

CONSTRUCTION MANAGEMENT



UNSW
AUSTRALIA

Graduation Projects
Construction Management & Property

Never Stand Still

Built Environment

PROPERTY 2015

Again it is time of the year to celebrate and showcase the talents of our high achieving students! This booklet contains our students' research projects in their Honour's degree program, and covers a wide range of topics in the construction and property industry. This year's students produced some very interesting research outcomes and achieved outstanding results in their thesis program.

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Bachelor of Construction Management & Property
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PROFESSOR ALEC TZANNES AM

Congratulations to the students who have completed their degree at UNSW Built Environment and now join our alumni community.

This catalogue provides a glimpse into some of the many study themes and projects you have undertaken as part of your academic experience and serves as a record of your graduation class.

We have designed your program of study to reflect advanced contemporary professional practice emphasising the development of leadership skills and innovation, ensuring that as a graduating student you have the best opportunity to be at the forefront of your chosen field of endeavour.

Now that you have graduated, our relationship evolves from student to alumnus, continuing a lifelong engagement of support and involvement (register to join the alumni community at www.alumni.unsw.edu.au). As you travel the world through your career, you will meet many alumni who have become global leaders through their innovative thinking, acting as catalysts for change in all facets of the built environment professions as well as in other fields of work. As an alumnus we encourage you to keep in touch with UNSW Built Environment. We are always keen to support our graduates and publish their successes throughout our alumni network. Please email us your news and updates at BEalumni@unsw.edu.au.

We are also always grateful to our alumni who support our future students with scholarships, prizes, internships and mentoring programmes.

Should you wish to further your education, qualifications and knowledge, UNSW Built Environment Graduate School of Urbanism (AGSU) offers an extensive suite of post professional degrees. AGSU focuses on advanced qualifications in specialised interdisciplinary areas of professional practice and a suite of highly relevant research orientated programs of study. Our commitment to being the leading educators in the design and delivery of more liveable, sustainable cities has underpinned the creation of the AGSU.

As a professional, I also invite you to join our LinkedIn group (UNSW Built Environment) where you will be able to keep in touch and network with your peers, other professionals and UNSW Built Environment.

I wish you a successful and rewarding career.

Professor Alec Tzannes AM
Dean, UNSW Built Environment



DR. CYNTHIA WANG DISCIPLINE DIRECTOR

Again it is time of the year to celebrate and showcase the talents of our high achieving students! This booklet contains our students' research projects in their Honour's degree program, and covers a wide range of topics in the construction and property industry. This year's students produced some very interesting research outcomes and achieved outstanding results in their thesis program.

Construction management and property development are concerned with the effective procurement of built facilities in the context of time, cost and quality objectives, and the growing imperative for sustainable development. The complexity of the planning, design, construction and operation of client's properties requires graduates to be able to oversee and coordinate large multidisciplinary teams. At UNSW, the Bachelor of Construction Management and Property (BCMP) Program aims to produce graduates with broad knowledge and skills to meet the changing demands of the construction and property industry.

The degree provides students a unique opportunity to explore both the construction and property area, while also allowing students to specialise in one of the four areas – building construction, quantity surveying, property development and facilities management. The education of the BCMP students at UNSW is provided by highly capable university academics and experienced industry professionals. Students gain practical skills and real life experience in the course of the study as well as high-level critical thinking and strategic management skills. Our program is renowned for its ability to produce future industry leaders. In this booklet, our honour's students have contributed to a range of contemporary issues in the construction and property industry.

Please join me in congratulating the 2015 Honour's program students for their wonderful achievement and wish them great success in their future career.



DR. BEE LAN OO THESIS PROGRAM CONVENER

The thesis program of the Bachelor of Construction Management and Property (CMP) degree entails two courses, namely: BLDG 4501 Thesis Foundation and BLDG 4502 Thesis, which continuously extend over two 13-week semesters. The program enrolment is by invitation only based on students' academic progression and performance. The program offers students with capstone experience, in their final year of studies, towards development and implementation of a major independent research project. Upon completion of their research project, students would have acquired key competences including problem-solving and analytical skills, and report writing skills.

In 2015, our 15 students enrolled in the thesis program pursued a remarkable diversity of thesis topics ranging across important contemporary topics in the Architectural, Engineering, Construction and Property industries. These include: Construction Innovation, Construction Cost Management, Construction Education, Sustainability Management, Construction Safety, Facilities Management and Property Market Analysis and Development.

