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**BUILDING DEVELOPMENT COST DRIVERS IN THE NEW
ZEALAND CONSTRUCTION INDUSTRY: A MULTILEVEL
ANALYSIS OF THE CAUSAL RELATIONSHIPS**

2018

**BUILDING DEVELOPMENT COST DRIVERS IN THE NEW
ZEALAND CONSTRUCTION INDUSTRY: A MULTILEVEL
ANALYSIS OF THE CAUSAL RELATIONSHIPS**

A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy (PhD)

in

Construction

School of Engineering & Advanced Technology

Massey University

Albany

New Zealand

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[SID 09166424]

February 2018

Statement of Originality

I declare that this thesis is my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for degree or any other qualification.

Lin Lin Zhao

Abstract of Research

Building development cost is influenced by a raft of complex factors which range from project characteristics to the operating environment and external dynamics. It is not yet clearly understood how these factors interact with each other and individually to influence building cost. This gap in knowledge has resulted in inaccuracies in estimates, improper cost management and control, and poor project cost performance.

This study aims to bridge the knowledge gap by developing and validating a multilevel model of the key drivers of building development cost (BDC) and their causal relationships. Based on literature insights and feedback from a survey of industry practitioners, some hypotheses were put forward in regards to the causal relationships between the BDC and the following key drivers as latent constructs: project component costs factor, project characteristics factor, project stakeholders' influences factor, property market and construction industry factor, statutory and regulatory factor, national and global dynamics, and socio-economic factor. Observed indicators of the model's latent constructs were identified and measured using a mixed methods research design.

Results showed that property market and construction industry factor was the most significant predictor of building development cost in New Zealand, while project component cost factor has the least impact. The model's fit to the empirical dataset, and its predictive reliability, was validated using structural equation modelling. Results of an additional model validation test by a panel of experts further confirmed its efficacy. Overall, the results suggest that sole reliance on the immediate project component costs without due consideration of the wider and more influencing effects of the external factors could result in inaccurate estimates of building development cost. Key recommendations included addressing the priority observed indicators of the most significant latent variables in cost studies and analysis.

Keywords: Building development cost, cost drivers, cost modelling, cost prediction

Ethical Approval

Massey University Human Ethics Committee (MUHEC) granted 'Low Risk Notification' to this research project. Such approval was granted on 20 October 2015 under Ethics Notification Number 4000015096 for the study titled "Building Development Cost Drivers in the New Zealand Construction Industry: A Multilevel Analysis of the Causal Relationships.

Acknowledgements

I am immensely thankful to so many people who have been part of my Ph.D. journey and made it possible. While I look back to write this acknowledgment, a feeling of gratitude and thankfulness is becoming more overpowering and overwhelming. This thesis would not have been possible without the participation of many wonderful people who contributed their precious time, valuable feedback and expertise to this research project. Without their incredible support I could not have accomplished it.

First, I would like to express my deepest gratitude and appreciation for my research supervisor, Dr. Jasper Mbachu, for his unstinting guidance, knowledgeable advice, unfailing support, and motivation. Dr. Mbachu has remained a steadfast source of support and encouragement throughout this journey.

I would like to thank my Co-Supervisor, Dr. Niluka Domingo for her feedback and encouragement. Special thanks go to staff and colleagues from the School of Engineering and Advanced Technology (SEAT) for their kind and continuous support.

This research was supported by the Chinese Scholarship Council and Massey University for which I am very grateful. Without their financial support, it would have been impossible to pursue my doctoral degree in such an academic university and in such a beautiful country.

I sincerely express my utmost appreciation to the professional associations/institutions in New Zealand and internationally operated, such as NZIA, NZIQS, NZIOB, ACENZ, PINZ, and PCNZ for their assistance in providing their in-depth insights based on their expertise and experience. Moreover, a big thank you to all those people who provided assistance and the facilities enabling contact and connection with the industry professionals.

I also wish to express thanks to Massey University Human Ethics Committee (MUHEC) for granting approval to undertake the stakeholder consultation process.

I am grateful to the organizations and individuals who participated in this research. Heartfelt thanks go to all the clients, consultants, contractors and project managers, quantity surveyors

and all those industry-related professionals who extended their support, dedicated their time and shared the data required for this research.

Finally, my sincere thanks go to my family for their blessings, unfailing faith, and enormous support, all of which has contributed to my progress to date towards successful completion of this research. I am very glad to have an opportunity to say “Thank You” to my great Mom — Li Feng Yun. You are so kind, so careful, and such a lovely Mother; I am so lucky to be your child. Moreover, I will always have sadness in my heart for my Father – his loss was such a blow.

Dedication

To my amazing Mother

Feng Yun Li

List of Abbreviations

ACENZ	Association of Consulting Engineers New Zealand
AMOS	Analysis of Moment Structures
ANOVA	Analysis of Variance
BDC	Building Development Cost
BRANZ	Building Research Association of New Zealand
DBH	Department of Building and Housing
IPENZ	Institution of Professional Engineers New Zealand
MANOVA	Multivariate Analysis of Variance
MUHEC	Massey University Human Ethics Committee
NGD	National and Global Dynamics Factor
NGD1	Global Political Dynamics
NGD2	Natural Forces
NGD3	Global Economic Trend
NGD4	Global Business Sentiments
NZIA	New Zealand Institute of Architects
NZIOB	New Zealand Institute of Building
NZIQS	New Zealand Institute of Quantity Surveyors
PCA	Principal Component Analysis
PCC	Project Component Costs Factor

PCC1	Design Cost
PCC2	Construction Cost
PCC3	Procurement Cost
PCF	Project Characteristics Factor
PCF1	Project Location
PCF2	Project Complexity
PCF3	Procedures Methods
PCF4	Contract Types
PCF5	Technology Innovation
PCNZ	Property Council New Zealand
PINZ	Property Institute of New Zealand
PMCI	Property Market and Construction Industry Factor
PMCI1	Material Market
PMCI2	Labour Market
PMCI3	Competition Level
PMCI4	Market Structure & Size
PMCI5	Boom and Bust Cycles
PMCI6	Relationship of Supply and Demand
PMCI7	Investment Tendency
PMCI8	House Sell/Rent Prices
PSI	Project Stakeholders' Influences Factor

PSI1	Clients
PSI2	Consultants
PSI3	Contractors
PSI4	Suppliers
PSI5	Building Officials
RMBF	Registered Master Builders Federation
SEF	Socio-Economic Factor
SEF1	Gross Domestic Production
SEF2	Capital Goods Prices
SEF3	Producers' Prices
SEF4	Consumer Price Index
SEF5	Productivity in Construction Industry
SEF6	Labour Cost
SEF7	Net Migration and Population Growth
SEF8	Employment Rate
SEF9	Housing Prices
SEF10	Building Consents
SEF11	Energy Prices
SEF12	Exchange Rate
SEF13	Monetary Policy
SEF14	Investors' Confidence

SEF15	Government Fiscal Policies
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
SRF	Statutory and Regulatory Factor
SRF1	Building Code and Compliance
SRF2	Health and Safety Regulations
SRF3	Political Policies
SRF4	Financial Regulations
SRF5	Construction Contracts Act

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