The Sheffield Hallam University Built Environment Research Transactions

Editorial Board

Purpose of the Series

The aim of this publication is to provide an opportunity for students to publish the findings of their undergraduate or postgraduate work. Guidance on publication will be given by staff who will act as second authors. It is hoped that by providing a guided transition into the production of papers that students will be encouraged throughout their future careers to publish further papers. Guest papers are welcomed in any field relating to the Built Environment. Please contact E.A.Laycock@shu.ac.uk. A template will be provided on request.

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CONTENTS

AN EVALUATION OF HOW MANAGEMENT THEORY IS USED TO MOTIVATE EMPLOYEES AND IMPROVE PERFORMANCE

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Terri Louise Broadhead, the primary researcher, studied BSc (Hons) Construction Project Management at Sheffield Hallam University and graduated in 2019 with First Class Honours. This research project was produced in preparation for the final year dissertation. Jonathan Took is a Senior Lecturer and Course Leader of Construction Project Management at Sheffield Hallam University who supervised and helped guide this research project.

An Organisation's greatest asset is its people therefore understanding and implementing successful management techniques to motivate a workforce is the key to maximising performance and achieving success. The evolution of management theory is the foundation upon which the study of motivation and performance drivers stands. Highly notable theorists include Frederick Winslow Taylor and George Elton Mayo whose research into the effectiveness of differing management theory concepts, paved the way for later research by Abraham Maslow and Frederick Herzberg into how human behaviour and emotion affects motivation and performance. Based on these theories and many others over the years, Willis Towers Watson (2014) conducted the Global Workforce Study which identified the motivational drivers of workplace performance and how they ranked amongst the 32,000 employees who took part. The results of the study produced recurring key themes such as engagement, recognition and relationships. This research project explored these same recurring themes that the Global Workforce Study produced through a series of semi-structured interviews. The literature review and data analysis confirmed the importance of a number of combined motivational drivers, it cannot however prioritise them as motivation is a very individual concept where what drives one person, may not necessarily drive the other. The key to success is to understand that all areas which affect motivation must be given equal

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attention in a bid to motivate the entire workforce collectively. Motivation is an interesting and thought provoking concept which requires the detailed understanding of what drives human behaviour. It is a great misconception that money is the sole motivational driver, when in fact there are a number which employees consider important to them as individuals. Job satisfaction, recognition, personal development, workplace relationships and working conditions are all key themes which contribute to motivation and performance in some way. Motivation however is an individual experience; each person approaches it differently with unique views, behaviours, wants and needs, therefore no one size fits all approach can be successful. The researcher therefore concludes that prioritisation is unnecessary as it is clear that all five themes are as equally important as each other. Implementing all themes collectively will therefore ensure all employees have their motivational needs met one way or another.

KEY WORDS: Management Theory, Motivation, Behaviour, Maslow, Herzberg

INTRODUCTION

Motivation is an interesting and thought provoking concept which requires a detailed understanding of what drives human behaviour. Motivation is an individual experience; each person approaches it differently with unique views, behaviours, wants and needs, therefore no 'one size fits all' approach can be successful. An Organisation's greatest asset is its people therefore understanding and implementing successful management techniques to motivate a workforce is the key to maximising employee performance and achieving success.

This research project will aim to explore the results of previously completed workforce studies around motivation and performance whilst simultaneously evaluating the evolution of management theory and the notable management theorists who have helped shape the management techniques of the modern workplace. Alongside this, new data will be established through the completion of interviews with workplace professionals in a bid to investigate employee perceptions and attitudes towards motivational drivers.

The overall objective of this research project is to recommend a unified management theory solution which ensures optimum employee performance through positive motivational techniques.

The 2014 Global Workforce Study

Towers Watson (2014) is one of the leading professional services companies around the world, with the notable aim of improving performance through effective people management. They published The 2014 Global Workforce Study involving more than 32,000 full time employees across a range of medium to large Organisations, throughout 26 separate industries. The study was designed to guide Organisations to develop a greater understanding of employee diversity and the identification of factors which influence employee performance, focusing on attitudes and changing behaviors which directly affect sustainable engagement and the behavior, morale and motivation of employees.

Sustainable Engagement

It has been widely agreed and accepted by a number of researchers that the impact of employee engagement is clear however, the definition of engagement is open to individual interpretation which presents a wide range of definitions and viewpoints (Whittington, Meskelis, Asare and Beldona, 2017). Described as a positive and stable personality trait by Macey and Schneider (2008), engagement is the active effort and enthusiastic involvement of all areas of work and personal life. In contrast, Byrne (2015) describes engagement as a state of perception rather than a personality trait which is linked to ad hoc moments of motivation where an individual assesses the level of psychological and physical effort required to achieve a certain goal. The Global Workforce Study (2014) compares the view points of employees to those of employers (based on a separate study) on the top drivers of employee attraction (Figure 1)

	Employer view – Talent Management and Rewards Study	Employee view – Global Workforce Study
1	Career advancement opportunities	Base pay/salary
2	Base pay/salary	Job security
3	Challenging work	Career advancement opportunities
4	Organisation's reputation as good employer	Learning and development opportunities
5	Organisation's mission/vision/values	Challenging work
6	Learning and development opportunities	Organisation's reputation as good employer
7	Job security	Vacation/paid time off

Figure 1: Top Employee Attraction Drivers (Towers Watson, 2014)

It is clear that there is some alignment between how the employer and employee think about base pay / salary and career advancement opportunities however there is also some disconnect based on where job security ranks on either side. The list of drivers is not identical meaning the employer's viewpoint is different to the employee's.

Behaviour, Morale and Motivation

As individuals, our behaviour can be characterised by our actions and the way in which we conduct ourselves in social situations. Actions are accepted as extensions of personal values and beliefs which can greatly contribute to the prediction of work-related behaviours (Furnham, 2012). Eby and Allen (2012) define the importance of working relationships as being essential to creating and developing a meaningful and sustainable work life. Positive interactions at work help to reduce work related stress and improve well-being, whereas negative interactions at work actually increase work related stress and reduce positive wellbeing. To succeed, organisations must make high morale a high priority (Hacker, 1997). High morale drives enthusiasm and commitment whereas low morale reduces effort and participation. To boost morale, employees must be motivated to perform (Bowles and Cooper, 2009).

LITERATURE REVIEW

The Evolution of Management Theory

During the 19th century, the industrial revolution saw the emergence of large scale manufacturing processes and new technologies within factory environments which brought together high concentrations of workers and the much needed improvement of management systems. Managers found that the increase in workforce led to problems in the planning, execution and controlling of work (Wood, 2018). Out of the industrial revolution, management theory was born (Adetule, 2011). It was a key turning point which saw several different theories emerge in the years that followed (Sheldrake, 2003), many of which have evolved over time but are still relevant within today's modern age of organisational management.

Scientific Management Theory

Fredrick Winslow Taylor (1856 - 1915) was an American Mechanical Engineer and Management Consultant who sought to improve industrial efficiency. He was an intellectual leader of the Efficiency Movement and known as the "Father of Scientific Management" (Kanigel, 2005). His book, The Principles of Scientific Management, published in 1911, was one of the first management theories to emerge following the industrial revolution (Latham, 2012).. Taylor's philosophy focused on the belief that making the workforce work as hard as they could was far less efficient than optimizing the way in which the work was carried out therefore he began to study work processes scientifically, breaking down the

processes of working operations into individual tasks to identify which tasks could be made more efficient (Taylor, F. 1947 / 2016). Scientific management is based on four management principles. These principles are known simply as Taylorism and are listed below;

1.	Replace "rule-of-thumb" work methods with scientific methods to determine the most efficient way to perform specific tasks.
2.	Assign workers to jobs by matching their capability and motivation and train them to work at maximum efficiency.
3.	Monitor worker performance, and provide instruction and supervision to ensure the use of most efficient ways of working.
4.	Allocate the work between managers and workers so that managers can spend time planning and training, allowing the workers to perform their tasks efficiently.

Table 2: Principles of Scientific Management (Taylor, F. 1947 / 2016).

Human Relations Management theory

George Elton Mayo (1880 – 1949) was an Australian psychologist and organisational theorist who began his organisational studies during the immediate period following the Second World War. Until this time, Scientific Management was the principle used in management theory (Nanda, 2006) but Mayo believed increasing the productivity of working processes only treated workers as extensions to machines rather than the thinking, feeling human beings they are (Wood and Wood, 2004). In 1924, Mayo began an experiment with the workers of the Western Electric Hawthorne Plant in Chicago which saw him conduct research into changing working conditions. The research was dubbed The Hawthorne Effect and would be identified as the starting point of Mayo's human relations management theory (Roethlisberger and Dickson, 2003). Despite the success of Taylor's theory and the business gains it produced, it didn't account for the people carrying out the work and firmly held that money was the main influencer of employee performance (Mackay, 2016). Mayo challenged this concept and through his studies discovered that forming relationships in the workplace was a key motivator for employees. When working as part of a group, employees became more productive (Mayo, 2004). Mayo's research was the first to focus on the productivity gains of teamwork.

X and Y Management Theory

Douglas McGregor (1906 – 1964) was an American Management Professor who focused his research on motivational theory and personal development. In 1960, McGregor published his bestselling book "The Human Side of Enterprise" (McGregor, 1960) where he presented his X and Y management theory based on two contrasting leadership styles and the assumptions he had made about human nature which impacts on how a manager manages his or her employees. The X and Y management theory assumes that there are two distinct types of people within an organisation (Dudovskiy, 2013). Theory X identifies those who have very little ambition to succeed, dislike work wholeheartedly and are unwilling to take responsibility. Theory Y in contrast, identifies those who take ownership of their work and make a positive contribution to meeting the needs of the company whilst attaining feelings of job satisfaction, as reiterated by Wicker (2011).
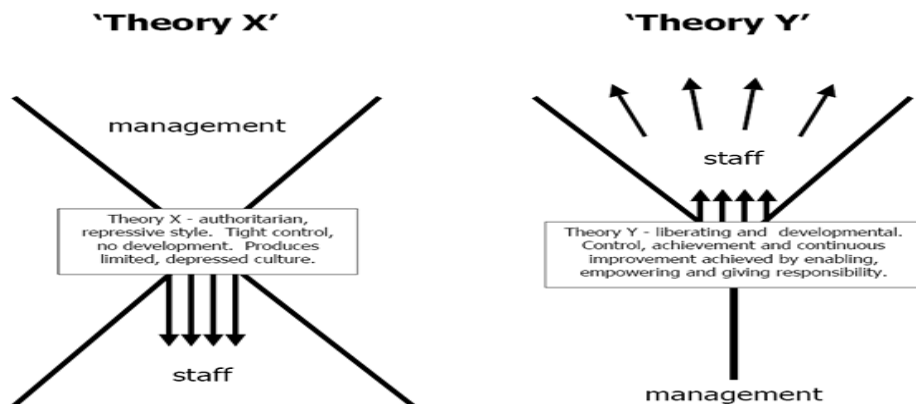
Figure 5:   Theory X and Theory Y (Dudovskiy, 2013)

Abraham Maslow – Human Motivation Theory

Abraham Maslow (1908 - 1970) was an American Psychologist and best known as one of the founders of humanistic psychology and one of the most influential psychologists of the 20th century (Stoyanov, 2017). Maslow's early career began with his interest in other psychologists work around behaviorism however he quickly tired of the negative associations of human existence therefore he chose to explore the creativity and potential that human beings possess (Maslow, A. 1943 / 2013). In 1943, Maslow published his book "A Theory of Human Motivation" in which he presented his Hierarchy of Needs model, identifiable as a 5 tier pyramid of human needs. Maslow theorised that all human beings are on a journey of personal growth, seeking fulfillment throughout different aspects of their life, in order

to grow they must meet certain needs at different levels, reiterated by Kleinberg-Levin (2019).
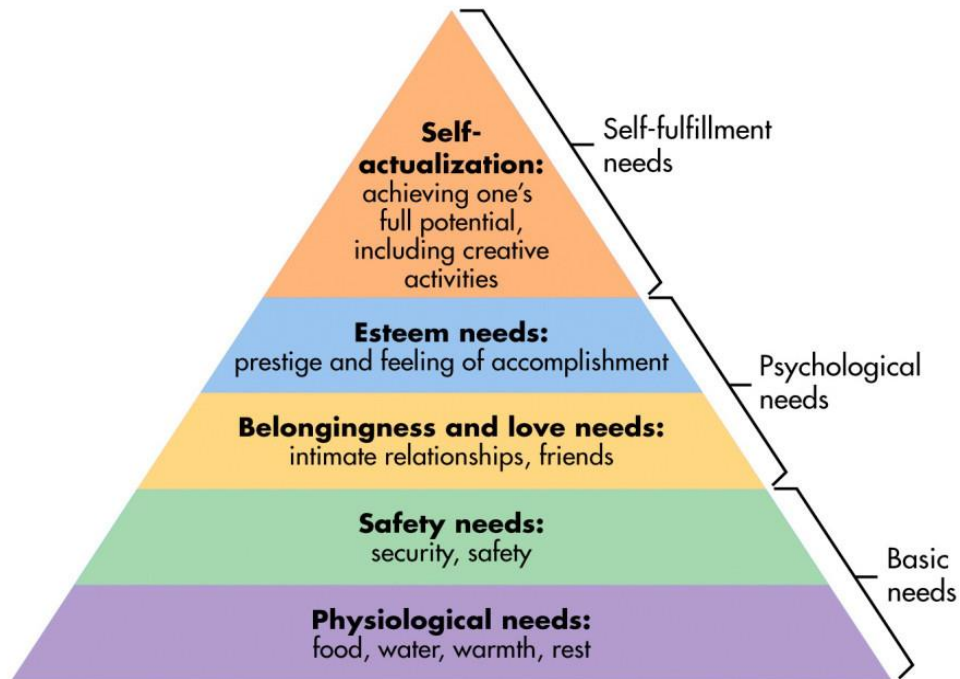
Figure 6: Hierarchy of Needs (Maslow 1943 / 2013)

A publication by The British Psychological Society (2018) dispels the myths and misconceptions around what self-actualisation means. It is viewed by some as elitist and unattainable (Kriz, 2006), when the true definition simply is to realise your own potential; exude spontaneity and creativity and be accepting of your status within the world. It is however important to note that self actualization is a continuation of personal growth and should not be viewed as the end of the journey. Frey (2018) further theorises that self actualization is not actually the tip of the pyramid and that a sixth level, self transcendence, goes beyond self actulisation and is concerned with helping others, spiritual enlightenment, progression to the highest levels of human consciousness and considering oneself as an integral part of the universe, favoured also by Westphal (2004).

