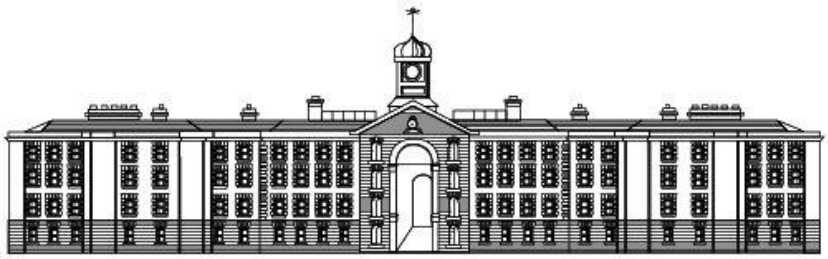
Exploring the Relationship between Motivation and Occupational Commitment in Engineers in the Irish MedTech Industry: A Qualitative Study

Research dissertation presented in partial fulfilment of the requirements

for the degree of

MSc in International Business Management



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June 2023

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I certify that the dissertation entitled ***Exploring the Relationship between Motivation and Occupational Commitment in Engineers in the Irish MedTech Industry: A Qualitative Study*** submitted for the degree of **MSc International Business Management** is the result of my own work, and that where reference is made to the work of others, due acknowledgement is given.

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And finally, thank you to my friends and family for being a constant source of guidance, comfort, support, snacks, and reprieve.

There is no magic to achievement. It's really about hard work, choices, and persistence. – Michelle Obama

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List of Abbreviations

EU – European Union

FDI – Foreign Direct Investment

GPO – Group Purchasing Order

MDR – Medical Devices Regulation

MedTech – Medical Technology

MNC – Multinational Corporation

NFQ – National Framework of Qualifications

OBL – Office-based Lab

OECD – Organisation for Economic Cooperation and Development

OEM – Original Equipment Manufacturer

RD&I – Research, Development & Innovation

SDT – Self-determination Theory

SHRM – Strategic Human Resource Management

STEM – Science, Technology, Engineering and Mathematics

USD – United States Dollars

Abstract

Exploring the Relationship between Motivation and Occupational Commitment in Engineers in the Irish MedTech Industry: A Qualitative Study

In this study, the author explores the relationship between engineers' motivation and occupational commitment in Ireland's MedTech industry. The objectives of this study were to determine the presence of occupational commitment in this population, define the motivation factors affecting their job satisfaction, and then explore the relationship between their occupational commitment and motivation.

These objectives are addressed through the collection and analysis of qualitative primary research data from participants working as engineers within the Irish MedTech industry, and the critical review of secondary research data from various books, articles, journals and reports. This primary and secondary data is later analysed, compared, and interpreted using the thematic analysis procedure, and subsequently discussed according to the research objectives.

The results of this study found that 70% of participants demonstrated commitment to their occupation. Of those who displayed occupational commitment, 83% were biomedical engineering graduates, with this group also reporting higher job satisfaction than participants from mechanical or manufacturing engineering backgrounds. This study concludes that there appears to be a causal relationship between motivation and occupational commitment in Ireland's MedTech engineers, whereby all participants who reported being committed to their occupation also reported being satisfied to somewhat satisfied with their current job. The 30% of participants who are not committed to their occupation also shared that they are dissatisfied with their current job.

A key recommendation for further study in this field would be the exploration of educational background as a mediating role in engineers' motivation and occupational commitment.

Chapter 1 – Introduction

1.1 Research Purpose

This research aims to explore the relationship between motivation factors and occupational commitment in engineers working in Ireland's Medical Technology (MedTech) industry. Though engineers' motivation has been widely studied in academia, little research has explored engineers' occupational commitment. In addition, limited literature is available regarding the motivation or occupational commitment of engineers working in MedTech in Ireland.

In 2022, McKernan and McDermott reported that the global MedTech market is expected to reach a USD $612.7 billion valuation by 2025, representing an almost 44% increase from 2018 (McKernan and McDermott, 2022). In addition, they reported that just 15 companies are responsible for 54% of global sales, with all 15 having a significant presence in Ireland.

Today, the Irish MedTech industry employs approximately 1.75% of the Irish workforce (Irish MedTech Association, 2022a; Central Statistics Office, 2023). By undertaking this study, the author seeks to provide a foundation for further academic study and actionable insights for Human Resources and Employer Brand professionals into the relationship between factors influencing engineers' motivation and occupational commitment in Ireland's MedTech industry.

1.2 Background & Significance of Study

The MedTech industry in Ireland is dominated by American Multinational Corporations (MNCs), with Ireland playing host to nine of the ten largest MedTech companies in the world. Since initial investment began in the 1960s, MedTech has become a central driver of Ireland's economy. Over 450 companies employ approximately 45,000 people, making Ireland the largest employer of MedTech professionals in Europe per capita (Irish MedTech Association, 2022a, 2022b). Based on recent workforce data issued by the Central Statistics Office (2023), the MedTech industry now represents 1.75% of the Irish workforce.

In 2022, the Irish MedTech Association issued their 2022-2025 strategy, establishing a vision of 'Ireland [being] strongly positioned as a global leader in innovative patient-centred medical technology solutions, helping to set the future global healthcare agenda, with a proven ecosystem that is a major contributor to

the economy' (2022b). Essential to this aspirational vision is a motivated and committed workforce that will continue to innovate, collaborate and seek competitive advantage on behalf of the MedTech industry and their employer. Analysing the future skills needs of the Irish MedTech industry, the Irish MedTech Association reported that over 89% of survey respondents faced increased difficulty filling vacant roles over the past five years (2017). In addition to a skills shortage, the existing scholarship suggests that the Irish MedTech industry faces significant challenges in innovation management, knowledge transfer, empathic design and continuous improvement, as demonstrated in *Table 1.* Within each of the studies referenced, improving employee motivation is a crucial recommendation to mitigate these challenges.

Challenges	**References**
Innovation Management	(O'Dwyer, Nolan and Fisher, 2017; McDermott *et al.*, 2022; Trubetskaya, Manto and McDermott, 2022)
Knowledge Transfer	(Doherty and Cormican, 2017)
Empathic Design	(Cormican, 2012; O'Dwyer, Nolan and Fisher, 2017)
Continuous Improvement	(Davey *et al.*, 2011; Cormican, 2012; Cormican and Ronan, 2013)

Table 1: *Summary of recent challenges faced in the Irish MedTech Industry*

Motivation and occupational commitment have received previous academic interest both together and independently. However, the extant literature in this field explores motivation and commitment largely in isolation in the context of engineers. Furthermore, occupational commitment in engineers has received little academic interest, with the few existing studies into this concept electing to focus on specific characteristics of engineers as opposed to characteristics of the industry in which they exist. Though the industrial context is more closely aligned with organisational commitment, studies have shown the importance of occupational commitment in eliciting organisational commitment from knowledge workers such as engineers (Blau, 1989; Campbell and Furrer, 1995; Lee, Carswell and Allen, 2000).

1.3 Research Objectives

Further to the above, this research aims to explore the nature of the relationship between motivation and occupational commitment in engineers working in the Irish MedTech industry.

As such, the objectives for this study are:

- To determine the presence of occupational commitment in engineers working in the Irish MedTech industry,
- To define the motivation factors that contribute to job satisfaction and dissatisfaction in this population,
- To explore the relationship between the motivation and occupational commitment of engineers working in the Irish MedTech industry.

1.4 Structure of Study

This dissertation is structured as follows:

Chapter 1 - Introduction

Chapter One defines the purpose of this study and establishes the contextual backdrop and significance of this research to academia and industry applications. It then sets out the research objectives and subsequent structure for this paper.

Chapter 2 - Literature Review

Chapter Two explores and critically assesses the extant literature relating to the context and concepts of this paper. It first establishes the central concepts of motivation and commitment, and later examines the presence and application of these concepts on the research subjects and context. This chapter also presents the conceptual framework for this study.

Chapter 3 - Methodology

Chapter Three considers the approaches to research methodologies and evaluates their application to this study. Furthermore, based on this evaluation, Chapter Three outlines the selected research philosophy and strategy before determining the approach to data collection and analysis taken.

Chapter 4 – Findings & Discussion

Chapter Four is presented in two sections; first, it details the critical primary research findings in line with Braun and Clarke's thematic analysis protocols (2006). Subsequently, Chapter Four discusses the analysis and comparison of the primary research findings against the secondary research findings.

Chapter 5 – Conclusion

The final chapter of this dissertation captures the conclusions drawn from this study and summarises the key findings under each research objective. Chapter Five then makes recommendations and contributions to practice or further study. This chapter also acknowledges the limitations of this study before providing closing conclusions for the research project.

Chapter 2- Literature Review

2.1 Introduction

As the knowledge economy grows, the competition for highly skilled and highly educated employees in Ireland has never been more challenging. Despite above-average tertiary education levels, Ireland's skilled labour market remains notoriously competitive with Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar, recently stating, 'More people are employed in Ireland now than ever before' (2022). With significant growth forecast for the coming years, the Irish MedTech industry must reinforce itself to Irish talent as a desirable employer to ensure they do not fall short of the objectives set in the Irish MedTech Association's 2022-2025 Strategy (2022b).

Central to the achievement of this strategy is ensuring that Ireland remains positioned to develop and deliver continued operational excellence, advanced manufacturing technologies and innovation through people, infrastructure and strategic connections. Research has shown that engineers working in the MedTech industry face unique challenges due to the industry's complex and highly regulated nature (Bayon *et al.*, 2016). These challenges can negatively impact employee motivation and commitment, and stifle innovation (McDermott *et al.*, 2022).

This literature review explores the relationship between motivation and occupational commitment in engineers working in the MedTech industry in Ireland. Through the evaluation of extant literature, this chapter establishes the prevailing theory and context for this study, before critically examining the previous relevant research into these concepts amongst engineering professionals.

2.2 Background

2.2.1 MedTech in Ireland

The MedTech sector in Ireland comprises over 450 companies and 45,000 employees, with continued future growth forecast for the industry's presence, revenue and prominence in both domestic and global markets (Irish MedTech Association, 2022b). Rising costs of manufacturing, supply chain and labour in Ireland, coupled with increasing competition from emerging MedTech clusters such as China and Costa Rica, continue to threaten the competitiveness of Ireland in the global MedTech value chain (McKernan and McDermott, 2022). However, to date, Ireland remains an attractive location for Foreign Direct Investment (FDI), offering

MNCs open access to the European market and a highly educated, English-speaking workforce (Yingming, 2009; Vickova and Thakur-Weigold, 2019; McKernan and McDermott, 2022).

Additionally, Ireland offers MNCs opportunities to avail of lucrative taxation policies, including a 12.5% corporate tax rate and a 25% tax credit against eligible Research, Development & Innovation (RD&I) activities. Though the corporate tax rate is set to increase to 15% in 2024, Ireland's taxation will still fall almost 10% below the Organisation for Economic Cooperation and Development (OECD) average (OECD, 2022; IDA, 2023).

These rising costs have caused a shift in the focus of Ireland's MedTech operations. Once a leader in low-cost consumables manufacturing, Ireland has become an attractive and cost-efficient centre of excellence in the innovation, development, manufacturing and commercialisation of high-value, complex therapeutic technologies. Today, Ireland ranks as the fifth highest for medical patents in the world and as the second-largest exporter of medical devices in Europe, boasting annual exports of approximately €12.6 bn across its diversified product portfolio as illustrated *in Figure 1* (O'Cearbhaill, Murray and Lee, 2019; McKernan and McDermott, 2022).

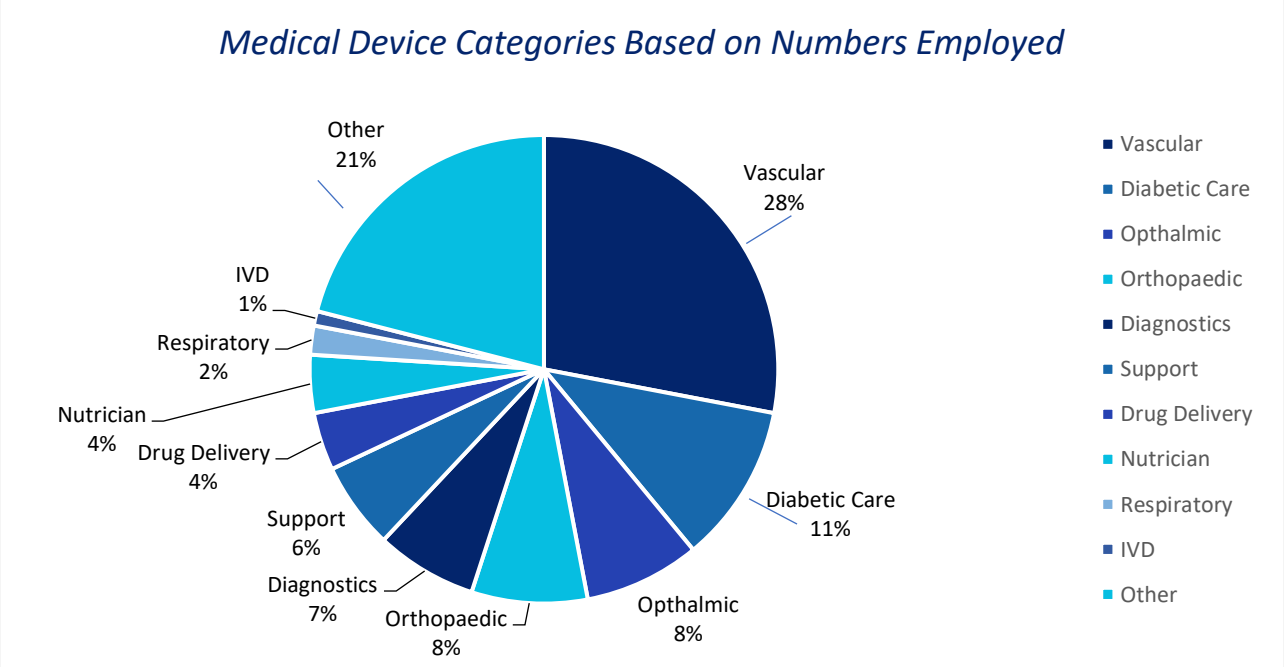


Figure 1: *Medical Device Categories Based on Numbers Employed (McKernan and McDermott, 2022)*

2.2.2 Challenges Facing MedTech in Ireland

There are several challenges facing Ireland's MedTech sector that must be addressed to sustain the competitiveness of Ireland's MedTech sector. When the first European Union (EU) medical device regulations were introduced in the 1990s, Irish sites were able to commercialise new products quicker than their counterparts in the United States, providing a distinct competitive advantage for the Irish MedTech sector in an industry where lead time to market is critical (European Commission, 2023; McKernan and McDermott, 2023). However, in 2017 the EU announced the introduction of the Medical Devices Regulation (MDR). This new regulatory framework seeks to set out ' a more robust system of conformity assessment to ensure the quality, safety, and performance of devices placed on the EU market' (European Commission, 2023). Consequently, this has significantly extended the time it takes to launch new products and, as such, has eroded the competitive advantage Ireland once held in the commercialisation process.

Although the Irish MedTech sector has retained its focus on differentiated technologies, 50% of MedTech organisations in Ireland are wholly or at least partially contract design, development or manufacturing operations, otherwise known as Original Equipment Manufacturers (OEM) (Irish MedTech Association, 2022b). Whilst there has been a trend towards the greater use of OEMs by MedTech organisations, the rising costs associated with inflation and supply chain issues have eroded the profitability of designing and manufacturing component parts. Additionally, the increase in the proliferation of Group Purchasing Orders (GPOs) and Office-based Labs (OBLs) has led to some standardisation of devices and subsequent downward price pressure (McKernan and McDermott, 2023).

The recent literature surrounding Ireland's MedTech industry highlights the importance of investing in successful innovation management, systems implementation, improvement, and differentiation to ensure Ireland remains a top destination for MedTech investment. However, central to this is ensuring a robust and highly-skilled talent pipeline of engineers. According to a recent report, Ireland's workforce is the most productive in the OECD (2023), whilst O'Cearbhaill, Murray and Lee (2019) found Ireland to be the fifth highest per capita for medical patent registration globally. Furthermore, Ireland ranks first in the EU for tertiary education attainment and tenth for graduate employment, with 87.2% of Irish graduates entering employment in the three years post-graduation (Eurostat, 2023a, 2023b).