Each student was assigned an advisor from our CMP program, who possesses respective contributory expertise within the Architectural, Engineering, Construction and Property domain. Taking this opportunity, I would like to thank all my fellow colleagues: Prof. Martin Loosemore, Dr. Jinu Kim, Dr. Cynthia Wang, Dr. Imriyas Kamardeen, Dr. Riza Sunindijo and Dr. Benson Lim. Their valuable contribution and guidance to the students' research projects are indispensable.

This graduand catalogue is a showcase of the students' masterpieces. On behalf of our entire CMP team, I am honoured to offer sincere congratulations to our thesis students of 2015.

BACHELOR OF
CONSTRUCTION
MANAGEMENT
& PROPERTY
FINAL YEAR
THESES



Property Developers' Perspectives Towards Developing Sustainable Commercial Building

The perception of a commercial building as a commodity is changing to emphasise building characteristics and performance as a major determinate of property developers to develop sustainable commercial building. Initiatives to develop high performance commercial buildings attract new development methods that increasing development cost subjecting property developers to development dilemmas.

This research aims to discover the perspective of property developers and attempts to examine the issues and challenges when developing sustainable commercial buildings. It raises the theoretical question – 'How sustainable goals may be achieved'. A semi-structured interview was conducted and based on a qualitative approach, five property developers were individually interviewed to discover the issues and challenges they face. Interviews accurately determined behavioural patterns, by displays of attitude and reactions, in conjunction to the objectives of this thesis.

Findings show a lack of knowledge and education, company policy and corporate social responsibility are responsible for the issues and challenges property developers face. Results indicate training and development programs will subsequently encourage clients to pursue sustainable commercial buildings. Through the implementation of company policies and corporate social responsibilities, clients will be aware of the benefits, leading to increased developments of sustainable commercial buildings.

Contact

ferrasbatta@hotmail.com

Thesis Supervisor: Dr. Benson Lim

Pictured

Sustainable commercial building



Cross-cultural Construction Management

An Australian project manager's perspective

The construction industry within Australia has had to adapt to the effects of an increasingly globalised world. Within the industry there exists a shortfall in research on the increasing importance of soft skills in an Australian context. As such this research paper attempted to address the gap in knowledge. The research aim is to investigate the cross-cultural project management experience of Australian project managers. Under this aim, the specific objectives are set as follows:

1. To explore the trend of globalisation and its impact on the Australian construction industry;
2. To identify key project issues in cross-cultural project management; and,
3. To identify the key skillsets for successful cross-cultural project management.

This research adopted a qualitative approach and eleven interviews were conducted. The construction project managers interviewed were at the time of writing working for APP Corporation, CBRE, Cornerstone Projects, FDC, IHA, INFIGO, Knight Frank, PWC and PACT.

The key findings demonstrate that soft skills, including greater communication skills, could form a greater part of a project manager's skillset. The soft skills appear to complement the project management technical 'hard' skills and be the competitive edge required to manage cross-cultural relationships and deliver successful projects.

The findings in this research will help steer the direction of project managers in the construction industry by informing them of how to gain a competitive edge in cross-cultural projects.

Contact

david.cotterill79@gmail.com
0404 500 593

Thesis Supervisor: Dr. Benson Lim

Pictured

Cross-cultural construction

An Investigation into Barriers to Entry Faced by Indigenous Businesses and Social Enterprises in the Australian Construction Industry

Social enterprises are organisations that operate like a business, but address a social mission and redirect profits towards that social mission. Although the literature on this subject is growing, there is little research done into social enterprise and its relationship with the Australian construction industry. Further, social enterprises are vastly underrepresented in the Australian construction industry. This research therefore seeks to identify the barriers to entry that are preventing these businesses from being more prevalent in the Australian construction industry. Indigenous businesses form the focus of the research because, even though they may operate for a profit, there are many Indigenous businesses who seek to improve the skills and education of a local community, in a similar manner to social enterprises. The results of the research show that Indigenous construction businesses have similar experience to Indigenous non-construction businesses regarding general barriers to entry. However, the results also highlight that there are a number of construction entry barriers specific to Indigenous businesses. These mainly relate to the attitudes towards Indigenous businesses and social enterprises. These results indicate that there needs to be an attitude shift within the industry to a more inclusive culture that encourages their use. This is particularly true in the context of the federal government's new Indigenous Procurement Policy introduced in July 2015. Building off this study, future research has the potential to explore the cause and effect of these barriers to entry, and investigate the relationships that have been identified between certain barriers.

