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Precarious work and mechanisms of control across the Brazilian wind power supply chain

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Abstract

The aim of this thesis was to evaluate how mechanisms of control were used within the Brazilian wind power industry and across the supply chain. This thesis used Labour Process Theory as a lens through which to: explore how the structure of the industry impacted working conditions across the supply chain; address the gaps in the employment relations evidence base on these topics and in longitudinal research on the changing nature of employment within supply chains. It also engaged with literature on dormitory labour regimes and the power resources approach. This longitudinal case study of the Brazilian wind power industry found that precarious working and living conditions heightened managers' ability to exploit workers through a combination of market, direct and cultural controls.

Semi-structured interviews and observations were undertaken from a critical realist perspective, which revealed that due to recent deregulation, the temporary nature of work and the remoteness of their workplaces, workers were largely unable to resist mechanisms of control, bargain for better treatment, or receive adequate union representation. Furthermore, working in remote locations cut workers off from basic infrastructure, clean and adequate accommodation, training, and social support from their families and often led to negative implications for health and safety. Workers' precarious circumstances left them vulnerable to managers' encouragements to overwork and being overly relied upon to learn on the job.

This thesis adds to existing theory through bringing together literature and knowledge around Labour Process Theory (LPT), dormitory labour regimes, precarious work, and power resources across the wind power supply chain in Brazil. It adds to contemporary labour process theory through extending the understanding of mechanisms of control in the wind power supply chain. Moreover, it advances knowledge on power resources and new forms of organising in the Global South. Although some of the insights from this study are generalisable to other similarly precarious industries, such as oil, gas, and heavy construction, the thesis also has implications for future research. It highlights the need to contextualise the dynamic power relationships between managers and workers to understand how workers are controlled and emphasises the importance of research across the supply chain to shed light on the multiple dimensions of precarity, as well as having important implications for Brazilian industrial policy, employment legislation and trade union representation.

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Declaration

I, the author, confirm that the Thesis is my own work. I am aware of the University's Guidance on the Use of Unfair Means (www.sheffield.ac.uk/ssid/unfair-means). This work has not previously been presented for an award at this, or any other, university.

Chapter 1 - Introduction

> *"Ha! They use the green appeal of clean energy saving the planet but at the cost of our lives. It's a crazy world we are living in. Nobody sees what we are going through here. Still, we cannot complain. We need jobs to feed our families. It is what it is" (C1_QUALASSIST_1).*
>
> *"The red symbolises our blood being given to work. I feel so tired…I see my energy dissipating within the dust" (C1_QUALASSIST_2).*

The aims of this study were to evaluate how mechanisms of control were used within the Brazilian wind power industry and across the supply chain. This study is important since in Brazil, as in many other parts of the world, there has been a move toward austerity accompanied by the protection of capitalist interests. In view of this, Giddens has argued that "*the power of capital and governments is strong but their legitimacy is weak, the exact opposite of the protesters whose power is weak but whose legitimacy is strong*" (Giddens, 2015, p2). In this context, there is a need to protect those who are in weaker positions, including workers. Workers are particularly vulnerable in the wind power supply chain, given the precarity of work in parts of that sector including construction, but there is a lack of evidence of the ways in which workers are subject to (and able to resist) mechanisms of control. Brazil has been referred to as an emerging economy, but it also has high levels of poverty. The wind power sector has been chosen because it is an important and growing part of the economy and one where there are challenging labour conditions across the supply chain.

1.1. Overview

Little is known about how structurally precarious the wind power industry in Brazil is or how this affects the supply chain as a whole. At the commencement of this doctoral study, the paucity of strong evidence of the ways workers are subjected to control is striking, and insufficient literature explains employment relations in the Brazilian wind power industry supply chain. Parallel to it, in some of the debates among stakeholders responsible for the wind industry's establishment and development in Brazil, there was already mention of the lack of sufficient workforce for meeting the imminent demand required, and calls for them to do something about it (ABEEOLICA, 2017; Global Wind Power Energy Council Statistics, 2016).

Many possible explanations for such issues exist, one being that the wind industry in Brazil was considered relatively new, and working in this field was only just starting. It could also be that both the Government (Bayer, 2018; Bayer et al. 2018) and the industry (Global Energy Council Statistics, 2016) were focused more on attracting investors, therefore, not wanting to highlight potential risks like this lack of sufficient workforce ready to meet the imminent demand. However, regardless of the newness of the industry, there was enough evidence that the work building wind farms involved similarly precarious working conditions as work done in heavy construction, such as a general lack of infrastructure; work in remote locations with accommodations provided by employers; and ephemerality of jobs (Quinlan, 2012; Berntsen, 2016). On the one hand, the Government avoided highlighting the problem and instead, allegedly distracted investors with the creation of new jobs within the wind industry, representing economic growth (Global Wind Energy Council Statistics, 2016). On the other hand, reports from the industry regarding supply chain bottlenecks generated concerns for companies regarding the need to train enough people to make sure that there would be a workforce with the minimum skills necessary to start operations promptly (Wind Energy Manufacturing Supplier Handbook, 2011; Brazilian Power System Operator, 2016).

Like many other countries, Brazil moved towards austerity and increased protection of capitalist interests (Oliveira and Proni, 2016). The Bolsonaro administration’s policies further complicated the labour landscape. The government’s austerity measures and labour reforms weakened the power of unions and reduced workers' access to legal recourse. Legislative changes made it more difficult for workers to organise and engage in collective bargaining, exacerbating their vulnerability to exploitation. Oliveira (2018) and Filgueiras (in Krein, Oliveira, and Filgueiras, 2019) argue that these policies align with broader austerity objectives, prioritising economic liberalisation over the protection of workers' rights.

