



ASSOCIATION OF RESEARCHERS IN **CONSTRUCTION MANAGEMENT**

Proceedings of the
ARCOM Doctoral Workshop

*Linking Methodology and Methods in
Construction Management Research*

17th January 2024

University of Limerick

Workshop Convenor: Dr. Emmanuel Aboagye-Nimo
Birmingham City University

Editors: Dr. John Spillane & Dr. Jim Bradley
University of Limerick



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Editorial

Welcome to this doctoral workshop which forms part of what is now a well-established support mechanism for researchers in the discipline of the Built Environment. The idea for this Doctoral Workshop first germinated during discussions at the ARCOM Conference in Leeds in September 2023 and we are delighted to host this ARCOM event here in the University of Limerick and warmly welcome all those attending as Doctoral Researchers and Academic Panel members.

The ARCOM Doctoral Workshops, around now for some 24 years, have involved many diverse research areas that Doctoral Researchers have chosen to focus on for their doctoral journey. This Doctoral Workshop focusing on Linking Methodology and Methods in Construction Management Research, offers an opportunity to explore and share research methodologies in terms of both the practicalities and theoretical underpinnings that impact Doctoral Researchers within the construction sector. The opportunity for researchers to come together in an environment offering the correct conditions to share and discuss their progress, and problems, to date on their Doctoral journey can only be beneficial.

These Proceedings contain the five papers that were presented at the workshop. The Doctoral Researchers had the opportunity to learn from each other and receive valuable input from the Academic Panel involved. The essence of the ARCOM Doctoral Workshops is that they facilitate Doctoral Researchers to present their 'work in progress' in an environment where formative and developmental review, through critical discussion and engagement, can be offered as a constructive support mechanism.

Thanks and Acknowledgements

The workshop would not be possible without the attendance of the Academic Panel for this workshop, especially those who have travelled to UL from the UK:

- Dr. Emmanuel Aboagye-Nimo, Birmingham City University
- Dr. Barry Gledson, Northumbria University
- Dr. Pippa Boyd, University College of Real Estate
- Dr. John Spillane, University of Limerick
- Dr. Michael Curran, University of Limerick
- Dr. Jim Bradley, University of Limerick.

A special mention to Dr. Ronan O'Higgins, Head of the School of Engineering here in UL for the support provided and to Joanne McHugh for help in coordinating the logistics for the workshop.

Finally, it is a pleasure host this ARCOM Doctoral Workshop here in the University of Limerick. We hope that all involved whether as a Doctoral Researcher or Academic Panel member found it to be of use and we look forward to meeting you all again at future ARCOM events.

Dr. Emmanuel Aboagye-Nimo, Birmingham City University, Convenor

Dr. John Spillane & Dr. Jim Bradley, University of Limerick.



ASSOCIATION OF RESEARCHERS IN **CONSTRUCTION MANAGEMENT**

ARCOM Doctoral Workshop

Linking Methodology and Methods in Construction Management Research

Call for Participants

When: 17th January 2024, 9am – 4pm (Evening reception on 16th)
Where: University of Limerick (In-person only)
Workshop Conveners Dr John Spillane (University of Limerick)
Dr Jim Bradley (University of Limerick)
Dr Emmanuel Aboagye-Nimo (Birmingham City University)

As part of the ARCOM Research Methodology Workshop series, the University of Limerick (UL) is delighted to announce it is hosting an ARCOM Doctoral Workshop titled 'Linking Methodology and Methods in Construction Management Research'. Construction management scholars have continued to embrace new and diverging methodologies and underlying methods in the attainment of their respective research objectives. However, due to the plethora of opportunities available, there is more confusion than consensus across the discipline on the most appropriate, if any, methodology and associated method(s) one can adopt. With widespread use and misuse across the discipline, early career researchers often find it difficult to identify nor justify their choice of approach and method used in their doctoral studies.

This workshop proposes to explore the distinctive characteristics and underlying nuances of construction management research methodologies and supporting methods, by addressing some common misunderstandings and pitfalls. This is aimed at PhD students, who are undertaking their doctoral studies, in aiding them in conveying their proposed methodology and associated methods, in a constructive and non-judgmental environment, regardless of where they are on their research journey. This workshop seeks to provide peer-support in a welcoming and supportive environment, providing opportunities for students to share ideas, advance their understanding of research design, and constructively critique and feedback. To participate in this workshop, please submit, using the ARCOM Template, a 6-page article. The paper must contain three key parts. (i) An overview of the topic, supporting rationale, aim, and research questions. (ii) Description (with justification) of the data collection approach. (iii) Explanation of the data analysis and main (indicative) findings to-date. This document, together with a short presentation (circa 10 minutes), will be used to generate discussion, debate, and caucus among participants. Working papers submitted to john.spillane@ul.ie by 31st December 2023.



ARCOM Doctoral Workshop Schedule Wednesday 17th January

Welcome	Dr. Ronan O'Higgins		8.30am
Keynote by: Dr. Emmanuel Aboagye-Nimo			8.40am
Student Presentations - 40 minute		2 x presentations	9.10am
15 minute Presentation			
20 minutes Discussion			
5 mins changeover			
Tea/Coffee			10.40am
Student Presentations - 40 minute		2 x presentations	10.50am
15 minute Presentation			
20 minutes Discussion			
5 mins changeover			
Lunch			12.20pm
Student Presentations - 40 minute		2 x presentations	1.00pm
15 minute Presentation			
20 minutes Discussion			
5 mins changeover			
Tea/Coffee & Panel Discussion			2.15pm
Close			3.30pm

STRATEGIC PLANNING PRACTICES IN SMALL FIRMS IN THE IRISH CONSTRUCTION INDUSTRY

Noel Clarke

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The Irish construction industry is an important element of the economy creating employment, contributing to GDP and providing buildings and infrastructure to satisfy societal demands. A considerable portion of the sector encompasses SMEs and micro firms with up to ninety four percent of construction employment occurring in these organisations. These firms are susceptible to changes both from their external and internal environments which can pose a risk to their business. Augmenting this they have limited resources, and most of their time is taken with project planning, hence long-term planning does not take precedence. While strategic studies have been conducted in the Irish context there is a paucity of research with respect to small construction firms. With these factors in mind this paper aims to understand where strategic planning is positioned in small construction firms in Ireland. A two stage qualitative approach is taken to gather data. Semi-structured interviews for the explorative phase and focus groups to provide confirmatory support of the initial results. Evidence suggests strategic planning is informal with long term high level objectives set for the firms but in most cases the management are overrun with the day to day operations of their firms, neglecting their long term objectives. The result being small firms are not maximising the potential of their businesses.

Keywords: construction industry, small firms, strategic management, strategic planning, environment.

INTRODUCTION

The need for a concept of strategy related to business became greater after World War II, as business moved from a relatively stable environment into a more rapidly changing and competitive environment (Bracker,1980). This has caused the field of strategic management to become firmly established in both the business and academic environments where a proliferation of topics, theories and methods have been researched by numerous seminal authors in the field of strategic management (Hoskisson et al, 1999), with Rumelt et al., (1991) suggesting strategic management can be regarded as a fundamental issue that explains the success or failure of firms. More recently and in a similar vein to Rumelt et al., (1994), Seriki (2020) proposes the central focus of strategy research is to uncover how people design and get on with their work within organisations, with strategy being central to an organisation's survival within a given business environment.