Fredrick Herzberg – Two Factor Theory

Frederick Herzberg (1923-2000) was an American Psychologist whose interest in job satisfaction and personal motivation led him to conduct research into individuals and their work experiences. The basis of his study was to question a select group of people on their good and bad work experiences and how those experiences made them feel. In 1959, Herzberg published his Motivation-

Hygiene Theory, perhaps better known today as the Two Factor Theory, where he developed the concept that job satisfaction is based on two kinds of factors, motivation factors (satisfiers) and hygiene factors (dissatisfiers). Motivation factors include recognition, opportunity for growth and responsibility whereas hygiene factors include salary, working conditions and company policies (Pinder, 2015).
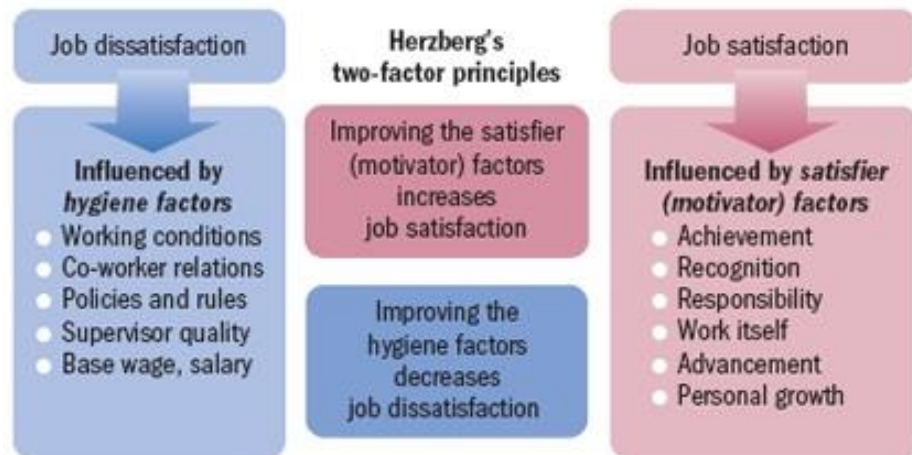
Motivator-Hygiene Theory (Mind tools, 2018)

Herzberg (1968) claimed that the two factors functioned in parallel with one another, meaning that satisfaction and dissatisfaction are not actually polar opposites, confirmed by Aquinas (2006). By removing employee dissatisfaction, for example by giving an employee a pay rise, this will not necessarily lead to the employee becoming satisfied, the employee would just no longer be dissatisfied.

Self Determination Theory

Deci and Ryan (2002) founded the self determination theory (SDT) which addresses basic biological needs of extrinsic and intrinsic motivations and personality, they are; competence, autonomy and psychological relatedness. In order for humans to function and grow, the SDT theory argues that basic biological needs must be met by the social environment.

Motivation is commonly grouped into one of two types; extrinsic and intrinsic motivation (Shea, 2012). The basis of extrinsic motivation is that a person will complete a task or activity purely because there is some kind of benefit or reward to be received upon completion, usually money. Intrinsic motivation, in contrast, is based on a person completing a task for their own self fulfillment (Thomas, 2009).

Biological Need	Description
Competence	The need to produce desired outcomes
Autonomy	Perception that an individual is in control of their life
Psychological Relatedness	The need to be involved in close, loving relationships

Table 3:   Self Determination Theory (Deci and Ryan, 2002)

Summary of Literature Review

Key performance motivators have been further explored through the literature review by analysing and comparing a number of well known management theories to identify their origins and accepted strengths and weaknesses. Scientific Management by Taylor confirms that extrinsic motivations are met through increased pay whereas Human Relations Management by Mayo confirms that intrinsic motivations are met through workplace relationships and improved communication.   From the literature review it is clear that motivated staff really do perform better at their jobs as they have a higher sense of job satisfaction. What motivates staff is debatable as every person is different therefore their motivators and individual needs will be different as shown by Herzberg's Two Factor Theory and Maslow's Hierarchy of Needs. It is important that organisations understand what their employees want out of their jobs, do they just want more money or do they want better relationships with colleagues and opportunities for career advancement? This question is at the root of motivation and knowing how to manage staff to get the best out of them. It is generally accepted that most modern day workplaces may employ a number of management theories to ensure optimal employee performance.   The five key themes which have presented themselves from the Global Workforce Study (2014) and the literature review are job satisfaction, recognition, personal development, workplace relationships and working conditions. Each of these themes contributes to motivation and performance in some way and will be taken forward as suggested thematic areas when preparing the interview questions.

RESEARCH METHODOLOGY

Outline Position

The direction of the research focuses on the perceptions of differing management theories and how the application of each contributes to the successful, or unsuccessful, motivation of employees and the intended aim of improving performance and productivity in the workplace. In order to collect and analyse meaningful data, a research methodology has been followed to ensure the aims and objectives that were identified at the outset of the study are reflected as the

research is developed (Kuada, 2012).. The research process, presented below by Collis and Hussey (2014) illustrates the logical order in which research should be conducted. It is however important to understand that research is not always a linear or straightforward process. The researcher revisited a number of chapters of the research study to amend upon and improve the original content.


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┌─────────────────────────────┐
│   Choose a topic and search │
│        the literature       │
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│  Review the literature and  │
│  define the research        │
│  question(s)                │
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│   Design the research and   │
│      write the proposal     │
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│    Collect the research data│
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│  Write the dissertation,    │
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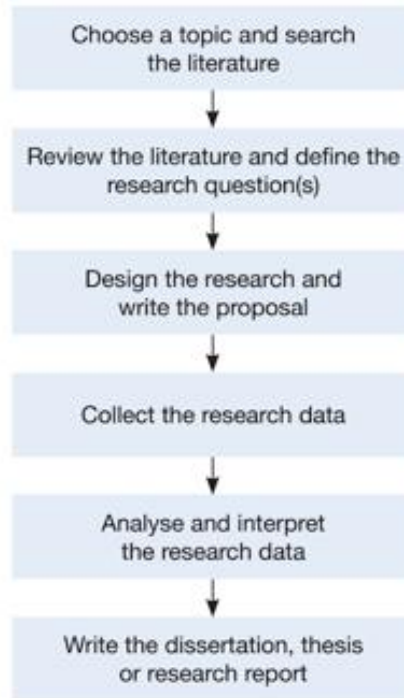
Figure 2:   Overview of the Research Process (Collis and Hussey, 2014)

Research Design

A process of data triangulation will be applied to the research study to enable the collection and analysis of both the primary data (semi-structured interviews) and secondary data (case study and literature review) to help facilitate a deeper understanding of the research topic (Naoum, 2013) and form a conclusion based on the main research questions. Fellows and Liu (2015) recommend the use of data triangulation as a way of assuring validity of the research through various methods of data collection. Data triangulation however is not used to necessarily cross-validate data, it is used perhaps to capture a different dimension of the same phenomenon. The literature review will form the basis and background of the research (Bell, 2005) including the identification of an existing case study, which the researcher will use to pin point the key issues surrounding the research topic. As clear themes emerge from the research, a total of 5 pre set themes are to be

deduced and a total of 10 semi-structured interview questions written around each deductive theme.

LITERATURE REVIEW

CASE STUDY

SEMI-STRUCTURED INTERVIEWS
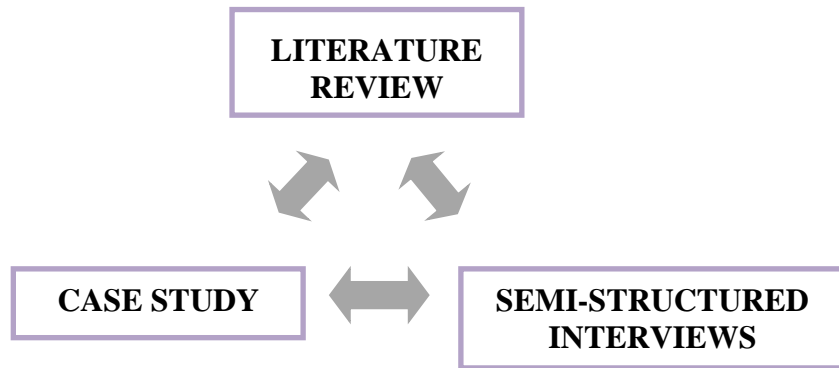
Figure 3:   Triangulation of Data (Author Illustrated)

Research can be both inductive and deductive (Glaser, 2014) depending on the research topic and the data that is presented. This research study is deductive in nature with an emphasis on identifying causality and testing existing theory. Although the themes will be deduced prior to the actual data collection taking place, the resulting codes that will be identified following the data transcription will be entirely inductive in nature and flow naturally from the responses given by each of the interview participants. The transcription and analysis of the primary data will be completed using a qualitative open coding and analysis technique (Auerbach and Silverstein, 2003) to clearly identify the sequences or lines of text, which will identify emerging codes, which will then feed in to the pre set themes and conclude the thematic coding process as shown in Figure 4.

THREADS (lines of text)

CODES (corresponding concepts)

THEMES (broader concepts)
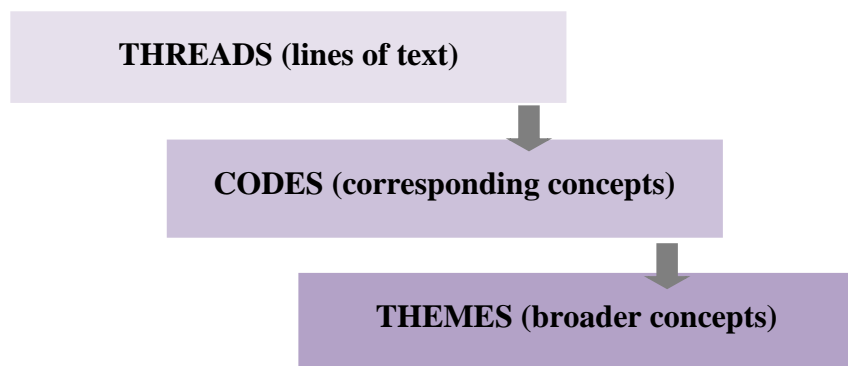
Figure 4:   Thematic Coding Process (Author Illustrated)

DATA COLLECTION AND ANALYSIS

To effectively collate and analyse perceptions based around the research topic, a qualitative approach to the data collection was taken to ensure the information gathered was of a rich and deep nature, taking into account the emergent thoughts and feelings of the participants (Bryman, 1998). The distant, hard fact finding approach of quantitative data collection was inappropriate to the research study. The interview participants, who took part in the data collection process, were selected by the author based on their differing credentials including age, gender, experience and hierarchical position within the company. This ensured an unbiased selection of participants and would hopefully produce a range of responses to the questions asked of them (Creswell, 2014). The 8 interview participants were all initially contacted via email to ascertain whether they would like to participate in the research study. The email gave an overview of the purpose of the interview and also contained the interview participation information sheets and consent form attachments to allow the interviewees to read through them before agreeing to take part. The participation briefing email ensured all ethical considerations had been addressed prior to the interviews taking place. Participants were fully aware of their part in the research study and that their identity would remain completely anonymous by the use of alphanumerical codes when transcribing the collected data. All participants were informed they could withdraw from the study at anytime. Each of the 8 semi-structured interviews based around 12 open ended questions took place at the researcher's normal place of work within a meeting room setting, away from the noise and distraction of the daily office environment. The interviews were all arranged and conducted within a two week period from 29th January to 11th February 2019, with a maximum of 2 interviews being rearranged by a couple of days to meet the interviewee's work commitments. The researcher had initially planned to carry out the interviews over a 6 week period, 14th January to 28th February, but then chose to accelerate the interview programme due to the perceived lengthy task of data transcription as the interviews were being conducted.   Each of the interviews was proposed to last 25 minutes in duration however both senior management interviews doubled the proposed duration, ending at 40 and 44 minutes. The author attributed this overrun to the wealth of experience of both senior management employees and their ability to give more detailed answers to the interview questions. The interview schedule below gives an overview of the alphanumeric codes assigned to each participant, their company position, date, time and overall duration of the interview. All 8 interviews were audio recorded then transcribed into separate Microsoft Word documents. The researcher chose to conclude all interviews before commencing transcription. Once all interviews had been transcribed, qualitative coding could commence.

Interviewee Code	Interviewee Position	Date	Time	Duration
PS01	Support Staff	29.01.2019	12:30pm	10m 47s
PS02	Support Staff	30.01.2019	16:00pm	14m 39s
PS03	Support Staff	05.02.2019	09:00am	16m 35s
PM01	Management	04.02.2019	09:00am	19m 28s
PM02	Management	04.02.2019	13:00pm	22m 24s
PM03	Management	11.02.2019	12:00pm	14m 25s
SPM03	Senior Management	29.01.2019	15:00pm	40m 20s
SPM04	Senior Management	04.02.2019	10:00am	44m 04s

Table 1:   Interview Schedule (Author Illustrated)

RESULTS

The data transcription and subsequent qualitative coding revealed a total of 25 codes derived from the participants' responses to the interview questions. These 25 codes were divided equally between the 5 pre set themes which have been derived from the recurring issues that appeared throughout the literature review. Each theme represents the contributing factors that play a part towards employee motivation and performance. The themes, are discussed below.