This study became important since the wind power sector in Brazil is an important and growing part of the economy. Moreover, challenges associated with precarious working conditions across the supply chain seemed to not be held accountable by Government or the industry. Instead, as this thesis proposes, precariousness at work in this scenario meant that companies in the wind power supply chain had reduced costs. This led me to investigate this problem under the umbrella of Labour Process Theory as a means by which to evaluate whether managers were taking advantage of precarious working conditions to exert more control over workers and intensify work to manage these issues in the industry (Brown, Hyatt and Benson, 2010; Thompson, 2010; Marchington and Wilkinson, 2012; Evans and Tourish, 2017).

Thus, it would appear that there is a well-established need to address a vital gap in our understanding of how managers perceive precarity, potentially as a means of intensifying work regardless of the worsening of working (and living) conditions and reductions to workers' ability to resist. Moreover, it is argued in this thesis that the inertia in relation to precariousness of working conditions in the wind industry aligns with austerity purposes, since, for example, the current status of labour legislation reduces unions' power of representation and workers' access to Court (Oliveira, 2018; Filgueiras, *in* Krein, Oliveira and Filgueiras, 2019).

Jobs in the wind power industry might be assumed to be 'good jobs' rather than 'bad jobs'. However, this thesis questions these assumptions. The debate about what constitutes a good or bad job is longstanding. Harry Braverman's (1974) work has highlighted how there has been a degradation of labour, pointing to the loss of skill and autonomy, fragmentation of tasks, and deskilling processes characteristic of industrial capitalism. Yet, despite the extensive discussion of the degradation of labour, definitions of 'good' and 'bad' work are often only vaguely implied. Braverman (1974) highlights problems resulting from the separation of conception from execution and reducing work to repetitive tasks but does not provide a comprehensive definition of quality work. Similarly, those referring to the concept of 'precarity' revolve around the insecurity and unpredictability of work in contemporary economies but do not generally provide benchmarks for stable or secure employment. This tendency for implied definitions is problematic because it leaves room for interpretation, often through an academic or ideological lens applied across different sectors and economies (Laaser, 2022).

Laaser (2022) delves deeper into meaningful work and explores how sociology can broaden the idea by considering work within a dynamic continuum. The author creates a framework that merges subjective and objective components, such as autonomy, recognition, and dignity. This framework recognises meaningful work as a result of organisational structures and the actions of workers, creating a fluid relationship that shapes perceptions of work. He also emphasises that understanding meaningful work in sociology requires acknowledging the challenging realities of workplace conditions and structures. The author stresses that autonomy and recognition are crucial for avoiding alienation and enhancing the potential for meaningfulness.

Another important consideration is how what is regarded as good or bad work can vary across different parts of the world. Adamson and Roper (2019) discuss the nuanced challenge of distinguishing between good and bad jobs across different contexts. They emphasise that job quality is defined by a mix of economic and non-economic factors such as pay, stability, working conditions, and social status. They argue that job satisfaction is inherently subjective due to personal expectations and societal norms. Additionally, they explore how collective

action through unions and social policies can improve job quality by advocating for fair employment standards, even as job quality becomes more difficult to classify in the age of the gig economy and precarious work.

Rapid growth in the 'green economy' provides a timely opportunity to critically assess what is meant by 'good jobs'. Sometimes, the assumption seems to be that green jobs are good jobs. For example, the International Labour Organisation ILO defines green jobs as “decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency” (International Labour Organisation, 2016). However, it is important to consider more carefully the extent to which these jobs are good jobs. Sofroniou and Anderson (2021) highlight the importance of including aspects of job quality and inclusivity when analysing green job growth. They suggest that such aspects are intrinsic to what constitutes a ‘good job’ and challenge the misconception that all green jobs are ‘good’. A report by the United Nations Environment Programme (UNEP) on green jobs also highlights aspects of occupational skills, wage levels and worker empowerment and representation among the qualitative aspects to be taken into consideration by governments and industry in their roles to develop decent green jobs (UNEP, 2008).

Questions remain regarding whether jobs in the green economy are 'good' regarding working conditions or job security. An alternative argument is that despite the promise of sustainability, many green jobs involve long hours, temporary project-based contracts, work in remote areas and hazardous working conditions. Rather than offering good jobs, they are part of the further degradation of work. Therefore, there is a need for an analysis of workplace relations that goes beyond critiquing the erosion of labour standards in traditional industries and expands their analysis to include emerging forms of work.

This study defines ‘good’ work’ as that which includes work-related and non-work-related aspects such as working conditions, occupational skills, wage levels and worker empowerment and representation, dignity, job security, health, family life, and social integration (Kalleberg, 2009; 2015; UNEP, 2008).

This thesis will seek to examine these issues and address these gaps in knowledge. The intentions of the project, the methodology used and contributions made will be discussed in the subsequent sections of this Chapter, which will demonstrate how these challenges posed by the situation in the Brazilian wind power industry are explored, understood and addressed in this thesis.

1.2. Research aim and objectives

The aim of this thesis is evaluating how mechanisms of control were used within the Brazilian wind power industry and across the supply chain. More specifically, the objectives of this study were to:

- Analyse mechanisms of control across supply chains;
- Investigate the precarity of work in the Brazilian wind power industry and how this may influence the way in which workers are controlled;
- Assess how workers across the Brazilian wind power industry and its supply chain are subject to and resist forms of control;
- Critically evaluate the current status and future potential of legislation and policy governing work in the Brazilian wind power industry.

In addition to the above objectives, I will also reflect on the transferability of this study's findings and consider the implications this study has for recommendations for employers, unions and the state.

The theoretical framework underpinning this study will seek to address gaps in literature and answer the research questions that guide this research. Using Labour Process Theory (or LPT) will enable me to better understand the relationships between the actors in the employment relations. I propose to evaluate (managers and workers) and the role of different stakeholders in influencing these power relations. LPT helps me understand workers' exploitation and different forms of managerial control to establish the theoretical base that informs this study (Thompson, 2010). Literature on dormitory labour regimes will help me to consider forms of control outside of the workplace. I will also look into precarious work literature, conceptualising precarious work to inform my understanding of how precarious working and living conditions in the wind power industry in Brazil influence the way that managers control workers. In addition, I will draw on literature on power resources to understand the possibilities for worker resistance.