Strategic management consists of planning, implementation, and evaluation. Integral to strategic management is strategic planning (Lu, 2010). Strategic planning establishes where a

firm is currently positioned, determines a desired future and sets objectives of how to get there (Murphy, 2013). The process of strategic planning in the construction industry has tended to focus on operational planning and elemental forecasting, centring on the resources needed for specific projects, suggesting a need for companies to redirect their thoughts from tactical to strategic thinking (Danosh, 2005). The business environment in which construction firms operate adds to the complexity of the strategy process (Adesi et al., 2019). Additionally, in the construction industry, uncertainty demands the need for strategic planning but also negates its effectiveness (Danosh, 2005), resulting in a complex multifaceted process with characteristics differing between firms (Murphy, 2013). The value of strategy for Greene et al., (2008) lies in its ability to enhance organisational performance, however it is constantly evolving and firms need to be able to reconfigure their operating routines to cope with changes in their environments. Price (2003) suggests conceptually there is no one right way for a firm to develop a strategy; the key is selecting the tools and techniques best suited to a firm's individual needs, raising the question of how firms enact strategy planning in the first instance.

The resultant literature has brought to light there is a need to develop a deeper understanding of how construction firms perform strategic planning in their organisations from both a theoretical perspective and at industry level by deciphering what strategic planning means to construction firms. This thesis is centred on furthering strategic planning research in the Irish construction industry. Examples of previous work in the Irish construction industry include; Tansey and Spillane (2016) large contractors, Tansey and Spillane (2018) the different strategic approaches of large and SME sized contractors during a recessionary period, and Murphy (2011); Murphy and Oluwasegun, (2017); Seriki, (2020) who have explored the strategic practices of professional service firms. However, to date no research has been undertaken in the small firm sector of the Irish construction industry, where such firms are defined by the European Union of employing between 10-50 people and having a turnover of €2-10 million euro. Specifically, this thesis will provide new knowledge on the characteristics of strategic planning practices, communicate the relevance of strategic planning theories to the construction industry and address the need for action of small firms to develop their strategic planning practices to increase their effectiveness within the construction industry.

AIM & RESEARCH QUESTIONS

The introduction to the study gives rise to two research questions:

1. What are the characteristics of strategic planning practices in small Irish construction industry firms?
2. Establish if strategic planning theories developed in other industries are relevant to small Irish construction industry firms?

To answer the research questions the thesis has the following aims.

1. Determine if plans are developed at strategic, tactical and operational levels in small construction firms.
2. Establish how the development of the firm brought the firm to its current position.
3. Reveal the internal and external factors firms manage to achieve their strategic objectives.
4. Understand what qualities/features small firms deem essential for their business development.
5. Discover the management issues small firms perceive in planning for the future of their business.
6. Develop a set of guidelines or a framework for strategic planning in small construction firms.

RESEARCH METHODOLOGY

Table 1: Methodological Choice

Topic	Content	Choice
Ontology & Epistemology	Positivism Critical Realism Interpretivism Postmodernism Pragmatism	Interpretivism
Research Design	Deductive Inductive Abductive	Abductive
Research Methodology	Action Research Grounded Theory Phenomenology Case Study Ethnography	Phenomenology
Evidence Sources	Literature Participants Interviews Focus Groups Questionnaires Archives Observations	Literature Participants Interviews Focus Groups
Sampling	Convenience Snowball Purposive Random Non-probability Case Sampling	Convenience Non-probability Snowball
Qualitative Methods	Literature Review Cognitive Mapping Content Analysis Causal Loop Diagrams Dynamic Modelling Semiotics Discourse Analysis Narrative Analysis	Literature Review Content Analysis Casual Loop Diagrams

Philosophical Choice

Ontology is the notion that concerns with nature of reality. It refers to the assumptions that the researchers have concerning the way the world operates and commitment held to particular view (Saunders et al, 2009. p.108). According to Saunders et al., (2016) five major philosophies exist. Positivism which relates to the stance of the natural scientist and entails working with an observable social reality to produce law-like generalisations. From an epistemological perspective a focus on the discovery of facts and measurable data are meaningful. The philosophy of critical realists see reality as external and independent, but not directly accessible through our observation and knowledge of it. Epistemological knowledge is based on facts and historical contributions are used to aid explanation. Interpretivism emphasises that humans are different from physical phenomena because they create meanings. Furthermore, the purpose of interpretivist research is to create new, richer understandings and interpretations of social worlds and contexts, with a focus on narratives, stories, interpretations and perceptions. Postmodernism emphasises the role of language and of power relations, seeking to question accepted ways of thinking and give voice to marginalised views.

The fifth philosophy is pragmatism asserts that concepts are only relevant where they support action. Researchers are driven by doubt and the research question and belief returns when the problem has been solved. Knowledge is based upon meanings that enable successful action.

An interpretivist stance is taken for this thesis as strategic planning is a complex subject involving human actors their organisations and the broader business environment. Taking an interpretivist stance allows the processes, multiple realities and the experiences of the participants to be told in an in-depth manner, resulting in rich data for the research project, but the researcher must be cognizant of the participants point of view when conducting research.

Research Design

Research design is associated with building theory. Three broad approaches exist namely inductive, deductive and abductive. Okili (2021) notes in inductive theorizing, the researcher starts from empirical data and works towards developing a theory based on that data. In contrast, in deductive theorizing the researcher starts from a theory and then infers what the data is expected to show based on the inferences from that theory. While abductive theorizing starts off with a rudimentary theory or theory in progress, which should ideally result in a proposed or supported theory.

Abductive theorizing is purported for this research for the following reasons.

1. Qualitative data from the interviews is being analysed using inductive reasoning to determine codes and develop an understanding of strategic practices.
2. Theories borrowed from the business environment are being analysed deductively to determine if they are suitable for use in the construction industry.
3. It is hypothesized that singular theories are not comprehensive enough for firms to use, to adequately guide them in their strategic practices.

Research Methodology

Five choices are available to the researcher. Action research where participants and researchers co-generate knowledge through collaborative communicative processes where all participants contributions are taken seriously (Reason and Bradbury, 2001). Grounded theory is used to gain insight into the understanding of the phenomenon from the view of the insider or those who experience the phenomenon where the researcher has no preconceived idea about the subject and reasoning is generally inductive (Turner and Astin, 2021).

Phenomenology examines and highlights human situations, events, meanings and experiences to provide a description of human life as it is lived through the first person (Pollio et al., 1997). Case studies involve what is best defined as an intensive study of a single unit with an aim to generalize across a larger set of units (Geering, 2004). Ethnography is a methodology based on direct observation through the role of the researcher either through documents, culture and people (Gobo, 2001). The choice of phenomenology for this research is deemed suitable as strategic planning in the first instance relies on the human element, their subjective experiences and interpretations to develop and implement plans for their firms.

Evidence Sources

The existing literature is used as an evidence source by providing the researcher with knowledge on strategic planning, small firms and the construction industry. By using a critical review of the literature, interview questions were designed to capture the data required to understand strategic planning in small firms. The participants in the study through the medium of semi-structured interviews provide the data for analysis in the exploratory phase of the research. Focus groups consisting of the existing participants are used to confirm the findings of the exploratory phase.

Sampling

The researcher because of the qualitative approach to gathering data has access to convenience, non-probability and snowball sampling. Two approaches were used. Firstly, contacts within the industry were used to find suitable firms within the defined parameters of

the research. These people were then asked to recommend other suitable participants until data saturation was achieved. Construction agencies were approached such as recruitment agencies, the CIOB, CIF and CIRI. Cold calling using websites was also used but both approaches yielded no success.

Qualitative Methods

As per the evidence sources used, the literature review was initially used to understand where strategic planning is positioned in small firms in the construction industry. This information formed the basis for the interview questions. It also aided the researcher in developing initial codes and using content analysis of the participants text to further develop an understanding of strategic planning in small firms. The researcher is currently in the process of content analysis of the text. It is hoped to use casual loop diagrams in the results to provide an understanding of the effects stated below.