"Job Satisfaction"

This theme was the most obvious to deduce from the literature as it could quite easily be linked to almost all of the codes that have been assigned to the other themes. It describes the feeling of overall contentment and fulfilment that the participants feel towards their job role which can greatly affect workplace behaviours based on the level of satisfaction that is felt, as stated by Christensen (2016). Although the majority of codes would sit comfortably here as job satisfaction can encompass many statements, the researcher ensured that the remaining four themes were all effectively utilised and had codes attached to them. The "Job Satisfaction" theme produced the following codes;

- Engagement (1)
- Decision Making (2)
- Varied Workload (3)
- Ability to Influence (4)
- Sense of Achievement (5)

Job satisfaction is high as all participants indicated they felt engaged with their varied and interesting workload ("I really enjoy my job", PS03) which provides intellectual challenge and a positive sense of achievement. Decision making capability and the ability to influence can be restricted due to complex governance processes and input from decision making committees leaving Project Managers feeling like decisions are regularly out of their hands.

"Recognition"

Interestingly, this theme was referred to the least overall by each of the participants compared to the other themes. Although important within the workplace, the participants' responses showed the other themes having a greater weighting on what motivates them. That being said, participants felt that appreciation should not be underestimated. As the literature shows; staff retention can be closely linked to whether an employee feels they have been recognised for their performance and the contribution that they make. Employees are no longer just small cogs in the bigger machine (Sirota and Klein, 2014); they want to feel like they're worth something. If they don't, they may seek other opportunities. The "Recognition" theme produced the following codes;

- Paid what you're Worth (6)
- Incentivisation (7)
- Performance (8)
- Thank You (9)
- Everyone's Different (10)

Participants gave recognition a lower priority in terms of salary. Pay grades were deemed fair with participants confirming their awareness that higher salaries were available elsewhere. Other motivational drivers such as workplace relationships were prioritised over money. Performance was recognised via commendations and daily verbal appreciation from management which greatly increased morale.

"Personal Development"

According to Maslow (1943) in order for a person to realise and expand their potential, they must embark on a continuous journey of personal growth, seeking opportunities to develop emotionally and intellectually, both internally and externally to the workplace. This theme had many threads of text associated with it, confirming the participants' desires to continuously achieve and progress forward in their careers. The "Personal Development" theme produced the following codes;

- Training Opportunities (11)
- Personal Growth (12)
- Promotion (13)
- Mentoring (14)

- Support Mechanisms (15)

Personal development was achieved with access to a vast amount of training opportunities, some of which the participants felt could be more targeted instead of the access to everything approach. Personal growth is greatly encouraged through mentoring and supporting colleagues by sharing ideas and experiences. Promotion can be limited due to little natural staff turn-over which restricts career advancement.

"Workplace Relationships"

Of all the themes deduced, this theme had the greatest number of threads of text associated with it. The participants placed a great deal of importance on creating positive working relationships within the workplace as it has a big impact on how happy and productive they are. Negative relationships can cause de-motivation (Eby and Allen, 2012) which in turn leads to negative behaviour traits. This theme is key to identifying how well employees interact with their peers and their managers whilst also ensuring team building and collaborative working is championed over working in isolation. The "Workplace Relationships" theme produced the following codes;

- Leadership Styles (16)
- Communication (17)
- Feedback (18)
- Collaborative Teams (19)
- Trust and Respect (20)

Workplace relationships were favoured highly over all of the other themes with participants placing a great motivational emphasis on the colleagues that they work with. Participants reported that collaboration and communication is key to ensuring successful delivery of projects and building trust and respect amongst colleagues. Existing leadership styles were well received however interaction with senior management can be limited due to their workload at senior business level as well as project level.

"Procedures and Working Conditions"

This final theme focuses on how the participants feel about their day to day working lives in terms of the hours they work and the complexity of the procedures they have to follow. It links closely with the importance that must be placed on an employee's wellbeing as stated by Russell and Russell (2010) and the importance of managers showing understanding and empathy towards their staff (Bence, 2014). Each of the participants claimed to have a healthy balance of work and home life and felt that this contributed a great deal to their positive wellbeing. The "Procedures and Working Conditions" theme produced the following codes;

- Governance (21)

- Systems (22)
- Work Life Balance (23)
- Flexibility (24)
- Office Environment (25)

Procedures and working conditions received mixed responses with participant's claiming the use of multiple systems and tight governance processes can cause frustration and delays. Health and wellbeing is championed as is promoting a positive work life balance, flexibility in working hours was one of the top positive comments given by all participants. The below images capture the importance of a continuous cycle of motivational themes and the contributing factors which drive each theme. They collectively present the key themes identified throughout the results section above;
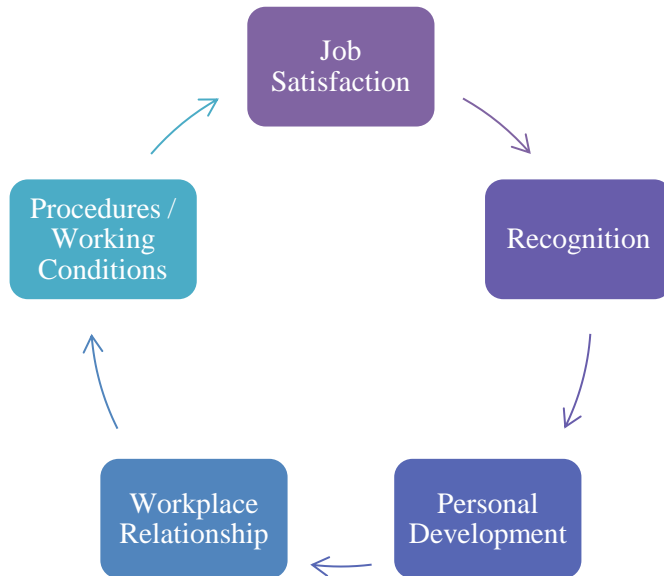
Figure 8: Continuous Cycle of Motivational Themes (Author Illustrated)

Job Satisfaction	•Engage employees by providing interesting and challenging work
Recognition	•Pay a fair salary, reward performance and remember to say thank you
Personal Development	•Encourage personal growth, provide training opportunites and support
Workplace Relationships	•Strong and effective leadership, ensuring collaboration and communion
Procedures / Working Conditions	•Promote health and wellbeing and a positive worklife balance

Figure 9:   Contributing Motivational Factors (Author Illustrated)

CONCLUSIONS

Motivation is an interesting and thought provoking concept which requires the detailed understanding of what drives human behaviour. It is a great misconception that money is the sole motivational driver when in fact there are a number of drivers which employees consider important to them as individuals.

The data clearly shows a continuity thread through the performance motivators that were reported within the Global Workforce Study (2012) and the historical management theories presented in the literature review.

Interestingly, a comparison of the views of the employers against the employees, based upon the top employee attractions and drivers of the Global Workforce Study (2014), shows a sizeable disconnect between prioritisation and importance.

This suggests that employers understand motivational drivers however they are not proactively prioritising the drivers which could lead to the improvement of productivity. Job satisfaction, recognition, personal development, workplace relationships and working conditions are all key themes noted in the literature which contribute to motivation and performance in some way and are a clear starting point for any proactive employer.

Motivation however is an individual experience; each person approaches it differently with unique views, behaviours, wants and needs, therefore no one size fits all approach can be successful. As stated by Wiley and Kowske (2012) the Organisations that succeed and outlive their competitors are the Organisations that take the time to invest in their employees to ensure their wants and needs are effectively met.

This poses a resource issue when the number of employees can extend in to the thousands; however the hard part is putting the effective systems in place, the rest will follow naturally as employees start to appreciate that their Organisation really cares.

The "Workplace Relationships" theme confirms that Organisations perform better when their employees feel heard. Communication and collaboration play a huge role in workplace motivation to foster positive workplace behaviours and nurture a culture of trust and respect amongst employees at every level.

The researcher therefore concludes that prioritisation is unnecessary as it is clear that all five themes are equally important and implementing all themes collectively will ensure employees have their motivational needs met.

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AN INVESTIGATION INTO ACHIEVING ENVIRONMENTAL WHOLE LIFE VALUE WITHIN UK PUBLIC RAILWAY DESIGN

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The construction industry contributes significantly towards many global environmental issues, and reports have found that there are less than 12 years before global warming reaches 1.5 degrees, the critical level for irreversible damage. This investigation considers how UK public railway projects are helping to mitigate damage, how effective the methods are, an understanding of future plans, and by what means any issues are being overcome. The research was undertaken with an extensive initial literature review, followed by questionnaires and interviews to gain primary data specific to the topic. Once analysed, the three research methods were triangulated in order to form the conclusions and make recommendations. It was discovered that design teams are using various methods and incorporating many features for environmental Whole Life Value (WLV) aspirations. These methods can be considered as somewhat effective. There are key differences between smaller and larger projects regarding prioritisation and resource allocation for environmental matters, with larger projects generally putting more emphasis on it. Increased flood risk from the changing climate is being managed. Electrification of railways is helping to reduce operational energy. Issues include integrating with the supply chain by way of eco-materials and having a labour force that is environmentally educated. A second issue is the commonly high costs of being environmentally sustainable and the long payback periods for investment. Lastly, balancing economic and social sustainability

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can impede environmental aspirations. Solutions found include the early involvement of project teams, the incorporating of environmental specialists on all projects and statutory fines.

Keywords: Sustainability, Rail, Environment, Railway, Engineering

INTRODUCTION

Recent reports warned the global public that there were 12 years before global temperatures will exceed an increase of 1.5°C since pre-industrial levels (CARE, 2019; IPCC, 2019; Kureethadam, 2018; Mellor, 2018). This is the critical temperature rise whereby risks of floods, drought, and extreme heat would worsen dangerously and lead to poverty for millions of people (IPCC, 2019; Kureethadam, 2018; Watts, 2018). The construction industry significantly contributes to environmental damage, Figure 1 outlines the key statistics. It highlights the industry's opportunity to improve operations in response to the terrifying warnings.
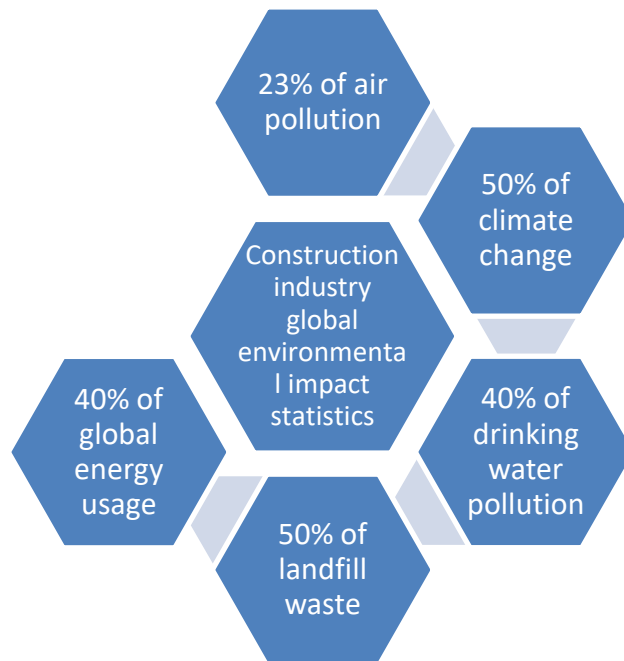

Figure 1 - Diagram to show construction industry environmental damage statistics, incorporating (Snook, 2017)

There is little research covering this exact topic, particularly recently, making the research unique. There is however data covering environmental sustainability and rail infrastructure separately. This research comes at a good time following the climate change warnings and the current designing of major railway project, HS2. Public Clients for UK rail include the central government, local government, or Network Rail and NI Railways. Network Rail is a public organisation which owns and maintains the railway infrastructure in Great Britain (Network Rail, 2017b), NI Railways for Northern Ireland (DBpedia, n.d.). The UK has an ageing national infrastructure network. Consequently, railways are set to be renewed, giving the opportunity to adapt for climate change resilience and to reduce operational energy (Kennedy and Corfee-Morlot, 2013).

RESEARCH METHOD

Literature review provided this study with secondary data. This involved critically appraising the related studies which already existed. The literature review highlighted areas of uncertainty around the topic and provided the rationale to undertake the primary research. Primary research was obtained through the medium of questionnaires and interviews. An ethics proforma was completed before the commencement of the primary research. A maximum of 44 responses were recorded for the questionnaire using Qualtrics (some participants did not answer every question). The questionnaires were answered by a range of construction professionals from all infrastructure disciplines. Following a pilot interview, the researcher conducted 5 face to face semi-structured interviews, as follows:

Participant Identifier	Category	Job Role	Date
Participant 1	Client – Light Rail	Principal Engineer	25/02/2019
Participant 2	Client - Signalling	Environment Manager	04/03/2019
Participant 3	Design contractor – New rail/structures	Technical Director	05/03/2019
Participant 4	Design contractor – New rail	Commercial Director	05/03/2019
Participant 5	Design contractor – New rail and upgrades	Principal Environmental Consultant	06/03/2019

Figure 2 - Interview participants

Data was then analysed using the programs Instat and MS Excel. The data was presented in graphs using Excel. Chi-square was used to compare the relationship between two categorical variables. The Kruskal-Wallis nonparametric ANOVA test was used to compare two or more data sets of equal or different sample sizes. The mean and standard deviation were calculated for questions involving rating scales. Likert scales were occasionally analysed by applying a numerical value to the different answers. Many of these tests obtained P (probability) values to assess whether the data was statistically significant; how likely the relationship between two or more variables does not occur by chance (Kenton, 2019).