1.3. Research Methodology

With the review of literature this study identified four main gaps in knowledge in relation to:

- the ways in which mechanisms of control were used across supply chains, within and outside the workplace;

- the weak evidence base on employment relations, and particularly the nature of precarious work and the extent to which workers have access to power resources in the Brazilian wind power industry;

- how the political and regulatory context affect mechanisms of control, precarity of work, and workers' access to power resources in Brazil

- methodologically, the lack of longitudinal research on the changing nature of employment within supply chains.

To address these gaps, a qualitative research project was carried out using a longitudinal case study design, consisting of semi-structured interviews and observations. I also had access to a few documents containing information regarding company's reward systems and tools used to measure workers' performance.

The Methods Chapter provides more details about the data collection and how the longitudinal case study was executed, covering a wide range of organisations and stakeholders. The research adopted a critical realist ontology (Bhaskar, 2016; Fletcher, 2017; Bhaskar, Danermark and Price, 2018) and an interpretivist epistemology (Saunders, Lewis and Thornhill, 2009; Gill and Johnson, 2010), allowing for triangulation that included observations of participants and their working environment and contrasting this with data from interviews (Bhaskar, Danermark and Price, 2018). The intention behind this was to capture how managers perceived control as being influenced by the precarious working and living conditions that workers were subjected to and also how employees were affected by these control mechanisms. Other aspects of precarious work leveraged against workers included: temporary nature of work, risky operations, living in remote locations without infrastructure, accommodation provided by the employer (particularly where this represented a monopoly). These were in addition to various characteristics inherent to a new industry, such as reliance on low-skill workers to engage in and learn high-skill jobs, and the use of micromanagement and other harmful methods of performance management.

These literature gaps also influenced the design of my research questions, which are:

1. How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace?
2. To what extent can work in the wind power industry in Brazil be characterised as precarious?
3. To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control?

4. How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil?

This empirical research focused on companies within the wind power industry in Brazil and its supply chain. This was the ideal setting for the proposed research since the wind power sector is an important part of Brazil's national economy, attracting international investment and employing large numbers of workers directly and through its supply chain. This focus on the supply chain context holistically also makes some of the research insights generalisable to other similarly precarious industries, such as oil and gas, and heavy construction (Oliveira, 2013; Castro, 2014; Penelas, 2015).

1.4. Key contributions

One of the key contributions of this thesis is to bring together literature and knowledge around Labour Process Theory (LPT), dormitory labour regimes, precarious work, and power resources across the wind power supply chain in Brazil. The study shows that precarious work can influence managers' use of mechanisms of control. It also reveals that workers' precarious living conditions can affect how managers perceive control over workers, which, in turn, may worsen the working conditions, creating a vicious cycle. There is little relevant literature on the impact of living conditions on precarity and exploitation due to the newness of the Brazilian wind power industry. Thus, this research contributes to the literature around the use of precarious living conditions to encourage overwork, thereby exploiting workers. The thesis also extends literature that forms our understanding of the employment relations in the Brazilian wind power industry supply chain in terms of workers' limited access to power resources. Moreover, it shows how the political and regulatory context affect mechanisms of control, precarity of work, and workers' access to power resources in Brazil. Methodologically, an important contribution is to provide longitudinal research on the changing nature of employment within supply chains. Cross-sectional or other non-longitudinal methods are unable to adequately capture this.

1.5. The structure of the thesis

The thesis is presented in seven chapters. The methodology chapter and final concluding chapter are in the first person, but the rest of the thesis is in the third person. Following this introduction, Chapter 2 critically reviews the relevant literature: 2.1) Labour Process Theory and mechanisms of control; 2.2) Dormitory labour regimes; 2.3) Precarious work in the wind power industry supply chain in Brazil; and 2.4) Worker resistance and power resources. This is followed by Chapter 3 on the regulatory and political context in Brazil. Toward the end of

Chapter 3, there is a reflection on how the different literatures help to form a theoretical framework for this study. Chapter 4 then explains the methodology adopted in this study, and critically examines the philosophical debates informing my research through a critical realist ontological lens (Thompson and Vincent, 2010), supported by an interpretivist epistemological approach. The chapter moves on to explain my research design, including details of the selection criteria for case study organisations within the context of wind power industry in Brazil. It also provides details of the research methods and how data was collected from semi-structured interviews, observation and documents. Finally, Chapter 4 provides my ethical considerations and shows how data is managed in this study. It also includes a sub-section on reflexivity.

Chapter 5 presents the findings, which are grouped into four subsections: 5.2. mechanisms of control; 5.3. employer control over living conditions; 5.4. precarious work; and 5.5. worker resistance and (lack of) power resources. These findings demonstrate links between the labour process, precarious working conditions and the nature of the industry and how this affected workers ability to resist control and engage with unions. Before moving onto the Discussion, Chapter 5 revisits the theoretical framework to show how the findings add to the original theoretical framework. Chapter 6 provides a Discussion of the findings. The chapter starts by returning to the research questions, and it then provides a more detailed analysis of how the findings move forward knowledge in relation to mechanisms of control, offering insights into how precarious working conditions enabled managers to control workers (such as by the use of direct controls, market controls and cultural controls) and increase work intensification, as well as controlling how they lived. The more detailed discussion of precarious work provides insights into how workers (and managers) experience precarious work. It is followed by a discussion of worker resistance and diminishing workers' power resources affecting unions' ability to organise and represent workers.

Finally, Chapter 7 sets out the conclusions reflecting on the methodology of the study. It then further explains how each of the research questions was addressed, how the findings contributed to knowledge and what implications they have for employers, unions and the state. It finishes by explaining this study limitations and possible avenues for future research.