Indeed, MedTech organisations must address their challenges regarding their effectiveness and efficiency; however, the Irish labour force data demonstrates that the biggest challenge these organisations will face is hiring and retaining the key, valuable talent needed to operate.

2.2.3 SHRM in Ireland's MedTech Sector

Despite the significant impact of MedTech on the Irish economy, contributing to 10% of overall Irish exports (Irish MedTech Association, 2017), there has been an absence of recent academic enquiry into the role of Strategic Human Resource Management (SHRM) practices that support the continued growth of MedTech as an industry. In particular, the author noted a gap in research about the motivation and commitment of engineers working in Ireland's MedTech industry.

Engineering professionals are essential to MedTech's innovation and development activities, amongst other technical business functions, including operations, supply chain, quality, and regulatory affairs. In addition, engineers often work across various corporate functions due to their extensive technical and functional product knowledge (Kang, Morris and Snell, 2007). *Figure 2* presents an overview of the categories of work within the Irish MedTech industry. As such, engineers play a critical role in the success of their organisation and the wider MedTech industry.

Occupation Group	Examples
Operations	Machine Operatives Assembly Operatives
Engineering	Product Design Engineer Materials Engineer Maintenance Engineer
Research and development (R&D)	R&D Engineer
Supply chain	Logistics Manager Supply Chain Coordinator
Regulatory	Regulatory Affairs Officer
Quality	Quality Engineer Validation Engineer
Finance/procurement	Finance Manager Finance Accountant
Sales/marketing	Sales Representative Strategic Marketing Specialist
Human resources (HR)	Recruitment Specialist HR Manager
Business excellence	Operational Excellence Engineer
Commercialisation	Product Design Specialist Manufacturing Engineer
Data analytics	Data Analyst Reporting Specialist
Scientists	Microbiologist Medical Technologist

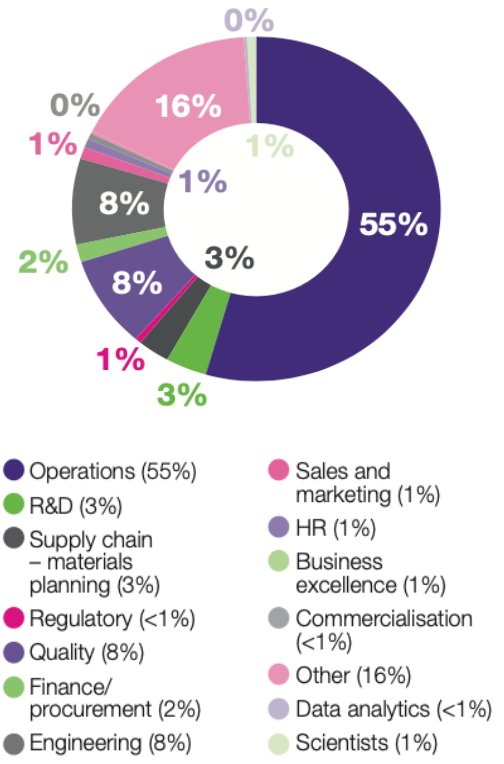


Figure 2: *Categories of Work in the Irish MedTech Industry (Irish MedTech Association, 2017)*

The resource-based view of SHRM can be understood as 'the range of resources in an organisation, including its human resources, that produces its unique character and creates competitive advantage' (Armstrong and Taylor, 2023). In the context of the MedTech industry, in knowledge-intensive firms, engineers are an

invaluable resource for organisations which require their unique knowledge, expertise and experience to drive innovation and competitiveness (Kang, Morris and Snell, 2007). To this point, Boxall and Purcell (2016) built on this, identifying 'human resource advantage' as a product of resource-based SHRM whereby organisations see increased competitiveness as a result of a more skilled, intelligent and effective workforce compared to their competitors. In highly competitive talent pools like Ireland, MedTech organisations must be able to effectively engage and retain employees for fear of losing this advantage.

2.3 Motivation

2.3.1 Background to Motivation

Defined as 'an internal state that induces a person to engage in particular behaviours' (P. E. Spector, 2012), motivation has long been at the centre of organisational research and practice (Meyer, Becker and Vandenberghe, 2004). Stemming from the Latin for movement, *movere,* motivation is often thought of as a force or drive that directs and sustains behaviour (Ryan and Deci, 2000b; Armstrong and Taylor, 2023).

Locke and Latham (2004) note that this motivational force comprises internal factors that impel action and external factors that induce action. How this action is taken is summarised by Arnold, Robertson and Cooper (1991), who presented motivation as having three components:

- *Direction* - what a person is trying to do,
- *Effort* - how hard a person is trying,
- *Persistence* - how long a person keeps on trying.

2.3.2 Types of Motivation

Seminal authors in workplace motivation, Ryan and Deci (2000a), highlight the importance of studying the level of motivation in individuals and the orientation of that motivation. In their 1985 self-determination theory (SDT), Ryan and Deci address the inherent role that personality and psychological needs play in the direction of motivation; in other words, the 'orientation of motivation [that] concerns the underlying attitudes and goals that give rise to action' (1985).

From the SDT perspective, motivation can be categorised as intrinsic or extrinsic. The primary difference between these types of motivation is informed by the source of the drive to participate in particular behaviour or activities. Intrinsic motivation refers to the inherent enjoyment or interest of engaging in an activity as the driving force. In contrast, extrinsic motivation is undertaking an activity in pursuit of an external reward or consequence (Ryan and Deci, 2000a).

Though the categorisation of the types of motivation is indisputable in its influence on the field of study, several limitations have been observed in applying this knowledge in the workplace. For instance, Howard et al. (2016) observed a distinct lack of consideration around the implication of designing workplace interventions designed to increase one type of motivation. In this study, the authors found that high levels of extrinsic motivation interventions, when not balanced with intrinsic motivation in white-collar technology workers, produced an amotivated employee profile. These amotivated employees feel trapped in their roles and become less receptive to intrinsic motivation over time, leading to lower productivity and innovation behaviours. This is important learning for the engagement and retention of engineering professionals who would fall into this category of white-collar workers.

2.3.3 Theories of Motivation

Though studies into human motivation can be traced back to the time of Greek philosophers, motivation theory, as we understand it today, began in the early 20th century (Armstrong and Taylor, 2023). There have been many attempts to explain how motivation works, owing to the complexity of the multiple theories and perspectives (Stecher and Rosse, 2007; Holbrook and Chappell, 2019). These theories include:

- Reinforcement theory,
- Content theory,
- Process theory.

2.3.4 Reinforcement Theory

Reinforcement theory was developed by behavioural psychologist Edward Thorndike in 1911, who posited a theory he called 'the law of effect'. In essence, the law of effect describes how a person's motivation is subconsciously driven by the potential for positive and negative outcomes, whereby a positive outcome should result in the individual repeating that behaviour (Thorndike, 1911). Skinner later expanded Thorndike's law by introducing the notion of 'operant conditioning', writing that Thorndike's work is not a theory but 'simply a rule for strengthening behaviour' (Skinner, 1953).

Though reinforcement theory has been criticised in academia for its failure to acknowledge human agency and context, it still serves today as a sound rationale for financial incentives and performance-related pay (Armstrong and Taylor, 2023). There has been some inquiry into the efficacy of positive reinforcement in more recent times, particularly in knowledge-intensive firms where employees are seen as a source of value. Research conducted in Taiwan and China reported the success of positive reinforcement through performance-related incentives among engineers in the Information Technology sector, with both studies

citing increased output and productivity (Liu, 2010; Linz and Semykina, 2012). A 2014 study of the relationship between positive reinforcement and employee performance found that intrinsic and extrinsic positive reinforcement is positively linked with employee performance (Wei and Yazdanifard, 2014).

2.3.5 Content Theory

Content theories of motivation, or needs theories, attempt to explain the process of human motivation in terms of the needs that drive action. When needs are unsatisfied, tension and unease are created (Armstrong and Taylor, 2023). *Figure 3* illustrates the process of need fulfilment that underpins the theories of Maslow, Alderfer, Herzberg, and McClelland.

Figure 3: *The Process of Motivation According to Content Theory (Armstrong and Taylor, 2023).*

Perhaps the best-known content theory of motivation is Maslow's hierarchy of needs (Maslow, 1943). Stemming from the work of Freud, Maslow posits that humans have five categories of needs that must be fulfilled in order from basic physiological needs to safety, social and esteem needs before reaching the pinnacle of human motivation, self-actualisation. The prevailing belief of Maslow's theory is that humans cannot fulfil higher needs without having their preceding needs fulfilled.

Maslow's theory has been criticised for its rigidity and failure to acknowledge the role of social and cultural influences (Anwar and Shukur, 2015); however, this criticism prompted the development of Alderfer's ERG theory (1972). In this, Alderfer postulated that Maslow's hierarchy could be simplified to just three categories of needs that would enable broader applicability in academia and practice. These categories include:

- *Existence needs* – basic necessities such as food, water, pay, and working conditions,
- *Relatedness needs* - refer to the need for social interaction and connection,
- *Growth needs* - speak to the possibility of achievement, advancement, development and recognition.

Similarly, McClelland's achievement motivation theory proposed three categories of needs based on his study of managers: achievement, affiliation and power (McClelland, 1961).

Another content theory of motivation heavily influenced by the work of Maslow is Frederic Herzberg's two-factor model of motivation (1959). During an investigation into the sources of job satisfaction and dissatisfaction among engineers and accountants, Herzberg asked interview participants to recall a time when they felt exceptionally satisfied in their job and then a time of intense dissatisfaction (Ansari, 2022).

The results of this study established two factors that affect job satisfaction - hygiene factors and motivating factors. Hygiene factors refer to the job context and include pay and working conditions, whilst motivating factors relate to the job content, including responsibility, achievement and opportunities for advancement (Armstrong and Taylor, 2023). Crucial to Herzberg's model is the influence these factors have on job satisfaction is crucial to Herzberg's model. He posited that hygiene factors prevent job dissatisfaction but cannot contribute to job satisfaction. Conversely, motivating factors only drive job satisfaction and cannot cause dissatisfaction.

Though they continue to prevail in organisational practice and research, content theories of motivation, as summarised in *Figure 4*, have been subject to extensive critique. Shields (2016) notes the absence of empirical corroboration surrounding content theory, particularly that of Maslow and Herzberg. Moreover, academics have argued that the simplistic view on motivation presented is insignificant without practical implications and guidance for use (Locke and Latham, 2004; Pinder, 2014).

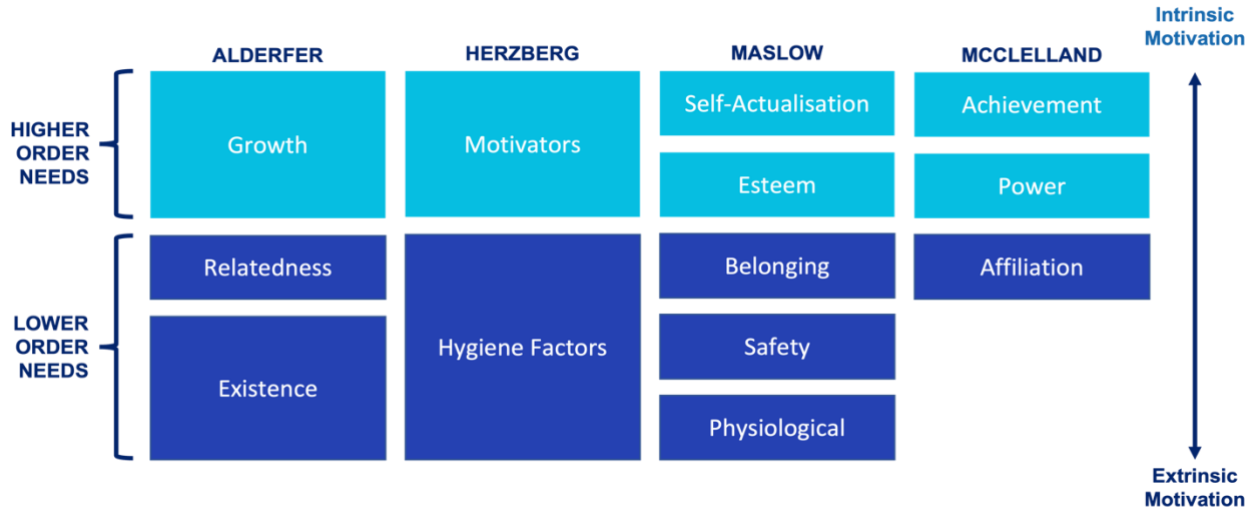


Figure 4: *Summary of Content Theories of Motivation*

Given the original context of Maslow and Herzberg's research being of engineering professionals, content theories have been widely accepted in engineering management research and have seen significant further research. For instance, Utley (1995) evaluated the role of Maslow and Herzberg's concepts in successfully implementing quality management systems in engineering organisations. The results of this analysis were consistent with that of Maslow and Herzberg. Drawing on the work of Utley, Lord (2002) expanded this field of research with his study of content theories of motivation in older engineers, producing a similarly consistent result.

2.3.6 Process Theory

Where content theories of motivation focus on the specific needs that drive behaviour and the factors that satisfy or dissatisfy those needs, process theories, on the other hand, refer to the cognitive processes and forces that govern an individual's behaviour and decision-making, as well as basic needs. In other words, process theory pertains to how humans perceive, interpret and understand their working environment (Armstrong and Taylor, 2023). Though many process theories exist, Stecher and Rosse (2007) argue that the prevailing components of process theory can be seen in expectancy theory and equity theory.

Expectancy theory states that individuals display greater motivation when they understand what they need to do to get a reward, know that this is achievable and expect the reward will be worthwhile (Armstrong and Taylor, 2023). According to Erez and Isen (2002), expectancy theory 'is one of the most central motivation theories, and substantial evidence supports the view that expectancy theory can predict effort and performance'. Originating from Vroom's (1964)'s Valency-Instrumentality-Expectancy theory, Porter and Lawler (1968) later drew upon this to develop their motivation model, as seen in *Figure 5.*

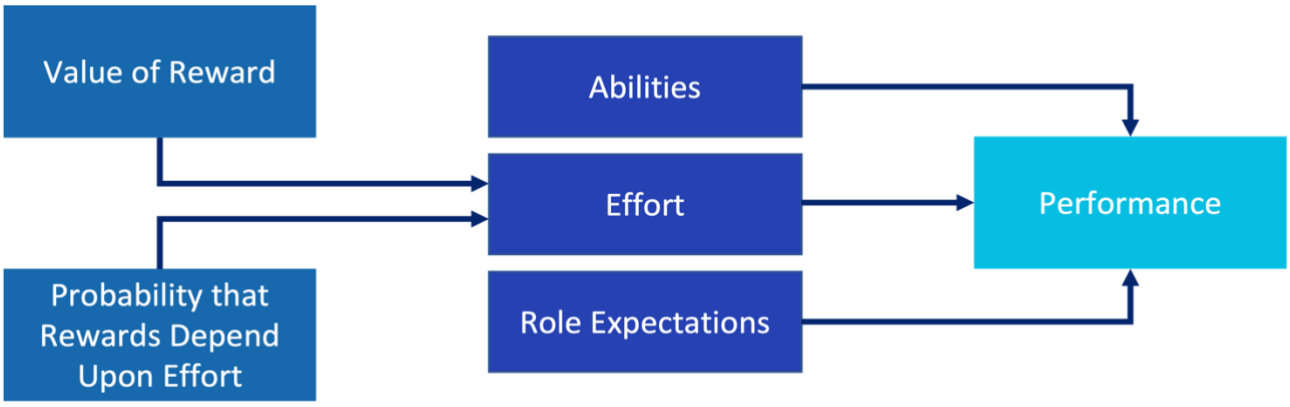


Figure 5: *Expectancy Model of Motivation (Lyman W. Porter and Lawler, 1968)*

This model follows Vroom's model by proposing two factors determining individuals' work effort. Firstly, they evaluate the value of the potential reward against their needs, as defined in the content theories of motivation. Secondly, they consider the influence of effort exerted on the ultimate reward, that is, the relationship between effort and reward (Armstrong and Taylor, 2023). Thus, the greater the value of the expected reward, the greater degree of effort produced by employees.