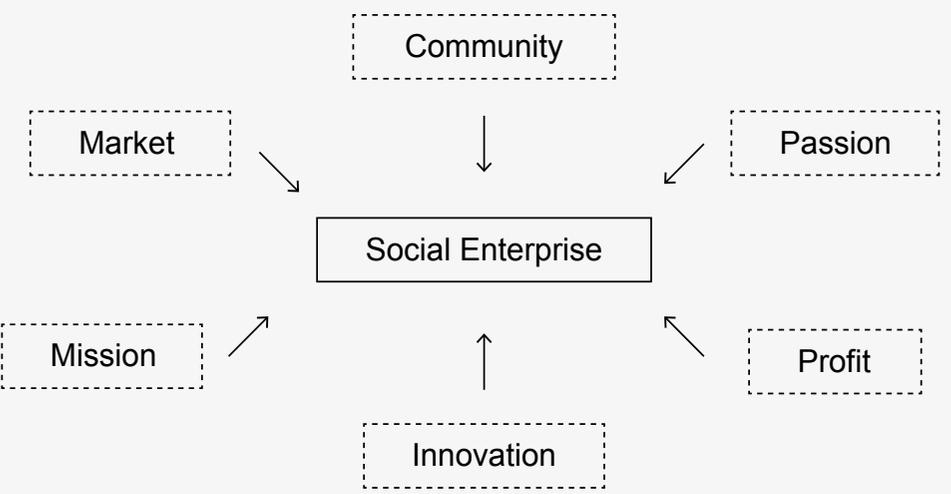
Contact

george.dennysmith@gmail.com
0409 213 029

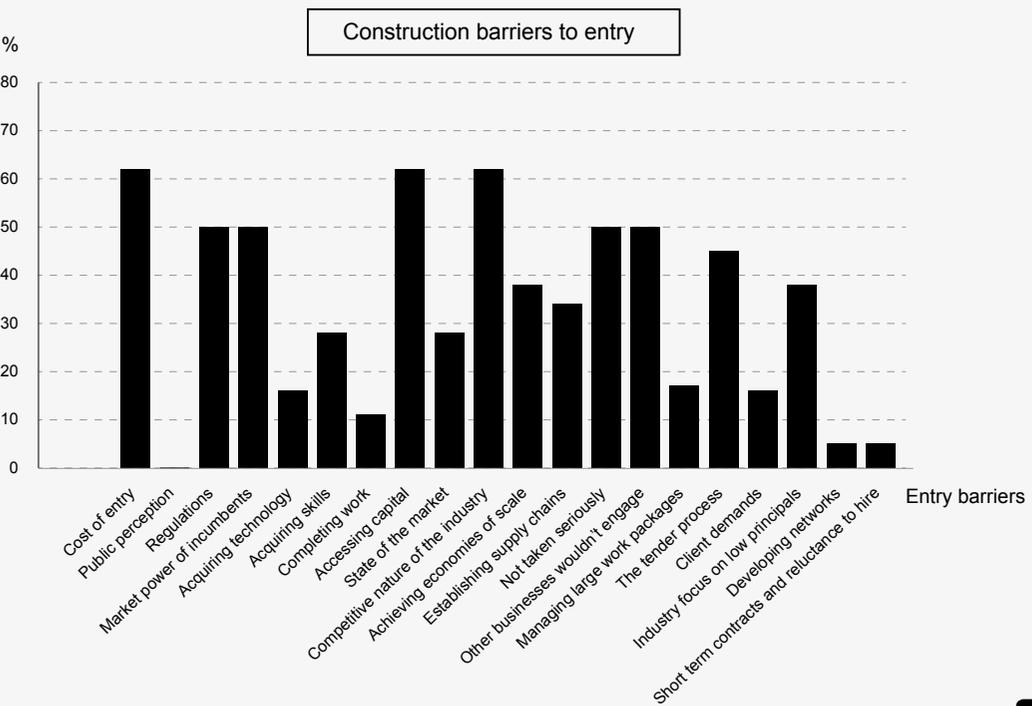
Thesis Supervisor: Prof. Martin Loosemore

Pictured

1. Drivers of social enterprise (www.socialenterprise.com.au)
2. Entry barriers faced by Indigenous construction companies



1



2

Investigating the Potential Impacts of the WHS Act 2011 on Safety Management in Small and Medium Construction Companies in NSW