Chapter 2: Literature Review (1)

This chapter examines literature that is related to the core aim of this study which is to evaluate how mechanisms of control are used within the Brazilian wind power industry and across the supply chain. This chapter will also provide an understanding of how precariousness can contribute to increase managerial control and reduce workers' ability to resist those controls. There are four main streams of literature informing this thesis: Labour Process Theory (LPT), dormitory labour regimes, precarious work, and power resources.

The literature review is divided into six sections. Section 2.1 will first focus on the relevant literature in LPT. This is accompanied by a critique of LPT that includes acknowledgment that it has tended to focus on the Global North and to ignore the role of the state, as well as extra-workplace conditions. Consequently, this critique is accompanied by a discussion of literature on dormitory labour regimes in section 2.2. Section 2.3. will outline precarious work and the labour process in the 'Global South'. For this, the thesis will draw on work by Arne Kalleberg (2018, p.2), who defines precarious work as that which is "uncertain, unstable, and insecure and in which employees bear the risks of work (as opposed to business or the government) and receive limited social benefits and statutory protections". He further explains that the impact of precarious work on a worker's life depends not only on the work itself, but also on the context within which the workers are based (Kalleberg, 2018). Then this section will provide an outline of different facets of precarity such as job insecurity and temporary work; income insecurity; health and safety; and precarious working conditions. This section will conclude with a review of precarious work within supply chains, including comparative studies of precarious work in the construction industry and the Brazilian oil and gas offshore industry. Section 2.4. will then analyse perspectives of worker resistance, drawing on literature on power resources.

2.1. Labour Process Theory

This section introduces Labour Process Theory (LPT), including more recent debates on how workplace control is linked to global value chains (or global production networks). It then explains its three features in greater depth, namely: the division of intellectual and manual labour; the deskilling of labour; and hierarchical controls. It then develops these ideas to explain how companies have been increasing their control over workers.

2.1.1 Labour Process Theory: intellectual origins and recent developments

Labour process theory (LPT) seeks to explain the nature, origins and processes of the transformation of work organisation. It focuses on analysing the clashes experienced by employers and employees in their employment relationship, accounting for aspects of the labour market and the labour process (Litter, 1982, p1-21). Labour Process Theory can be traced back to interests in the labour process expressed by Karl Marx and highlighted in Braverman's work, especially *Labor and Monopoly Capital* (1974). Braverman focuses attention on capitalism and labour and the degradation of work in the twentieth century (Braverman, 1974).

Braverman's original thesis remains a cornerstone in understanding the capitalist labour process. He elucidated how the fragmentation of work into repetitive tasks led to the deskilling of labour, enhancing managerial control and reducing workers' intellectual engagement with their work. This process was seen as a deliberate strategy by capital to consolidate power and control over the workforce. In simple terms, it is a theory that analyses how control is used to reduce worker's power, how people work and who controls their work and in what ways they control their work (Bray and Litter, 1988). In modern contexts, these mechanisms have evolved but retain their foundational principles. For instance, the introduction of advanced technologies and automation has further exacerbated the deskilling process, while the proliferation of performance monitoring tools such as wearable technologies has intensified surveillance and control over workers.

LPT has received criticism, including the way in which theorists have become distanced from the tension between capitalism and labour, instead focusing on business strategy. By the 1990s, the core features seemed to revolve around three main strands: a) division of intellectual and manual labour; 2) deskilling of labour; and 3) hierarchical controls. However, there has also been discussion of worker resistance to managerial controls (Thompson, 2010), and some theorists have recognised the need to expand LPT to include analysis of dynamics such as labour markets and worker mobility (Thompson and Harley, 2009). In contemporary workplaces, technologies such as automation, artificial intelligence, and wearable monitoring devices have not only perpetuated but exacerbated the processes of deskilling and surveillance. Workers are often subjected to intricate systems of performance monitoring and control, which extend beyond the physical workplace to encompass various aspects of their daily lives.

The integration of labour processes within global value chains (GVCs) (or global production networks) marks a significant shift from national to transnational scales of labour

control. In this framework, labour regimes are shaped not only by local and national dynamics but also by the transnational governance structures imposed by leading firms within GVCs. These structures determine labour outcomes by dictating terms of production, often leading to precarious and informal work conditions, especially in the Global South (Hammer and Fishwick, 2020).

According to Nikolaus Hammer and Lone Riisgaard, the analysis of Labour Process Theory within the context of global value chains provides a comprehensive understanding of contemporary labour dynamics. While Braverman's foundational principles of deskilling and managerial control remain relevant, the transnational nature of GVCs introduces new dimensions of labour control and worker resistance. The interplay between local labour practices and GVCs emphasizes the need for a multi-layered approach to labour process analysis, one that accounts for the complex interconnections between local, national, and global factors shaping the modern workplace (Hammer and Riisgaard, 2015). Moreover, Anita Hammer and Immanuel Ness highlight that this contemporary approach not only revitalises Braverman's thesis but also enriches it by integrating the diverse and dynamic realities of global labour markets, particular in the Global South, where informal and precarious work forms a significant part of the labour landscape (Hammer and Ness, 2021).

Despite the intensified control mechanisms, however, there is evidence of worker agency and resistance within GVCs. Studies have shown that workers in sectors like garment manufacturing in Cambodia and India engage in various forms of resistance against oppressive labour conditions. This resistance is often shaped by local social relations and intersecting identities of caste, gender, and ethnicity, which influence workers' strategies and their capacity for collective action (Arnold, 2013).

The context of the Brazilian wind power industry is shaped by broader socio-economic and political dynamics. The rapid growth of the sector, coupled with the Bolsonaro administration's pro-business policies, has exacerbated the precarious nature of employment within the industry. Labour Process Theory provides a valuable framework for analysing these dynamics, highlighting the mechanisms of control and exploitation that underpin the labour process.