1. The internal and external factors that affect small firms strategic objectives.
2. Understand how strategic, tactical and operational strategies align.
3. How perceived management issues to developing strategic planning affect the firm.

FINDINGS

The researcher to date has completed the explorative phase of the data collection through the use of semi-structured interviews. Initial coding has taken place and the process of content analysis is in progress. The tentative findings to date are.

1. Strategic planning in a formal context does not occur in the majority of cases.
2. Labour recruitment and retention, and procurement have the largest impact on achieving strategic objectives.
3. Singular theories aid in strategic planning, but several theories are required to provide comprehensiveness.
4. Time and expertise are the two prominent issues for management in implementing strategic planning.

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USING WORK BREAKDOWN STRUCTURE DECOMPOSITION AND EARNED VALUE MANAGEMENT TO IMPROVE CONSTRUCTION PROGRAMME PERFORMANCE ON DATA CENTRE PROJECTS

Anthony McElwee

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This research examines the integration of Work Breakdown Structure (WBS) decomposition and Earned Value Management (EVM) within the context of Data Centre construction projects, focusing on enhancing construction programme performance. By amalgamating qualitative insights and quantitative empirical evidence, the study seeks to establish correlations between WBS/EVM utilisation and critical project metrics such as schedule and milestone adherence, and resource allocation. Initial findings suggest there is no clear and obvious constraint to measure the performance of the WBS, meaning EVM is the most appropriate, along with potentially a Monte Carlo simulation. The research aims to identify best practices, validate hypotheses, and formulate actionable guidelines for industry implementation, intending to contribute robust frameworks to optimise project management practices and foster efficiency and success in Data Centre construction endeavours, to mitigate delays.

Keywords: data centre, earned value management, work breakdown structures

INTRODUCTION

40% of projects are late, 50% are over budget, and 30% fail to meet the expectations of the users (Department of Finance, 2008). Many factors may contribute to the successful performance of a project programme or schedule; however, this research will focus on the effectiveness of Work Breakdown Structures (WBS) in Data Centre construction as they are essential for storing, processing, and distributing vast amounts of digital information that is used by a vast amount of people and organisations on a regular basis.

Ireland had produced an average of 75 MW of Data Centre Capacity annually from 2009 to 2021. To meet the forecasted demand, there will need to be an average of 200 MW developed each year from 2022 to 2025, resulting in a production increase of approximately 267% annually (Bitpower, 2021). Although representing a different sector of construction, Data Centres employ the services of many traditional disciplinary companies for their construction. In 2022 the Central Bank of Ireland noted that new residential developments increased to 30,500 (SCSI/PwC, 2022), which is still short of the 33,000 annual target. To recover this shortfall, more resources are required and when this is integrated with the remaining constructors such as the Data Centre Sector which requires an increase of production, there will undoubtedly be a significant strain on the construction industry considering housing alone requires a resource increase of approximately 6.5%, coupled with the 267% output increase in Data Centres, without consideration for the sustained or growing output of the commercial, industrial, infrastructure, healthcare, and educational construction sectors, there is

undoubtedly a need for projects to be delivered in an efficient manner in alignment with an accurately developed programme of works.

This research will look at the programme of works, or schedules, being developed on past Data Centre on projects to assess their final output when compared with the original milestone dates associated with the respective project. By delving into the level of detail associated with their development when compared to the scope of works, an analysis of success and failure components will be identified and incorporated into a framework for development of future programmes with an aim to increasing the success rate of achieving project specific milestones.

Aim

The aim of this thesis research project is to investigate the application of Work Breakdown Structure (WBS) decomposition measured by Earned Value Management (EVM) as tools to enhance construction programme performance in data centre fit-out projects.

Research Questions

1. How are fit-out contractors performing on data centre projects when the at completion construction schedule is compared to the baseline schedule?
2. What is the current knowledge of the Project Management Team regarding a WBS decomposition, and what EVM indicators are the projects currently utilising?
3. 3. What is the most appropriate WBS level for use on a data centre project, and at what stage should it be developed?
4. What EVM indicators are the most suitable for measuring the performance of a WBS decomposition?
5. What framework composition could be effectively designed and implemented to encourage and enhance contractors understanding and adoption of a detailed WBS decomposition and EVM?
6. How can the framework best incorporate effective communication and information exchange among multiple contractors to support the development of a fully integrated, multi-disciplinary, project schedule?
7. What internal or external barriers and challenges exist within a Project Management Team that hinder the effective incorporation of WBS decomposition into the project management process?

DESCRIPTION OF THE DATA COLLECTION APPROACH

Upon determination of the purpose of the study, and having completed a thorough literature review, a strategy to form a conclusion of an initial set of questions can be determined (Naoum, 2012). Having established the increase in productivity required to meet the demand of Data Centre construction among other construction sectors, the next step is the identification of the most appropriate research methodology or strategy to perform data collection and analysis.

Abowitz and Toole (2010) describes construction as a “social” process in that construction is an application by people, completed using technology developed by people, to achieve goals that have been established by people that involves the erection or retrofitting of infrastructure and buildings. In addition to this, the concept of construction management indicates the execution of the process, essentially the construction of the project, is managed by people who play key roles in all aspects of the construction process indicating that understanding the human or social factors requires an understanding of the social science research methods. Algeo (2015) discusses the growing recognition of the social nature of construction projects, programme, and portfolio management. Researchers now recognise the similarities between construction and project management to that of social sciences which requires alternative approaches for research and possibly a greater use of qualitative and mixed mode research is

required. Describing construction management as a social science would indicate that the research itself would primarily be qualitative in nature. Byrne (2001) indicates qualitative research is elusive, vague, and imprecise by any definition as the term captures a broad umbrella of research methods resulting in the definition of a single term being impossible. However, qualitative research could be defined as inquiries of knowledge that live outside the framework prescribed by the scientific method and assumptions of inferential statistics. The intertwining relationship between methodology and methods is foundational in the process of research, construction management specific or otherwise. Methodology serves as the guiding framework, outlining the path toward achieving the research objectives, while the methods are tools to implement the study design and data collection. However, the challenge often lies in developing a fruitful connection between these two strands to ensure coherence, precision, and relevance to the outcome of the research.

Quantitative Methodology

The literature for this research is still ongoing, however, its focus currently is on the most appropriate method of measurement of a Work Breakdown Structure (WBS). Generally, in project management, the performance of a project is measured in terms of the constraints applied by cost, time, or quality (Blaskovics, 2018). In 1969, the Iron Triangle was developed to show correlation between all three constraints (Weaver, 2007). This framework introduces a three-dimensional approach to evaluating projects and indicates their dependency on each other, as demonstrated in the figure below.

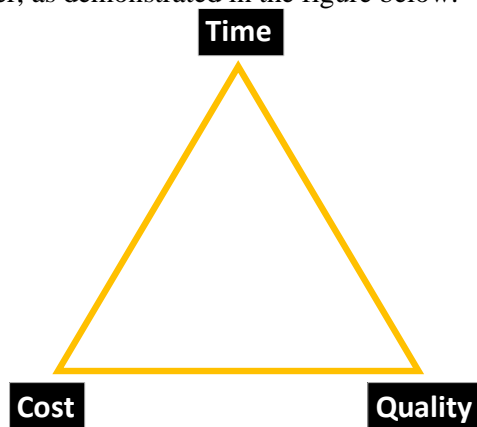


Figure 1 - The Iron Triangle

The importance of measurement cannot be underestimated. The constraint, or constraints, will provide the method the performance of the Work Breakdown Structures (WBS) is measured. The measurement of performance would lend itself to being a quantitative form of data collection and analysis given that it will be based on the collection of numerical data from the schedule itself.