However, Porter and Lawler (1968) state that effort alone is insufficient. Increased performance is achieved through the two variables of task achievement. Firstly, employees must be able to exert effective effort in pursuit of rewards. Secondly, they must know what they want or are expected to do, meaning the consistent understanding of expectations between the business and its employees is of the utmost importance (Fudge and Schlacter, 1999; Armstrong and Taylor, 2023).

According to Adams (1963), a key contributor to employee motivation is the ongoing evaluation of an organisation's personal and colleague outcome/input ratio. Put simply, employees evaluate the value of their compensation against what they feel is deserved for the work they contributed (Kim *et al.*, 2019). From this perspective, equity theory adds a layer of complexity to theories of motivation as it acknowledges not just an individual's context as part of the motivation process but also the context of others through comparison.

A key consideration for organisations that employ engineering professionals is balancing expectancy in their early career employees. Adams et al. (2011) note the disconnect between understanding and application in learners leaving engineering disciplines where the opportunities to engage in active learning or work-study programs can vary widely from institution and engineering discipline. This can cause dissatisfaction and disengagement in engineering employees whose actions may not be as effective as their colleagues, leading to unfulfilled expectations for organisations and their employees.

2.3.7 Job Characteristics

Much of the inquiry into motivation theory has focussed on the personal, environmental or circumstantial factors contributing to job satisfaction. In response to this, Hackman and Oldham proposed their job characteristics model (1976), which addressed in detail the influence of the characteristics specific to one's job on job satisfaction. This model identified five key job characteristics: skill variety, task identity, task significance, work autonomy, and feedback, that influence three psychological states, including work meaningfulness, sensed responsibility and knowledge of results (Hackman and Oldham, 1976; Young, McLeod and Carpenter, 2023). The interplay of these characteristics and psychological states has been found to correlate positively to job satisfaction and work performance, as seen in *Figure 6.* To assess the impact of

job characteristics on employee satisfaction, Hackman and Oldham (1974) developed the job diagnostic survey, which was later revised by Idaszak and Drasgow (1987) for accuracy and empirical applications.

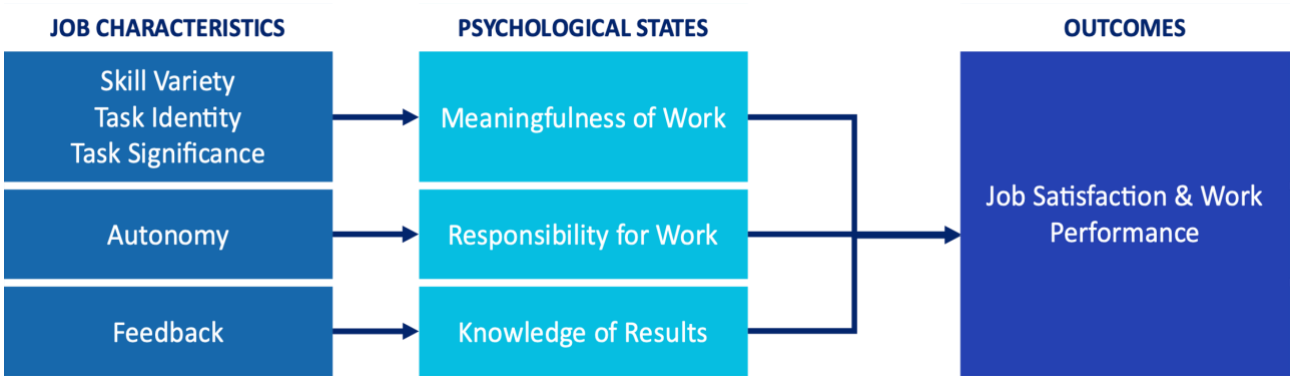


Figure 6: *Job Characteristics Model (Hackman and Oldham, 1976)*

Moras (2021) summarised the five characteristics of the job characteristics model as:

- *Skill variety* is concerned with the range of specific skills and competencies required in an individual's job. Employees experience greater meaningfulness when their work requires the full breadth of their skills.
- *Task identity* refers to the degree of employee involvement in their role. When their involvement is greater, employees demonstrate higher engagement and meaningfulness.
- *Task significance* is the extent to which an employee's tasks directly contribute to the outcome and the positive impact they have had as a result of this task.
- *Autonomy* is simply the responsibility granted to an employee to conduct their work. In other words, an individual's ownership over their day-to-day work.
- Finally, *feedback* refers to the recognition an employee receives from their superiors that is directly related to their contributions.

Subsequently, the psychological states identified in the job characteristics model can be understood to be:

- *Work meaningfulness* refers to the extent to which an individual feels that the contributions of their work have significance to themselves or others.
- *Sensed responsibility* is concerned with the ownership an employee has over their contributions.
- *Knowledge of results* is the experience of seeing the positive outcome of their work on others.

According to SDT, employees who understand the meaningfulness of their work are found to be more intrinsically motivated and demonstrate more innovative behaviours (Ryan and Deci, 2000a, 2000b; Guo, Peng and Zhu, 2022). The same is true for biomedical engineering graduates, as correlated by Cruz et al.

(2017). This is further reinforced by Jamison et al. (2022), who found that the potential to impact people's lives positively was one of three key personal motivations to pursue engineering in students. The impact of meaningful work cannot be understated, given the role of innovation as a strategic imperative in the MedTech industry. Rooted in the balance of organisational needs and employee needs (Han, Sung and Suh, 2021), job characteristics and meaningfulness are important motivational factors.

2.4 Commitment

2.4.1 Background to Commitment

The study of commitment has been the focus of social and behavioural research for many years. Meyer and Herscovitch defined commitment as 'a force that binds an individual to a course of action that is of relevance to a particular target' (2001). Organisations today operate in highly competitive global environments, meaning obtaining and maintaining competitive advantage through SHRM is paramount (Wright and McMahan, 2011). Within SHRM practices, employee commitment to their jobs and organisation is often considered central to achieving competitive advantage and organisational objectives (Meyer and Allen, 1991).

Howard Becker (1960) first studied the concept of commitment, positing that commitment emerges when an individual makes a 'side-bet' and subsequently links their interests and activities to their role or profession. In other words, side-bet theory suggests that employees who are invested in hobbies or interests outside work are more motivated to perform at work to sustain these interests. At the crux of side-bet theory is the importance of considering employees as whole individuals with lives outside of work that can and do influence their work performance and behaviours.

Side-bets can take many forms and are often categorised as general cultural expectations about responsible behaviour, self-presentation, impersonal bureaucratic arrangements, individual adjustments to social positions, and non-work concerns (Becker, 1960; Powell and Meyer, 2004). Drawing on the work of these authors, the categories of side-bets can be summarised as follows:

- *General cultural expectations* refer to expectations of important reference groups or social norms, resulting in real or imagined negative consequences.
- Conversely, *self-presentation* can be understood as the self-imposed expectations that drive behaviours to avoid tarnishing an individual's image or reputation.
- *Impersonal bureaucratic arrangements* are the policies or practices within an organisation's compensation structures that reward service and tenure.

- *Individual adjustments* refer to the actions taken to adapt to a given situation, but that may make an individual less suited to other situations in the future.
- Finally, *non-work concerns* encompass all side-bets made outside of an individual's place of work that would be impacted if they were to leave the organisation or occupation. This includes things like moving towns, sporting affiliations or club memberships.

Becker's side-bet theory has been extensively tested since its inception in the mid-twentieth century and, as such, has been subject to some criticism on its empirical evidence and practical applications. In particular, Blau (1985) argued that though side-bet theory acknowledges the existence of outside influences through the general cultural expectations category, Becker fails to account for the influence of social and cultural context on an individual's decision-making.

Similarly, Meyer and Allen (1991) criticised the validity of side-bet theory due to its assumption that an individual's decisions are always wholly rational. In assuming that all decisions are entirely rational, Becker ignores the complexities of human behaviour in the workplace and the many contingencies that inform how employees interact and perform. This perspective is supported by Smith, Edwards and Scullion, whose 1984 study into industrial conflict revealed the power dynamics that persist in organisations between employees and their managers (Smith, Edwards and Scullion, 1984).

2.4.2 Types of Commitment

At the outset, it is essential to note the delineation of research surrounding employee commitment as categorised into occupational and organisational commitment. Though both types of commitment have been found to positively correlate to work-related outcomes such as job satisfaction, performance and turnover intention, they are psychologically and theoretically distinct from one another (Aranya and Jacobson, 1975; Mowday, Porter and Steers, 1982; Blau, 1985; Meyer and Allen, 1991; Lee, Carswell and Allen, 2000). However, despite this distinction, how we measure the antecedents and consequences of occupational and organisational commitment are similar and have theoretical roots in the work of Howard Becker.

2.4.3 Organisational Commitment

Organisational commitment can be defined as 'the psychological attachment that an employee has towards their organisation' (Meyer and Allen, 1991), and refers to the extent to which employees feel committed to their employer and demonstrate loyalty. In addition, employees exhibit organisational commitment when they identify with their organisation and are willing to exert effort above the expectations of their role (Meyer and Herscovitch, 2001; Afshari *et al.*, 2020).

2.4.4 Occupational Commitment

The focus of this research is the concept of occupational commitment. Where organisational commitment refers to an employee's attachment to their organisation, occupational commitment is the extent to which employees are committed to their line of work or profession (Meyer, Allen and Smith, 1993). In other words, occupational commitment can be defined as the 'attachment to one's occupation or profession, regardless of employer or organisation' (P. E. Spector, 2012). Thus, someone with high occupational commitment 'strongly identifies with and has positive feelings about their occupation' (Blau, 1985, 2003).

The concept of a person's commitment to their occupation or profession has been given many terms in the past, such as professional commitment, work commitment and career commitment. These terms have been criticised in the past, with professional commitment being limited in not considering non-professional roles and career or work commitment being too vast due to the many occupations a person might hold throughout their career. As such, the dominant use of the term occupational commitment has since emerged as encompassing those not in professional roles whilst being focused enough to capture just one occupation within an individual's career path (Blau, 1985; Meyer, Allen and Smith, 1993; Lee, Carswell and Allen, 2000). Notably, Blau, Paul and St. John (1993) suggested adopting a consistent term for occupational commitment after reporting some inconsistencies in their research data that may have resulted from differing interpretations of the term 'career' among their research participants.

The study of occupational commitment is important for several reasons, as summarised by Lee, Carswell and Allen. In their 2000 meta-analysis of occupational commitment, the authors note reasons for this importance, including the increasing importance of occupations in the knowledge economy, coping with uncertainty, links to retention and performance, and the relationship of occupational commitment with organisational commitment (Lee, Carswell and Allen, 2000). Additionally, Ivtzan, Sorensen and Halonen (2013) recognise the increasing pressure faced by organisations to undergo significant change in order to remain at the forefront of their fields. An unfortunate consequence of organisational change is often workforce reductions or restructures, meaning employees are often offered less job security. In the absence of job security, employees may transfer their commitment to the organisation to their occupation instead (Carson, Carson and Bedeian, 1995; Ivtzan, Sorensen and Halonen, 2013).

2.4.5 Three-Component Model of Commitment

In a 1991 review of organisational commitment research, Meyer and Allen proposed a model of commitment that would serve to 'aid in the interpretation of existing research and serve as a framework for future research' (Meyer and Allen, 1991). Their three-component model of organisational commitment organises

commitment behaviours and attitudes under three general themes: affective attachment to the organisation, perceived costs of leaving the organisation, and feelings of obligation to remain with it (Meyer and Allen, 1991).

Affective commitment refers to an employee's emotional attachment and identification with an organisation and its values. This is most often measured using Mowday, Steers and Porter's (1979)'s organisational commitment questionnaire. This scale comprises 15 items that evaluate an individual's organisational identification. This scale has been subject to extensive testing and is generally accepted to provide sufficient reliability in research and practical applications (Mathieu and Zajac, 1990; Meyer and Allen, 1991).

Continuance commitment or perceived costs of leaving an organisation is rooted in Becker's (1960) side-bet theory, whereby the accumulated side-bets would be lost if an activity were discontinued (Meyer and Allen, 1991). In Meyer and Allen's original model of organisational commitment, these side-bets were considered to be things like an individual's pension, seniority or benefits that would be discontinued in the event of leaving an organisation. Continuance commitment also extends to the financial costs associated with leaving an organisation. Though many attempts have presented an empirical measure of continuance commitment, few have gained mass consensus on their reliability. Ritzer and Trice (1969), and Hrebiniak and Alutto (1972) proposed a means to investigate the reasons that could persuade individuals to leave their jobs; however, these have been criticised as presenting only a means to evaluate their intention to stay as opposed to the costs of leaving (Meyer and Allen, 1991).

Normative commitment, otherwise known as obligation to stay, is understood to be the feeling of obligation or duty to remain with an organisation. In their original proposed model, Meyer and Allen (1991) note that normative commitment is often seen as an internalised moral obligation. Though still considered a core component of the three-component model of commitment today, normative commitment is generally understood to be recessive in today's society due to the shift in behaviours away from remaining with one organisation for life (Guan *et al.*, 2019).

2.4.6 Dimensions of Occupational Commitment

Meyer and Allen's three-component model of commitment was developed in response to a perceived unidimensional evaluation of organisational commitment to date. As such, the authors later extended their three-component model of commitment to include occupational commitment based on the same observation in research (Aranya and Jacobson, 1975; Blau, 1989; Blau, Paul and St. John, 1993). Meyer, Allen

and Smith (1993) posit that 'the value in taking a multidimensional approach to the study of occupational commitment is that… it provides a complete understanding of a person's tie to [their] occupation'.

The results of this investigation in the generalised applications of their three-component model of commitment, Meyer, Allen and Smith (1993) proposed the following amended dimensions of occupational commitment.

Affective commitment refers to one's emotional attachment to an occupation. This attachment is generally accepted to be rooted in social exchange theory. Blau (1964) posits that employees who feel valued and supported by their organisation are more likely to reciprocate these feelings and demonstrate higher commitment and loyalty. In other words, when employees feel a strong emotional connection to their role and employer, they are likely to see their employer as a positive social exchange partner and reciprocate with greater commitment to them.

Normative commitment is a sense of duty or obligation to remain within an occupation. Similar to affective commitment, normative occupational commitment is often studied in conjunction with social exchange theory, whereby individuals form their beliefs about the fairness of the exchange between what they contribute to the organisation and what they receive in return. Employees who feel their employer has invested in them are more likely to feel obligated to stay. This perspective on normative occupational commitment is consistent with Adams' equity theory (1963), whereby employees exhibit job satisfaction when they feel the input/output ratio is equitable. From this perspective, one would expect normative occupational commitment to positively correlate with job satisfaction; however, limited studies have found this to be a direct relationship. Instead, Singh et al. (2018) and Zheng and Wu (2018) noted that the relationship between normative occupational commitment and job satisfaction is mediated by perceived organisational support, the 'degree to which the organisational support promoted the employees' sense of obligation to increase their commitment to the organisation and achieve organisational goals' (Eisenberger *et al.*, 1986).

Continuance commitment pertains to the potential costs of leaving an occupation. This can include the reduction in earning power associated with leaving your current occupation, the loss or waste of investment in specialist training for the vacated occupation or the reputation or authority losses of leaving an occupation. Continuance commitment in the context of occupational commitment is closely linked with career entrenchment (Carson, Carson and Bedeian, 1995).

These dimensions were accepted as generally applicable following a confirmatory factor analysis on samples of nurses by Meyer, Allen and Smith (1993). They were later adapted to more heterogeneous samples, including teachers, engineers, hospitality workers, human resources workers, accountants, air traffic controllers and more (Chiang, 1995; Irving, Coleman and Cooper, 1997; Snape and Redman, 2003; Hall, Smith and Langfield-Smith, 2005; Jepson and Forrest, 2006; Snape, Lo and Redman, 2008; Özgenel, 2019).