2.1.2 Labour Process Theory: division of labour, deskilling and hierarchical controls

The focus of Labour Process Theory is on how work is organised, how it is performed and how workers are encouraged to cooperate with management (Thompson, 2010). It aims to

explain how the labour process shifted from skilled craft workers to low skilled workers in the manufacturing of the industrialised era assembly lines. LPT looks at the shifts in labour-power relations, introduced by these new methods of managerial control, resulting in the suppression of workers' ability to think for themselves. There are three main strands to LPT: 1) division of intellectual and manual labour; 2) deskilling of labour; and 3) hierarchical controls (Thompson, 2010).

With regard to the first of these, the division of labour, it is argued that labour came to be hierarchically dominated by capital as a means of fulfilling capitalist control (Armstrong, 1989). As Braverman (1974) explains, the differentiation between intellectual and manual labour and the separation of design and execution became a problem when workers' intellect was seen by management as a means of degrading and taking control over manual work. This separation between intellectual and manual labour is linked to the fragmentation of work. During industrialization, employers of manufacturing firms simplified the ways in which workers performed on assembly lines by routinising their tasks. When the work began to involve technology and automation, workers were forced to give way to machines. With the drastic increase in task repetitiveness, workers were expected to work faster, not having to think much, but instead to concentrate on repetition. This method of fragmenting work into simple individual movements remains in widespread practice today. It involves a process of deskilling workforces at the same time as increasing forms of managerial control over workers. Studies have shown that these automated changes at the workplace have led to underemployment, undermined intellectual skills and diminished work quality (Lawrence, 2010).

A further important dimension of LPT is hierarchical control. Hierarchical control refers to the bureaucratic processes have been integrated into the workplace, and with them different forms of checks on and controls placed over workers. Over time, the intensity of work has been linked to greater surveillance and higher performance targets. This has been the case for a range of jobs from low-skilled work to jobs demanding a large amount of knowledge or creativity (Thompson, 2010).

The management control systems created have involved both work intensification/demand and surveillance/performance targets. Today's managers have various options for exercising control over workers, such as monitoring, self-tracking and wearable technologies (Moore and Robinson, 2015). The latter, for example, is referred to by Moore and Robinson (2015) as a form of neo-Taylorism: a systematic effect of a particular labour process providing the basis for modern-day capitalism.

Managerial controls might also be used as part of a performance management system to control workers. A key tool for this is the use of performance appraisal (PA), which managers use to set performance targets and evaluate performance. As Thompson (2010) suggests, the use of a labour process theory lens is an important way to understand managerial forms of control.

2.1.3. LPT and performance management as a mechanism for control

Performance management (PM) is concerned with the present and future development of employees' performance within an organisation, covering the individual, team and organisational levels, but focusing on the organisation as a whole. Performance appraisal (PA) can be used as part of a PM system to evaluate workers individually, based on how the employee has undertaken their job within a certain period (Collings and Wood, 2011). While PM can be a flexible process linked to the business strategy, PA is often bureaucratic, making use of ratings and rankings, and its use has been criticised as it can tend to be used as an operational tool but not necessarily linked to business needs (Grint, 1993). The value of PA to an organisation also assumes that it is viewed throughout the organisation as a useful tool. Yet, both employees and managers may simply view it as a 'tick box' exercise, compromising its results/benefits (Sumelius et al. 2014).

Performance Appraisal can be performed by supervisors, peers, teams, or customers, among others, but it can also involve self-assessment. Recently, there has been growing interest in utilising customer reviews and the use of upward reviews (the process of asking employees to review managers) is also increasingly being adopted by UK companies. However, individual appraisal is the most typical model with line-managers or direct supervisors usually being responsible for carrying out the appraisal (Marchington & Wilkinson, 2012). Although it has been suggested that the use of PA can encourage and promote better communication and closer relationships between the appraiser and the appraisee (Marchington & Wilkinson, 2012), the anticipated benefits assume that there is a close relationship between the supervisor and the employee for the appraisal to enhance or build on, which might not always be the case. When the rater-ratee relationship is of poor quality, this may not generate the desired outcomes (Brown and Benson, 2003; Kavanagh, Benson and Brown, 2007; Hunt, 2010; Pichler, 2012). Inaccuracies can arise when attempting to define and measure an individual's responsibility and performance in relation to that of the whole team (Fletcher, 1999; Evans and Tourish, 2016). PA can also be vulnerable to bias, for example, research by Prowse and Prowse (2009) has shown that some workers can be viewed more positively than others on the basis of demographic characteristics, with ratings depending on gender and ethnicity of the appraiser and appraisee.

The results of PA review can be used as part of a High Performance Management System to identify training needs, career development scheme plans and rewards. High performance systems aim to identify workers' individual targets and monitor employees' productivity, enabling the company to set up a customised plan for each employee to progress in their careers (Brown, Hyatt and Benson, 2010). However, there is sometimes tension between using the PA to determine rewards and using it to determine training needs. The former means that the appraisal is evaluative and could be used to incentivise and discipline employees, while the latter means that it is developmental. Evans and Tourish (2016) are very critical of the use of appraisal in an evaluative way, arguing that relating appraisal to pay is predominantly driven by the assumptions that immediate self-interest and tangible rewards will generate motivation. In practice, they argue that this focus tends to undermine the essential developmental objectives of organisations.

It has been suggested that Performance Appraisal has the potential to offer many benefits to employers and employees. Improving employee performance and motivation might lead to increased productivity and therefore economic benefits to the firm, and at the same time, the employees might benefit from development opportunities, assuming that the performance management system is carried out effectively. However, since the system functions as a mechanism of control, it might generate capital accumulation but not benefit employees, instead leading to increased pressure and work intensification (Brown, Hyatt and Benson, 2010; Evans and Rourish, 2016). PA can therefore be used as part of an organization's disciplinary policies and monitoring practices (Friedman, 1977; Littler, 1982). PA can therefore cause work degradation and a deterioration in job quality (Taylor, 2013; Laaser, 2016). Supervisors might even cause injury to those they manage, contrary to the aim of using PA methods (Tepper et al., 2011).

