. This isolated and

geographical separation provides difficult challenges when it comes to supply chain management [2, 4], which will have an effect on profits through transport or material costs [8].

3. Research Methods

A qualitative research has been conducted to collect primary data on the topic. The qualitative approach focuses on the subjective assessment of attitudes, behaviour and opinions, which includes smaller samples, but in more depth, resulting in deeper thoughts and opinions that can only be reached through prolonged analysis and discussion [9]. The method for data gathering was through one on one interviews, all interviewees that took part in the research have experience in excess of 10 years within the construction industry and were willing participants. For the research gathering, 3 site managers and 2 project managers are interviewed, which is an acceptable sample size for such research [10]. All the interviews are recorded and summarized into some brief notes. After that, post analysis of the recordings is provided and the results are reported in this paper. However, such method is limited in factual data production. The results only offer an interpretation of what is being said, which is still fundamentally in the mind of the researchers. Otherwise, such method can benefit the research by providing words and not just numbers as data analysis. It aims to answer the questions of 'how', 'what', 'where', 'when', or 'why' instead of the 'how much' and 'how many' from quantitative research.

4. Analysis & Results

The opinions of the interviewees are summarized as followings.

- From the comments received regarding complex details and nothing being typical in building design, it is commented that many buildings and developments are seen as 'one-offs' that is to say there is not much in the way of modular construction in New Zealand.

The vast range of details and designs coming out into the market place lends itself to inefficiencies as each build is unique. Therefore, the isolation from design developments being made overseas coupled with our smaller population base is contributing to the lack of repetitiveness of details and proven systems that is occurring elsewhere in the world.

- The supply chain in New Zealand for regularly sued building materials and fixtures is adequate. Construction sites are able to access the materials they require for conventional construction works without long lead times. Although the literature conveys this as a major issue on site it was not something that came through as being a major issue during the interviews, but it does form part of the problem. There were issues mentioned relating to the control mechanisms in place for the construction market in terms of price and availability of some products.
- A lack of skill for site based personnel was perceived by all participants in the interviews. There is a shortage in the skilled labour and this has a direct effect on productivity on site.
- All participants in the qualitative research were aware of labour costs associated with their projects. This is a good sign as it shows there is a connection between the costing of the job and the project team that undertaken the project itself, however it appears this is the extent of that connection. Otherwise, with all participants in the interviews agreeing the costs for labour and the resulting productivity were some ways apart, it links back to the skills and training section from the research undertaken. With no culpability on estimating staff currently observed from the responses gathered as part of the qualitative research there seems to be an area for improvement, at least in the reporting of trades and productivity witnessed.

- A vast amount of planning goes into any construction project to help make it more productive, but from time to time the planning can go out the window if there is a breakdown in communication and a crucial material is short onsite. As was mentioned by the interviewees many of them have relied on their relationships and history with particular suppliers to ‘make it happen’ and have an order on site at a fast turnaround. This works well for the suppliers too.

5. Discussion & Conclusion

The research contribution as a result of achieving the research aim can be found in the form of actionable bullet points listed below.

a. Design

- More collaboration is required between designers (architects) and sub-contractors.
- The use of modular construction and standard details for certain areas – mainly regarding roof construction flashings and details should be increased.
- Designers should only take a workload they can reasonably handle and service.
- Simplifying or developing standard construction details for certain areas of the buildings.
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b. Supply Chain

- The supply chain is reasonably good for basic building materials; however, more clarity is required on the costs New Zealanders are paying for the materials compared to markets such as Australia.
- Make it easier for new materials to be tested and BRANZ approved for integration into New Zealand market.
- Training would be beneficial for construction site management on motivational techniques and fundamentals of motivation.
- Technology uptake needs to be more wide spread with regards to building

information modelling (BIM). Training, advertising and buy-in from consultants will save time on site regarding productivity.

c. Labour

- A more robust method of recording labour rates and output is required for some businesses to get a better idea of market rates and output expectations.
- Closer collaboration between site and tender teams is needed to check time frames.
- Labour reporting from job to job and site team to site team would be advantageous for future jobs and team member requests.

d. Project Planning

- Office teams need to be collaborating with the site teams for program durations and buildability concerns.
- Construction companies need to encourage their site teams to note down issues they encounter through the job.
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- Architects and designers need to review the lead times for items they specify in their design.
- Risk registers need to be setup at the tendering stages to outline areas where supply or other construction risks may lie.
- The Government should look into areas of construction that are providing constant productivity issues, such as windows and glazing, and report as to what reasons there could be for parts of the essential construction products to have supply chain issues.
- Suppliers of New Zealand building products need to be monitoring the construction industry more closely to recognize fluctuations in demand, ensuring product is stocked accordingly.

e. Skill, Training and Motivation

- New Zealand business need to be more aware of training available for their staff, and ensure their staff are aware of training options open to them.
- More collaboration between employers and employees is required so that employees can voice their wishes with regards to training and employers can see that it happens.
- Family trees from sub-contractors and relative experience need to be recorded at tender time.
- An investigation into the standard of the apprenticeship programmes in New Zealand may be required with more advertising and exposure to trades as a good career option for youth.

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