The harmonisation of Australia's Work Health and Safety (WHS) Act, implemented on the 1st of January 2012, poses significant implications for safety management on Australian construction sites. The several changes in the legislation have the potential to affect all construction businesses, however, to varying degrees, particularly to small and medium enterprises (SMEs). The aim of this study is to identify the potential impacts of the WHS Act 2011 on safety management in SMEs in the NSW construction industry. In particular, the objectives of the research are:

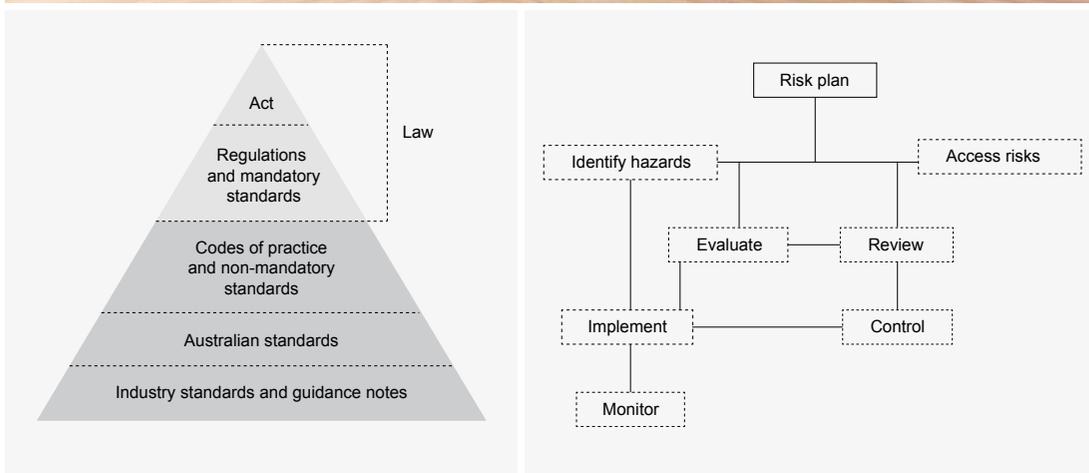
1. To identify the major changes resulting from the Act;
2. To measure the current level of awareness of these changes among SMEs;
3. To establish the potential of the changes to affect SMEs safety management in the NSW construction industry.

Seven key changes were identified, with SMEs awareness being tested via the use of a two-part questionnaire survey. Results in part one showed a particularly low level of awareness of the major changes in the WHS Act 2011. This was found to be concerning, particularly given that the results in part two showed strong potential for the WHS changes to positively affect SMEs safety management. This study is significant as it shows that SMEs in the NSW construction industry require more education and training at times of legislative change in order for them to ensure legislative compliance is implemented and maintained.

Contact

j.furci@ganellen.com
0437 017 962

Thesis Supervisor: Dr. Riza Sunindijo



Sydney's Growing Property Prices

A study of Waverley Council's residential property market

Waverley Municipal Council is a local government that administers a handful of suburbs within Sydney's Eastern Suburbs. These suburbs governed by Waverley council are notorious for their above average property price and rental premiums. With a dense population and large proportion of dwellings being units or semi-attached, the area appears to be a desirable location for home owners and/or occupiers. Furthermore, the areas close proximity to amenities such as iconic beaches, schools, CBD and more could attribute to these price premiums.

The purpose of this study is to analyse the Waverley local government areas residential property market. Research focused on:

- Exploring past market tendencies, where a sample data set (over a 10 year period) was identified;
- Understanding diverse cyclical behaviour and attempting to link their relationship to fluctuations within property prices and rental returns; and,
- Identifying lead property performance indicators through the establishment of these relationships.

With property wealth reported to represent 60% of net household wealth, ambiguous property performance concepts cloud the market, which has a potential to spur uninformed decisions resulting in equity loss.

Throughout research explored, a theoretical framework is established. This framework then aims to guide the studies objectives.

The findings support a relationship between identified property performance indicators and property price and rent fluctuations. Conclusions and recommendations aim to guide further study, where larger data sample sets are proposed to yield more accurate results.

Contact

allanlivits@live.com.au
0402 620 994

Thesis Supervisor: Dr. Jinu Kim

Pictured

1. Dover Heights, Waverley LGA
2. Property auction hype



1



2

Managing Client Requirements

The Australian construction industry's perspective

A significant research gap within the subject area of Client Requirements Management (CRM) was discovered upon completion of an extensive literature review. Existing research had not included the perspective of client side Project Managers (PMs) and was not specific to the Australian construction industry. Therefore, this research is to identify the best practices of the Australian construction industry for CRM, and propose ways to improve the efficiency of CRM for the construction industry in a wide context.