2.1.4. Cultural controls

Organisational culture can be used to enhance performance and increasing motivation (Marchington and Wilkinson, 2012). Culture also has the power of shaping peoples' beliefs and assumptions to inform certain behavioural outcomes. In other words, culture is managed in the organisation's interests. This study investigates how managers use culture to enhance workers performance. This section explores how culture can be used to manipulate and control workers behaviour.

The concept of organisational culture was introduced to the field of organisational studies in the late 1970s. More specifically, an article by Andrew Marshall Pettigrew entitled "On Studying Organisational Cultures" is considered to be one of the pioneer works on the

subject. In his understanding, culture is something generated by a collection of beliefs, identity, rituals and myths within an organisation (Pettigrew, 1979). With a background in anthropology and sociology, he emphasises the importance of history and context and power relationships within organisations (Pettigrew, 1979). Pettigrew's conceptualization is still in use today and has influenced the field of management studies, including organisational performance.

Ouchi and Wilkins (1983) are generally considered to be the first authors to link culture and performance, with the idea that organisational culture can be used or manipulated in order to increase organisational performance. First, Ouchi and Wilkins (1983) argue that employees need to see their own interests as congruent with those of the organisation for which they worked. This argument is later supported in subsequent research by Shahzad and colleagues in 2012. Shahzad et al. (2012) review the literature and find that organisational culture affects organisational processes, employees and performance. In particular, employee performance is enhanced when values and goals are aligned with that of the organisation. When this occurs, there is a reduced need for any monitoring of employees, even in complex or uncertain conditions, as they would merely want what is best for the company. Moreover, when they buy into the goals of the company, even though the workers might perceive or experience inequity, they will think that this is simply short-term, and still believe that their interests will be served in the long-term.

When analysing cultural controls, Ouchi and Wilkins (1983) study particularly focuses on the cultures of 'clans' or subgroups within the organisations. They also suggest that 'clan culture' will be more likely where organisations have a long history and stable membership, with a homogeneous workforce. Interestingly, particularly for this study, they also refer to how organisations can adopt existing cultures (e.g. of a religious group). In referring to this adoption, they do not, however, go into detail regarding how this might happen.

Ouchi and Wilkins (1983) also suggest that the context within which work takes place (as well as the broader economic and social conditions) affects the extent to which managers are able to manipulate cultural controls. In this study it will be important to consider whether the working context influences how workers are treated in different countries such as Brazil, where there are different political and economic contexts than in the 'Global North' where the majority of extant research on LPT and cultural controls has taken place. Although they acknowledge the relevance of quantitative studies to this topic (especially referring to the work developed in the 1970s), Ouchi and Wilkins (1985) suggest that qualitative methods (such as ethnography and observations), are best equipped to investigate the phenomena in depth.

A further paper which provides insights into how culture might be controlled is an ethnographic study by Kunda (1992). Kunda (1992) carried out a critical analysis of the dark side of the use of culture in organisations, referring to the idea of culture management, which he describes as:

> *"…an attempt to control the attitudinal and behavioural characteristics of new organisational members or by management attempting to influence the value premises of existing members' behaviour through trying to restructure their attitudes and beliefs through the use of an array of related human resource management practices. The resultant normative control is based upon establishing intense emotional attachment and the internalisation of clearly enunciated company values"* (Kunda, 1992, p.10).

This study will consider how culture management and cultural controls are used in different parts of the wind power supply chain in Brazil.

As indicated in the introduction, the literature on labour process theory has tended to be focused on the Global North, to ignore the role of the state, and has failed to pay attention to extra-workplace conditions. The following section draws on dormitory labour regimes literature to help to address this latter gap.

2.2. Control of workers through dormitory labour regimes

Labour process theory focuses on controls within the work situation. However, this is arguably a major limitation of this literature. Workers, particularly in the Global South, can also face employer controls over their living conditions. In the construction of wind farms in countries such as Portugal, workers are usually no farther than 30km or less from their homes and although having to commute, they are not willing to migrate (Costa and Veiga, 2020). In contrast, workers in Brazil's wind power industry work in remote areas, away from home and family, under precarious living conditions. Access to social support is of vital importance to worker wellbeing and their health and safety as well as in coping with difficulty more generally (Leblanc, 2009). Kallberg (2012) and Standing (2014) mention the problems of social dislocation for workers, highlighting the "*pervasive consequences for workers' health and well-being, […] and the broader social implications of inequality and precarious work"* (Kalleberg, 2012, 445-446).

Workers in Brazil's wind power industry are placed by employers in accommodation near to where they are working. This situation has echoes of the empirical findings in the literature on dormitory labour regimes. Ngai and Smith (2007) argue that considering dormitory labour regimes is essential for theorizing worker accommodation that is under employers'

control since the shift from Taylorism/Fordism toward more flexible casual labour, deregulation and privatization. Only by considering these two spheres of control is it possible to understand the worker's position.

Employer-provided accommodation has not always been considered a negative situation. Historically, as highlighted by Smith (2003), the provision of accommodation to workers has been seen as paternalistic and benevolent. This was the case, for example, for apprentices, those engaged in domestic labour and for nurses. Moreover, where it was necessary for workers to be located near to their workplace, such as in mining, logging, or fruit picking in the agricultural sector, employers saw the need to provide accommodation as a means to attract and retain labour (Smith, 2003).

By contrast, the dormitory labour regime literature illustrates a specific manifestation of labour control that integrates work and living spaces. At the same time, such regimes highlight the transnational nature of labour control where the local labour process is heavily influenced by global production demands and capital flows (as explained in section 2.1.1). It refers to a type of control that involves employee exploitation, rather than accommodation being provided as a benefit that can help in the retention or attraction of workers. Instead, control is exerted under scenarios of high unemployment with a prevalence of temporary contracts. Employers, in this case, offer accommodation to enable more control over workers' hours, making workers more vulnerable to being asked to work overtime and on weekends, that is, making workers more readily available for use in the labour process. Ngai and Smith (2007) and Ngai (2008) characterise it as a system that enables employers to closely monitor and control workers by merging productive and reproductive spheres. The goal is to maximise value extraction by controlling not just work but also the social environment of the workforce (Smith, 2003; Smith and Ngai, 2006; Nagai and Smith 2007; Ngai, 2008).