Gouldner's (1957) 'Analysis of Latent Social Roles' is a seminal text in understanding commitment in engineering professionals. In this text, he defines individuals as falling within a binary of cosmopolitan or local. This scale is explored by Keller (1997) in the context of scientists and engineers and later expanded on by Goswami, Mather and Chadha (2007). The latter text notes the distinctive nature of RD&I professionals as cosmopolitan social roles, stating that RD&I employees are more likely to have strong technical expertise, prefer autonomy and flexibility, demonstrate strong occupational commitment and prioritise professional ethics. Furthermore, the greater perseverance and cross-disciplinary expertise exhibited by engineers in MedTech are found to produce higher career entrenchment and subsequent occupational commitment (Carson, Carson and Bedeian, 1995; Meriwether, 2017).

2.5 Conceptual Framework

The conceptual framework can be defined as 'a system of concepts, assumptions, and beliefs that support and guide the research plan' (Miles and Huberman, 1994). Given that this study takes a phenomenological perspective, the conceptual framework for this study is best understood as a structure of what has been learned for use in explaining the nature of the phenomenon being studied (Camp, 2001). The conceptual framework illustrated in *Figure 7* outlines the author's approach to addressing the research objectives from their 'epistemological and ontological worldview' (Grant and Osanloo, 2014). This model defines the vehicles for primary and secondary data collection and analysis within the scope of the research subject, context and participants.

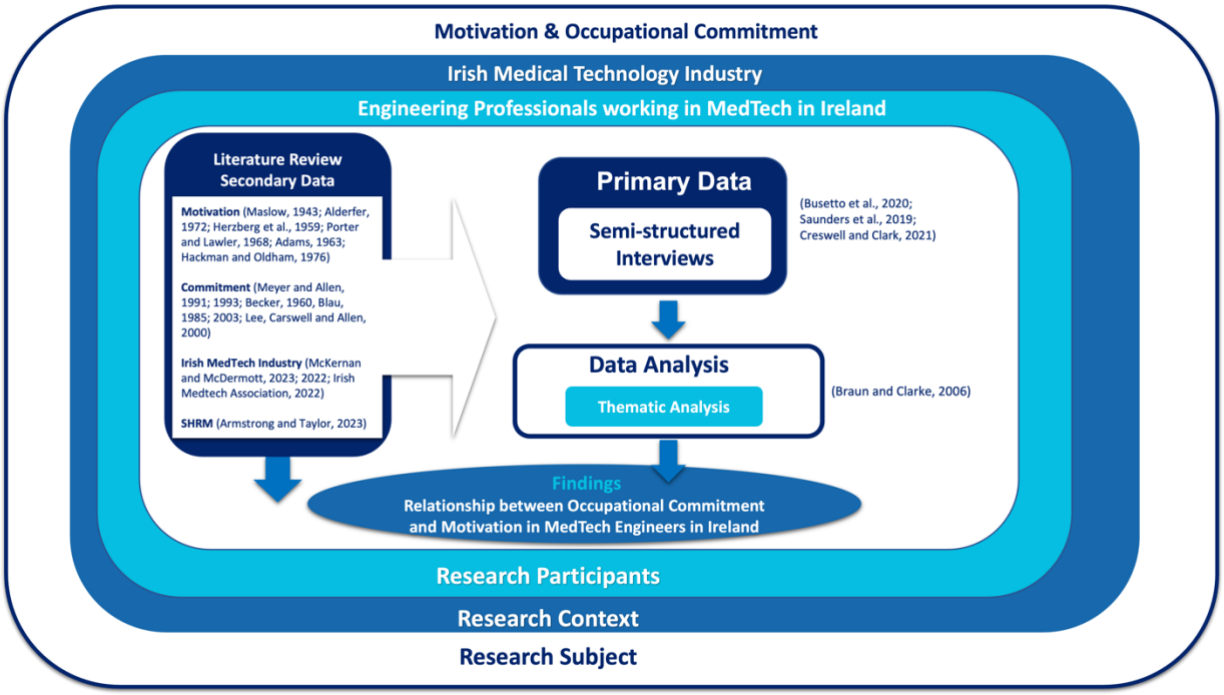


Figure 7: *Conceptual Framework*

Within this framework, the author seeks to first ascertain the extant research and literature relating to the key concepts of motivation and commitment, as well as supplementary data relating to the conceptual and contextual background of this study. This secondary research data then influences the primary data collection by informing the interview questions and later is subject to thematic data analysis. The findings of this analysis are presented as findings and will contribute to the practical and theoretical understanding of motivation and commitment within this segment of the Irish labour market.

Chapter 3 – Methodology

3.1 Introduction

The purpose of this chapter is to explore and evaluate the most common research paradigms and their philosophical roots, in the context of the overarching research question. Through this evaluation, the author seeks to identify an appropriate research method and supporting philosophy for this research, providing a rationale for the selected research design, data collection, and data analysis. This rationale will also include any necessary considerations for this specific body of research, including ethical considerations and methodological limitations.

3.2 Research Purpose

According to Saunders et al. (2019), a researcher's choice of research purpose is inevitably rooted in the research question. Depending on the objectives of their study, a researcher may elect to conduct an exploratory, explanatory, or descriptive body of research as summarised in *Table 2***.** The research purpose underpins each methodological decision made during a study; however, this purpose may change over time.

This research aims to understand the relationship between the factors that influence motivation and occupational commitment in engineers working in Ireland's MedTech industry. Though existing theories of motivation and commitment frame this study, the author seeks to understand the application of these theories as opposed to ascertaining their validity. As such, an exploratory approach was deemed the most appropriate research purpose. Reiter (2017) states that exploratory research 'openly embraces a using of theory in order to assess its explanatory strength and predictive power and make sense, or explain, a previously defined segment of reality'.

	Objective	**Characteristics**	**Methods**
Exploratory	Discover meaning, explore ideas, and gain insights	• Flexible • Adaptable to change • Foundational	• Secondary data analysis • Expert/Individual interviews • Focus groups
Descriptive	Understanding events, groups, or situations	• Driven by specific hypotheses • Structured	• Secondary data analysis • Surveys • Observation
Explanatory	Determine causal	• Measurement of the effect of	• Experiments

	relationships between variables	dependent variables • Evaluation of the roles of independent variables • Investigation of mediating variables	• Empirical testing

Table 2: *Approaches to Research Purpose (Saunders, Lewis and Thornhill, 2019)*

3.3 Research Philosophy

Methodology refers to the 'philosophy and frameworks that are fundamentally related to the entire process of research' (Ahmed, Opoku and Aziz, 2016). It is often seen expressed through research paradigms - a way to frame research within their prevailing philosophies. The idea of research paradigms has been studied in-depth since the term was coined by Kuhn (1962) as a result of his work to provide a standardised approach to research in academia. Kuhn posited that research based on shared paradigms is committed to the same rules and standards for scientific practice. Though focused on natural sciences, Kuhn's work resonated with the wider research community and has since become a foundation of sociological thinking.

Today, these paradigms include; positivism, critical realism, interpretivism, post-positivism, and pragmatism (Saunders, Lewis and Thornhill, 2019), each with its own underlying philosophy and characteristics. The choice of research paradigm depends on the researcher's ultimate research objective and philosophical outlook, as summarised in *Table 3.*

	Objective	**Characteristics**	**References**
Positivism	Proving a theory and predicting outcomes	• Used in business and organisational research • Produces law-like generalisations from observing reality • Assumes the researcher is value-neutral and wholly objective	(Crotty, 1998; Gill and Johnson, 2011; Saunders, Lewis and Thornhill, 2019)
Critical Realism	Identifying what we do not see and evaluating the role this plays	• Used in business and management • Focused on the duality of the social world; seeks to understand the social structures that underpin the lived experience	(Dobson, 2002; Bhaskar, 2010; Saunders, Lewis and Thornhill, 2019)

Post-positivism	Proving a theory and predicting outcomes through repeated testing to remove subjectivity	• Used in sociology, psychology, political science, and anthropology • Holds the belief that objectivity in research is an epistemological ideal • Acknowledges the inherent subjectivity of the researcher	(Guba and Lincoln, 1994; Denzin and Lincoln, 2011; Creswell and Poth, 2016)
Pragmatism	Focusing on the consequences and meanings of an action or event	• Used in social work and social-justice fields • Seeks to pursue value in the application of research as opposed to validation • Closely associated with problem-solving	(Sibley and Dewey, 1950; Denzin and Lincoln, 2011, 2011; Hall, 2013; Morgan, 2014)
Interpretivism	Empathising with individuals' meaning-creation and subsequent behaviours	• Used in business, human resources, and organisational research • Places emphasis on conducting research amongst people rather than about them as an object or subject • Requires the researcher to adopt an empathetic stance	(Fossey *et al.*, 2002; Denzin and Lincoln, 2011; Creswell and Poth, 2016; Saunders, Lewis and Thornhill, 2019)

Table 3: *Summary of Research Paradigms*

3.3.1 Interpretivism

In the context of the wider research question, the interpretivist approach has been selected as the most appropriate paradigm due to its acknowledgement of the individualism of meaning. In the business and management field, Johnson and Clark (2006) note that there is a particular need for the researcher to be aware of any philosophical commitments made through their choice of research strategy, given the significant impact that has on how their research is designed and how they understand what it is they are investigating.

With dimensions of motivation and commitment under review as part of this research, interpretivism allows for further insights into 'different people of different cultural backgrounds, under different circumstances and at different times [making] different meanings' (Saunders, Lewis and Thornhill, 2019). In contrast to the positivist approach, interpretivism believes that when humans are reduced to 'law-like generalisations' against which outcomes may be predicted (Denzin and Lincoln, 2011; Saunders, Lewis and Thornhill, 2019), those insights into humanity are lost. These insights are integral to businesses and allow for distinct cultural meanings and understandings across their interactions.

3.4 Research Approach

The identification of a research approach hinges on the researcher's proposed use of theory and can be categorised into three types: deductive, inductive, and abductive (Saunders, Lewis and Thornhill, 2019).

- *Deductive reasoning* refers to testing and validating a theory by generating a hypothesis for empirical testing whereby the conclusion reached is either 'true' or 'false' (Locke, 2007; Ketokivi and Mantere, 2010).
- In contrast, *inductive reasoning* begins with observations that are subsequently analysed for patterns, producing a broad generalisation about some phenomenon upon which concepts and theories can be formed (Locke, 2007).
- Combining these approaches, *abductive reasoning* neither starts nor ends with a theory, rather it combines induction and deduction by beginning with an observation and then working out the plausible theories for how this could have occurred (Van Maanen, Sørensen and Mitchell, 2007; Saunders, Lewis and Thornhill, 2019).

This research ascribes to the inductive approach as it aims to expand the existing research in this area by using existing theory not as a test, but as a framework for data collection and analysis. Instead, the author seeks to use meaning-driven methodologies to derive understanding as opposed to measurement (Khasim and Kwadwo Antwi, 2015).

3.5 Research Design

Research design refers to how a study will answer the author's research question and objectives by specifying the sources, collection, analysis, and considerations for the research data (Saunders, Lewis and Thornhill, 2019). Depending on their desired outcome, researchers may choose from quantitative, qualitative, or mixed methods research design.

- *Quantitative research* is concerned with objectively collecting and analysing numerical data to prove a hypothesis to analyse pre-existing knowledge. This approach assumes that human cognition and behaviour are highly predictable (Khasim and Kwadwo Antwi, 2015).
- In contrast, *qualitative research* believes that humans shape and construct their behaviour and attitudes through their lived experiences in a way that is fluid and subject to change. Due to this subjectivity, there is often no hypothesis to be proved. Instead, there are simply observations to be made from the data collected. These data collection methods include document studies, observations, focus groups, and semi-structured interviews (Busetto, Wick and Gumbinger, 2020).

- Finally, *mixed methods research* is most often rooted in realist and pragmatist research paradigms and seeks to explore both the objective and subjective understandings of a research question, often in a 'generate to test' approach (Tashakkori and Teddlie, 2010; Saunders, Lewis and Thornhill, 2019).

Given that this study aligns with the interpretivist philosophy and seeks to use meaning as opposed to measurement-oriented methodologies, the author has chosen to conduct qualitative research (Denzin and Lincoln, 2011). A qualitative research approach focuses on subjective experiences and beliefs, allowing the author to gain in-depth knowledge of participants' specific culture or context (Tenny, Brannan and Brannan, 2023).

3.6 Research Strategy

The research strategy can be defined as 'a plan of action to achieve a goal', acting as the 'methodological link between research philosophy and methods of data collection and analysis (Saunders et al., 2012; Denzin and Lincoln, 2005). Within the field of qualitative research, there are a variety of research strategies available, including action research, case studies, ethnography, grounded theory, narrative research, and phenomenology (Fossey *et al.*, 2002; Langdridge, 2008; Creswell and Poth, 2016; Saunders, Lewis and Thornhill, 2019).

3.6.1 Phenomenology

For this study, the author identified phenomenology as the most appropriate approach for this exploratory research. Phenomenology is primarily concerned with the human experience; both the philosophies that underpin human experience, what was experienced, how it was experienced, and the impact of that experience on how humans interpret and navigate the world (Teherani *et al.*, 2015; Neubauer, Witkop and Varpio, 2019). As this study seeks to understand the relationship between motivation and occupational commitment in engineers working in the Irish MedTech industry, the phenomenological procedure allows for sufficient insight into participants' perspectives by exploring the patterns, relationships, and lived experiences (Savage-Austin and Honeycutt, 2011).

3.7 Data Collection

Reiter (2017) states that exploratory research benefits from using theory to gain further insight and explanation into segments of society. As such, both primary and secondary research methods were used.

Secondary research is collected from existing sources such as books or academic journals, whilst primary research is collected directly by the researcher through data collection methods (Collis and Hussey, 2021).

3.7.1 Secondary Research

Secondary research data was collected from examining existing literature in the fields of motivation, commitment, and the research context, the MedTech industry in Ireland. This literature comprised books, journal articles, reports, and websites, each of which was critically reviewed for relevance and presented in the literature review section of this paper as applicable. The author first focused this secondary research on classic, influential literature within the fields of motivation and commitment and later sought studies directly related to the research context. This revealed a gap in the existing research surrounding the role of motivation and commitment within the context of engineers working in MedTech in Ireland. Though much research has been done to date on motivation and commitment generally, little has focussed on the relationship between motivation and occupational commitment. This secondary research provided a foundation of knowledge upon which the researcher could conduct primary research.

3.7.2 Primary Research

For this study, semi-structured interviews prevailed as the most appropriate method of primary data collection, namely due to their nature as a means to 'gain insights into a person's subjective experiences, opinions and motivations' (Busetto, Wick and Gumbinger, 2020). Semi-structured interviews are characterised by open-ended questions and an interview guide that aids the researcher in ensuring the conversation stays on track (Saunders, Lewis and Thornhill, 2019). Given the rigorous timeline for this research, semi-structured interviews were an effective way for the researcher to obtain significant data within a short period (King and Grace, 2008).

3.7.3 Sample Selection

According to (Saunders, Lewis and Thornhill, 2019), sampling techniques can be divided into probability and non-probability sampling. Rooted in objectivity, probability sampling is most often associated with quantitative research methods. With probability sampling, the potential of each participant being selected is understood to be equal. In contrast, in non-probability sampling, the researcher must segment the population to ensure the selected participants can answer questions and contribute to the body of research.

The sampling method for this primary data collection is non-probability purposive sampling to allows the author to select participants based on a specific set of characteristics or experiences that make them suitable for the phenomenon of interest (Creswell and Plano Clark, 2021). A total of ten participants were selected to

ensure the sample was representative of the wider population, sufficient in size to reach data saturation, and realistic given the resource and time available (Patton, 2002; Becker, 2008; Creswell and Creswell, 2018; Saunders, Lewis and Thornhill, 2019). As the author works within the Irish MedTech industry, participants for this study were known to the researcher. This knowledge of appropriate participants gave the researcher a high degree of insight into participants' suitability for this study and ensured they were best placed to represent the wider population.

3.7.4 Interview Structure

A total of ten, 45-minute semi-structured interviews were conducted with engineers working in the MedTech industry in Ireland. The goal of semi-structured interviews is to develop open-ended questions that allow participants to share their interpretations, thoughts, and contributions to this subject in a way that elicits in-depth data for analysis (Saunders, Lewis and Thornhill, 2019). During the secondary research process, interview questions (Appendix A) were created to explore engineers' individual motivations, commitment behaviours, and attitudes. These questions were trialled with a test interview to ensure sufficient clarity before beginning the interview process. Participants were contacted via email to confirm their participation and were provided with an informed consent form (Appendix B) and a plain language statement (Appendix C).