Limitations of all methods were considered. It was decided that through triangulation, the three methods should complement one another and provide reliable results. This enabled conclusions to be then drawn out of this discussion in the final chapter.

LITERATURE REVIEW

The Literature Review critically appraised both quantitative and much qualitative secondary research on the topic. A variety of sources such as academic textbooks and journals as well as news articles and professional reports were used. The Literature Review was limited by the number of sources relating specifically to the research topic. This highlighted a necessity for validation and primary research.

Definitions of Sustainability consider preserving environmental, economic and social factors in development, and the Hueting (1990) definition is the one most frequently cited (Butterworth-Heinemann, 2001; Emas, 2015; Krygiel and Nies, 2008). Whole Life Value considers all three sustainability factors, throughout design, construction, operation and disposal (Bourke, et al., 2005). Quantitative data suggests that the government has been committed to increasing railway spending over recent years (statista, 2019), and has simultaneously increased associated greenhouse gases minimally (Kennedy and Corfee-Morlot, 2013). This suggests procedures are improving through some measures.

Many methods were ascertained for assessing environmental WLV or helping to achieve it. However, their use and effectiveness must be explored further. The key methods were Whole Life Costing (Bourke, et al., 2005; Constructing Excellence, 2006; Pellegrini-Masini, Bowles, Peacock, Ahadzi, & Banfil, 2010; RICS, 2018b) and Embodied Carbon Assessments (Circular Ecology Ltd, 2018; Rawlinson & Weight, 2007). CEEQUAL which has now been bought by BREEAM (the construction index, 2015), is a respected tool which incorporates WLV assessment and supports UK Government strategies.

BIM level 2 became a government mandate in 2016 (Holzer, 2015, p. 6; IPA, 2016). BIM is said to help improve collaboration between parties, facilitates the delivery of defined processes and requirements, provides a single file for sharing between parties and a 3D BIM model containing all useful data. Users can also

foresee the environmental impacts of their designs and therefore make changes prior to construction (BSI, 2016). Design teams can also incorporate several features such as using construction by-products and low-energy additives (ICE, 2008a), green corridors alongside rail track, green bridging of railway cuttings (LUC , 2009) and net-gain biodiversity calculations (Network Rail, 2017a). Legislation is in place to allocate 'duty of care' to the person best able to control the environmental risks (Countrystyle Recycling Ltd., 2016). The UK has multiple legislative drivers, as well as international agreements such as the Paris Accord, (UNFCCC, 2018; Salawitch, Canty, Hope, Tribett, & Bennett, 2017) and the Kyoto protocol. Both Network Rail (Network Rail, 2017c), and Translink (NI Railways) have robust environmental policies.
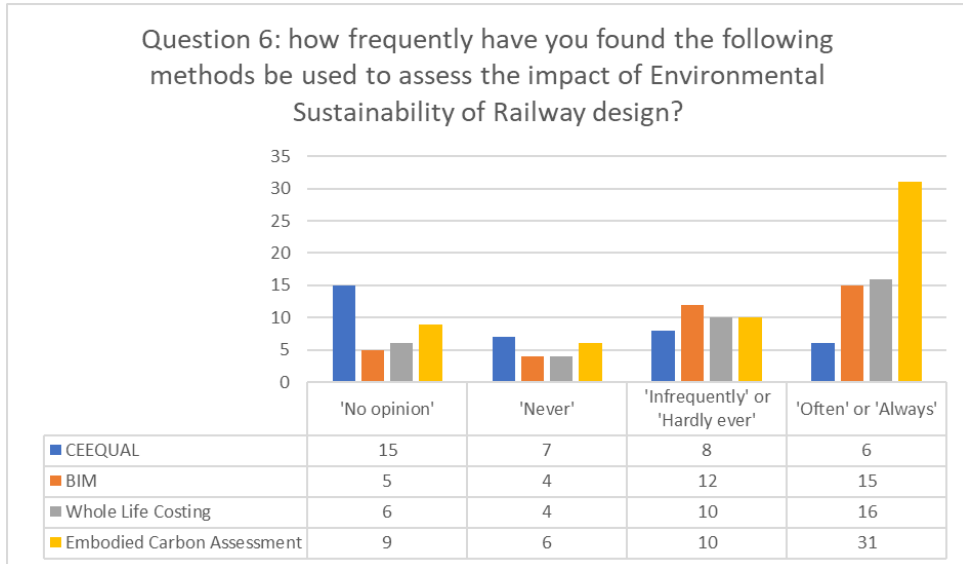
The key issues found with accomplishing environmental WLV were the interdependence of rail with other infrastructure types (ETH, 2019; Turner, 2018), and supply chain integration (ICE, 2008b), as environmental policy differs across organisations such as private suppliers of public projects. It is also found that environmentally sustainable methods can be costly to incorporate (DfT, 2017; Turner, 2018). However, investment in environmental protection measures often reduces operational costs over an asset's lifecycle (DfT, 2017; Kubba, 2010). An industry and government collaboration initiative 'project-13' aims to improve delivery and management of infrastructure projects in the UK. This includes improving sustainability within the industry (ICE, 2018a; ICE, 2018b). A RICS and UCL report found that issues in implementing sustainable practice in industry could be helped through early involvement of project teams, more specialist training for project teams and advancements in technical competence of staff handling relevant software (RICS, 2018).

When researching the future, a significant challenge will be preparing the infrastructure for extreme weather (DfT, 2017; Kennedy and Corfee-Morlot, 2013), such as more frequent flooding and increased rainfall, which previous drainage systems could not handle. Other future considerations are, the uncertainty surrounding Brexit (Lee, 2017; Priestley & Smith, 2018); the development of Hyperloop and its low operational energy and the electrification of existing routes; reducing operational damage and a less damaging alternative to building new routes (Lee, 2017; Priestley & Smith, 2018).

RESULTS

The questionnaire data suggests that the Hueting (1990) definition was preferred. However, when statistically analysed, it was not considered more significant than the other definitions discussing the three parameters. During the interviews, participants highlighted social and economic WLV considerations. Literature suggests that the Government acknowledges a link between the three parameters, that the Government has increased annual spending on rail every year between 2013 and 2018 and that rail is viewed as a sustainable transport mode. The interview participants agreed with the latter. They also felt that when

commissioning a rail project, the focus is on cost, particularly for smaller projects. The environmental specialists felt remaining sustainable within the confines of

Question 6: how frequently have you found the following methods be used to assess the impact of Environmental Sustainability of Railway design?

	'No opinion'	'Never'	'Infrequently' or 'Hardly ever'	'Often' or 'Always'
CEEQUAL	15	7	8	6
BIM	5	4	12	15
Whole Life Costing	6	4	10	16
Embodied Carbon Assessment	9	6	10	31

the budget were secondary. Therefore, although there is a link between the parameters, it is likely economic sustainability was the primary investment aim.

Figure 3 - Graph to show how frequently the participants have used environmentally sustainable methods

Question 7: to what extent do you agree that the methods have influenced Railway design to be more environmentally sustainable?

	'No opinion'	'Disagree or 'Strongly disagree'	'Neutral'	'Agree' or 'Strongly agree'
CEEQUAL	15	5	12	4
BIM	5	6	12	13
Whole Life Costing	8	2	11	15
Embodied Carbon Assessment	9	5	9	13

Figure 4 - Graph to show the observed values of environmentally sustainable railway design method effectiveness for question 7

Statistical tests found the variation among the columns to be non-significant. BIM has the highest effectiveness value and Whole Life Costing the highest frequency value. However, the majority have experienced the use of embodied carbon assessments 'often' or 'always'.
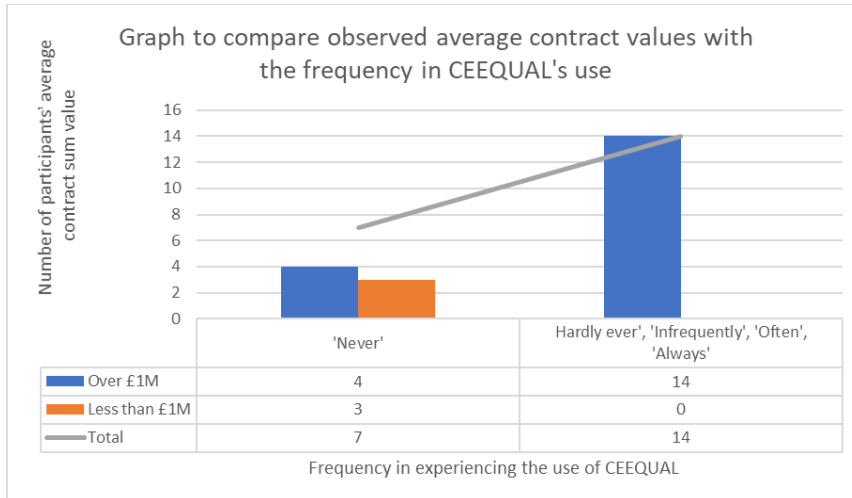
Figure 5 - Graph to compare participants' average contract sum value with how often they have experienced the use of CEEQUAL

Figure 6 - Graph to show how frequently the participants have incorporated certain design features

Figure 5 suggests that CEEQUAL/BIM is generally used on larger projects. Figure 7 shows that green bridging of railway cuttings was the least used feature. The effectiveness scores had a negligible difference, all with reasonably high scores.

Question 9: to what extent do you agree that the features have been effective in mitigating the Environmental Impact of Railway design?

	Incorporation of construction by-products	Green corridors alongside rail track	Green bridging of railways cuttings
'No opinion'	9	8	9
'Disagree or 'Strongly disagree'	0	1	1
'Neutral'	14	13	12
'Agree' or 'Strongly agree'	13	14	14
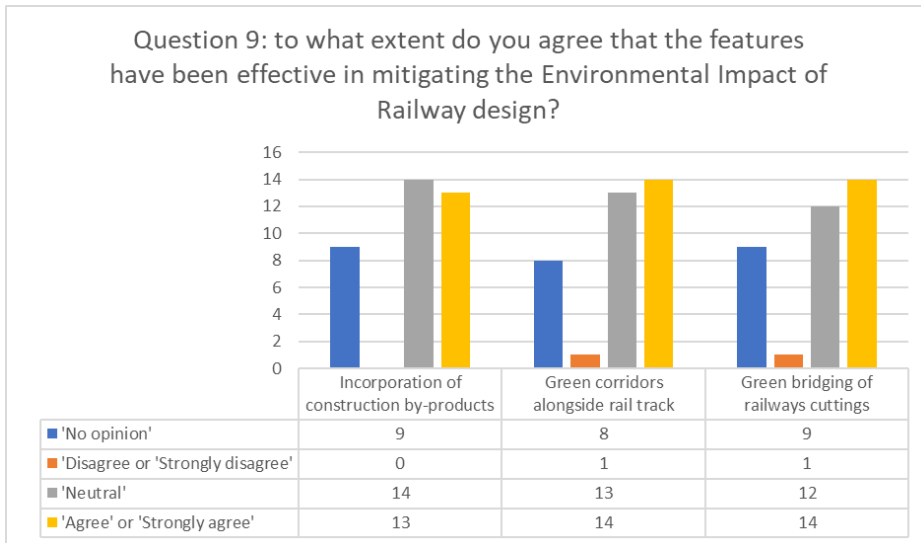
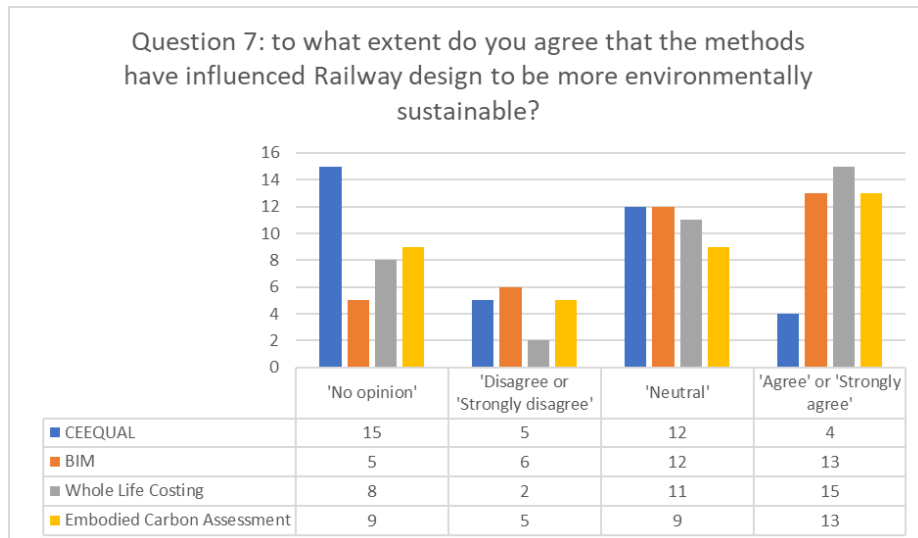*Figure 7 - Graph to show the observed values of environmentally sustainable railway design method effectiveness*

Question 18: from your experience, how often are future environmental demands being considered on UK Public Railway projects?