The dormitory labour regime is a stark example of how workers' rights are compromised through the spatial reconfiguration of labour processes. This regime, characterized by a deep control over workers' autonomy and quality of life, can significantly shape their identities and everyday relationships. The severity of this impact underscores the urgent need for collective action and resistance (Perry, 2018, p. 1021). However, workers who are in this situation are more likely to be in precarious forms of work. As a result, in this regime, workers often find their rights undermined, as their autonomy is eroded through spatial reorganisation. This phenomenon is not limited to specific regions but has echoes in various parts of the world, where the erosion of labour rights is of significant concern (Ngai, 2008).

The exploitation of workers through control over both the social as well as the work sphere appears to be rooted in the temporary nature of work, remote locations, migrant work,

and precarious accommodation. Rather than seeing this situation as a few isolated incidents, it might instead be regarded as symptomatic of a global trend in labour exploitation. Employers can indirectly (or directly) force workers into longer working hours, with increased direct control over labour effort and flow. The control of working and living conditions also directly influences workers' collective bargaining power. However, there might also be opportunities for collective action and resistance, opening up potential avenues for challenging and renegotiating the terms of labour within these regimes (Smith and Ngai, 2006; Andrijasevic, 2022; Goodburn and Mishra, 2024).

2.3. Precarious work and the labour process in the 'Global South'

Research on Labour Process Theory in the 1970s focused on what was happening to the workforce in industrialised Europe and North America. However, the situation of workers in the Global South was quite different. In Brazil, the great push to industrialization came after World War II, when the country experienced a growing rural-urban migration as a result of the modern industrialised economy (Baer, 1978). Another feature of work in Brazil was the level of informal employment and unemployment. Baer (1978) points out that, unlike what happened in developed countries, Brazilian policymakers at that time did not take concrete steps to increase effective labour absorption. Consequently, the percentage of the labour force that was in formal employment hardly changed between 1919 and 1960 (14% in 1919 and 13% in 1960), reaching 17% of the workforce by 1970. For example, if compared with the Global North, the transition to automation was considered modest and the bulk of manufacturing operations in Brazil continued to be manual and typically employed semi-skilled workers (Baer, 1978). Carvalho and Schmitz (1989) argue that this route taken in Brazil was influenced by the scientific management mentality of engineers, featuring what the authors called an 'automated Fordist assembly line', characterised by deskilling and precarity. This small increase in formality, accompanied by rapid growth in informal jobs, illustrates one of the dichotomies between the Global North and the Global South.

Focusing on South Africa, rather than Brazil, Mosoetsa et al. (2016) further emphasise the need to consider how the labour process in the Global South is influenced by precarity. They point to a lack of understanding of precarity in studies attempting to differentiate between precarious work in the Global North and South. Mosoetsa et al. (2016) also note the weak understanding of how context influences the experiences of workers in different sectors in the Global South.

2.3.1. Conceptualising precarious work

One of the objectives of this study is to investigate the precarity of work in the Brazilian wind power industry and how this may influence the way in which workers are controlled. As will be shown in this thesis, investigation of precarious work in the Global South needs to take account of the social, economic and political context. Moreover, it is also necessary to take account of how the precarious nature of work in the Global South might impact the different ways in which the mechanisms of worker control are used, and how they might differ (sometimes in type, and at other times in intensity) from those mechanisms found in the Global North.

In studying precarious work in Brazil it is also important to be aware of the historical context. Quinlan (2012) suggests that contemporary studies looking into precarious work must take into account the historical context of precarious employment. He examines the use of the term “precarious employment” prior to the 1930s. He argues in favour of the importance for contemporary studies to recognise some features of the ubiquitous precarious working conditions in developed countries before the Second World War, mirroring labour markets strategies today. The studies of Quinlan (2012) and Kalleberg (2012) regarding precarious work highlight the relevance of understanding the historical context of the use of the term “precarious employment”. As indicated above, precarity in Brazil has been influenced by its past.

Kalleberg and Vallas (2018) point out that it is important for new studies to include in-depth analysis of the different forms of market control and regulation, looking at the micro level of specific groups of workers in specific regions. They also call for further study and greater understanding of aspects outside the employment relationship that may be playing a role in increasing precarity, including trends such as de-unionisation and market controls. An understanding of how these interact in Brazil will therefore help to move research further forward.

2.3.2. Precarious work: comparing the Global North and Global South

This section further explores the concept of precarious work, drawing contrasts between the Global North and Global South. Precarity can be considered at various levels - the individual, the workplace and the political and socioeconomic levels. Firstly, it can be considered from the individual level, considering how it feels to be in insecure work. Secondly, precarity may be viewed from the workplace level (including managerial controls). Third, it is important to consider the political, economic and social context (Campbell and Price, 2016).

One of the most widely cited authors on precarious work is Guy Standing. Standing (2011) defines precarious work through referring to how various groups of workers formed *"the precariat"*. He coined this term to explain work in the 'New World', and the ways in which work could be seen as precarious. His idea of the precariat is based on what he refers to as the *"new economic era of austerity"* (Standing, 2014, page 21), taking account of the economic context and political forces. For example, he argues that the new precariat had distinctive relations to the State, with the unremunerated and unmeasured *"work-for-labour"* situation resulting in workers having fewer and weaker civil and political rights (Standing, 2014, page 21). In defining 'The Precariat', Standing (2014) refers to three main groups of workers: Atavists, Nostalgics and Progressives. The first group is composed of those whose parents had traditional manual jobs and lives. He refers to this group as "*alienated, anomic, anxious and angry*" (Standing, 2014) because they cannot go back to the past. The second group, Nostalgics, are migrants or ethnic minorities. They have the same feelings but tend not to express their anger. The third group, Progressives, tend to be educated people who feel that they were promised a good future which has been denied to them, so have feelings of relative deprivation and frustration. Moreover, Standing (2014) also refers to how workers in the informal sector face precarity because they do not have union representation.