A qualitative approach was adopted and executed through a series of semi-structured interviews which were carried out with clients, PMs and builders. A thematic analysis was then encompassed to examine and identify themes within the collected data.

Firstly, the thematic analysis uncovered that Australian construction professionals take the project brief as the most effective method of capturing and managing CRs. Other methods include regular meetings; project management plans; the procurement method; risk management plans; and design drawings.

Several problems which have been noted in previous literature to hinder effective CRM are also present within the Australian construction industry.

These problems include poor stakeholder management, the clients changing requirements and poor communication. Industry professionals also highlighted several issues which had not been disclosed in existing literature. These include poor administrative skills, a lack of relevant experience and insufficient resourcing.

In order to realise 'best practice' of CRM within the Australian construction industry, all common problems hindering effective CRM should be addressed. A clear establishment of CRs, strong stakeholder management, and continuous communication were perceived to be the main contributors to 'best practice' of CRM.

Furthermore, industry professionals encouraged the engagement of PMs on project as they perceive them to encompass all of the skills to execute best practice of CRM.

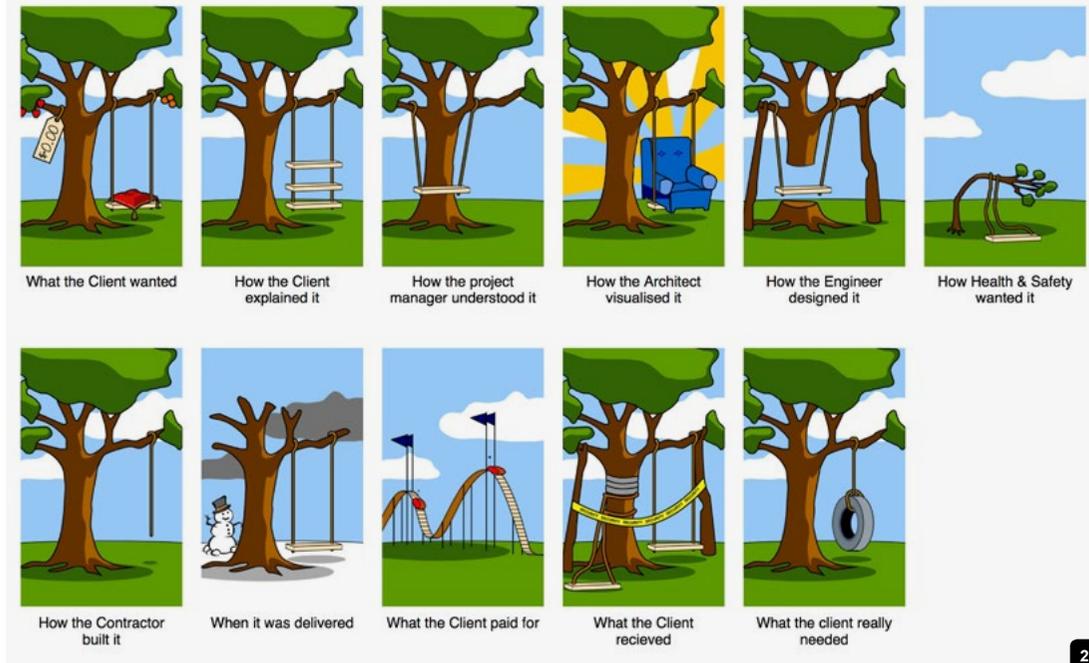
Contact

james.lubke@gmail.com
0435 133 608

Pictured

1. Increased client focus on Australian construction
2. Differing professional perspectives

Thesis Supervisor: Dr. Cynthia Wang





Facilities Management and its Education in Australia

Facilities Management (FM) services are central in the Australian property industry to organisations since its inception in the late 1970s. Despite the contributions FM has made towards the built environment, organisations, and economy, the discipline's development is still in rudimentary stages with limited educational offerings and recognised career pathways.

This research-explores-the current state of FM in Australia and its lack of educational courses. It offers a definition of FM, explores the ideal competencies of those employed in the industry, and presents some identified shortfalls in the industry. It gauges feedback from the analysis process on current FM educational offerings.