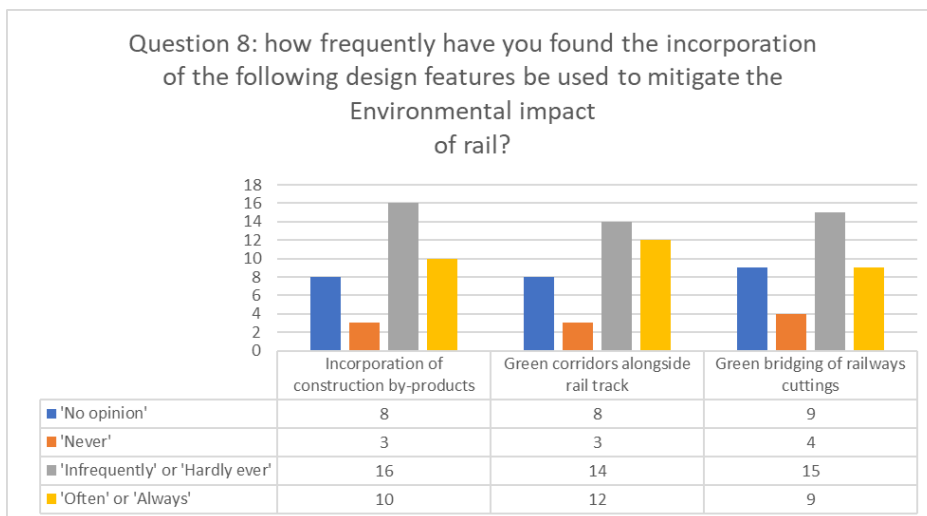|	Never', 'Hardly ever'	'Often', 'Always', 'Infrequently'
Over £1M	4	22
Less than £1M	1	3

Figure 8 - Graph comparing respondents' average contract sum with how often future environmental demands are being considered within Railway design

CONCLUSIONS

Sustainable development can be thought of as development that balances sustaining the environment, the economy and society for future generations. Environmental Whole Life Value is the term for sustaining the environment from

the design of an asset through to its disposal. The UK Government values all parameters of sustainable development. However, the primary motivation for railway projects is usually economic. UK public railway projects use multiple environmentally sustainable methods: CEEQUAL/BREEAM, Whole Life Costing, Embodied Carbon A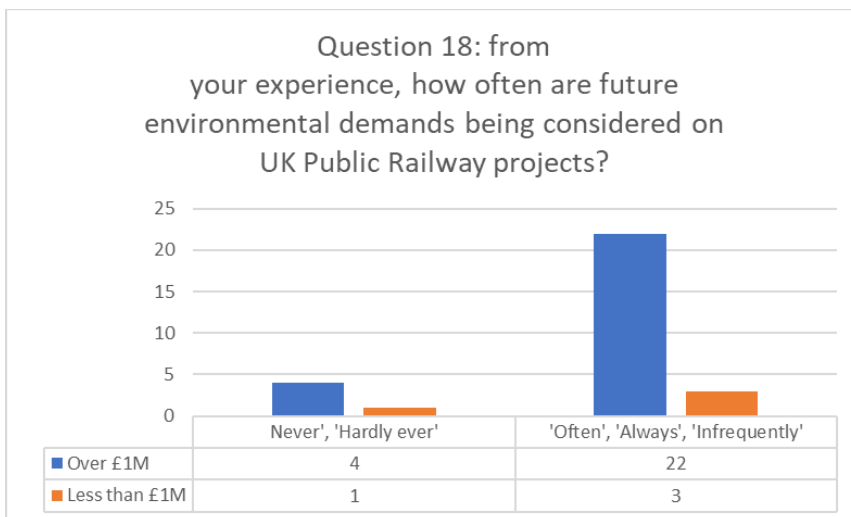ssessment, and BIM. Projects incorporate the use of recycled materials, green bridging of railway cuttings and measures to protect and create ecological habitat. CEEQUAL/BREEAM is not used on smaller projects and they are less resourced to focus on the environment. Legislative drivers such as the Environmental Protection Act 1990 and the Paris Agreement govern UK public railway projects, as well as the Network Rail environmental policies. Generally, projects are preparing for extreme weather conditions due to climate change. Particularly, projects are incorporating drainage solutions which will manage the increased flood risk. Environmental Consultants believe that Brexit will negatively impact environmental WLV on public railway projects. Biodiversity net gain/loss calculations will be used on future Network Rail projects and it is already being used on larger UK public railway projects. Railways are being electrified and will continue to be for lower operational energy.

The methods used can be thought to be somewhat effective. Integrating with the supply chain in order to achieve environmental WLV is an issue, particularly for materials and the environmental education of labour. They are perhaps hindered by the challenge to influence supply improvements within project timescales. The implementation of environmentally sustainable methods on railway projects can be costly, which is a constraint on budgets. Further, the operational cost savings of implementing sustainable methods are not attained within railway funding cycles. The interdependence of balancing the social and economic parameters of sustainability can impede on the environment. Early involvement of project teams would help overcome issues associated with the incorporation of environmentally sustainable methods. Environmental specialists can help to challenge and promote environmental matters within design teams. However, they are usually only afforded on larger projects. Statutory fines for environmental offences can mean that it is costly for organisations to not comply with environmental legislation.

The author felt that questionnaire and interview participants, aside from the environmental professionals, had limited knowledge in environmental sustainability. There was also a lack of knowledge surrounding future methods. The questions in the survey and the interviews were very different, partly due to the nature of the research methods. However, this limited the direct triangulation of the results. All interviews were undertaken entirely in England and questionnaires were not directly targeted outside England. However, from the open nature of LinkedIn sharing and forward distribution of emails, it is hoped that responses were obtained from Wales, Scotland and Northern Ireland.

In order to better achieve WLV in UK public railway projects, the conclusions inspire the following recommendations:

- Government policy for all contractor design teams to include an ongoing environmental or sustainability specialist and have environmental protection within all project key performance indicators.
- The upskilling of all industry staff regarding environmental measures, enforced by the government and professional bodies.
- A separate budget for environmental WLV to ensure long-term funding strategies.
- Larger fines for environmental legislation non-compliance so that it is more cost-effective to protect the environment.
- Further investment could be given to research for improving existing, and developing new methods.

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Watts, J. (2018). We have 12 years to limit climate change catastrophe warns UN. The Guardian, 1.

AN INVESTIGATION INTO THE IMPACT OF OFFICE TO RESIDENTIAL PERMITTED DEVELOPMENT RIGHTS IN LONDON

Bethan Leonard[3] and Beatrice Fairley

Bethan Leonard studied Bachelor of Science (Hons) in Real Estate at Sheffield Hallam University and graduated in 2019 with a First-Class Honours. She now works as a Graduate Surveyor at Lambert Smith Hampton. Beatrice Fairley is a member of staff in the Built Environment faculty at Sheffield Hallam University who supervised the dissertation.

Purpose – This paper aims to investigate the impact of office to residential permitted development rights on the supply of office accommodation and the lack of planning controls in London. It identifies the impact that permitted developments rights have had on the office market, the financial impact for local authorities and the consequences of local authorities having a lack of control over the policy.

Design/methodology/approach – Interviews were conducted with different stakeholders to obtain their views on office to residential permitted development rights. Purposive sampling was used to choose the 7 participants as the author believed they would provide specialist knowledge and opinion on the chosen topic.

Findings – Findings reveal the quantitative amount of office accommodation which has been converted and the wider impact that this has had on businesses, the quality of the housing being delivered, the loss of planning obligation contributions for local authorities, and the unintended consequences. In addition, there was a general consensus that affordable housing contributions seem to be the most significant loss for local authorities and the research concludes that although there is an urgent need to provide more housing, it does not need to be at the expense of providing poor quality housing or leaving the office market undersupplied.

Research limitations/implications - This study would be too large if every stakeholder was to be interviewed, thus purposive sampling was utilised to select the interviewees.

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Originality/value – The literature review emphasised that there is limited existing studies and research on the impact of the loss of office accommodation on the office market. This study investigates the views of stakeholders on this area as well as gathering updated qualitative research.

INTRODUCTION

It has long been identified that there is an urgent need to boost the housing supply in England (DCLG, 2013). In 2013 in a bid to fulfil this need the government announced that they would allow the change of use from office to residential without the need to obtain planning permission. When the legislation was introduced it was intended that it would only last for three years but it was announced in October 2015 that it would be made permanent. There are currently 17 areas within England where the government has granted exemption from office to residential permitted development and 10 of these areas form part of London Boroughs.

The legislation was originally aimed at tackling the issue of office accommodation that had outlived its economic life. However, it would now appear to be driven by the agenda to provide more affordable housing and this has impacted on the office market by putting pressure on supply and rental levels (Womble Bond Dickinson, 2017). This legislation was met with strong opposition and it is considered that office to residential permitted development "has turned out to be one of the most controversial planning reforms introduced in England over the last decade" (RICS, 2018, p. 13).

Whilst completing a 12 month placement in the property sector working within a London valuation team, the author witnessed a vast amount of office accommodation being converted to residential use and the poor quality of dwellings being delivered. This research aims to investigate in the London area the impact of office to residential permitted development rights on the supply of office accommodation, the effects for those living and working within areas where conversions have taken place and the impact of the lack of planning controls.

LITERATURE REVIEW

Subject Background

During the twentieth century there was an unprecedented growth in the delivery of office space which quickened dramatically after the Second World War (Heath, 2002). However, over the last three decades, the growth in surplus office space has been one of the most severe problems related to property cycles (Gann & Barlow, 1996). During the 1990s, the increasing level of dissatisfaction with the 1960s and 1970s office accommodation led to a surplus of obsolete and vacant post-war office buildings (Key et al., 1990; Merrifield, 1993).

While the idea of converting buildings to residential use is not new, converting offices became a relatively new phenomenon in the early 1990s which was initially purely a commercial response to the surplus office accommodation. Property owners and developers also became increasingly aware of the economic and technical viability of converting redundant office space into residential accommodation towards the late 1990s (Heath, 2002). Nevertheless, there were a number of factors deterring developers. The main barriers were the planning restrictions, for example, affordable housing contributions and car parking provision, unsympathetic taxation and management problems (The British Property Federation, 1999).

Office to Residential Permitted Development Rights

In 2013 the government announced that they would extend Permitted Development Rights (PDR) to allow the change of use from office to residential without requiring planning permission. It was anticipated that the change of legislation would "encourage developers to bring underused offices back into effective use as houses for local residents" (Pickles, 2013, para. 4). It also aimed to reduce bureaucracy costs, ease the process and incentivise developers who no longer would have to comply with rigorous planning controls. In October 2015 PDR for office to residential conversion was made permanent. The policy has attracted controversy and "concern has been expressed about the impact on office rents and availability and on the quality and affordability of the housing produced" (House of Commons, 2017, p. 3).

Total Loss of Office Accommodation

Since the introduction of office to residential permitted development, the British Council for Offices (BCO) (2017) estimates that, 966,000 m² (10.4 million ft²) of office floor space is lost per annum across the country and the TBR (2014) report for Camden, claims that between April 2004 and October 2013, 60,000 m² (645,000 ft²) of office accommodation was lost, in comparison to 23,000 m² (248,000 ft²) in less than 12 months since the policy was introduced. This demonstrates the high rate of conversion in Camden. It was predicted that extending PDR in 2013 would have a minimal impact on the UK's urban environment, with only a small number

of applications anticipated (Butt, 2018). However, 10,166 applications for prior approval for permitted development (PD) were received in England between 2014 and 2017 (RICS, 2018) and since 2015, approval has been granted for office conversions into 30,500 homes in England which amounts to 8% of new homes nationally (Butt, 2018).

Despite the government's aim to bring 'underused offices back into effective use' (Pickles, 2013), PD does not necessarily result in the conversion of vacant units. It has been recorded across London, where information on occupation was available, that 39% of all office to residential prior approvals were fully occupied spaces (RICS, 2018). The existing PDR "allow for no consideration of the impact of the loss of key office space" (London Councils, 2015, p. 3) and do not make a distinction between economically viable and redundant office space (London Councils, 2015; Muldoon-Smith & Greenhalgh, 2016).

Evidence from the London Development Database 2017 found that it has had many "unintended consequences including loss of occupied business space…and loss of secondary business space" (GLA, 2018, p. 22). Croydon is regarded as a 'permitted development haven' (Belger, 2016) and since 2013, 187 prior approvals were granted which resulted in a total potential loss of 336,300 m² of office space which equates to a loss of employment space for 19,872 workers (Elliott, 2018).

Impact on the Office Market

Whilst PDR has helped to remove excess or inappropriate floorspace and to contribute to housing needs, the scale of loss is creating serious imbalance between supply and demand. The natural consequence of a decrease in supply will be an increase in office rents (TBR, 2014). An increase in rent may increase investment appetite, which should stimulate a supply side response, and as a result better quality space may be provided than was lost to residential use.

Nevertheless, in areas where there is already a dearth of office space and availability rates fall below 8%, it is expected that an increase in rent will arise as there is a narrowing choice for occupiers (GLA, 2018). In the short term this could result in a loss of affordable office stock (BCO, 2015) and the scarce office accommodation is "threatening the viability of office redevelopment and refurbishment even in areas where there is clear demand" (London Councils, 2015, p. 3). Without safeguards in place there is a serious risk of major areas of highly-suitable commercial floorspace being lost to residential via PDR because of the greater financial return associated with their conversion (RICS, 2015).

The BCO (2015) report states the concerns of Local Planning Authorities (LPAs) over the loss of small and cheaper office accommodation. Smaller occupiers will be the most affected by PD conversions as the new office stock which is replacing old offices are achieving higher rental values, therefore there is not an alternative for the occupants whose offices have been converted (RICS, 2018). Nevertheless, the way that people and businesses occupy offices is changing. High office vacancy

rates, the need for businesses to improve productivity and the increase in the number of start-ups is driving the growth of flexible working (CBRE, 2018a). With as much as 50% of the property portfolio estimated to be in flexible assets by 2040 (CBRE, 2018b), there's a strong possibility that there may not be such high demand for office accommodation.

Financial Impact

A noteworthy feature of PD is the inability of LPAs to enter into Section 106 (S106) agreements (RICS, 2018). Large developments are usually contracted to pay Community Infrastructure Levy (CIL). Although office to residential PD is not exempt from CIL, an offset is allowed for existing office floorspace that has been occupied for 6 of the last 12 months. For many of the PD developments, applicants have been able to demonstrate this and developers have been able to further maximise the profits. Between May 2013 and May 2015, it was estimated that there was a £50 million loss of affordable housing contributions in inner London and 3,000 affordable units in outer London (EGi, 2015).