Interviews were conducted virtually, via Zoom, and recorded natively in Zoom with a secondary recording captured on a mobile phone. This recording was later used to generate transcriptions of the interview. The absence of a necessity to take notes allows the researcher to participate in the conversation, which aids in evoking an appropriate level of involvement and emotional response from the interviewee.

3.8 Data Analysis

Drawing from the inductivist perspective, the author took a thematic approach to data analysis, defined by Braun and Clarke (2006) as a method for identifying, analysing, and reporting patterns or themes within data. This choice of data analysis method is reinforced by Braun and Clarke, who state that thematic analysis can be used to interpret data from a social and psychological perspective, accounting for participants' feelings, attitudes, and behaviours as being significant components.

By applying Braun and Clarke's six phases of thematic analysis, as shown in *Figure 8*, the author employed an inductivist perspective, deriving themes from the data for comparison against theory instead of theory testing.

PHASE	DESCRIPTION OF THE PROCESS
1. Familiarising yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme
4. Reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic map of the analysis
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

Figure 8: *Phases of Thematic Analysis (Braun and Clarke, 2006)*

3.9 Considerations & Limitations

3.9.1 Sample Size

Due to the nature and timelines of this study, ten semi-structured interviews were conducted over a three-week period. According to Creswell and Creswell (2018), this is at the lowest end of their recommended ten to fifty participants for qualitative interviews and may not provide a representative outlook on the wider population of engineers working in MedTech in Ireland.

3.9.2 Participant Diversity

It is also necessary to ensure that participants of this study are an accurate representation of the wider engineering industry in Ireland. However, the professional body for engineers in Ireland only reports on gender representation among their members and does not take into account the social or ethnic backgrounds of their members. Additionally, they do not delineate their member data by sector. To ascertain an acceptable gender proportion for this study, the author conducted a review of the 2022 Gender Pay Gap Reports for ten leading MedTech organisations in Ireland. The results of this review found that women make up approximately 46.4% of the MedTech workforce in Ireland. *Table 4* presents a summary of these findings.

As many organisations did not disclose a percentage or figure representative of their gender composition, the population interviewed may not reflect an accurate demographic split of the MedTech industry in Ireland. Furthermore, Engineers Ireland (2022) report that women make up just 23% of engineering graduates, and just 12% of engineering professionals in Ireland.

Organisation	Men (%)	Women (%)	References
Boston Scientific	60	40	(Boston Scientific Ireland, 2022)
Cook Medical	47	53	(Cook Medical Ireland, 2022)
Medtronic	N/A	N/A	(Medtronic Ireland, 2022)
Johnson & Johnson	N/A	N/A	(Johnson & Johnson Ireland, 2022)
Teleflex	53	47	(Teleflex Ireland, 2022)
Merit Medical	51	49	(Merit Medical Ireland, 2022)
Abbott	N/A	N/A	(Abbott Ireland, 2022)
AbbVie	N/A	N/A	(AbbVie Ireland, 2022)
Hollister	59	41	(Hollister Ireland, 2022)
Edwards Lifesciences	N/A	N/A	(Edwards Lifesciences Ireland, 2022)
Mean Average	**53.6%**	**46.4%**	

Table 4: *Summary of 2022 Gender Pay Gap Reports from ten organisations in Ireland*

3.9.3 Ethical Considerations

Upholding ethical integrity is of the utmost importance in academic research, and as such, the author has taken great care to ensure exemplary ethical practices throughout. All participants were provided with an informed consent form and plain language statement before participating in this research. During the interview, all participants were made aware that the call was being recorded and that they could leave at any time, should they wish. In addition, participants were provided with the author's contact information if they need to reach out. All participant data was anonymised for the purposes of reporting in this study.

Chapter 4- Findings & Discussion

4.1 Introduction

This chapter presents and discusses the primary and secondary research data relative to the research question for this study. As such, this chapter will first set out the primary data collection procedure used, followed by an overview of the research participants before detailing the data analysis procedure employed and, finally, presenting the emerged themes from the primary data. Subsequently, each theme will be discussed and analysed alongside the secondary research data presented in Chapter Two.

4.2 Data Collection

As this is an exploratory study, the author thought it prudent to undertake both primary and secondary research. The primary data collection instrument used in this enquiry is semi-structured qualitative interviews. Before the data collection process, the author created a list of interview questions (Appendix A) that their research supervisor reviewed for clarity and suitability. Moreover, the interview questions were trialled prior to beginning data collection.

During these interviews, participants were first asked some brief screening and demographic questions to confirm their suitability and later provided demographic data for comparison. They were then asked a series of questions surrounding their career in MedTech under two sections; motivation and occupational commitment. Each section began with a closed-ended question and was followed by a series of core open-ended questions supported by probes as needed. All interviews concluded with a final question whereby participants were allowed to raise any points or add to their responses.

A total of ten interviews were conducted over three weeks. Participants were recruited using a non-probability purposive sampling technique based on core criteria whereby they must be qualified engineers currently working in the Irish MedTech Industry. *Figure 9* summarises their roles, categorised according to *Figure 2.*

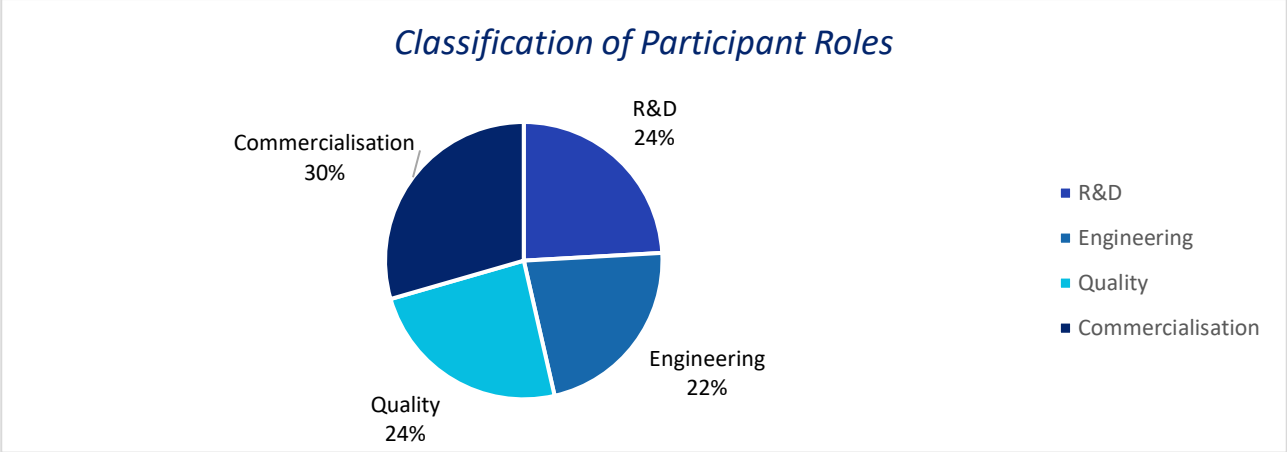


Figure 9: *Classification of Participant Roles*

Participants were invited to attend a 45-minute interview via email and supplied with an informed consent form (Appendix B) and a plain language statement (Appendix C). These interviews were conducted virtually on Zoom and recorded natively. The author also recorded each interview on a secondary device to ensure no data was lost. Each interview recording was transcribed and stored online in Google Drive. Again, the author stored a secondary copy on a physical external hard drive.

4.3 Research Participants

During each interview, participants n=10 were provided with an opportunity to self-volunteer specific demographic data for the purposes of comparison and to ensure the validity of the research sample relative to the broader MedTech industry in Ireland. These questions pertained to their current role, gender, location, education, age and years of experience. Participants were informed that this data would be anonymised, as presented in *Figure 9* above and *Table 5* below.

No.	Age	Gender	Location	NFQ Level 8	NFQ Level 9
R1	27	Man	Galway	Biomedical Engineering	Biomedical Engineering
R2	25	Woman	Dublin	Biomedical Engineering	Biomedical Engineering
R3	27	Man	Galway	Biomedical Engineering	Biomedical Engineering
R4	33	Man	Galway	Mechanical Engineering	-
R5	38	Man	Limerick	Manufacturing Engineering	-
R6	30	Woman	Galway	Mechanical Engineering	Biomedical Engineering

R7	27	Man	Wicklow	Mechanical Engineering	Mechanical Engineering
R8	35	Woman	Galway	Manufacturing Engineering	-
R9	34	Man	Galway	Biomedical Engineering	-
R10	27	Woman	Galway	Biomedical Engineering	Biomedical Engineering

Table 5: *Research Participant Summary*

4.3.1 Gender

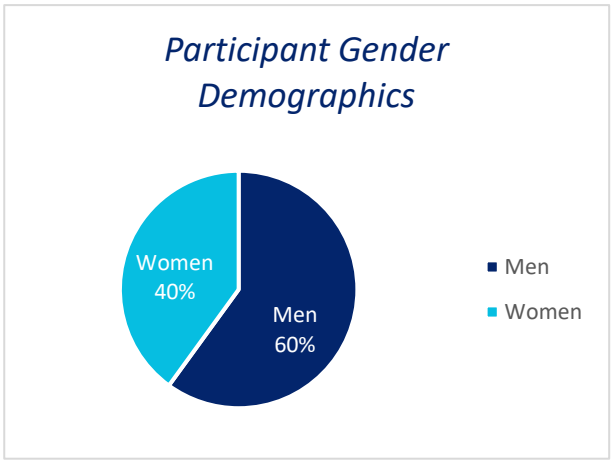


Figure 10: *Participant Gender Demographics*

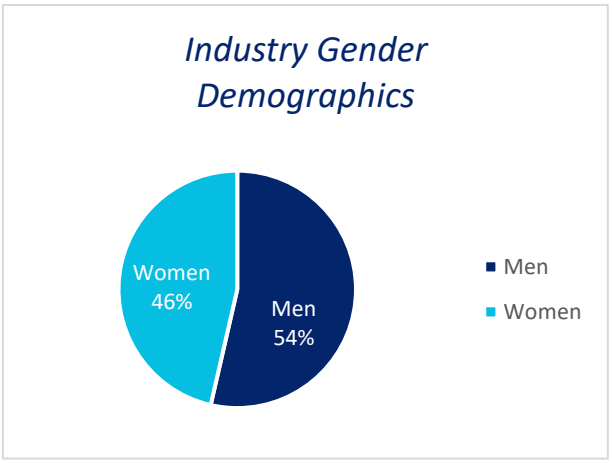


Figure 11: *Industry Gender Demographics*

Figure 10 presents the gender composition of the research participants, with 60% (n=6) of participants identifying as men and 40% (n=4) as women. As seen in *Figure 11,* this composition is consistent with the wider Irish MedTech industry following an analysis of gender pay gap reports from 2022, as previously presented in *Table 4.* Engineers Ireland (2022) reported that women make up just 23% of engineering graduates. Furthermore, they note that this figure falls further post-graduation, with women representing just 12% of the engineering profession in Ireland. As such, it was imperative to ensure adequate gender representation for this study, given the unique composition of the MedTech industry.

4.3.2 Location

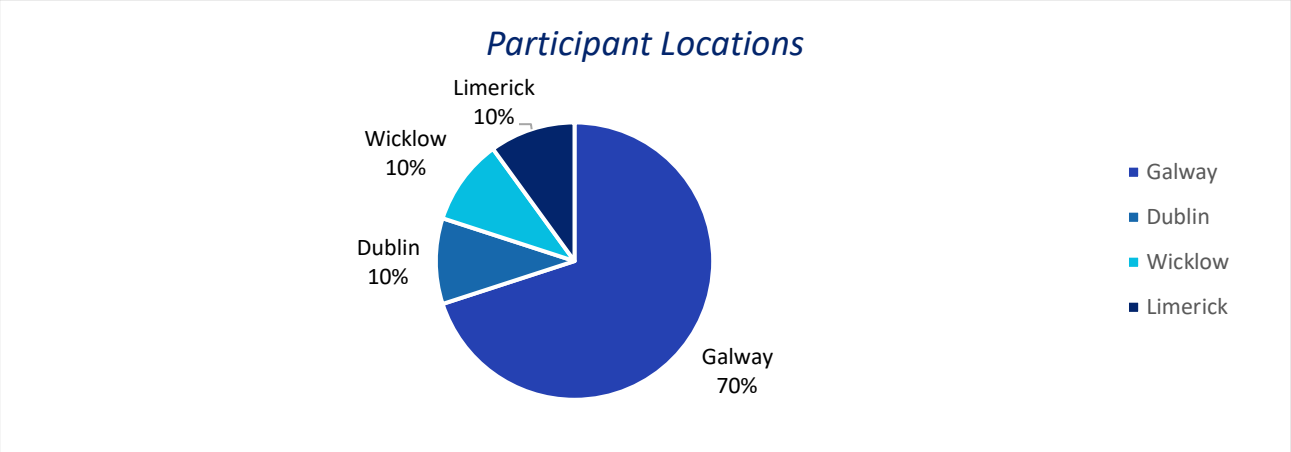


Figure 12: *Participant Locations*

The presence of a mature MedTech cluster in the west of Ireland is well documented, with Co. Galway comprising 31% of the Irish MedTech workforce (Murray, 2018; McKernan and McDermott, 2022). Naturally, as is much of the participant population as summarised in *Figure 12,* where it is noted that 70% (n=7) of participants are currently living and working in Co. Galway whilst the rest were split between Co. Dublin (n=1), Co. Wicklow (n=1) and Co. Limerick (n=1).

4.3.3 Education

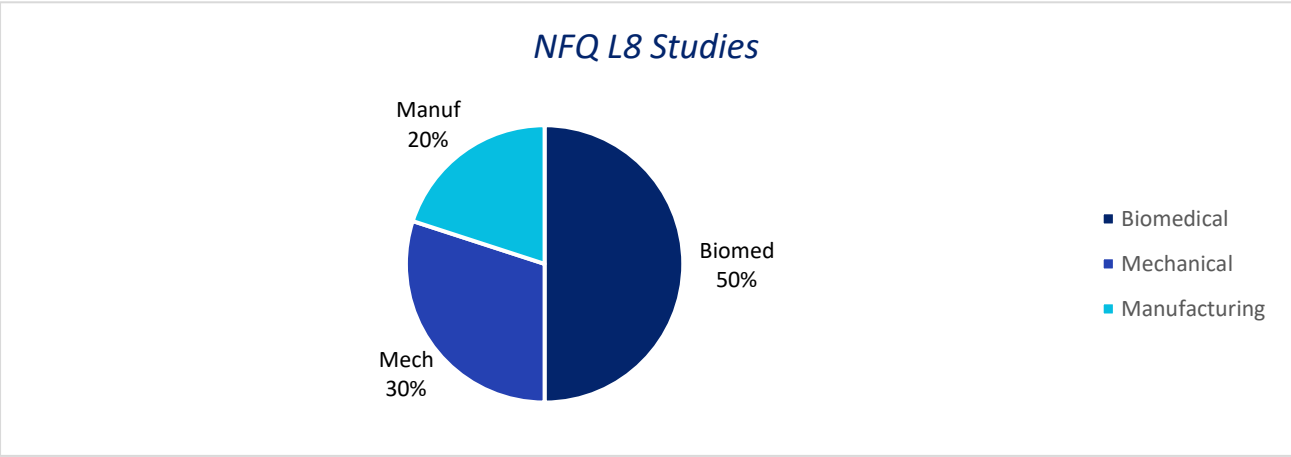
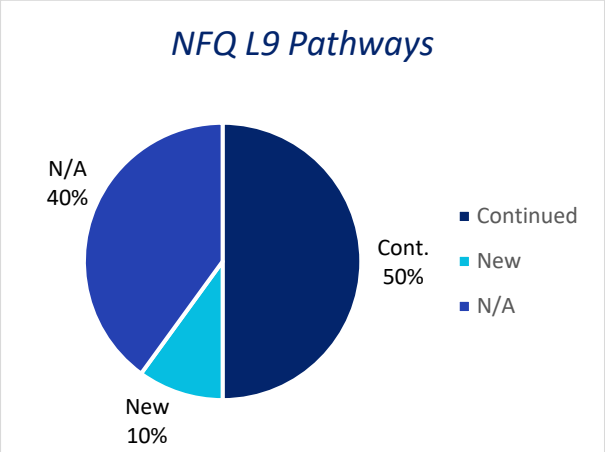


Figure 13: *NFQ Level 8 Studies*

An essential eligibility criterion for participants in this study was a qualification in an engineering discipline. 100% (n=10) of participants have a third-level undergraduate qualification in engineering, classified at level 8 or above on the National Framework of Qualifications (NFQ). *Figure 13* presents the NFQ level 8 qualifications of the research participants. At this level, participants' engineering disciplines varied

somewhat, with 50% (n=5) coming from a biomedical engineering discipline, 30% from mechanical engineering and the remainder from manufacturing engineering.