This research adopted a qualitative methodology and eight semi-structured interviews were conducted with industry experts. A thematic analysis was conducted to map out the perspectives and opinions of what FM is, the skills and competencies required of facilities professionals and the opinions of FM education and qualifications. The end result is a proposed conceptual FM framework for an undergraduate course for future research. By doing this it attempts to address those shortcomings and offer a starting point to build a FM knowledge base and promote future development of this upcoming discipline.

Findings show and reaffirm the many differences in the definition of FM, is a cause in a blurred identify of the discipline. This spills across to facilities managers where their roles and responsibilities, along with their skills and competencies are varied dependent on their work and organisation. Findings show that education and formal qualification for facilities managers are not so much a prerequisite. However, if a distinct FM course were offered, it would be well received and welcomed. Overall the findings correspond with existing research and identified shortfalls in the Australian FM industry and discipline.

Contact

lindaly811@gmail.com

Thesis Supervisor: Dr. Benson Lim

Pictured

Facilities Management higher educational courses in universities

Costs and Causes of Defects in the Construction of Electrical Substations

Defect costs and causes have plagued the construction industry for decades. Previous research has identified the need to explore costs and causes of defects to help eliminate or reduce the occurrence. Defects can arise immediately after completion, during the project assessment stage and some during the implementation stage. There are a variety of reasons why defects occur at this time. The defects have far-reaching implications on the project and the reputation of the contractor. Measurement and an analysis of the causes and costs of defects will provide an opportunity to overcome factors that cause poor project quality performance and management.

This thesis aims to examine the types and causes of defects on electrical substations in Australia, investigating their cost implications, as well as exploring the relationship between prefabrication and the costs and causes of defects. Using a survey design, 33 electrical substation project defect data was collected. The results show that the most common cause of defects is construction defects. Defect costs in electrical substations in Australia averaged 3.3% of the project value and projects that featured prefabrication produced lower total defect percentages than projects that were built in situ. From this, contractors should learn from previous experiences and implement systems to reduce defects.

Contact

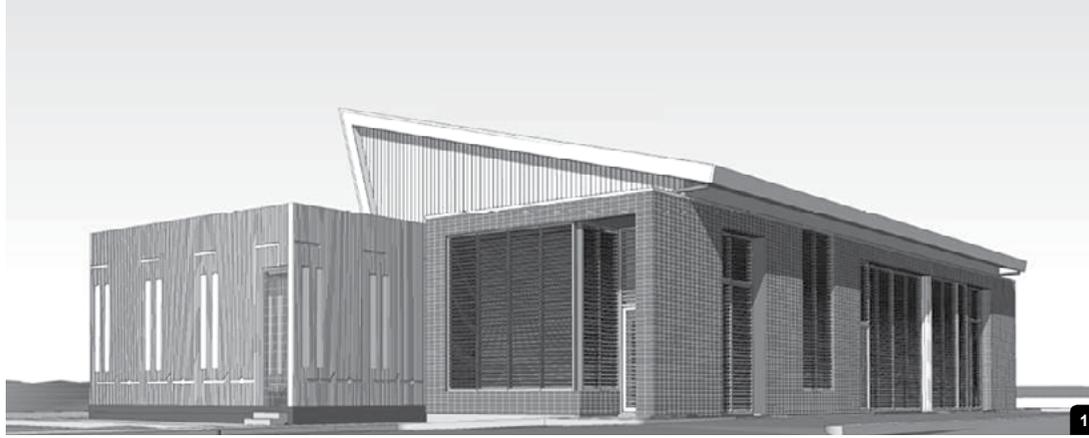
daniel.sesar@student.unsw.edu.au

0477 377 299

Thesis Supervisor: Dr. Bee Lan Oo

Pictured

1. Electrical substation building concept design
2. Electrical substation building fully constructed
3. Electrical substation building and infrastructure



An Investigation into the Absorptive Capacity of Australian Construction Firms and its Influence on the Use of Prefabrication

The Australian construction industry has been known to be slow to change and poor in adopting more innovative practices such as prefabrication. Therefore the purpose of this study is to identify if the absorptive capacity of construction firms has an effect on the uptake of prefabrication. In order to identify the absorptive capacities and prefabrication use of construction firms a questionnaire was sent out, whereby the absorptive capacity of firms could be measured and their use of prefabrication could be identified. The results of the study identified that firms who were shown to have better levels of absorptive capacity adopted more complex levels of prefabrication. Therefore, based on the findings in this study the effectiveness and importance of absorptive capacity has been identified. As a result absorptive capacity should be considered a fundamental aspect of a construction firm's ability to become more innovative.