The RICS conducted an assessment within the Borough of Camden where they looked at 7 office to residential PD schemes and examined their financial impacts which are shown in Table 1.

| Scheme | Financial impact | | | | | |
| | Local infrastructure/services (one off) | | Planning fees (one off) | | Taxes (per annum) | |
	Potential loss (£4,600 per unit)	Potential gain	Potential loss	Potential gain	Potential loss (2010 business rates)	Potential gain (current council tax)
116 Boundary Road St Johns Wood	-£4,600	S106 = £0 CIL = 0	-£385	£80	-£2,415.70	£1,259.97 (1 x Band C)
	Net: -£4,600		Net: -£305		Net: -£1,155.73	
2 & 4 Kings Terrace Mornington Crescent	-£0	S106 = £0 CIL = 0	-£770	£80	-£18,610.75	£4,094.88 (1 x Band E + Band G)
	Net: £0		Net: -£690		Net: -£14,515.87	
68A Delancey Street Camden Town	-£4,600	S106 = £0 CIL = 0	-£385	£80	-£101,430	£2,834.92 (1 x Band H)
	Net: -£4,600		Net: -£305		Net: -£98,595.08	
48-56 Bayham Place	£59,600	S106 = £0 CIL = (Mayoral) = £26,000	-£5,005	£80	Not readily available	Not readily available

Scheme	Local infrastructure/services (one off)		Planning fees (one off)		Taxes (per annum)	
	Potential loss (£4,600 per unit)	**Potential gain**	**Potential loss**	**Potential gain**	**Potential loss** (2010 business rates)	**Potential gain** (current council tax)
Mornington Crescent		CIL (Borough) = £130,000				
	Net: £96,200		Net: -£4,925		Net: N/A	
5- Anglers Lane Primrose Hill	-£124,200	S106 = £0 CIL = 0	-£10,395	£80	Not readily available	Not readily available
	Net: -£124,200		Net: -£10,315		Net: N/A	
Merlin House Kilburn	£55,200	S106 = £0 CIL = (Mayoral) = £31,700 CIL (Borough) = 0	-£4,620	£80	Not readily available	Not readily available
	£23,500		Net: -£4,540		Net: N/A	
Asher House **West Hampstead**	-£133,400	S106 = £13,600 (for highways) CIL = (Mayoral) = £65,250	-£11,165	£80	-£102,900	£45,819.19 (15 x Band D + 13 x Band E + 1 x Band F)
	Net: -£68,150		Net: -£11,085		Net: -£57,068.81	

Table 1 - Financial impact of 7 PD schemes in Camden (RICS, 2018).

It has been calculated that Camden lost £665,853 in planning application fees over the first four years of PD and a potential loss of 333 affordable housing units in the area outside of the Central Activity Zone (RICS, 2018). In addition, there has been a minimum loss of £9,012,825 in S106 contributions.

The Lack of Control for Local Authorities over the Planning Policy

Every LPA has a local plan which creates a framework for development inside their boundaries. Although there may be sufficient evidence to suggest that there is demand to preserve the office space, planners retain little influence over conversions taking place through PDR. Local Authorities (LAs) view the policy as

a "restrictive and unwarranted incursion on their professional capacity to plan and deliver wider societal benefits" (Holman & Mossa, 2018, p. 615). Local authorities have also voiced their concerns over the loss of control they have over the poor quality of the units being produced (BCO, 2015). As office to residential PD no longer requires to be plan-compliant there are examples where developers are not complying with minimum space standards. Croydon, for instance have seen studio flats measuring 12 m² and 14 m² (RICS, 2018).

The RICS examined 5 PD schemes in Croydon. Neither scheme fully met the national space standards and 3 of the 5 schemes have not provided any amenity space. See Table 2.

Scheme	Building details and quality				
	No. units	Building typology	Mix of units	National space standards?	Amenity space? Play space?
Concord House London Road, Inner city, North of town centre	126	1960s or 70s office	93 studio 22 one bed	33/126 units meet these. Studios all about 28m², 1 beds 52m²	None provided (private or communal)
Green Dragon House High street, Town centre	111	1970s office	75 one bed 36 two bed	0/111 units meets these. 1 beds 26-35m², 2 beds 37-47m²	Communal residents lounge and roof terrace
5 Sydenham Road Town centre	54	Late 20th C office	54 studios	14/54 meets these. Studios are 23-42m² each	None provided (private or communal)
3 Church Road Town Centre	32	Late 20th C office	32 studio	0/32 appear to meet these. Studios 16-22m²	None provided (private or communal)
St Annes House Wellesley Road, Town Centre	197	1960s office	151 studio 10 one bed 36 two bed	46/197 units meets these. Studios 18-27m², 1 beds about 58m², 2 beds 66-79m²	22 units have a balcony (added via permission) No communal space at all

Table 2 - Building details and quality of office to residential PD schemes in Croydon (RICS, 2018).

Croydon's council member, Paul Scott (planning and regeneration) believes "it's totally unreasonable, and unprecedented in all other aspects of planning, to be able to build whatever you want. We are seeing units with no windows — we are building the slums of the future in Croydon now" (Evans, 2018, para. 10). There is also a concern regarding the lifespan of these conversions due to their poor quality and whether they will continue to house the population in the future. Nevertheless, the BCO (2015) report seems to suggest that basic specification housing is better than no housing and the loss in affordable housing contributions "need to offset against the benefits of providing housing at all" (BCO, 2015, p.7). According to the

Housing, Communities and Local Government Committee (HCLGC) (2019) the government should suspend any further changes to PDR as it is undermining the strategic vision that a community has developed.

Summary

The overriding purpose for the change in policy was to deliver additional housing, yet this has come at a cost both socially and financially for communities. The issues which keep arising are concerns over the loss of affordable housing contributions and the quality of the housing being delivered.

RESEARCH METHODOLOGY

It was considered that qualitative methods were the most suitable method for this research. The author has conducted interviews to explore the opinions of the participants with regard to the impact of office to residential permitted development rights on the supply of office accommodation and the lack of planning controls in London.

The author carried out 7 semi-structured interviews at either the participant's place of business or over the telephone. Purposive sampling was used to choose the participants as the author believed they would provide specialist knowledge and opinion on the chosen topic. A summary of the interview participants and the justification for their selection is provided in Table 3.

Participant Number / Code for Reference	Job Role	Location	Rationale for Selection
1 / P1	Office Agent	London	• Witnessed the change in legislation and has seen the impact this has had on the office market.
2 / P2	Property Finance Broker	London	• Advises and arranges finance for PD schemes.
3 / P3	Croydon Planner	London	• Involved in producing the Local Plan for Croydon and experienced the effect of office to residential PD from a local authorities' perspective.

Participant Number / Code for Reference	Job Role	Location	Rationale for Selection
4 / P4	Developer	London	• Involved in delivering many office to residential PD schemes within the London Boroughs.
5 / P5	Property Valuer	London	• Undertakes many office to residential PD scheme valuations.
6 / P6	Property Valuer	London	• Undertakes many office to residential PD scheme valuations.
7 / P7	Greater London Authority Strategic Planner	London	• Involved in delivering the London Plan and has experienced the impact of office to residential PD in London as a whole from a planning perceptive.

Table 3 - Participant information and rationale for selection within the research

Upon completion of the interviews, transcripts were produced and the interviews were analysed using a coding system which identified common/re-occurring themes, key trends and connections that surfaced within the transcripts.

RESULTS, ANALYSIS AND DISCUSSION OF FINDINGS

Delivery of Housing

In accordance with the government's aim to boost the housing supply in England, there was a general consensus that overall office to residential PDR has delivered more affordable housing. As highlighted by Heath (2002) property owners and developers became increasingly aware of the economic viability of converting office space to residential. The interviews supported this and suggested that when the policy was first introduced developers "jumped on the bandwagon" (P1; P2) due to the significant premium in values.

The interviewees agreed that there is no doubt that PDR has been a positive impact on the residential market simply because of the lack of supply available. P2

mentioned that PDR gives developers a secondary option from ground up purchases to provide more affordable and attractive accommodation.

P3 commented that "if you see the delivery of meeting the housing crisis as a numbers game not a sustainable development…it is unarguable that there has been an increase in the number of units being delivered". Nevertheless, P7 disputed this and stated "it is not just about the numbers". The interviewee expressed that it should be about the quality of the housing in terms of whether it provides sufficient space standards, proper functional layouts and crucially, ensuring that the new housing provides genuinely affordable homes and, on these bases, "it has completely failed" (P7).

Vacant Office Accommodation

All of the participants identified that the vast amount of underutilised and vacant office accommodation was another drive for office to residential PDR. P1 recognised that the "type of office space was dramatically changing" and there is now a preference for better quality office stock which has led to a surplus of obsolete and vacant office buildings as identified by Key et al., (1990) and Merrifield (1993).

P1 stated that this office accommodation was unlettable after the recession and demand had effectivity evaporated. P4 suggested that a lot of the vacant space had reached the end of its economic life and it was not viable to convert without the introduction of PDR. The interviewees implied that the policy has essentially stripped out the poor-quality office buildings and enabled the vast swathes of vacant space to be used properly again for the next best use, residential.

The majority view was that this policy has resulted in the conversion of underused offices. However, P7 commented that this aim "hasn't been effective simply because the statutory instrument does not contain any caveats or clauses to ensure that the office space is either vacant or underused". This statement supports the London Councils (2015) and Muldoon-Smith & Greenhalgh (2016) beliefs that PDR does not make a distinction between economically viable and redundant office space. This implies that the government has been very unclear about what they mean by 'underused offices'.

Conversion of Occupied Space

The interviewees agreed with the views that were apparent in the literature with regards to the loss of occupied office space. Similarly to the TBR (2014) report for Camden, P1 claimed that office "tenants basically became refugees; they were either paid surrender premiums or at the end of leases they weren't renewed or prudent landlords only renewed leases on short term bases without security of tenure".

According to P7 approximately "55-60% of the floorspace that was affected by PD was either occupied or part occupied". The interviewees expressed their concerns

about the direct impact this is having on businesses, particularly Small and Medium-sized Enterprise (SME) occupiers which supports the views within the BCO (2015) report. SME's are reliant on affordable office accommodation which is being converted to residential use and P4 claims PD has "failed to actually protect" these businesses. This is supported by GLA (2018) who state that this has been one of many unintended consequences of PD.

Office Market

When the policy was first introduced, it was acknowledged by all of the interviewees that it instantly reduced the supply for offices and demand take up increased. As previous studies suggest, a decrease in office supply will cause office rents and values to increase. According to P1 the market saw really strong rental growth all the way through from 2014 to 2018. This surge of rental growth had not been seen since the late 80s and it led to some record rents in particular locations.

The interviewees confirmed that the lack of supply for offices has driven up office rents and values, some maybe an artificial effect (P4; P6). There is an overall consensus that this is impacting the affordability of the office space and it has also "undermined office space in the market that was being occupied by SME's at rates which were much lower than the current prime office rates" (P7) which RICS (2018) suggested in the literature.

Although it is not apparent in the literature review, the primary data suggested that the PD market has become over saturated and the prices that developers are having to pay for the opportunities are significantly higher now. P5 suggested that PD is now quite subjective and it is debateable whether the office accommodation stacks up for conversion or whether it is more viable for the buildings to be retained for office use.

S106 / CIL

Whilst PD is attractive for developers, the interviewees also acknowledged that LAs have missed out and it is a "controversial policy from a community perspective" (P2). P3 stated that councils have lost out on contributions to obligations that they would have expected to be included in the policy, for instance affordable housing, skills and training, public realm, carbon offsetting highways. They also express that the "toughest obligation that has been missed out on is the affordable housing" (P3). P1 stated that the government probably underestimated the huge premium in values in many areas which had good residential values but poor office demand and values. Similarly, P4 commented that S106 has been an oversight and that it has been a shortcoming of the government.

Quality

Throughout the data collection, the interviewees highlighted their concerns regarding the poor quality of the housing which has been delivered through PDR. There was a consensus that due to office buildings being purpose built, converting

them to residential creates many problems with regard to the internal configuration, natural light, ventilation and there are many technical challenges which means that PD isn't particularly suitable. Similarly to Evans (2018), P1 also suggested "these buildings are going to be the slums of the future" and the overall quality of the housing is poor. P7 specified that the strategic plan for London states that "housing development should be a high-quality design, should provide adequately sized rooms with comfortable functional layouts, fit for purpose which meets the needs for Londoners". The interviewee suggested that these conditions should apply to all residential development in London and PDR effectively undermines those objectives.

Marrs (2016) identified that as office to residential PD conversions do not require to be plan-compliant, developers are not complying with minimum space standards and building regulations which consequently means housing is being provided which would otherwise be deemed totally unacceptable. The participants supported this view and highlighted that due to developers not having to meet any space or environmental standards, PD has seen a shift towards creating micro units. As identified by RICS (2018) there are examples of units as small as 12 m² and P3 also commented that they have seen studios measuring 16 m² in Croydon.

During the interview process it was evident that none of the interviewees agreed with BCO's (2015) suggestion that basic specification housing is better than no housing as they all had concerns regarding the quality and longevity of the housing. The interviewees shared the view that the increase in housing supply should not be achieved at the expense of producing poorer quality units because what will the quality and condition of these conversions be like in five years' time?

Control over the Policy

A theme that was evident throughout the interviews was the lack of control that LPAs had over the policy. According to P7, the policy undermines localism and the potential to intensify and make better use of the offices which have been converted through PDR. The general view from the planners interviewed (P3 & P7) is that the objection to the conversion of office buildings to residential use is not an objection to it in principle, but it is an objection to it happening through PDR.