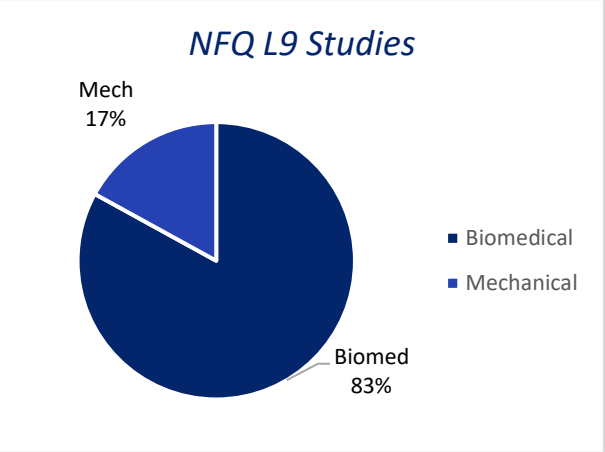


Figure 14: *NFQ Level 9 Pathways*

Figure 15: *NFQ Level 9 Studies*

Figure 14 illustrates that 60% (n=6) of participants proceed to obtain an NFQ level 9 qualification. Of those who pursued further education, 83% (n=5) continued their studies in their respective engineering discipline, while 17% (n=1) undertook a new discipline, as shown in *Figure 15.* R6 was the only respondent to change engineering discipline, moving from an NFQ level 8 in mechanical engineering to a level 9 in biomedical engineering. When asked why this was, she stated,

> *"I suppose it was down to wanting to make a difference with my work. I originally only did mech [mechanical engineering] because it was supposed to give me the most career options down the line, but by the time I finished my undergrad and started working, I realised I didn't really care about the other options. I knew I wanted to work in medical devices, so I decided to take the leap and go back to do the master's in biomed [biomedical engineering]." (R6)*

Taking into account the final NFQ qualification achieved, 60% (n=6) of participants are biomedical engineers, whilst 20% (n=2) are mechanical engineers, and 20% (n=2) are manufacturing engineers.

4.3.4 Age & Experience

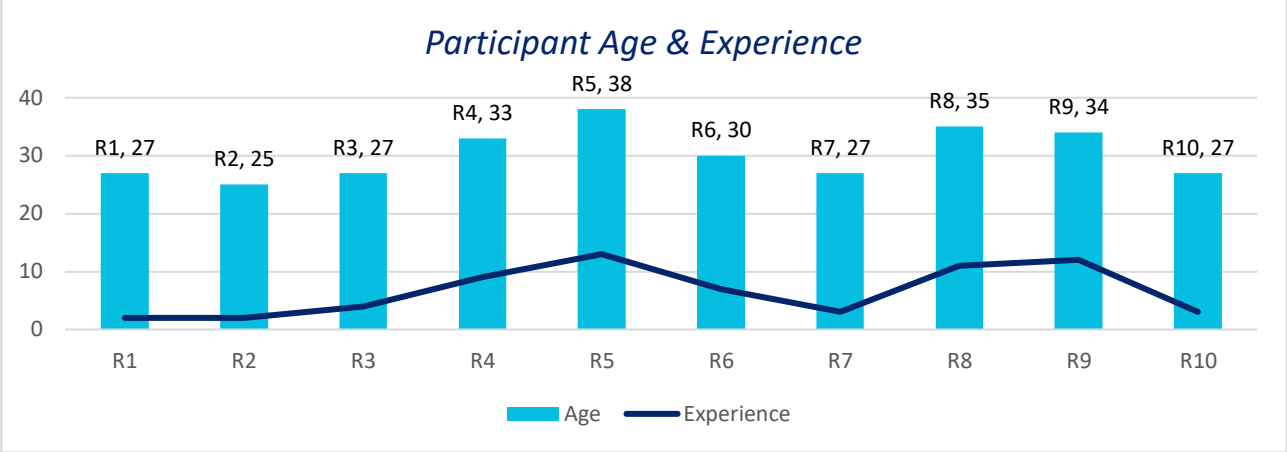


Figure 16: *Participant Age & Experience*

In their research, Parasuraman and Nachman (1987), and Reilly and Orsak (1991) noted that age and professional experience positively correlate with occupational commitment. Furthermore, Lord (2002)'s study of older engineers' motivations highlighted the importance of age as a context for studying motivation. Drawing from this rationale, the author allowed participants to volunteer this information, as presented in *Figure 16.* However, despite 100% (n=10) of participants disclosing their age and years of professional experience, the author failed to derive any notable findings for discussion from the analysis of research data.

4.4 Data Analysis

The analysis of the semi-structured interview primary data for this study follows Braun and Clarke's six phases of thematic analysis (2006). Following each interview, the author transcribed the data and made initial notes on apparent potential themes. As the interview process continued, the author identified some initial codes later evaluated for their commonality across the research data and, later, their relevance as themes. The researcher looked for themes using both hard and soft copies of the interview transcripts, identifying common words and phrases across the data and using a colour-coding system. The product of this thematic analysis is the generation of five emergent themes apparent in the primary research data, each supported by subcategories as depicted in *Figure 17.*

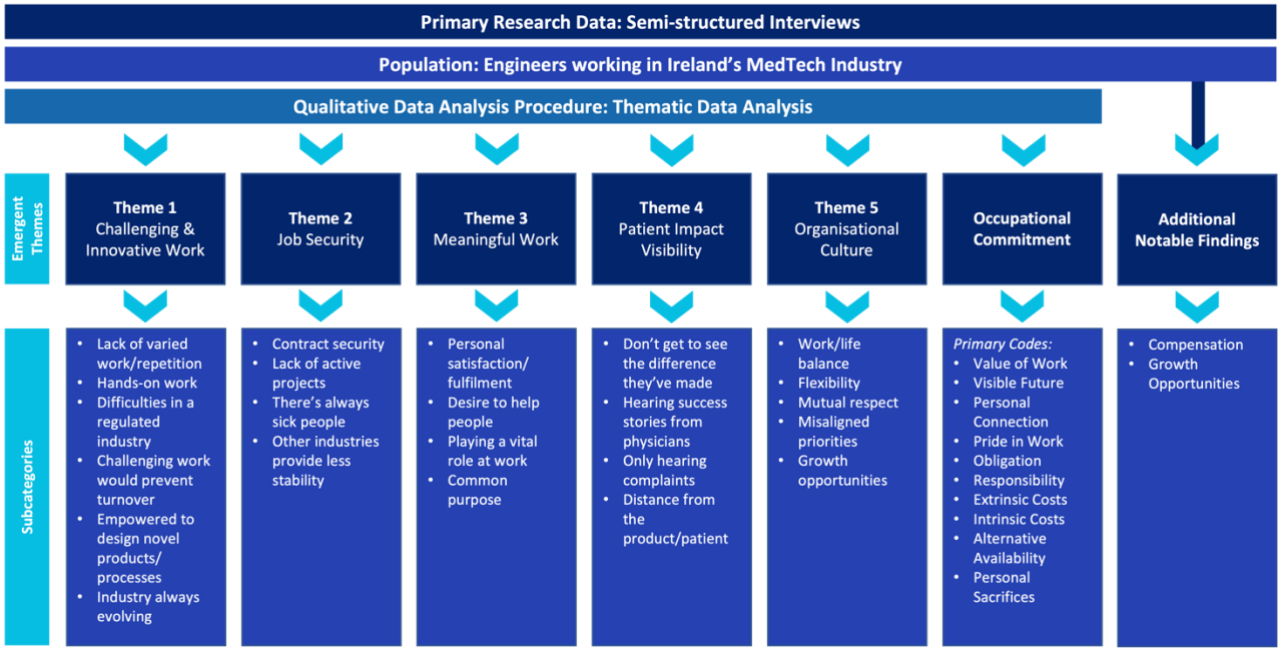


Figure 17: *Findings of Thematic Analysis*

4.4.1 Theme 1: Challenging & Innovative Work

A recurrent theme throughout the primary data is that of challenging and innovative work, arising as both a source of satisfaction when present and dissatisfaction when absent or suppressed. Having responsibilities that challenge both skills and knowledge is paramount to the research participants, with all interviews addressing this theme directly.

When present, challenging and innovative work was explained to be one of these individuals' favourite parts of the job. In particular, R1 stated,

> *"My biggest achievement to date has to be developing a novel test method in-house where I was given the opportunity to have dedicated, hands-on time with a device so that I could prepare and test some bonding features. In the end, I was able to put together a step-by-step technique on how best to approach this process that is still used now. That freedom and oversight I got to have and being hands-on with the device was the most mentally rewarding thing I've done." (R1)*

R4 and R6 shared this sentiment, highlighting the opportunities to engage in novel design and identify opportunities for improvement as being amongst the best parts of their roles in MedTech.

Conversely, it was evident that the absence of challenging or innovative work can be a significant source of dissatisfaction. R9 raised the issue of documentation and paperwork as a source of frustration and tension in his team.

> *"Being stuck in an office 90% of the time, looking back through old documents and trying to figure out why someone made a decision years ago that has since become my problem is seriously frustrating. It just leads to everyone being a bit fed-up because nine times out of ten, it'll cause a bottleneck. It's these times that I honestly wonder how the hours of work I spend doing documentation every day could possibly make a difference." (R9)*

In addition, R3 and R7 both mentioned repetitive tasks when asked about the worst parts of their role. For R3's organisation, quality engineers are assigned to a specific project instead of working across many. As such, the work can be very repetitive.

> *"Different challenges that come from different projects would be much more rewarding." (R3)*

Despite R7 working across various projects in his role, the nature of his work is niche and has led to him being repeatedly called upon as a subject matter expert. When asked what would make his role more satisfying, he responded,

> *"To be challenged in different aspects and not repeat projects. I feel like since honing my skills in design transfer, that's all people think I am able to do. I'm scared I'll just end up pigeonholed in this company now." (R7)*

These findings are consistent with Ryan and Deci's (2000b) SDT, whereby employees who are not intrinsically motivated can become amotivated. In the case of R7, who feels pigeonholed and trapped, the SDT perspective would expect him to become less productive and innovative over time, as his skills are not being used or refined. Similarly, Hackman and Oldham's (1974)'s job characteristics model can be used to explain R9's feelings of task insignificance and R3's frustrations with repetitive work.

Interestingly, the research data indicates that the lack of challenging work contributes directly to job dissatisfaction for participants, which contradicts Herzberg's two-factor model of motivation (1959). These participants include R1, R2, R5 and R7.

4.4.2 Theme 2: Job Security

During the interview process, seven of the ten participants brought up job security unprompted. Of those, four respondents spoke positively about their perceived job security, whilst three expressed concern about the future of their roles.

Of those concerned about their job security, all three were women. When asked about the worst parts of her role, R2 shared that she is on a rolling contract that depends on investor funding and expressed her concerns about her future, having invested so much in MedTech so far.

> *"Being in a start-up situation is equal parts exciting and incredibly stressful. My contract is contingent on rounds of investment, and with inflation and supply chain issues, I'm constantly anxious about the future of my role. I've been working on a really niche technology now for three years, and whilst I love it, I'm also conscious that no one else is doing this so if my contract were terminated, I'd not only lose my job, but I'd be wasting my entire careers worth of work too." (R2)*

R10 shared this sentiment, noting that her specialised skillset in biomedical engineering is very niche. Though she feels somewhat secure now, she feels that her lack of surgical knowledge in the future may hinder her progression.

> *"I feel like as a Biomed[ical] engineer, I'm held to a higher standard than some of my colleagues during the design process, so I have to work harder for the same recognition that others are getting simply because of my background. Mind - we're all doing the same job!" (R10)*

Working for a contract manufacturer, R8 noted fewer projects in her department, resulting in a less exciting environment and casting doubt about her job security. She is aware of the rising costs of manufacturing in Ireland and wonders what impact that will have on her career in the future, given her particular skillset.

"More and more often, I'm working with customers to design the product and the line in our site here, and then once it's running, they send someone over to get the whole line replicated in Costa Rica or Malaysia. What used to be a full three or five-year contract for us is now more like a two-year contract." (R8)

The other seven participants felt more positive about their job security, referencing Covid-19 durability, evolving technologies and global health crises as influencing this perception. R4, in particular, stated,

"There's always sick people, unfortunately." (R4)

The concept of job security is well documented in the secondary research data. Within Maslow's hierarchy of needs (1943), job security is a critical safety need. For R2, R10 and R8, being unsure about the future of their job may impact their sense of belonging, esteem and self-actualisation in the long term.

For those who feel their job is secure, Porter and Lawler's (1968) expectancy theory suggests that they have an adequate understanding that their performance should result in a reward. However, participants who feel job insecurity may not believe that performance will produce a reward and, as such, may cease to exert effective effort on behalf of their organisation, leading to lower productivity.

Additionally, R10's point surrounding the standards she feels she is held to is consistent with Adams' equity theory (1963). From an equity theory perspective, R10 is evaluating the outcome/input dynamic in her organisation and has noted that, instead of the outcome being inequitable for similar input, the input is inequitable for an equitable outcome. This inequity could lead to higher turnover intentions for R10.

4.4.3 Theme 3: Meaningful Work

The theme of meaningful work was prevalent throughout the participant interviews. When asked about the factors that influenced them to begin a career in MedTech, all participants demonstrated a high degree of positive emotional connection to the nature of their work. This connection stems from participants' inherent design to help others through their work. It is particularly apparent in those with a biomedical engineering qualification, such as R1, who said,

"I always wanted to help people feel better, but I didn't want to be a doctor or nurse. I considered doing physiotherapy but was put off by the points. In the end, engineering

seemed like a logical choice for my skill set and, in hindsight, allows me to impact so many more people with one device than I would have by seeing one patient at a time as a physio". (R1)

Similarly, R2 and R3 had considered other roles in the healthcare industry but ultimately decided to pursue biomedical engineering.

"Originally, I thought I wanted to do medicine, but I didn't do well enough in the HPAT (Health Professions Admissions Test). I always loved maths and wasn't bad at science either. Biomedical engineering merged the two really nicely and was all about MedTech. I really like deep-diving into a potential problem, generating out-of-the-box ideas and potentially helping the problem as opposed to treating the symptoms. In that respect, I feel MedTech is more fulfilling than being a doctor would have ever been." (R2)

For those who did not pursue biomedical engineering in university, the meaningful nature of working in MedTech was a pleasant surprise. R5 explained that his path into the MedTech industry was initially driven by convenience. During university, he was required to do a cooperative placement in manufacturing. Living in Galway, the manufacturing opportunities were primarily with MedTech organisations, and as such, he began a career in MedTech that would span thirteen years and counting.

"Doing a co-op placement in college honestly changed my life. I was the first in my family to go to college and, at the time, would have gotten a lot of grief about going to college just to end up working in a factory. But I was determined to make something of myself, and now, when I tell anyone in the family about my work, they're all really impressed that I get to work with products that really do change people's lives. It's what gets me out of bed in the morning. I can't imagine why anyone would want to give that up or walk away." (R5).

The importance of meaningful work is central to Hackman and Oldham's job characteristics model (1974). In this model, they posit that skill variety, task identity and task significance are essential to reach the psychological state of 'meaningfulness of work'. Drawing on SDT, employees engaged in meaningful work are

more intrinsically motivated and innovative (Ryan and Deci, 2000b). This meaningfulness is clearly demonstrated in R1's response to being asked about the best part of his role.