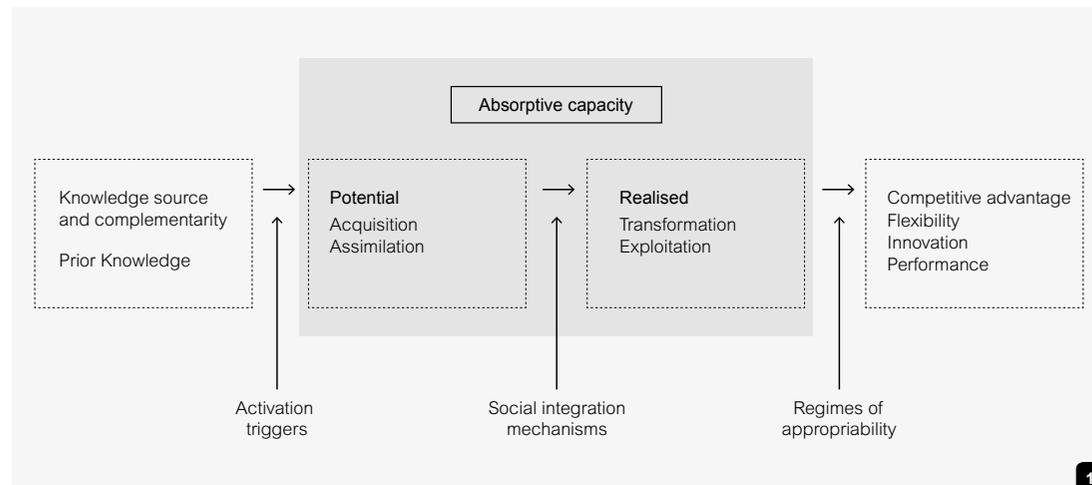
Contact

daniel.sesar@student.unsw.edu.au
0477 377 299

Thesis Supervisor: Prof. Martin Loosemore

Pictured

1. Prefabrication
2. Model of absorptive capacity



Organisational Citizenship Behaviour Among Quantity Surveyors

A multi-dimensional framework involving the culture and job satisfaction

Largely dependent on the organisation and external factors such as the age and size of the organisation, objectives and strategies of their corporate profile as well as an individuals' experience – culture can influence the individuals' behaviour. Culture matters to the extent that a social perspective provides new insights into the psychological processes – how an individual thinks, acts and performs.

The aim of this research is to examine the Individualism-Collectivism (IC) culture on Organisational Citizenship Behaviour (OCB) on professionals with Quantity Surveyor (QS) experience. More specifically, the objectives are to to:

1. Determine the dimensions of individualism-collectivism (IC) culture and OCB;
2. Explore IC culture and OCB through roles and experiences; and,
3. Examine the relationship between IC culture, OCB and job satisfaction.

This research adopted a survey design and data was collected by using an online questionnaire. A total of 66 responses were used to analyse the data. Four statistical tests were conducted using the SPSS (Statistical Package Social Sciences) software: factor analysis, one sample t-test, independent t-test and Pearson's correlation coefficient.

The results indicate the norms of Australian QS individuals were found to be 'cooperative' in nature and reinforced with strong 'courteous' behaviours, reflect collectivistic orientations. It is recommended that Australian corporations adopt the framework developed to reposition human resource management policies towards structuring, recruiting, retaining and managing QS individuals in the construction industry.

Contact

daniel.sesar@student.unsw.edu.au
0477 377 299

Thesis Supervisor: Dr. Benson Lim

Pictured

1. Decision time – behaviours in the construction industry
2. Synergy of quantity surveyors – cooperation



1



2

What is the most suitable work integrated learning framework in construction management education?

New graduates must overcome many challenges such as inexperience, lack of confidence in their abilities, shortage of skills, getting lost about the future career or even thinking that they are not prepared fully for industry employment. It is because of a big gap between university education and relevant employment, that students do not get much practical experience during studies. In order to solve this problem, this research focuses on how to implement Work Integrated Learning (WIL) and what is the most suitable WIL framework for construction management education and the challenges that students, universities and industry may face in implementing WIL in construction education.