It is evident through the interviews that the planners support the view of Holman and Mossa (2018) suggesting that PD has restricted their professional ability to plan and deliver wider benefits to society. P3 stated that LAs across the country have a plan led approach to seeing housing needs met and PD has simply stepped outside of this system and it has undermined the overall strategy. P7 suggested that PD is a "blunt instrument" and believed the objectives of delivering good quality office space and better-quality housing is better met through the planning system.

CONCLUSIONS

It can be concluded that the loss of office accommodation through PDR has impacted the office market both positively and negatively. The office market has gone through profound changes, occupier requirements have constantly changed and the workplace is now seen as a service rather than a commodity. Due to a high amount of office accommodation not meeting tenant requirements, there has been a surplus of office accommodation and office vacancy rates have increased. The literature identified the quantitative loss in office accommodation in London and highlighted the high rate of conversions in certain boroughs, therefore there is little doubt that PDR has reduced the amount of vacant office stock.

Nevertheless, despite the government's aim to bring underused offices back into effective use, a key finding of this research is that there is still no clear definition of the term 'underused' offices. The policy does not contain any caveats or clauses to ensure that the office accommodation is either vacant or underused and the primary data indicated that PD tends to result in the conversion of good quality offices and that obsolete offices remain. Consequently, LAs have seen occupied office accommodation and good quality space being converted to residential use.

When the policy was first introduced, it instantly reduced the supply of office and demand take up increased and the market saw a really strong rental growth. The surge in rental growth has increased investment appetite in particular areas and it has stimulated the development of new, higher-quality units which has been a positive impact of PD. However, the increase in rents has had a direct impact on the affordability of office accommodation. The new stock which is replacing old offices is achieving higher rental values, which is affecting SMEs as there isn't any alternative accommodation for businesses whose offices have been converted. This often means that businesses have to relocate out of central zones into suburban areas.

The interviews suggested that PD is now viewed as being quite attractive and profitable for developers as LAs are unable to enter into S106 agreements with developers and PD schemes are often not liable to CIL contributions. Nevertheless, the primary data further supported the literature on the significant financial impact that office to residential PD is having for LAs. The interviews highlighted that the most important obligation that LPAs have missed out on since the introduction of office to residential PD, is affordable housing contributions. This is a nationwide issue and PD has exacerbated the problem. The majority view is that the government probably underestimated and did not anticipate the scale of conversions that were going to take place and the significant financial losses that this would have for LAs.

As the decision-making process has effectively been stripped away from LAs, office to residential PD has enabled developers to freely convert what and where they like, effectively allowing only market values to be the deciding factor. Consequently, this policy has undermined local plans that LPAs have produced and

it has restricted LAs professional capacity to plan and deliver wider societal benefits. As PD conversions are not required to be plan-compliant nor have to comply with minimum space standards, poor housing is being provided which would otherwise be deemed totally unacceptable. London has seen a large surge in micro units, with examples of units being as small as 12 m². The research has highlighted the quality and the longevity of the housing and whether it will create slums of the future.

It can be concluded that whilst there is an urgent need to provide more housing in England, it does not need to be at the expense of providing poor quality housing as well as converting the space that London needs for businesses that provide employment. There was a general consensus that the surplus office space should be identified authoritatively. Furthermore, the policy should include conditions to meet space and quality standards for new residential dwellings and also conditions around ensuring that PD schemes include planning obligation contributions.

As a result of this study, the researcher has identified further areas where research can be undertaken. It is recommended that a greater number of interviews with a broader range of stakeholders be undertaken as the larger the sample size, the greater the accuracy of data. A case study approach comparing different London boroughs would also be beneficial as it would enable the researcher to identify and compare the impact that the loss of office accommodation has had due to the introduction of PDR in specific locations.

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ASSESSING THE SKILLS SHORTAGE WITHIN UK CONSTRUCTION

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This research paper is based on the skills shortage within the UK construction industry. A skills shortage occurs when the demand for specifically skilled workers is greater than the amount of adequately qualified labour available to fill these jobs. The skills shortage has been a topic of great discussion over the last 20-30 years and, due to this, there have been many government and industry response strategies put in place to tackle the problem. Many of which focus upon the need for greater learning and development programmes for trainees/apprentices. However, it is well documented that more workers are leaving the industry than joining it. This suggests that these strategies are ineffective and more needs to be done to solve the ever-growing skills gap in UK construction. The research to form this paper was based on both primary and secondary research. Quantitative data was obtained from a questionnaire sent out to over 200 construction professionals within Engie Regeneration UK. Qualitative data was gathered from existing literature and interviews with Engie's Regional Head of Learning & Development, Lee Firth and Leeds' CITB Advisor, John Long.

The combined findings obtained from the research confirms that the majority of construction professionals within the industry believe there is a skills shortage and suggests that further initiatives are required to close the gap. The recent introduction of the Apprenticeship Levy, Construction 'T-Levels', Construction 2025, 'Give Construction a Try' and many more new strategies shows that the Government and industry leaders are still diligent in reducing this problem. It is however, difficult to forecast how

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Brexit and other economic factors may further exacerbate the pertinent issue.

INTRODUCTION

This research paper is based on the skills shortage within the UK construction industry. A skills shortage occurs when the demand for specifically skilled workers is greater than the amount of adequately qualified labour available to fill these jobs.

The skills shortage has been a topic of great discussion over the last 20-30 years and, due to this, there have been many government and industry response strategies put in place to tackle the problem. Many of which focus upon the need for greater learning and development programmes for trainees/apprentices. However, it is well documented that more workers are leaving the industry than joining it. This suggests that these strategies are ineffective and more needs to be done to solve the ever-growing skills gap in UK construction.

RESEARCH METHOD

The research to form this paper was based on both primary and secondary research. Quantitative data was obtained from a questionnaire sent out to over 200 construction professionals within Engie Regeneration UK. Qualitative data was gathered from existing literature and interviews with Engie's Regional Head of Learning & Development, Lee Firth and Leeds' CITB Advisor, John Long.

LITERATURE REVIEW

A literature review was first undertaken to place the research into the current context In a study taken by the Federation of Master Builders (FMB) the skills shortage within the construction industry has got worse and has now spread beyond bricklayers and joiners to other key trades. The FMB's State of Trade survey for Q4 2016 Shows that;

- -Almost half of construction SME's are reporting difficulties hiring roofers (46%)
- Shortages of electricians and plasterers are at the highest point in four years
- The SME Construction sector has shown consecutive quarters of growth for 15 years

The CEO of FMB, Brian Berry raised his concerns over the worsening skills shortage, stating that 40% of the 15 key trades that FMB monitor are facing their worst skills shortages since 2013 (Amman, 2017). The Real Estate Monitor Worldwide investigated the skills shortage issue within London. It states that the London construction industry is struggling to attract and retain the workers it needs. Saying that the problem is 'huge', and the skills shortage is driving up the high cost of building in the capital and contributing to the poor quality of workmanship in the Construction Industry (Amman, 2018). Amman states that the 'Crisis is in manifold'. A standard economic model is built on supply and demand, when one of those factors increases the other must closely follow for economic stability. In many failing industries it is a reduction in demand that is often the main cause of the demise. Amman discusses that, in the construction industry, the demand for skilled workers is increasing, but the supply is not following suit. Although the demand for on-site labour is outweighing levels of employment, it is forecasted that the issue of more workers leaving than joining the industry will exacerbate over the forthcoming years. 2017 saw twice as many workers leave than join the UK's construction industry. A recent survey by the Greater London Authority (GLA) states that the demand for key trades, such as scaffolders and plant mechanics, is exceeding 2015 employment levels by more than three-fold (Amman, 2018). This only increases the concern of the issues and suggests that it will only get worse in time if preventative measures do not take place. One of the major initiatives in tackling the skills shortage was the implementation of the Apprenticeships levy, a fund designed to incentivise larger companies to employ more apprenticeships. However, Amman suggests that this has so far been ineffective and, that since the Apprenticeship Levy was introduced in April 2017, the amount of construction apprenticeships started in London has remained constantly low. Even with demand increasing the take-up has halved over a 5-year period, 2011-2016 (Amman, 2018). Although the article concentrates on London in particular, this shows the severity of the worsening issue. This can also be seen by comparing the titles of the two articles published only 20 months apart. In January 2017 the title reads 'Construction skills shortage gets worse.' Where as in September 2018 the title is 'London's construction skills shortage makes innovation more urgent than ever.' Perhaps this is due to the problem being worse in London than the rest of the UK industry overall. However, as the capital and largest city, it is likely to have a good representation on the industry and therefore suggests that the shortage is getting worse on a national scale and further innovation is required. This paper also refers to a recent survey undertaken by the Construction Industry Training Board that found over a third of those asked stated that slow career development and low pay were their primary reasons for leaving construction apprenticeships.

Construction Management and Economics (2000) discusses the key causes of the skills shortage and 7 of the main industry and government response strategies that have been brought in to tackle the issue. Although this may seem outdated, all the

response strategies mentioned are still in place. This suggests that the problem is still prevalent and the causes still relevant.

Table 1: Mackenzie's key causes and response strategies (Mackenzie, 2000)

Mackenzie's Key causes	Mackenzie's main industry & government response strategies
Demographic Decline Changing nature of construction markets New technologies Cyclical nature Growth of self-employment Decline in training	Considerate Constructors Scheme (CCS) National Construction Week Construction Skills Certificate Scheme (CSCS) Investors In People Initiative New Deal Employment Scheme CITB Equal Opportunities Initiative CITB Trainee Recruitment Scheme

Mackenzie's (2000) 6 key causes;

- The **demographic decline** in the amount of youthful potential employees accessible to the labour market, causing a rise of opposition for fresh additions to the labour pool.

- The **changing nature of construction markets** and the demand for skills, which has been linked with the decline in numbers of construction workers with traditional skill sets.

- The introduction of **new technologies**, bringing with it a need for new skills, in many cases more in depth, higher level training for new entrants with a constant need for the development of existing employees.

- The **cyclical nature** of the construction market, often referred to as 'boom and bust' which causes severe fluctuations in construction output and employment training levels.

- The **growth of self-employment** with the consequent procurement of specialist/labour-only sub-contractors.

- The **decline in construction training** and training resources

Mackenzie's (2000) 7 main industry and government responses;

- **The Considerate Constructors scheme**: Introduced in order to help improve the industry's image by reforming the behaviour of site operatives and increasing the standards set by site management by outlawing unsafe/untidy construction. Contractors promise to show respect to staff and members of the public who could be affected by the site's activity.

- **The National Construction Week**: An initiative composed by the CITB, in collaboration with BT. The week was designed to challenge members of the public to imagine life without construction. By offering the opportunity to gain an insight on varying aspects of construction, from off-site manufacturing to on-site works. it aimed to showcase the advanced technologies and professional nature in which the industry conducts itself.

- **The Construction Skills Certification Scheme**: Developed by the CITB and monitored by the industry's management board & trade unions, this initiative aims to promote better health & safety awareness, alongside improved training standards/requirements. The scheme sets a requirement of skill & competency levels in order for an individual to be allowed to work on a construction site.

- **The Investors in People Initiative**: In an industry where Human Resources can often be overlooked, this initiative is designed to promote motivation of the workforce, mainly through increased & improved training and development. This scheme came into place following an investigation by the National Training Force (NTF) which showed results of companies being much more successful than their competitors when People factors had been a company priority.

- **The New Deal Employment Scheme**: A government initiative originally called the 'Welfare to work scheme', incentivising employers to recruit trainees with an initial direct training grant and potential access to further CITB training grants if the employer retains new entrants.

- **The CITB Equal Opportunities Initiative**: An initiative led by the CITB with an aim to reduce the under representation of different social groups, in particular, targets have been set to increase the recruitment of women and ethnic minorities into the construction industry.

- **The CITB trainee recruitment scheme**: This CITB initiative is centred upon incentivising the recruitment of adults into the industry, by offering financial grants to subcontractors to cover/subsidise training costs.

Research from the Chartered Institute of Building (2005) revealed a worrying lack of skills amongst construction professionals. 65% of those questioned felt the

current workforce was not sufficiently skilled, while 91% anticipated a skills shortage beyond 2005. 79% of respondents experienced recruitment problems during 2004/05 – particularly in crafts and trades where 42% of members reported a serious problem (Anonymous, Construction Skills Shortage, 2005)

The Training Journal gives an insight into the type of alliances and initiatives that are required to close the skills gap. The Learning and Skills sector of the Trade Unions Congress (TUC), UnionLearn, partnered with Cogent Sector Skills Council (SSC) to form an agreement which targets 'Key training and development interventions for the Cogent industries.' The format of this agreement is scheduled over a two-year period, investigating the labour resource shortages and the skills gap. The aim being able to pin-point and concentrate on the worst hit areas by the skills crisis. Therefore, in turn, closing the skills gap within the Cogent industries. Although the Cogent skills work is amongst the science sector it may have a direct effect on the construction industry, such as engineers and off-site manufacturers. This also shows the much more widely spread problem the UK faces with the skills crisis. The Training Journal suggests that the Cogent apprenticeships will give people of all ages the opportunity to learn a profession and enter the industry (Anonymous, 2007a). The same Journal, published in March 2007, also discusses the difficulties that construction companies are facing when attempting to recruit new skilled labour. 'The Chartered Institute of Building (CIOB) annual skills shortage survey has revealed that 77% of respondents found difficulty in recruiting during 2006, particularly at the senior management and craft/trade levels' (Anonymous, 2007b). The majority of literature surrounding the topic of construction skills shortages focus on the Blue-Collar Skilled workers, whereas this journal states that the problem is much more widespread and that there is also a problem with the lack of White-Collar professional workers of the industry. The journal then states that the 623 construction managers surveyed for this research believed that the industry is not attractive enough to recruit potential candidates. The CIOB deputy chief executive of the time, Michael Brown, suggested that a focus was required on recruiting those who have retrained at a later stage, as there has been a large increase of numbers completing university degrees (Anonymous 2007a).