From a commitment perspective, R5 displays clear signs of affective occupational commitment. Drawing on Meyer, Allen and Smith's three-component model of occupational commitment (1993) with influence from Peng, Glass and Sassler's more recent 5-item scale of occupational commitment in Science, Technology, Engineering, and Technology (STEM) graduates (2022), R5 demonstrates his commitment to his occupation in MedTech through discussion of his occupation with others outside of the MedTech industry, contentedness in remaining in his occupation in MedTech and the personal meaning he assigns to his work.

R2 also displays signs of occupational commitment, particularly given the lack of job security. As identified by Carson, Carson and Bedeian (1995) and Ivtzan, Sorensen and Halonen (2013), when individuals do not feel their job is secure, they often transfer their commitment to their occupation. In sharing the personal connection she feels to her role in MedTech, R2 demonstrates affective occupational commitment. However, she notes the costs of leaving her occupation, which would be considered continuance occupational commitment and career entrenchment (Blau, 1989; Meyer, Allen and Smith, 1993; Carson, Carson and Bedeian, 1995).

4.4.4 Theme 4: Patient Impact Visibility

Often arising in tandem with meaningful work, patient impact visibility was a clear theme throughout the interview data. As illustrated above, many of the interview participant's responses spoke to the importance of meaningful work in their decision to join the MedTech industry. However, the positive associations of this meaningful work are negated when participants feel they do not have sufficient visibility as to the impact of their work on patients' health and well-being.

In fact, for R1 and R3, the absence of patient impact visibility is a direct source of dissatisfaction in their roles. R1, who joined the MedTech industry to help more people than in a healthcare practitioner role, described his lack of visibility as a 'paper wall' and suggested that greater exposure to patient outcomes would be a means to improve his job satisfaction.

> *"I have a stable job but rarely see how my products are making an impact. The procedure to implant the products I work on is highly risky, and really, we only ever hear about things going wrong. It's a huge source of anxiety, and I think if that were even somewhat*

balanced with hearing about positive patient outcomes, it would make a big difference to my own mental state." (R1)

R9 echoed this sentiment, explaining that his role as a Quality Engineer means he spends much of his day working through customer complaints and incidents. Having previously worked for a regulatory body, R3 had similar exposure to adverse patient outcomes, which later influenced his decision to leave. For R9, this negative experience of patient impact visibility feels notably stark due to his experience of working through Covid-19, stating,

"Through Covid, I worked with a small team of engineers who designed and validated three medical device manufacturing lines to enable a world leader to ramp up their state-of-the-art ventilator production by 10x. They were able to generate an additional 16,000 PB980s [ventilator], which saved countless lives over the pandemic. Going from that level of personal satisfaction back to physicians reporting adverse reactions or deadly patient outcomes would honestly make you walk away from it altogether." (R9)

This finding is interesting as, despite knowledge of outcomes being an existing psychological state in Hackman and Oldham's (1974) job characteristics model, their model presents feedback as being the preceding job characteristic to the knowledge of work outcome psychological state. In the case of this study, it is not recognition or feedback that participants seek as an outcome; it is the knowledge of the impact of their contributions to human health. Indeed, contrary to this model, participant's contributions would be captured in the task significance characteristic, and not feedback.

Though the areas of positive impact visibility and knowledge of results have seen extensive academic interest through Hackman and Oldham's (1974) job characteristics model, the author's attempts to locate secondary research data surrounding the impacts of negative impact visibility were unsuccessful. In the case of this study's participants, they are aware, for the most part, of the results of their work. However, they receive a disproportionate amount of negative visibility, which appears to correlate negatively to their job satisfaction and occupational commitment.

4.4.5 Theme 5: Organisational Culture

Many participants in this study referred to both positive and negative experiences with their organisation's culture during the interview process. For the most part, colleague relations appear to be the most significant

element of organisational culture to participants. R2 explained that as a start-up, her organisation is quite small. One colleague is enough to change the organisational culture dynamic from her perspective.

> *"We've one guy that's a bit of an egotist and lone wolf. He's a bit of a live wire, and it's causing relationship problems within the team as he promotes a bad atmosphere." (R2)*

Furthermore, R8 and R9 pointed to relations with their manager and leadership as being a source of strain, whilst R3 and R9 both mentioned the issue of mutual respect in the workplace. When asked about sources of dissatisfaction in his role, they responded,

> *"Being put under undue pressure by managers who do not understand the time requirements for individual tasks. I pride myself on ensuring that my work is done in a way that confirms to the site's QMS [Quality Management System] and would withstand the rigour of external audits. My manager, however, does not seem to recognise this and constantly pushes for things to be done faster irrespective of whether it's getting done right." (R9)*
>
> *"Having to constantly fight with other departments. We're all here with a common goal and objective. Why can't we all work in harmony?" (R3)*

In contrast, participants also had many positive experiences with their organisational culture to share. R5, R7 and R10 all noted teamwork and collaboration as a source of satisfaction in their roles. R5 and R7 both mentioned the opportunity to solve problems as a team as being amongst the best parts of their role. For R10, the exposure to subject matter experts is hugely exciting.

> *"I've recently been assigned a new project which means I'm working with completely new people and on a completely new technology and therapy area. It's great 'cause I'm getting to work with people who have more experience than me or have experience in different areas. I feel like I've never learnt as much on the job as I have in the past month or so." (R10)*

Outside of interpersonal relationships, other positive elements of organisational culture mentioned were hybrid-working opportunities, flexibility and mobility, and recognition.

> *"I feel like my employer values my contribution, and that makes me feel like I make a difference." (R7)*
>
> *"We can work half-days on Fridays if we put in a few extra hours throughout the week. I go home to Derry a few weekends a month; it's great being able to get on the road nice and early." (R6)*

The research findings under this theme are largely consistent with Herzberg's two-factor model of motivation (1959), whereby co-worker relations and supervisor quality result in job dissatisfaction, whilst recognition and responsibility result in job satisfaction. These findings are consistent with previous studies of motivation in engineers, such as Utley (1995), Lord (2002), and Adams et al. (2011).

4.4.6 Occupational Commitment

A key concept under investigation in this study is that of occupational commitment. Occupational commitment refers to an employee's attachment to their line of work or profession regardless of employer or organisation (Meyer, Allen and Smith, 1993; Paul E. Spector, 2012).

It should be noted that much of the previous enquiry into occupational commitment has been conducted quantitatively. As such, the author synthesised the secondary research data of Meyer and Allen (1993), Blau (1985), and Peng et al. (2022) pertaining to the measurement and evaluation of occupational commitment. This synthesis sought to systematically identify codes within the secondary research data for use in the development of an instrument for qualitative thematic analysis. *Table 6* outlines the 10-item model of occupational commitment that was developed through this analysis. This model was then used as a point of comparison for the primary research data.

Code	**Sub-codes**	**Code**	**Sub-codes**
Value of Work	• Personal value • External value • Support to conduct work	**Responsibility**	• Duty to deliver • Guilt of leaving • Perceptions of leaving

Visible Future	• Clear future in MedTech • No intention to leave MedTech	**Extrinsic Costs**	• Compensation loss • Leaving costs • Opportunity costs • Financial investment waste
Personal Connection	• Emotional attachment • Work as a point of identity	**Intrinsic Costs**	• Authority loss • Reputation damage • Security costs
Pride in Work	• Proud of work and contributions • Engages others in work • Enthusiastic about work	**Alternative Availability**	• Lack of alternative work • Skillset suitability
Obligation	• Professional obligation • Personal obligation • Loyalty to work	**Personal Sacrifices**	• Personal investment loss • Self-esteem damage • Difficulties in new work • Knock-on impact

Table 6: *Model for Qualitative Analysis of Occupational Commitment*

From here, the author used the thematic analysis protocol to analyse and interpret the primary research data to identify instances of these codes of occupational commitment. These instances were categorised as consistent or inconsistent. Consistencies were considered to be instances where codes appeared in the primary research data and aligned to the earlier definitions of occupational commitment stated in Chapter Two. Conversely, inconsistencies were instances of coded terms appearing in the primary research data in a way that did not indicate the presence of occupational commitment. *Table 7* illustrates some examples of this.

Code	Consistent	In-consistent
Visible Future	*"I can't envision working anywhere but medical devices."* (R3)	*"I could see myself going to pharmaceuticals. Less regulated industries are easier to navigate and can provide higher quality of life."* (R4)
Personal Investment	*"I spent a number of years studying biomedical engineering, wouldn't throw it down the drain now by just leaving the industry."* (R3)	*"I think, in pursuit of greater job satisfaction, it would be worth going away and starting a job in a new industry. Though, more than likely, it will mean a good bit less money and stability than what future roles would offer in MedTech."* (R1)
Alternative Availability	*"I'd be wasting my entire careers worth of work [by leaving]. Sure, what else am I qualified to do after 13 years in the same industry?"* (R5)	*"At the end of the day, manufacturing is manufacturing. With enough time, I know I could be as good at manufacturing toothbrushes as I am medical devices. Wouldn't make me happy though."* (R8)

Table 7: *Sample of Occupational Commitment Analyses*

Participants whose data produced more consistencies than inconsistencies were deemed to have exhibited occupational commitment for the purposes of this study. The results of this analysis concluded that 70% (n=7) of participants demonstrated commitment to their occupation as a MedTech engineer, with 30% (n=3) of participants failing to exhibit occupational commitment. Of those seven who displayed occupational commitment, five were graduates of an undergraduate or postgraduate biomedical engineering degree, whilst just one came from a different engineering discipline. *Table 8* provides a summary of these findings.

No.	Age	Gender	Location	NFQ Level 8	NFQ Level 9	Occ. Commit.
R1	27	Man	Galway	Biomedical Engineering	Biomedical Engineering	No
R2	25	Woman	Dublin	Biomedical Engineering	Biomedical Engineering	Yes
R3	27	Man	Galway	Biomedical Engineering	Biomedical Engineering	Yes
R4	33	Man	Galway	Mechanical Engineering	-	No
R5	38	Man	Limerick	Manufacturing Engineering	-	Yes
R6	30	Woman	Galway	Mechanical Engineering	Biomedical Engineering	Yes
R7	27	Man	Wicklow	Mechanical Engineering	Mechanical Engineering	Yes
R8	35	Woman	Galway	Manufacturing Engineering	-	No
R9	34	Man	Galway	Biomedical Engineering	-	Yes
R10	27	Woman	Galway	Biomedical Engineering	Biomedical Engineering	Yes

Table 8: *Summary of Occupational Commitment findings*

Interestingly, although R2, R7 and R10 demonstrated commitment to their occupation currently, these participants exhibited a degree of flexibility and adaptability that, to date, has not been integrated into the scales and measures of occupational commitment.

R2 noted the disappointment she would feel should she have to leave the MedTech industry, especially given her specialist skillset. However, she then countered this by stating,

> *"MedTech will always be top but if I need a job, I think I've the ability and experiences to transfer to a different industry. I'd hate to do it but, if I could be guaranteed the chance to work on exciting technologies still, I'd be happy to work in something second-best to*

MedTech. Particularly if that industry could offer me better work/life balance or opportunities." (R2)

Similarly, R7 demonstrated a clear commitment to his occupation in MedTech, highlighting the emotional attachment, personal meaning and enthusiasm he has for his role. Despite this, he noted,

"I love working in MedTech and all, and I'd say I'll spend 95% of my career there but I can't say that if the opportunity arose to work on cool technology in automotive or that, that I would say no. I'll always come back to MedTech but who wouldn't want to work on Formula 1 cars or something. Doesn't mean I'm any less loyal to MedTech. I just need to be loyal to me at the same time." (R7).

Prior to the Covid-19 pandemic, R10 would never have considered an alternative to a career in MedTech; however, she was resolute in stating,

"I've no intention to ever let my career get in the way of family. During the pandemic, I couldn't travel home for a family bereavement because I was working on the [manufacturing] line. Like - I'm proud of my contributions to human health during that time, but I'd like to think that my ambitions and passion for my career won't get in the way of what's really important. I think if it ever got to that again, I'd leave MedTech altogether." (R10)

4.4.7 Additional Notable Findings

During the thematic analysis of primary research data, the author identified two notable findings that did not constitute themes in a traditional sense. Throughout the interview process, the topics of compensation and growth opportunities were not brought up by participants. From the researcher's perspective, the interview discussions provided ample opportunities for participants to raise these subjects unprompted. However, they did not come up until the interviewer asked specific probe questions. Furthermore, when probed on growth opportunities and compensation, many participants seemed to disregard the question swiftly. When asked how they felt about their compensation, R1 and R3's responses similarly alluded to pay and compensation as being ancillary to their satisfaction. To try and better understand this response, the interviewer posed the question to R3 as to why he dismissed the satisfaction potential of compensation, to which he responded

> *"There's no real way to say this without sounding a bit stuck-up, but when you spend five years in college, and you're working on a novel technology that will change the trajectory of ischemic stroke, you kind of expect the pay to be good. I get the impression that this isn't unique to my company - I mean, most of my friends from college would be in a similar situation. It's a given, really." (R3)*

This non-concern surrounding pay and compensation continued throughout the subsequent interviews. Due to having to prompt participants to address the topic of compensation, and the responses being inarguably nonchalant, the author did not feel that this subject warranted a theme of its own. The topic of growth opportunities received a similar response. Several participants cited chartership, continuous professional development and growth opportunities as the norm in their organisations.

The absence of emphasis on extrinsic rewards such as compensation or investment in growth opportunities would indicate that intrinsic motivation is more prevalent in the research participants. This assumption contradicts that of Wei and Yazdanifard (2014), who postulated that engineers could be equally motivated by intrinsic and extrinsic means. In contrast, as knowledge workers, engineers' intrinsic motivation is understood to be positively correlated with job satisfaction and performance (Sun, Hong and Ye, 2022), whilst extrinsic motivation produced a weaker correlation (Lord, 2002).

Chapter 5 – Conclusion

This study aimed to explore the relationship between motivation factors and occupational commitment in engineers working in Ireland's MedTech industry. Though the secondary research demonstrated some academic interest in these concepts independently in engineering professionals, none investigated the dynamics of their relationship within this research context. The Irish MedTech industry is a mature cluster of high-growth and high-value MNCs that must compete for top talent to secure a competitive advantage.

From the secondary data, the author ascertained the various means by which motivation can be understood and measured, as well as the importance of doing so. Likewise, this data illustrated the various scales and indices of evaluating occupational commitment across many professions and careers. This data informed the interview questions used in primary data collection as pertinent to the research objectives of this study.

The below section briefly discusses the research findings under these objectives, as well as provides a conclusion for each.

5.1 Research Conclusions

5.1.1 Objective 1

Objective 1: to determine the presence of occupational commitment in engineers working in the Irish MedTech industry

As a core focus of this research, the first objective of this study was to determine if engineers working in Ireland's MedTech industry demonstrate commitment to their occupation. Occupational commitment, defined as the attachment an individual feels towards their line of work or profession, is comprised of three dimensions; affective occupational commitment, normative occupational commitment, and continuance occupational commitment (Meyer, Allen and Smith, 1993).

This research found that 70% of engineers interviewed demonstrated commitment to their occupation. Furthermore, 83% of participants who were determined to have occupational commitment had graduated with a biomedical engineering qualification.

This finding illustrates the power of normative occupational commitment. Given the specialist training undertaken in biomedical engineering, these graduates are more likely to display higher self-determination

pre-graduation and greater occupational commitment post-graduation. Interestingly, 30% of those with occupational commitment towards their career in MedTech directly caveated their commitment, stating that whilst they are committed right now, they don't perceive that as being impermeable. In other words, their occupational commitment is subject to change for reasons unrelated to the occupation itself.

The concept of occupational commitment contingent on non-work-elements does not appear to have been studied to date, particularly in a post-pandemic labour force. For the 30% of participants who did not display a commitment to their occupation, 20% of those cited mobility and flexibility as being the driving force for their lack of commitment. Just 10% were directly dissatisfied with their occupation.

This study used a novel approach to identifying occupational commitment within qualitative semi-structured interview data. As such, the author did not think it pertinent to categorise participants' dimensions of occupational commitment until this model can be empirically validated for accuracy and reliability.