The research found that participants believes WIL program should be compulsory for all students for a period of at least six months and they may do it during the 2nd and 3rd year of study. Moreover, students, universities and industry are likely to face many challenges to implement WIL programs such as conflicts with studying and working during the WIL program as the main challenge for students, lack of resources to manage WIL program properly as the main challenges for university and conflicts in the commitment of students is considered as the main challenges for the industry. The findings of this study can provide guidance for universities to improve understanding of industry and students' perspectives on WIL program and so, they can achieve the best outcomes for construction education in implementing WIL program.

Contact

khaihoang2301@gmail.com
0450 902 301

Thesis Supervisor: Dr. Imriyas Kamardeen

Pictured

1. WIL framework for construction management education after the research
2. Construction industry on site

Type of WIL	Placement
Status	Compulsory
Discipline	Construction Management
Duration	6 months
When offered	2nd year/3rd year
Paid/Unpaid	Paid
Method of matching student to industry partner	<ul style="list-style-type: none"> • Student find by themselves • University plays a third role to help students
Preparation for WIL	<ul style="list-style-type: none"> • Consider academic achievement • Complete an interview to assess students' suitability in the industry
Delivery	Workshop, guest lecture from the industry, weekly meeting with students, advertisement email from university
Assessment	Reflective journal and employer's report are used to assess student based on the SOLO taxonomy of level of understanding
Other requirements	Create Cooperative Education Unit to manage and help placement students – need to be discussed based on different universities and industry

1



2



Female Student Enrolments into Undergraduate Construction Management and Property Degrees

The trends and barriers

The construction industry is a leading contributor to the Australian national gross domestic product, with 9.1% of the Australian workforce being employed in a construction related position or trade. Globally there is a severe under-representation of women – a gender which makes a little over half of the tertiary graduates we have today. Yet female numbers in the industry remain static.

The aim of the study was to first examine the enrolment trend of females into the programme at UNSW. Then, we investigated the possible barriers which have prevented female students from pursuing a construction-related career. To satisfy the first aim, a trend-line was produced through the analysis of enrolment numbers into the UNSW construction programme over the past ten years (2006–2015). For the second aim, a questionnaire was sent to current students which asked them to rate on a 5-point Likert scale how much they agreed to certain statements pertaining to certain statements. Of the various statements given to the respondents, the major issues were found to be those relating to perception of the industry and the influence of significant persons, (such as parents and careers counsellors).

The research recommends that further studies should be done in the following two areas:

1. Factors affecting the formation of a child's gender schema (e.g. parenting styles or ideologies) which may deter/encourage enrolment into construction programmes; and,
2. The possible correlation between a student's perception of their probability of success in the industry and whether they will be willing to pursue a construction-related career.

Contact

ewidjaja93@gmail.com

Thesis Supervisor: Dr. Bee Lan Oo

Pictured

Women thriving in the construction industry



Research to Improve Implementation of Life Cycle Costing in Australian Construction Industry

Quantity surveyors' perspectives

Quantity surveyors have an important role in Life Cycle Costing (LCC). They help clients to achieve financial sustainability by evaluating the economic performance of a building throughout initial construction, operation and maintenance, refurbishment and demolition stages. However, the implementation of LCC in the construction industry is slow and limited. The research aims to investigate the implementation of LCC in the Australian construction industry from quantity surveyors' perspectives. The research adopted a mixed-method approach consisting of interviews and surveys to collect quantity surveyors' perceptual data on the implementation of LCC. Quantity data collected were analysed through the IBM Statistical Program for Social Sciences (SPSS version 21.0), and the results were justified with the preliminary findings from the interviews and literature review to derive the final findings. The research findings suggest tight budget is the most commonly identified barrier while providing a standard methodology on how and when to conduct LCC is the key driver to LCC implementation. The research findings also suggest the level of implementation of LCC is related to clients' bias against LCC and quantity surveyors' knowledge of LCC.

Contact

wanting.zhang@outlook.com.au

Thesis Supervisor: Dr. Benson Lim

Pictured

Life cycle costing – 'The Iceberg Effect'

This graduand catalogue is a showcase of the students' masterpieces. On behalf of our entire CMP team, I am honoured to offer sincere congratulations to our thesis students of 2015.

DESIGN BY: Equilibrium Design
equilibriumdesign.com.au



CONSISTENT MANIAC

UNSW BUILT ENVIRONMENT

UNSW Australia

Phone: +61 (2) 9385 4799

Email: fbe@unsw.edu.au

Online: be.unsw.edu.au

CRICOS Provider Code: 00098G

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