RESULTS

A questionnaire was sent to the Central Region of Engie Regeneration in order to gain an insight into the employees view of the skills shortage. The questionnaire consisted of 11 questions and the opportunity to provide further thoughts and comments on the topic. Some of the key questions were discussed in interviews with Engie Regeneration's Head of Learning, Development and Social Value, Lee Firth and CITB Leeds's Advisor, John Long. Both interviewees agreed to being named within this research.
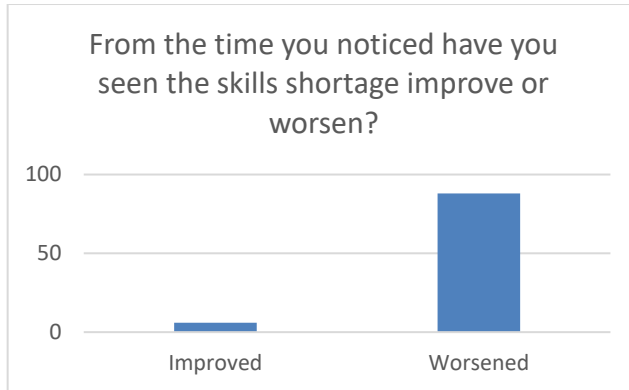
Figure 3 Response to question on skills shortage (n = 98)

94% of the respondents questioned stated that they have seen the skills shortage worsen since they first noticed the issue. Lee Firth was asked whether he believes that the skills shortage will continue to worsen, he speculates that the future could be heavily dependent on the effect of Brexit. "*A lot will depend on Brexit. We had a boom come in from overseas, however, a lot of these individuals are now returning to their home countries to work there due to the uncertainty. If Brexit goes through without the correct deals in place to keep certain skills in the country it could really affect our labour pool*" Said Firth who does feel that "*apprenticeships are now a lot better known, and although there could be a further dip we really need to educate young people and individuals from hard to reach groups about what an apprenticeship is, with the intention to get this new talent into our business.*" Lee also expects that advancements in technology could have a huge impact on the skills shortage. "*Another one will be technology when you look as the skills gap, it will change the nature of how we do different jobs and how we work smarter with it. The off-site works will need labour to manufacture and manage.*" John Long refers to research that shows the skills gap has been worsening 'sharply' over the past 4 years. It appears that the CITB are taking a similar approach by targeting alternative labour pools as means to close this skills gap, "*When CITB surveys employers they will often mention skills gaps or skills shortages, particularly in areas such as carpentry/joinery, painting & decorating, plasterers and bricklaying. Research undertaken by the Federation of Master Builders (FMB) indicates that recruitment difficulties in these trades have risen sharply over the last 4 years. With Brexit looming on the horizon, skills issues might in the short term be exacerbated. CITB is looking to work with construction employers and training providers to identify solutions to skills shortages and make training interventions where necessary e.g. develop training pathways for ex-offenders or ex-military to join the construction industry.*"
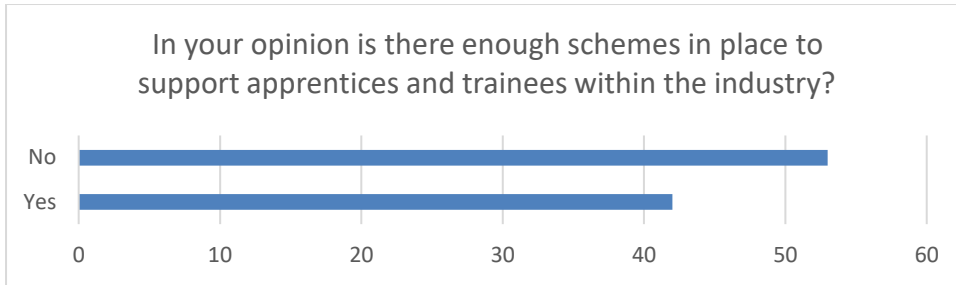
In your opinion is there enough schemes in place to support apprentices and trainees within the industry?

Figure 4 Response to question on current numbers of apprentices and trainees (n=98)

However, when asked if they thought there was enough schemes in place to support apprentices and trainees within the industry 44% of respondents believed that there was. This suggests that many of the respondents think that the industry is being responsive and that, although the issue has been getting worse, it should start to improve, or that the main causes of the shortage does not lie with apprentices and training requirements. The majority (56%) concluded that there are not enough schemes in place. John Long of CITB believes that there is a wide variety of apprenticeships currently on offer within the UK construction industry, "*There are many apprenticeship programmes available from level 2 upwards covering the wide range of disciplines construction can offer. CITB is currently assisting with the development of employer led apprenticeship standards, and new programmes are being released all the time*". Within the further comments section one respondent stated that apprenticeship opportunities were based on quantity rather than quality, "The industry is plagued by clients and training bodies focusing on the quantity of apprentices. This seems to be fuelled by these bodies chasing funding and bragging rights rather than the actual quality of the apprenticeship offered.", Lee Firth states that the quality and lengths of the apprenticeships programmes are actually improving. "A *good thing is now people used to go to college and do a full-time joinery course as an example and leave thinking that they are a joiner but without the real hands on work experience, however, all that has gone now. A minimum joinery course now is 2 years with time on site. You've got to spend the time on site to get the experience to do the job right. So, no constant churning of low-quality apprentices. This may reduce the numbers joining and completing the courses, but those that do will be sufficiently skilled. Since the launch of the AL the minimum timescale of an apprenticeship was 12 months, before that people were using them for short-term to tick boxes and maximise funding. Many regions where we work are really struggling for people with level 4/5 skills, these areas need to be focused on. If you can offer a good apprenticeship, they are more likely to stay in the industry than think, 'this isn't for me' and jump ship*." John Long, Leeds's CITB advisor also referred to the improved standard for apprenticeships when asked to comment on the same statement, "*It is hoped the new standards will raise the quality of apprenticeships in England.*"

On the flip side of this, another employee stated that "Apprentice placements too limited, used as basic labour rather than given quality training for the job to replace the declining labour force", Firth believes that this will vary from company to company and is heavily dependent on the mentoring in place. "*A lot depends on the employer and the mentor, if you have a good mentor it has a massive difference to the experience of the apprenticeship. We now have things in place to monitor mentors. We now have in-house plans. An employer needs to remember and not expect that the apprentice will learn everything at college and the right support lines and targets need to be in place. The colleges also need to be communicating with the SME's for targets*". John Long of CITB stated that "*The new apprenticeship standards have been designed by construction employers to deliver the skills and aptitudes required on the job. At the end of the programme, the employer must now decide when the apprentice is ready to undertake a final assessment and organise this with the training provider. It is hoped the new standards will raise the quality of apprenticeships in England*.
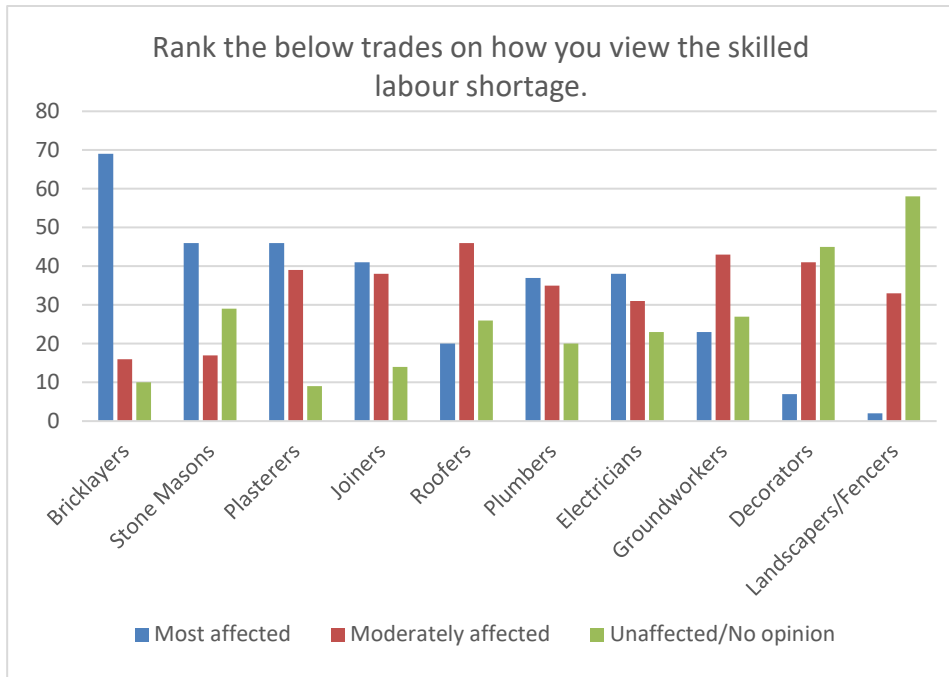

Table 2: Question 9 - Rank the below trades on how you view the skilled labour shortage (Raw Data) (n=98)

Employees were asked to rank key trades on how they viewed the effect the skilled labour shortage has on them. Crafts & Trades such as bricklayers, stone masons, plasterers, joiners, plumbers and electricians were viewed as the most affected by the skills shortage. A staggering 73% of respondents believed that bricklaying was one of the most affected trades. This question gave raw data

which is represented in the above graph. To show the results more clearly each option was then quantified – Most affected = 3, Moderately affected = 2 & Unaffected/No Opinion = 1, this was then collated into the below graph which shows a much clearer image of the problem trades

Rank the below trades on how you view the skilled labour shortage.

Table 3: Question 9 - Rank the below trades on how you view the skilled labour shortage (Collated Data) (n=98)
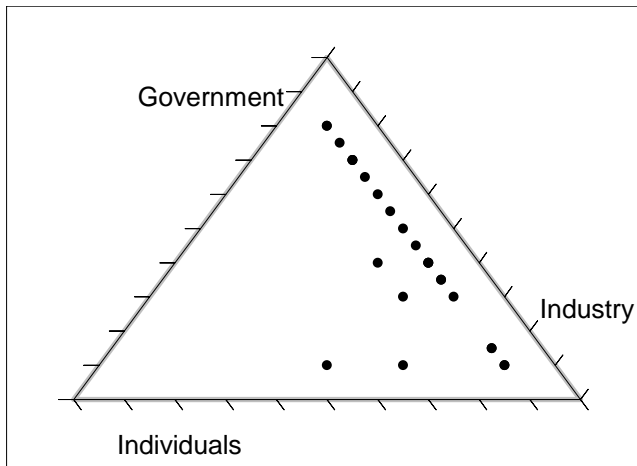

Figure 5: Ternary Diagram representing associated blame from 'Further Comments' (n=17)

The final question allowed respondents to provide further comments on the topic area. The results showed that the majority felt strongly about the issue and had certain opinions on the cause and effects of the skills shortage. To create a visual representation of the associated blame areas a table was created, proportionally dividing the percentage of blame between the 3 main categories; Government, Industry & Individuals. This allowed a Ternary diagram (Graham & Midgeley,

2000) to be created, to show where respondents felt the blame lies. Of course, this is heavily reliant upon personal conceptions of the responses and only 17 decided to leave their further comments. The scattered results, predominantly between 'industry' and 'government' indicates the mixed views on who is to blame for the skills shortage and that there were minimal respondents that believed the 'individuals', the potential labour pool, are to blame. The fact that the responses are so varied between blaming the industry and the government is a clear indication of the struggle in dealing with this issue and is most likely the reason as to why the skills shortage has been prevalent for well over two decades.

CONCLUSIONS

This research paper concludes that there is a major skills shortage within the UK construction industry. The skills shortage has been a prominent problem for the industry for many years, this is proven by the amount of literature available on the issue. Despite several response strategies in place to combat the issue, these are currently ineffectual, and the shortage is worsening. From all the secondary research reviewed and primary research in the form of the questionnaire and interviews there is only marginal evidence to suggest any recent advancement in closing the skills gap. There is, however, further initiatives arriving to help combat the industry wide problem.

Construction professionals state that this shortage directly effects; difficulty in recruitment, under-performance of sub-contractors, lack of adequately skilled labour available from agencies and many more negative consequences to the industry. An issue that has been discovered is that not only do the majority of construction professionals believe that the workforce is insufficiently skilled, but most have noticed the problem worsen since it first became apparent to them. It appears that although there are a number of initiatives and schemes in place to reduce the shortage, a high percentage of professionals questioned were either unaware of them and/or believed that they are ineffective. This suggests that an increase of awareness is required, along with potential adjustments to the current initiatives and new, revised schemes being brought into place. This paper suggests that both are required in order to reduce the skills shortage.

The analysis, of both the literature reviewed and the field work conducted for this dissertation, suggests that the education system is a prominent area that needs reforming to reduce the skills gap. In particular how it can be linked to apprenticeships to increase the skilled labour pool, both for younger entrants and those who decide to upskill or retrain at a later stage in life.

However, not all discoveries arising from this research paper are negative. Although many construction professionals still believe there are not enough schemes in place to support apprentices and trainees within the industry, it is apparent that since the introduction of the Apprenticeship Levy in 2017, opportunities and support schemes have been increased alongside the incentives for contractors to employ apprentices. This levy also introduced a new minimum

length and improved standards that are required to be achieved when recruiting apprentices, resulting in an increased number of adequately trained apprentice graduates, although the up-take rates are not yet following suit. The completion rates will be published after April 2019.

Out of all the schemes reviewed in this research, none of them seem as promising as the Apprenticeship Levy, which, following a slow start, is gathering momentum and encouraging commencement of T-Levels. This suggests a positive future for the skilled labour force of UK construction. This is a key aim of the government and industry collaboration initiative, Construction 2025.

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