Based on these findings, the author can conclude that engineers working in Ireland's MedTech industry display high levels of commitment to their occupation, with 70% of participants producing a positive result. Furthermore, 83% of biomedical engineers in MedTech demonstrate occupational commitment, compared to 50% of other participants from other engineering disciplines. This study also uncovered an attitudinal trend of situational occupational commitment amongst participants. This does not appear to have been subject to academic interest and is, therefore, a key recommendation for further study.

5.1.2 Objective 2

Objective 2: to define the motivation factors that contribute to job satisfaction and dissatisfaction in this population

Similar to the above, the second objective of this study was to define the motivation factors that contribute to job satisfaction and dissatisfaction amongst the Irish MedTech engineer population. When asked about their current level of job satisfaction, 40% of participants responded that they felt satisfied in their current role, whilst 30% responded that they were somewhat satisfied, with the same amount responding that they were dissatisfied.

Participants were then posed a series of follow-up questions that asked them to recount the best and worst parts of their roles, as well as things that would increase job satisfaction and dissatisfaction in their current

roles. The findings of this study were mostly consistent with those of Herzberg (1959), Utley (Utley, 1995) and Lord (2002). However, there were some distinctions.

Many participants referenced the Covid-19 pandemic frequently when discussing working conditions and policies. Given the radical change to working patterns and locations through the pandemic, many employees are now seeking greater agency over the terms of their employment, and MedTech engineers are no different. Participants noted that the possibility for flexible working and hybrid working models are a direct source of job satisfaction, contrary to Herzberg's two-factor model.

This theme of agency and self-determination continued throughout, with findings related to supervision, work itself and responsibility all producing results that are inconsistent with previous studies. As such, the author concludes that MedTech engineers display an altered set of motivation factors than previously found in research. These motivation factors can be seen in *Figure 18.* From the interview data, it appears that this change in motivation is largely due to the Covid-19 pandemic, and as such, the author recommends further research into the role the pandemic played in shifting engineers' motivations.

	HERZBERG 1959		RESEARCH FINDINGS			HERZBERG 1959		RESEARCH FINDINGS	
Hygiene Factors	Contribute to Satisfaction	Prevent Dissatisfaction	Contribute to Satisfaction	Prevent Dissatisfaction	**Motivator Factors**	Contribute to Satisfaction	Prevent Dissatisfaction	Contribute to Satisfaction	Prevent Dissatisfaction
Interpersonal Relationships	No	Yes	No	Yes	Work itself	Yes	No	Yes	Yes
Factors in Personal Life	No	Yes	No	Yes	Recognition	Yes	No	Yes	Yes
Policy & Admin	No	Yes	No	Yes	Achievement	Yes	No	Yes	No
Working Conditions	No	Yes	Yes	Yes	Possibility for Growth	Yes	No	Yes	Yes
Supervision	No	Yes	Yes	Yes	Responsibility	Yes	No	Yes	Yes
Status	No	Yes	Yes	No	Advancement	Yes	No	Yes	Yes
Salary	No	Yes	No	Yes	Impact Potential	-	-	Yes	Yes
Job Security	No	Yes	No	Yes					

Figure 18: *A Comparison of Herzberg's Two-Factor Model of Motivation and the Motivation Factors of Irish MedTech Engineers*

5.1.3 Objective 3

Objective 3: to explore the relationship between the motivation and occupational commitment of engineers working in the Irish MedTech industry

This research uncovered a notable relationship between motivation factors and occupational commitment in engineers working in the MedTech industry in Ireland. This is aligned with previous studies by Lee, Carswell and Allen (2000), Keller (1997), and Meyer and Allen (1993), whereby it was found that occupational commitment is positively correlated with job satisfaction.

Furthermore, there appears to be a higher instance rate of occupational commitment in engineers who studied biomedical engineering than those from other disciplines. Just one participant with a biomedical engineering background did not display any commitment to his occupation. This participant also reported being dissatisfied in his role and blamed this dissatisfaction for why he regrets his career in MedTech and would like to move to a different engineering sector.

From these findings, the author concludes that the relationship between the motivation and occupational commitment of engineers in Ireland's MedTech industry appears to be mediated by academic background. Though the mediating role of occupational commitment has been subject to a plethora of academic research, the author could not identify any previous studies that address educational background as a mediator in this research context.

5.2 Recommendations

At the conclusion of this study, the author has identified a number of recommendations for practice and future research that would support a deeper understanding of this important segment of the Irish workforce.

5.2.1 Recommendations for Practice

This study produced some recommendations for Irish MedTech organizations. In particular, human resources and employer branding functions should take into consideration the influence of academic background on current and future engineering employees' motivation and job satisfaction. The results of this study concluded that biomedical engineers displayed higher levels of occupational commitment and job satisfaction compared to their counterparts from manufacturing and mechanical engineering backgrounds. This knowledge can be used to inform the development of employee engagement initiatives, employee advocacy programs, employee value propositions, and employer brand and talent attraction campaigns. By

creating talent personas that reflect the unique motivations and commitment of the engineering disciplines, organisations can establish greater candidate preference.

With biomedical engineers reporting higher occupational commitment, MedTech organizations should seek to position themselves as a long-term employer of choice and provide employees with opportunities for internal lateral movement as well as growth opportunities to ensure they remain feeling challenged and stimulated. By engaging current employees according to their personal motivations, human resources practitioners will reduce voluntary turnover and increase organisational commitment. Where possible, employees may demonstrate greater job satisfaction when they are given more agency, responsibility and opportunities to see the impact of their day-to-day work.

5.2.2. Recommendations for Future Research

As a continuation of this research, the author recommends the empirical testing and validation of the model for qualitative analysis of occupational commitment illustrated in *Table 5*. This recommendation would include testing the applicability and validity of this model, as well as expanding upon the current codes in order to categorise them in line with the dimensions of occupational commitment, as defined by Meyer and Allen.

Additionally, the author recommends further investigation into organisational commitment in biomedical engineers in the MedTech industry. A key question that emerged from the conclusion of this study is around the mediating role of educational background on an engineer's motivation and occupational commitment. This study found that biomedical engineers display higher occupational commitment; however, it does not address why this is. In undertaking this study, future researchers would enhance the existing knowledge within the organisational behaviour field as well as contribute to practice by supporting organisations to better retain their current talent.

Finally, to expand on the knowledge of this population, the author recommends further inquiry into the antecedents and consequences of occupational commitment in engineers working in Ireland's MedTech industry. Given the somewhat inconsistent results of this study in comparison to previous research in this area, as well as the impact of the recent Covid-19 pandemic, the author expects that there may be unique causes and outcomes of occupational commitment in this population.

5.3 Contributions & Limitations

5.3.1 Contributions

This research addressed a notable knowledge gap surrounding the motivation and occupational commitment of engineers working in Ireland's MedTech industry. Comprising close to 2% of the national employment and with further growth anticipated, the author hopes that this study will contribute to the Human Resources and Employer Brand practices in this field, as well as support the work of academics dedicated to the study of Ireland's MedTech cluster.

This study found a distinction in the occupational commitment of MedTech engineers based on their academic background, which is important in the construction of employee attraction and retention strategies in MedTech.

5.3.2 Limitations

Theofanidis and Fountouki (2019) define research limitations as the 'potential weaknesses that are usually out of the researcher's control and are closely associated with the chosen research design, statistical model constraints, funding constraints, or other factors'. As a novice researcher, the author is aware of the inherent limitations of her lack of experience. This inexperience could have led to errors or inconsistencies in the data collection, analysis or interpretation for this study. Additionally, the coding of primary data during thematic analysis is subject to the author's interpretation, particularly related to the exploration of occupational commitment. As such, the author acknowledges that a quantitative approach may have been subject to less researcher influence or bias.

This study was time-bound to twelve weeks and, as a result, did not allow for extensive interviewing or additional analyses. The recurring theme of Covid-19 in the interview data might have been a product of the research timeline and may not be as influential in the long term as it appears now. The rigorous timeline for this study also limited the scope for participant recruitment. Despite every effort, the author acknowledges that the participants interviewed may not reflect the wider engineering community in MedTech.

5.4 Final Conclusion and Reflections

This study aimed to explore the relationship between motivation and occupational commitment in Ireland's MedTech engineers. The secondary research data established that these concepts had been studied

extensively independently. However, there was little academic inquiry into the relationship between motivation and occupational commitment within this research context.

The findings of this study confirmed the presence of occupational commitment in engineers working in MedTech in Ireland. They unearthed a clear relationship between this occupational commitment and motivation, particularly in the context of participants' university backgrounds. A key recommendation for further study would be empirically investigating this relationship in further detail. In doing this, the research objectives for this study were satisfied and contributed to the existing body of knowledge in this field.

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Appendices

Appendix A – Interview Questions

Demographic Questions			
Segment	**Q. Type**	**Question(s)**	**Reference**
Demographic Questionnaire	Core	Please confirm the following self-identified demographic details for the purposes of analysis and comparison: ● Age, Gender & Current Location ● Bachelors & Further Education ● Years of Professional Experience, Current Role & Length of Service	(Blau, 1985; Parasuraman and Nachman, 1987; Reilly and Orsak, 1991; Meyer, Allen and Smith, 1993; Fogarty, 1994; Snape, Lo and Redman, 2008; Williamson, Lounsbury and Han, 2013; Cudney and Riley, 2014; Matekele, Komba, and Mzumbe University (Tanzania), 2020)
Motivation Questions *Adapted from (Herzberg, Mausner and Snyderman, 1959; Spector, 1985) with additional referenced materials noted*			
Segment	**Q. Type**	**Question(s)**	**Reference**
Motivation - General Satisfaction	Core	Would you say you are satisfied with your current role?	
	Core	What are the best/worst parts of your job?	
	Core	What would make your job more/less satisfying?	
Motivation - Motivator Factors	Probe	Do you have many personal achievements at work?	(McClelland, 1961)
	Probe	How often do you deliver beyond the expectations of your role? Why?	(Lawler III and Porter, 1967)
	Probe	How often are you recognized for your efforts?	(Lawler III and Porter, 1967; Latham and Locke, 1979)
	Probe	Is your role interesting/challenging?	(Latham and Locke, 1979; Deci and Ryan, 1985)
	Probe	Do you get many growth opportunities?	(Alderfer, 1972; Deci and Ryan, 1985)
	Probe	Do you get many opportunities to assume responsibility?	(McClelland, 1961)

Motivation - Hygiene Factors	Probe	How do you feel about the policies and administration at your company?	(Pink, 2009)
	Probe	Do you feel your manager is a good supervisor?	(McClelland, 1961; Alderfer, 1972; Pink, 2009)
	Probe	How do you feel about your work environment?	(Alderfer, 1972)
	Probe	How is your relationship with your co-workers?	(McClelland, 1961; Alderfer, 1972)
	Probe	How do you feel about your salary/compensation?	(Adams, 1963; Alderfer, 1972)
	Probe	Do you feel your job is secure?	(Maslow, 1943; Alderfer, 1972)
Occupational Commitment *Adapted from (Blau, 1989, 2003; Meyer, Allen and Smith, 1993; Lee, Carswell and Allen, 2000; Peng, Glass and Sassler, 2022) with additional referenced materials noted*			
Occupational Commitment	Core	What were the factors that influenced you to begin a career in MedTech?	(Sax, Bryant and Harper, 2005; Shiverick and Janelle, 2009; Brown *et al.*, 2015)
	Core	How does your career in MedTech make you feel professionally/personally?	(Shiverick and Janelle, 2009; Wang, Eccles and Kenny, 2013)
	Core	Would you consider giving up your career in MedTech? Why?	
Summation			
Is there anything that you would like to add that hasn't been covered in the course of this interview?			

Appendix B – Informed Consent Form

INFORMED CONSENT FORM

I. Research Study Title: Exploring the Relationship between Motivation and Occupational Commitment in Engineers in the Irish MedTech Industry: A Qualitative Study

University: Griffith College, Graduate Business School.

Principal Investigator: Dr Garrett Ryan

Researcher Name: Kirsty Byrne Condon

Email: kirstybyrnecondon@gmail.com

II. Clarification of the purpose of the research

This research aims to explore the relationship between motivation factors and occupational commitment in engineers working in Ireland's Medical Technology (MedTech) industry in order to contribute to the existing body of knowledge in this field, and provide actionable insights to People functions in Irish organisations that should guide human resource practices for better employee retention.

III. Confirmation of particular requirements as highlighted in the Plain Language Statement

This project involves taking part in a semi-structured interview that will last approximately 45 minutes. The interviews will be recorded on Zoom and on a mobile device. During this session, the research is seeking to understand your current role, job satisfaction and commitment to working in the Irish Medical Technology industry. Questions are focused on the factors that contribute to your satisfaction and dissatisfaction in your role as an engineer in Medical Technology, and your future career plans.

Participant – please complete the following (Circle Yes or No for each question)

Have you read or had read to you the Plain Language Statement	Yes/No
Do you understand the information provided?	Yes/No
Have you had an opportunity to ask questions and discuss this study?	Yes/No
Have you received satisfactory answers to all your questions?	Yes/No
Are you aware that interviews will be audiotaped?	Yes/No

IV. Confirmation that involvement in the Research Study is voluntary

Involvement in this Research Study is voluntary. Participants who decide to take part may withdraw from the Research Study at any point. There will be no penalty for withdrawing before all stages of the Research Study are complete.

V. Advice as to arrangements to be made to protect the confidentiality of data, including that confidentiality of information provided is subject to legal limitations

Audio tapes will be destroyed on the successful completion of this master's degree in full compliance with GDPR regulations.

VI. Participant Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researcher, and I have a copy of this consent form. Therefore, I consent to take part in this research project.

Participants Signature: _____

Name in Block Capitals: _____

Witness: _____

Date: _____

Appendix C – Plain Language Statement

PLAIN LANGUAGE STATEMENT

Introduction to the Research Study

Research Study Title: Exploring the Relationship between Motivation and Occupational Commitment in Engineers in the Irish MedTech Industry: A Qualitative Study

University: Griffith College, Graduate Business School.

Principal Investigator: Dr Garrett Ryan

Researcher Name: Kirsty Byrne Condon

Email: kirstybyrnecondon@gmail.com

II. Details of what involvement in the Research Study will require

This project involves taking part in a semi-structured interview that will last approximately 45 minutes. The interviews will be recorded on Zoom and on a mobile device. During this session, the research is seeking to understand your current role, job satisfaction and commitment to working in the Irish Medical Technology industry. Questions are focused on the factors that contribute to your satisfaction and dissatisfaction in your role as an engineer in Medical Technology, and your future career plans.

III. Potential risks to participants from involvement in the Research Study (if greater than that encountered in everyday life)

I do not anticipate any risk to participants as a result of participation in this Research Study.

IV. Benefits (direct or indirect) to participants from involvement in the Research Study

The objective of this Research Study is to contribute to the existing body of knowledge that exists around the Irish Medical Technology industry. The results of this study will provide actionable insights to People functions in Irish organisations that should guide human resource practices for better employee retention.

V. Advice as to arrangements to be made to protect the confidentiality of data, including that confidentiality of information provided is subject to legal limitations

Every effort is made to ensure the confidentiality of the participant. Participant names will not be recorded, as all participants will be assigned a code. Where used, recorded interviews/survey data will be downloaded to a password-controlled computer, and typed transcripts/survey results are held within password-controlled documents. Participant biographical details and or mention of other persons will be omitted in the final report. Confidentiality of information provided is subject to legal limitations.

VI. Advice as to whether or not data is to be destroyed after a minimum period

Audio tapes/Survey data will be destroyed upon the successful completion of this master's degree in full compliance with GDPR regulations.

VII. Statement that involvement in the Research Study is voluntary

Involvement in this Research Study is voluntary. Participants who decide to take part may withdraw from the Research Study at any point. There will be no penalty for withdrawing before all stages of the Research Study are complete.

If participants have concerns about this study and wish to contact an independent

person, please contact:

Dr Garrett Ryan

Graduate Business School

Research Committee

Griffith College

South Circular Road, Dublin 8, Ireland

Phone: + 353 1 416 3324

Email: garrett.ryan@griffith.ie