Qualitative Methodology

Qualitative research is subjective in nature and emphasises meanings, experiences, description and so on (Naoum, 2012). It is generally classified under two categories, exploratory when there is little information about the topic available, or attitudinal where there is a focus on subjectively analysing people's opinions.

Unlike quantitative research, which emphasises numerical data and statistical analysis, qualitative research aims to delve into the depth and richness of experiences, perceptions, and meanings associated with a particular subject. It involves methods such as interviews, observations, and analysis of textual or visual data to uncover nuanced insights, patterns, and themes.

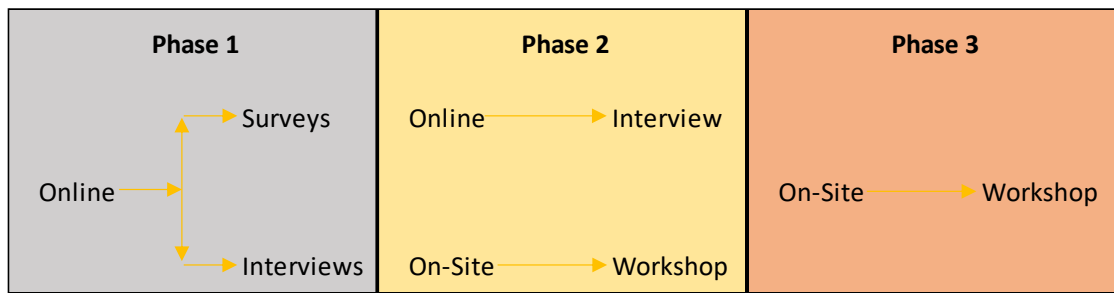


Figure 2 - Phases of Research

DATA ANALYSIS AND EXPECTED FINDINGS

Quantitative Data

This will entail an examination of project data collected from multiple Data Centre construction projects. Initially, key performance indicators (KPI's) related to the project schedule adherence and resource allocation will be identified and quantified, It is foreseen that Earned Value Management (EVM) techniques will be utilised to measure the WBS performance against planned benchmarks, allowing for the calculation of performance indices such as Schedule Performance Index (SPI), Planned vs Actual Labour, and potentially the Monte Carlo Simulation. Programmes such as Microsoft Excel to analysis the collected data, enabling regression analysis or correlation studies to determine the relationships between WBS decomposition and EVM implementation, and construction programme performance.

Qualitative Data

Qualitative data analysis will involve the use of content analysis to examine the data collected through survey questionnaires, semi-structured interviews, and workshops. The data will be coded, categorised, and analysed to identify patterns and themes related to the research objectives.

Collection of this data will be a in an online and workshop environment. The researcher intends to approach the interviews from staff holding a variety of positions in the project team and gaining an insight to their level of WBS decomposition and EVM understanding. Questions will be multiple choice and open ended to allow the interviewee to express any thoughts they may have. The information provided will be correlated with their role within the project team, and compared to the literature to gain an understanding if this knowledge baseline is aligned with where it potentially should be. This will provide further justification to the developments of a framework from which project programme may be developed within.

CONCLUSIONS

To date, the quantity of literature available specifically related to WBS is sparse, with the mention of constraints predominately related to the Iron Triangle themes of Time, Cost, and Quality. There is a lot of literature calling for an overhaul of how a project is measured with items such as scope and client satisfaction, however, this literature tends to lack a suggested method of measurement outside of communicational feedback. It is expected this research will unveil a substantial improvement in construction programme performance within Data Centre Projects by employing a greater level of detail within the Work Breakdown Structures (WBS) decomposition measured by a defined constraint using Earned Value Management (EVM). The study aims to identify best practices, validate hypotheses, and derive practical guidelines for industry implementation.

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APPRENTICE FACTORS INFLUENCING COMPLETION RATES OF BUILT ENVIRONMENT APPRENTICESHIPS

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Apprenticeships are structured educational and experiential training programmes that combine workplace learning with formal education. As of 31st October 2023, there were 26864 apprentices employed by 9063 employers in 73 apprenticeship programmes in Ireland (Trant 2023). Policymakers advocate for the promotion of apprenticeships to ensure a skilled workforce that can contribute to Ireland's future. This research focuses on the completion rates of built environment apprenticeships, specifically carpentry & joinery, electrical, and plumbing. The primary objective is to investigate apprentice-related factors affecting completion rates and identify common variables contributing to this phenomenon employing both qualitative and quantitative methods. The study contextualises apprenticeships in the Irish built environment sector, contributing to existing literature and offering practical solutions for the sector. Its primary contribution lies in the application of its findings to enhance completion rates for these specific apprenticeships in Ireland, benefiting the education and industry sectors and potentially impacting national apprenticeship completion rates.

Keywords: apprentice, built environment, qualitative & quantitative research, vocational education & training.

INTRODUCTION

An apprenticeship is a statutory programme of structured education and experiential training, which formally combines learning and training in the workplace and an educational setting (Department of Education and Skills, 2013). It emphasises learning by doing, while meeting the needs of the economy, and preparing the apprentice for a specific occupation.

Apprenticeships are a way to develop skills by combining theory and practice, providing an alternative to academic programmes ranging from level 5 to 10 of the National Framework of Qualifications. Apprenticeships involve being employed under a contract of employment, where there is a minimum of 50% workplace-based training (Generation Apprenticeship, 2020). There are 8 built environment apprenticeships within the 73 current apprenticeships in Ireland; brick & stone laying, electrical, plastering, stonecutting & masonry, wood manufacturing & finishing, painting & decorating, carpentry & joinery, and plumbing. These follow a seven phase, on the job and off the job standards-based model to Level 6 certification (O'Connor, 2006) and adhere to the SOLAS Code of Practice (Generation Apprenticeship 2016). For the 25 craft apprenticeships, apprentices receive their initial off-the-job training at

a specialised Training Centre, and more advanced skills are taught at higher education institutions.

All apprenticeships have several key features, such as a combination of on-the-job and off-the-job training, employment with a registered employer, and a focus on providing skills and knowledge for a particular trade or occupation (Mc Mahon et al, 2022). Assessments evaluate apprentices' knowledge, competence, and skills, which may include written exams, practical assessments, and workplace observations.

The academic achievement of apprentices is one of the primary goals of the Irish government (Department of Further and Higher Education 2021) and can be fundamentally measured from multiple aspects such as apprentices' achievements in Phase 2,4 and 6, overall award level or completion.

LITERATURE REVIEW

The drivers behind successful apprenticeship completion have been the subject of research in other countries predominantly conducted in Australia, Germany, the UK, and the USA, with a range of factors identified as contributing to or hindering completion. As per the study conducted by McMahan et al (2022), the determinants that impact the successful completion of apprenticeships can be broadly categorised into three groups, namely, employer-related considerations, attributes of the apprentice, and factors pertaining to the curricula and programme. This research aims to address gaps in knowledge as apprenticeship completion is not widely researched or reported in Ireland.

The literature review will encompass an examination of diverse dimensions, including attributes related to employers, curricula and programme quality, international apprenticeship comparisons, and apprentices themselves and will delve into pertinent areas such as the historical apprenticeship landscape in the specific context of Ireland. In particular, the study will rigorously scrutinise the attributes of apprentices, encompassing variables such as gender, age at the onset of their apprenticeship, instances of disability, prior utilisation of learning support mechanisms, academic entrance levels, and previous engagement with science, technology, engineering, and mathematics (STEM)-related subjects.

RESEARCH GAPS, OBJECTIVES AND RESEARCH QUESTIONS

The primary objective of this research is to improve the completion rates of apprenticeship programmes in Ireland by identifying apprentice factors influencing completion rates and make recommendations for policy and practice to support apprenticeship completion. At this stage following the literature review and examination of the research gaps, the initial research questions are as follows:

- What is the completion rate of apprenticeship programmes in Ireland?
- What are the most significant factors related to apprentices themselves that influence completion rates in Ireland? Do these factors exhibit variations across different built environment trades?
- What role does STEM play in preparing apprentices for modern workforce demands and influencing their decision to complete their apprenticeships?

RESEARCH METHODOLOGY

Reviews of other papers found during the literature review found that methodologies in similar studies including collation of primary and secondary datasets, interviews, focus groups, surveys, and questionnaires. This study will use a variety of research techniques and procedures to collect and analyse both qualitative and quantitative data. While the quantitative data will provide factual numerical information, the questionnaires and focus groups will bring depth to the understanding of the findings, contributing valuable insights to the broader discourse on workforce development in the industry. Together, these methods form a comprehensive approach, bridging quantitative data, historical insights, and qualitative experiences to provide a holistic evaluation of apprenticeship dynamics within construction

management to directly align with the research aim and questions.

The preceding 12 months of data acquisition were primarily devoted to the collection of quantitative data from the Apprenticeship Client Services System (ACSS) which holds and stores all apprentice and employer information in Ireland and apprentice application forms representing a pivotal segment of the data collection process. Qualitative data collection commenced predominantly in November 2023.

Data collection methods included to date and to include the following

Literature review

A rigorous literature review has been and will continue to be conducted to contextualise the study within existing research. This has helped identify gaps in the current understanding of apprenticeship programmes and establish a foundation for further investigation. The review encompasses studies on apprenticeship models thereby enriching the research with a broader perspective. The literature review will run parallel to all data collection activities, ensuring a continuous synthesis of existing knowledge.

Ex post facto

Utilising ex post facto analysis involves retrospectively examining existing data, in this case, application forms and ACSS records. This method offers valuable insights into historical trends, demographic information, long term impact, assessment success and completion rates of apprenticeship participants. By analysing past data, the research aims to identify patterns and correlations that contribute to a comprehensive understanding of apprenticeship programmes.

Online questionnaires

This method ensures efficient data collection (using MS Forms) from a large and diverse participant pool, including apprentices, employers, and training advisers. The structured nature of the questionnaire facilitates the analysis of trends and patterns with reference to apprenticeship programmes.

Interviews

Interviews will be conducted with key stakeholders. This qualitative method allows for a deeper exploration of individual experiences, perspectives, and challenges faced within the apprenticeship framework. The semi-structured nature of the interviews will ensure flexibility, enabling participants to elaborate on their experiences and offer insights that might not be captured through quantitative measures alone, to understand the lived experiences within these programmes.

Focus groups

To foster collective discussion and uncover shared insights, focus groups will be organised with apprenticeship classes. This method promotes a collaborative exploration of common themes, challenges, and successes among participants. The interactive nature of focus groups encourages participants to build upon each other's responses, potentially revealing nuances and perspectives that might not emerge in individual interviews.

Data analysis included to date and to include the following

Descriptive statistics

This involves summarising and presenting data in a meaningful and easily understandable manner. It focuses on describing the characteristics of a dataset through measures like average, range, standard deviation and median. This method will provide a concise overview of quantitative data, offering insights into patterns, distributions, and basic associations within the dataset.

Thematic analysis

This involves identifying, analysing, and reporting patterns or themes within the qualitative data providing a deeper understanding of participants' perspectives and experiences within apprenticeship programmes. Through systematic coding and categorisation, thematic analysis extracts meaningful insights from interview transcripts and focus group discussions.

Regression analysis

This assesses the relationship between demographic variables, such as age/entry levels and apprenticeship outcomes. By quantifying relationships and predicting outcomes based on specific variables, regression analysis complements descriptive statistics, offering a more nuanced understanding of the factors influencing apprenticeship success rates or participant satisfaction.

Content Analysis

(NVivo) NVivo assists uncovering patterns, trends, and relationships within qualitative data, allowing for a comprehensive exploration of themes and concepts emerging from interviews and focus groups. NVivo streamlines the process of coding, sorting, and analysing textual data, enhancing the depth of qualitative data interpretation.

Data visualisation

JMP enables the creation of interactive visualisations and graphical representations which help uncover patterns, outliers, and relationships within quantitative data. JMP helps see patterns and connections in data through visuals. It makes graphs and charts that show complex information in simple ways.

Throughout the data collection and analysis phase, ethical considerations, such as confidentiality and informed consent, will be rigorously adhered to. Ethical Approval for this research was submitted in November 2021 and was accepted without clarifications at University of Limerick Research Ethics Board for the School of Science and Engineering in December 2021.

INITIAL FINDINGS

The sample size for the ex post facto research is 75 from each trade, 225 in total. Results to date include those concerning gender, declared disability, declared learning support needed, actual learning support received while at school, time between formal examinations and apprenticeship start, age on registration, entry levels, subjects, STEM subject and level, mathematics level, apprenticeship status at 234 and 260 weeks, apprenticeship assessment results.

The sample size for the exploratory research was 23 electrical, 5 carpentry and 7 plumbing apprentices, 35 in total. Nearly half of the participants (46%) highlighted the importance of having a positive relationship with their employer in completing their apprenticeship. Wages were next significant with 43% of participants indicated that the level of wages provided by their employer during the apprenticeship played a crucial role in their completion. A significant portion of participants (29%) considered their educational background, such as having completed the Leaving Certificate, as crucial for completing their apprenticeship. 37% recognised the importance of a strong foundation in practical or other school subjects.

The sample size for the interviews and/or online questionnaires will be 140 from each trade, 420 in total. These interviews will commence in January 2024 when the results of the ex post facto research and exploratory questionnaires has directed the study. There is strong reasoning at this stage to investigate how educational backgrounds, especially in STEM fields, influence the outcomes of apprenticeships. The current understanding of mathematics and STEM anxiety within apprenticeship settings remains limited and the future proposed research will involve assessment of these using established psychological scales. These assessments will gauge the extent and nature of anxiety related to mathematics specifically within the context of their apprenticeships.

DISCUSSION AND CONCLUSION

The findings contribute to the research goals by offering a comprehensive understanding of apprenticeship programmes and align closely with the initial expectations set forth at the beginning of the study. The combination of quantitative data from surveys and historical records, along with qualitative insights from interviews and focus groups, allows for a multi-faceted evaluation.

The ex post facto study, encompassing a substantial sample size across 3 trades, has unearthed

significant demographic and temporal factors shaping apprentices' journeys. Gender distribution, declared disabilities, educational backgrounds, and temporal markers such as the time between examinations and apprenticeship initiation showcase the diverse landscape within which apprenticeships operate. In contrast, the smaller exploratory research sample highlighted apprentices' perspectives on essential elements for successful completion. Surprisingly, the emphasis on fostering positive employer relationships and the role of wages emerged as paramount. This finding, although initially unexpected, underscores the pivotal role of supportive work environments in facilitating effective learning and skill development. It aligns with the inherent nature of experiential learning, emphasizing the need for conducive and nurturing workplace dynamics during apprenticeships.

The significance attributed to educational backgrounds and proficiency in specific subjects, particularly STEM, substantiates the potential influence of prior academic experiences on apprenticeship success. This emphasizes the importance of a strong academic foundation, potentially indicating areas for intervention or support to enhance apprentice preparedness. Moving forward, the forthcoming phase involving interviews and questionnaires seeks to deepen the understanding as directed from initial findings. With a sizable sample planned the aim, is to corroborate and expand on the observed trends, delving into the intricate nuances of apprentices' experiences, aspirations, and challenges. The focus on STEM education's impact on apprenticeship outcomes indicates a critical direction for future investigations.

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MEETING SCIENCE: FUTURE PROOFING CONSTRUCTION DESIGN TEAM MEETINGS

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Meetings are critical to both human interaction and decision making. This paper aims to provide context for the need to study meeting science within construction, utilising a novel action research based approach. The anticipated findings of the works are that meetings are not benefiting those design team members involved, and that a framework for excellence must be implemented at all levels in the industry.

Keywords: meetings, project management, organisation.

INTRODUCTION

Employees spend up to six hours per week in meetings, with managers spending up to twenty-three in this environment. (Lehmann-Willenbrock et al, 2018). Meetings are therefore critical to organizational life, with the seminal works of Schwartzman (1986) demonstrating that meetings are the oldest form of unitary democracy in decision-making processes and gathering as a group. Construction is unique, with the designer-constructor relationship being one of volatility and distrust (Ponton, 2020), this degree of uniqueness in individuals from different organisations, who often have no contractual relationship can lead to communication and work-related challenges. (Emmitt and Ruikar, 2013). From the Emmerson Report (1962) to Farmer (2016), driving towards a better working environment is critical to the construction industry achieving success. With flagship work by Egan (1997) making the case for greater change, however, for this to occur, the problems associated with the industry must first be presented and explored. Design teams are from a variety of backgrounds, often seen as being the gatekeepers to better practice. However, the backgrounds from which they are from are changing in the modern age of design and build contracts, with the traditional design teams being the Quantity Surveyor, Project Manager, Contractor, Architect, and other Engineers. Often this can bring challenges, which relate to the timing of meetings and the value of providing a framework for future practice, with Humphreys et al (2003) and Farmer (2016) being in broad alignment of views that construction has struggled to remove the perception and reality of adversarial relationships between not only the project delivery partners but design team members. This is an issue that is identified not only by academic literature but the United Kingdom government in publications on sectoral-wide challenges and

ambitions, Construction 2025. (HM Government, 2013). With construction accelerating at pace, there has been a realisation that organisational and behavioural studies are closely aligned with how construction can be improved. Professionals are often taught ‘about’ a given role but are not taught how to perform ‘in’ a role, thus leading to aspects like meetings and skills in these situations being of little importance. (LeBlanc and Nosik, 2019). Therefore, throughout the literature review, data collection, and analysis, this project will establish and review the following areas of Construction Design Team Meetings (CDTM’s):

1. Leadership, 2. Managing Time, 3. Engaging and 4. Relating. Taking cognisance of the foregoing literature and evidential analysis, there are four (4) key areas where CDTM’s are currently not producing the desired outcomes, these are as follows.

Location of CDTM’s

Since 2020 and the COVID-19 pandemic, the location of CDTM’s has become a topical issue within the construction industry, with the typical environment for all meetings being removed from the selection, therefore forcing the technological advancement, but in turn, removing the human developmental skills enhancement and the chance for relationship building within teams. (Allen and Lehmann-Willenbrock, 2022). Ponton (2020) additionally highlights that the setting of a meeting, through observation-based research has a critical impact on the mood of design team members, and thus can lead to potential adverse relationships between team members, therefore creating decisions not conducive to a positive meeting outcome.

Technology & CDTM’s

Within the modern construction industry, the use of technology has been identified as both a hindrance and a great aid to project teams (Zhou et al, 2009). The advantages have been clear in that with all parties in one space, a project model from both an engineering perspective, matched with the project programme (schedule) can be interrogated in greater detail with a visual realisation of the aspects involved in the build. However, in the modern, virtual environment, as noted by Azizi et al (2019) there is a requirement for both advanced digital infrastructure and a greater understanding of what collaboration barriers may exist by the distance of individuals from a physical presence. Levi and Askay (2021) identify technology as historically being a shared frustration between meeting participants, alas greater understanding is required regarding the impact of the use of technology in the meeting environment, as the physical nature of meetings may be undermined as the use of digital technology increases.

Communication in CDTM’s

The existence of an ‘excellence framework’ for communication is key in successful CDTMs, with Foley and MacMillan (2005) identifying that there are two main styles of communication, enriched communication, and restricted communication. The enriched style allows communication to flow between two/three ‘leading’ parties within a meeting environment, however, others are encouraged to contribute. Conversely, the restricted style only allows for communication between these ‘key’ two/three parties and does not allow for any outside influence from others in the setting. Barnard (1938), in an early attempt to show what management science could do for executives, identified communication as being at the very heart of the management process within organisations and projects alike. To showcase the statement by Barnard as being true Allen and Rogelberg (2013) state that meetings

can often be the only time that workplace team members who are not managers or leadership team members can express any opinion.

Leadership in CDTM's

Meetings do not occur in isolation as a vessel, thus individual leadership characteristics including the demographic of individuals, and the groups that form when a meeting is initiated must be considered. It is also critical to consider the organisation(s) that are represented in the meeting environment. (Allen and Lehmann-Willenbrock, 2022). The aspect of leadership in meetings has been discussed by various authors, however, when explored, literature by Odermatt et al (2017) shows that the most critical leadership behaviour was consideration (i.e.; the behaviour of being able to consider other opinions and relate from an opposing position). Further findings from Rogelberg et al (2007) highlight a new transformative style of leadership in meetings could be through variety, they highlight that humans are habitual creatures, by changing the environment setting, seating arrangements, or indeed the attendees who regularly would not have a critical voice, this can increase the confidence in the leader throughout the meeting environment amongst attendees. Unlike the traditional assumptions of what leadership is, Maslow (1943) can be explored to create a theoretical understanding that the greatest role of a 'chair' or defacto 'leader' in a meeting environment is to provide a sense of belonging (Schueleigh et al, 2019).

AIM

To establish excellent practice, and a framework relating to people, process, technology and physicality for the future of effective Construction Design Team Meetings (CDTM's)

OBJECTIVES

1. Identify excellence in relation to people, process, technology, and physicality of CDTM's.
2. Identify industry wide, and cross sectoral innovation which exists in relation to CDTM's.
3. Develop a framework of CDTM excellence

DATA COLLECTION APPROACH

Action research was first adopted by Lewin (1946) as a method for social inquiry in natural settings. Others have advanced this view, advocating that action research aims to generate new knowledge relating to social systems, by implementing change of societal norms. (Blaikie, 1993; Hart and Bond, 1995). Further evidence by Azhar, Ahmed and Sein (2010) critiques the work of Hales and Chakravorty (2006) highlighting critical strengths in these approaches. They found that the advantages of utilising these approaches were the richness of the findings in a natural setting, and the explanation of both the "why" and "how" of events and naturally occurring phenomena. In contrast, critics argue that action research is both time consuming, and readily misunderstood in construction and academic settings. (McDonnell, 1998; Meyer, 1999). By reviewing the literature of Saunders et al (2007) this study utilises an interpretivist, inductive, mono method qualitative, action research-based approach, with a specific cross-sectional data collection method. Van Dongen et al (2018) utilises an action research approach within meetings, the research found that to be

successful, action researchers must (1) plan, (2) act, (3) observe, and (4) reflect (Dickens and Watkins, 1999).

ANTICIPATED DATA ANALYSIS APPROACH & FINDINGS

Holton (1973) identify thematic analysis as a widely used approach in qualitative studies. However, this has since been diminished by Javadi and Zarea (2016), who note that the process of thematic analysis involves no relationship to an epistemological or theoretical school of thought. (Clarke and Braun, 2013). Compared with other methods of qualitative analysis, thematic analysis provides flexibility for novel information to be uncovered through the research. The process will utilise an ‘inductive’ approach to analysis, this was compared with a ‘deductive’ approach. The inductive approach will use observations from the live meetings to be formed into (1) pattern identification, (2) tentative hypothesis, (3) forming theory. Meetings will be observed, with the researcher being present as an ‘active meeting facilitator/participator’ and coding will be undertaken using NVivo 12 software. Utilising an inductive approach, the commonality of themes will be drawn from the video recordings and transcripts. Further interviews will then be undertaken with ‘critical participants’ from the meetings using a reflective interview cycle approach. Additionally, recurrence and repetition will be reviewed to capture any critical interactions in the meeting, with the outlying elements being monitored for information that is relevant to the research and inductive coding. (Owen, 1984). Mehrbod et al (2019) show that the construction industry often lacks behind others in collaborative practice, additionally, Ponton (2020) identifies a need for a greater understanding of the role that both physicality and technology play in the meeting environment, therefore this research anticipates that in line with the previous projects there will be current industry practices that must change, this includes the adversarial nature of team relationships. Therefore, this doctoral work will seek to establish the interdependency between the social (people), process (task), technology and physicality of CDTM’s and produce a framework for use in future innovative practice.

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THE BARRIERS TO THE ADOPTION OF ADJUDICATION IN IRELAND

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The Construction Contracts Act 2013 (hereafter referred to as “the Act”) is yet to be utilised to the extent that was anticipated prior to its enactment. This study proposes to address why this is the case. A review of the literature and appropriate case law is conducted to compile an exhaustive list of all the factors that may be hindering the legislation's potential. The list is refined following twenty semi-structured interviews. Participants both confirm and discredit potential factors through discussing their experiences and opinions on the legislation. The data sample comprises of several categories including contact party (users), contract party (non-users) and adjudicators. The variety of participants is designed to limit researcher bias, while providing both the practical and legal perspectives. Thematic analysis is conducted to create a theory which may answer the research question "What are the factors prohibiting the potential of the Construction Contracts Act 2013?". This theory could assist in improving the Act, to potentially make it more captivating to contract parties. Doing so is likely to assist the legislation in reaching its desired usage sooner.

Keywords: alternative dispute resolution, construction contracts act 2013, multi-method, qualitative, research onion.

INTRODUCTION

Adjudication is a form of alternative dispute resolution (ADR). An ADR is any method by which disputes are resolved, with the assistance of an outside third-party, other than through traditional litigation in the public court (Mnookin 1998). In Ireland, the adjudication procedure comprises of an independent, neutral third party (the Adjudicator) deciding on behalf of two disputing parties within an initial period of 28 days. The Adjudicator's decision is binding on the parties until the parties finally settle the payment dispute or a different conclusion is reached. The different decision is reached either through arbitration or court proceedings. The economic recession of 2008 revealed a culture of payment deferral, particularly towards subcontractors, that had been practiced in the Irish construction industry, even during the sector's most prosperous years (Bunni 2017). Resultantly, subcontractors campaigned for their rights to payment security. They advocated for the Oireachtas to introduce a legislation that would protect them from the poor payment practices. The Oireachtas is the Irish parliament. The Act was first introduced on the 12th of May 2010 to Seanad Éireann (the upper house of Irish parliament), in the form of a private member's bill (Hussey 2016). The Bill was passed by Dáil Éireann (the lower house of Irish parliament) on 16th July 2013. Days later the Act was enacted, with the signing of the 'Construction

Contracts Act, 2013 Order 2016' on the 29th of July (Keogh and Lawless 2020). However, the Act did not come into force until the 25th of July 2016. The Act introduced mandatory interim payment provisions, the entitlement to stop work in the event of non-payment, and statutory adjudication for payment disputes (Pickavance 2015). Adjudication became a statutory right to all construction contracts entered into after the 25th of July 2016, subject to a few exceptions, for example, Public Private Partnership contracts.

Rational

The Irish Government believed that statutory adjudication would better equip subcontractors and small to medium sized enterprises (SMEs) in enforcing their right to payment security. Furthermore, they had hoped that by utilising the Act, poor payment practices would decline. The Government believed that 150 requests for adjudicator referrals would be made per annum (Hussey 2019). Under the Code of Practice, adjudicators are required to report information to the Construction Contracts Adjudication Service (CCAS) within 21 days after the conclusion of each adjudication to compile anonymous statistical data on the Act (Bunni 2017). The CCAS is an establishment responsible for undertaking the necessary administrative arrangements to implement the Act. This data is used to create an annual report of the implantation of the Act. The greatest number of disputes to be referred to the CCAS within a one-year period to date is 81 (Gogarty 2022). Hence, the annual reports reveal that adjudication has yet to be used to the degree anticipated prior to the Act's implementation. Numerous authors have developed their own theories as to why this is the case. Such theories include the high risk of straining business relationships (Dutton 2021), or the dependence on goodwill from both parties in order to reach a solution (Ashworth et al., 2013). However, these "drawbacks" are not specific to adjudication in Ireland; rather, they constitute a global problem with adjudication use. Thus, they are unlikely to be the sole cause of the Act's inactivity. Especially, since these common disadvantages have not affected the success of statutory adjudication in other regions, such as the United Kingdom (UK). On April 26, 2021, a new High Court Practice Direction came into effect in response to the rise in construction-related cases. Practice Directions outline the procedures that must be followed when bringing proceedings before the courts. Practice Direction HC 105 appointed a presiding judge, in charge of all adjudication enforcement applications; with the goal that all applications will be heard and determined with all due expedition. While this was a huge advancement for adjudication in Ireland, it is a relatively small feat when compared to the UK's implementation of their equivalent legislation, the Housing Grants Construction and Regeneration Act 1996 (HGCRA). Within 26 months, through a series of judgements which allowed adjudication to flourish, the UK judiciary had shown unequivocal support to the HGCRA (Gaitskell 2007). In contrast, the Irish judiciary has taken five years to show any evident support, for the Act. Hence, statutory adjudication in Ireland appears to be years behind its British counterpart.

Aim

The primary aim of this study is to examine why the Act has not been utilised to the extent that was anticipated by the Irish government prior to the legislation's enactment. In doing so this research wishes to answer the following research questions:

1. What are the factors prohibiting the potential of the Construction Contracts Act 2013?
2. What is perception of the Construction Contracts Act 2013, amongst users and non-users?
3. What, if anything can be done to overcome these barriers?
4. Does the Construction Contracts Act 2013 require an amendment?

One of the primary intentions of statutory adjudication is to reduce the need for timely, expensive dispute resolution processes, such as arbitration and litigation. Answering these research questions should assist with barriers being removed in future. Resolving these issues should make the procedure more approachable for potential users. Additionally providing clarity on the Act may result in more adjudications being successfully resolved without the

need for enforcement through litigation.

DATA COLLECTION APPROACH

Research Philosophy

This study is built upon ontology, as it is concerned with identifying the barriers that are limiting statutory adjudication's potential in the Republic of Ireland. However, to find these barriers the experiences and opinions of both those who have utilised the Act, and those who could have utilised the Act but choose not to, must be documented. Users of the Act can detail their experiences using the legislation. Non-users are included, so they can provide their reasoning for not utilising the legislation. Interpretivism is the most appropriate research philosophy for this study, due to its focus on the subjective. As the desired data is based on the feelings of the participants there are potentially multiple realities. Therefore, subjectivity must be acknowledged.

Research Approach

This study takes the inductive approach, due to there being very little existing literature to review. Furthermore, it is anticipated that the data sample will be relatively small. There are several reasons for this. Firstly, due to the niche nature of this study, there is a limited number of individuals who fit the criteria to partake in the data collection phase. Also, individuals generally don't enjoy talking about disputes. In particular, contract parties may not wish to discuss their dispute history in fear of hurting their reputation. Furthermore, in line with the code of practice, Adjudicators cannot disclose any information about their decisions, unless required to do so by law, ordered by a court, or given the consent of all the parties of the dispute. Fortunately, Adjudicators can give their opinions on the legislation and may be able to discuss their experience using it, in a vague context. The data that is gathered, is used to create a theory. Said data will be packaged based on what is observed during the data collection phase. Elements of the research will be compared, such as what barriers are common, uncommon, and so on. To align with the research questions the type of data collected will be qualitative. While the data may be categorised, it cannot be measured using statistical methods of analysis, as it is logic based.

Research Strategy

It has proven difficult to find research papers with similar research questions to this study. Resultantly, there is no real indication of what may be discovered during the data collection phase. To develop a theory a grounded research strategy is taken. This approach involves building a theory from the ground up, based largely on the collected data. For example, a theory may be built upon what is observed in interviews. Note, this tactic may require a layered approach; this is where there are multiple stages to the data collection procedure. Each stage or layer builds upon the last. In this study, the first layer focuses on data collection, while the second layer is designed to test the theory. Ideally the theory would be tested with a different sample group, to see if the same patterns emerge or not. However, this may not be possible.

Research Choices

As previously mentioned, qualitative research methods are the best suited to collecting the desired data. As the primary research question of this study is asking "what?", thematic analysis is required. Thematic analysis is a process of reflexivity, where a researcher reviews data with the goal of identifying themes. Said data is then categorised, into these themes. The results of this process are determined by the way the researcher chooses to make sense of the data. The themes that are identified will be influenced by the researcher's own subjective experiences and unique perspective. A qualitative multi-method approach may be necessary, depending on how the theory is tested.

Time Horizon

Time is not a variable that will be analysed in this research. The goal is to capture a snapshot of data, meaning that all the required data should be collected within a brief period of time. The data collection phase is estimated to last 3 to 4 months. This is to allow adequate time to find suitable participants, arrange meetings and transcribe data. There is no intention to collect data from the same sample group, multiple times. However, the theory that is built upon said data will need to be tested. The theory is tested at the earliest date possible, to limit the effect of the passing of time.

Technique and Procedures

Data Collection

To obtain a sample, potential participants are sent an information sheet and consent form. These documents inform participants of the researcher's identity and contact details, the reasoning behind the study, what any resultant data is used for, and the criteria required to participate. Each phase of the research has its own corresponding information sheet and consent form. Any questions the potential participants may have are answered prior to consenting. To address the research questions, qualitative research is carried out in the form of semi-structured interviews. Interviews are most practical method for discussing the experiences participants have had with the Act. The semi-structured format is chosen to allow participants to express their views of the Act at length. There should be little to no restrictions placed upon the interviewees; hence, only one predetermined question is asked during the interviews. That question being, "what is your experience with, or opinion of adjudication under the Construction Contracts Act 2013?". This question is used solely to begin the interview. No other predetermined questions are made before beginning the interview. This precaution is taken to avoid skewing the data through researcher bias. The goal is to provide the interviewee an opportunity to speak at will about their perceptions rather than those perceived by the interviewer.

Prior to the interviews, an exhaustive list is made of all the factors that may be hindering adjudication's potential in Ireland. These factors originate from literature and case law. Note, literature that discusses the barriers of other ADR methods have been included, to see if there is any barrier that also apply to adjudication that aren't front and foremost. The case law consists of cases where the adjudicator's decision required enforcement through litigation. The interviews act as a confirmatory process. Factors that are identified by the interviewees remain on the list, factors that failed to be mentioned are discredited, and new factors that are raised by the participants are added. The data collected in interviews encapsulate large quantities of text. Thus, interviews are audio recorded to allow for the accurate transcription. This is stated on the interview information sheet. Transcriptions are anonymised. A numbering system is used to identify participants within the final report, for example the first interview is referred to as "Interview 1" and the first interviewee is referred to as "Participant 1"; the second interview and interviewee are labelled "Interview 2" and "Participant 2", and so forth. The audio recordings are destroyed once the data is transcribed.

Once a participant's consent is obtained a location, date and time for interviews can be arranged. Interviews can take place in person or online using MS Teams. Note, conducting interviews in a one-on-one setting should be avoided. Where possible the researcher ensures that interviews are always be conducted in locations where additional individuals are present, such as co-workers in a company office, or operatives on a construction site. This precaution prevents a situation where the researcher could verbally apply pressure to the interviewee, or vice-versa. An example of "verbal pressure" would be blackmail or intimidation. Participants are free to leave the investigation up to two weeks from the date in which they were interviewed. The opt-out period is limited to two weeks, to avoid wasting time in the research analysis phase. Once the two-week time limit has passed the researcher has certainty that any analysis that is carried out on the collected data will not have to be removed from the results at a later date. No reason needs to be provided for a participant's withdrawal. In such a scenario the data they provided will be excluded from the findings. A thematic analysis of the data will

be undertaken using the software NVIVO. The findings are used to develop a theory. The second layer of the data collection is focused on testing the theory. Ideally the theory would be tested against a second sample, however, this is impractical for several reasons. Firstly, the anticipated lack of potential candidates, makes it difficult to obtain a second sample. Furthermore, testing the theory through second series of confirmatory interviews could take an additional 3 to 4 months. Therefore, a focus group appears to be a more practical solution. The benefits of focus groups include, faster collection of data, comparison of opposing views, deeper discussions. These factors result in the collection of very rich data.

Sampling

The participants consist of contract parties that have utilised the act, contract parties that could have utilised the act but have chosen not to, and adjudicators. Those who have utilised the Act can list the benefits and flaws they experienced. Those who chose not to utilise the Act can provide an insight into the perception the Act has. Finally, adjudicators are included as they possess a greater understanding of the legislation itself. The inclusion of these various groups allows for both the practical and legal perspective to be captured. This study is attempting to capture multiple perspectives of the Act. Notably, the category of "contract parties" consist of a large variety of roles, which may include employer, main contractor, subcontractor and so on. The inclusion criteria for all potential participants requires that candidates are over the age of 18 years and must be based and working in the Republic of Ireland. Additionally, there is specific criteria that must be met, depending on the candidate's profession. The inclusion criteria for contract parties are as follows. Participants must have been a party of a construction contract, post the 25th of July 2016, the date the Act became operational. They also must have entered a payment dispute with another party of said contract. As for adjudicators, the inclusion criteria requires that the individual is qualified to adjudicate in accordance with the essential requirements outlined in section 8.(6) of the Act. Also, they must have adjudicated a minimum of one case, under the Act. For the purpose of this study, the gender or ethnicity of the participants are not required or relevant. As all the primary data is gathered from those who have or could have utilised the Act, the information should be considered authentic and relevant.

CONCLUSIONS

The data collection phase of this research has not yet begun, hence there has been no analysis for indicative findings to date. Additionally, the lack of similar research makes it difficult to predict what may be found within this study. However, despite this ambiguity, the methodology and method have been set. As for the methodology, this study is classed as ontology as it is concerned with finding the reality of a situation. Furthermore, the research philosophy is interpretivism, to account for the subjectivity of the data. The research approach is inductive as the data will be used to create a theory, which aligns well with the research strategy, grounded theory. Finally, the type of data collection techniques used are qualitative. Qualitative was selected as this research is concerned with the experiences and opinions of the participants, rather than quantifiable measurements. The multi-method consists of two stages. The initial data collection comprises of semi-structured interviews. Following thematic analysis and theory development the second stage, theory testing, can commence. The validity of the theory is tested through discussion and debate with a focus group.

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