As mentioned above, in studying precarious work, it is essential to be aware of factors outside the workplace, taking account of the broader political, economic and social context. The nature of work is affected by regulation, market conditions, and levels of poverty, and precarity can affect living conditions as well as working conditions. Most authors writing about precarity in the Global South seem to acknowledge the impacts of politics, economics and social trends on precarious work. One of the authors writing about precarity in the Global South is Munck (2013). Munck (2013) criticises Standing for being Eurocentric. Although Brazil was colonised by Portugal, and Brazilian politics is strongly influenced by Western Europe and the United States' political and sociological thinking, the nature of precarity is not the same. For example, Munck (2013) has argued that precarity in the Global South is not a new phenomenon but is something that has been there forever. Moreover, in Brazil, workers are affected by extreme poverty and low levels of provision in public health, education and housing (Silva Filho and Queiroz, 2013).

However, there are some strong similarities. In common with the West, employers and the Government in Brazil perceive flexibility at work as a necessity - particularly numerical flexibility – as a requirement for companies to be able to be profitable. In Brazil, as in other countries, politicians and employers prefer jobs to be more flexible because this enables employers to extract maximum value from workers while paying them as little as possible,

minimising their rights and collective representation (Gato and Salazar, 2018; Oliveira, 2018). This tendency is further explained in Chapter Three.

It should also be noted that prior to this study, Brazil was going through a two-year recession (2014 and 2016). During that period, employers were pressuring the Government to make changes in labour rights aimed at reducing employment costs. This pressure culminated in a Labour Reform in 2017 that removed many employment rights for workers as well as the power of unions to represent workers' interests. Again, further analysis of this legislation will be undertaken in Chapter 3. One of the outcomes of this legislation was an increase in the levels of temporary work. At the same time, temporary work is a longstanding characteristic of the wind power industry and has been used by employers and managers as a means to exploit workers (Gato and Salazar, 2018; Oliveira, 2018).

2.3.2.1. Job insecurity and temporary work

Temporary work is flexible by nature and is often used for seasonal activities, when a company has extraordinary demands or exceptional temporary contracts. However, there has been a global rise in temporary work over the past three decades (Benassi, 2016), and the gradual increase in temporary workers relative to permanent positions has been harming employment conditions worldwide. The use of temporary posts has grown in the manufacturing sector in Germany, for example, which is typically a place where unionism is influential in bargaining over working conditions. Benassi (2016) highlights two factors that could explain this increase, one being the changes in technology and specificity in the industry, and the other being deregulation of the international labour market (see also Pulignano and Signoretti, 2016).

In Brazil, labour regulation has been an important factor in relation to the precarity of work across a range of sectors. Queiroz and Vanderstraeten (2018) carried out research on formal work in sugar cane plantations in Brazil. Between 2003 and 2010 there was an increase in formal jobs created due to labour law enforcements and increases in social entitlements for many workers, but this situation was reversed by the Labour Reform of 2017 which gave employers more flexibility in how they hired and fired workers. Employers systematically turned formal employment contracts into insecure and temporary ones. The main sectors affected were those in which the majority of activities are seen as temporary by the seasonality of the job (such as in agriculture, tourism and construction). As Queiroz and Vanderstraten (2018) explain,

> *"Workers end up experiencing numerous unstable temporary jobs with recurrent periods of unemployment, creating a class of permanently temporary workers, who have a precarious 'job for life'"* (Queiroz and Raf Vanderstraeten, 2018, p136).

In Brazil, as in other countries, temporary workers can receive less favourable terms and conditions. It is quite rare for a temporary worker to earn equal pay, receive the same amount of training or even experience the same quality of working conditions as a permanent worker. In general, they also qualify for less social benefits (Heyes and Lewis, 2014). Where temporary posts are used to replace positions that were once occupied by permanent employees, this raises concerns about how working conditions will be affected (Heyes and Lewis, 2014), including a range of forms of insecurity. The next section examines how workers are impacted by income insecurity.

2.3.2.2. Income insecurity

An unstable income can make workers feel insecure and harm their life both professionally and personally. Most research on income insecurity is based on the challenges associated with having a low income, although changes in income, irregularities or delays in payment or non-payment of the contractual wages also pose a real challenge to workers (Quinlan, 2012; Rubery et al., 2018).

Uncertainty or irregularity with regard to non-work periods of temporary employment can also add to income insecurity (Quinlan, 2012; Rubery et al., 2018). While temporary workers' living expenses (and those of their dependents) are commonly fixed, their earnings vary, making it a challenge for their regular base consumption (Quinlan, 2012). For example, in Silva Filho and Queiroz's (2013) study of work in the Brazilian construction industry, they found that around 80% of workers in construction, between 2006 and 2010, stayed less than 2 years on a job. They also found that 60% of them left a job within a year. This unstable situation affects workers' everyday lives, with them not knowing how they may cope with their financial commitments between uncertain contracts (Silva Filho and Queiroz, 2013).

Recent Brazilian Government policies have influenced how workers experience income insecurity. As explained above, since the latest Labour Reform in Brazil (Law 13.467 in 2017), employment protection has been reduced, meaning that those who are on temporary contracts no longer receive labour or social insurance. At the same time, the reform has reduced Unions' power of representation while enhancing employers' power to bargain. Feeling insecure about their earnings, workers can end up taking more risks, such as accepting hazardous practices and working when they are injured. Quinlan and Bohle (2004) argue that both employment and income insecurity can reduce workers' health and safety, engendering recurrent, chronic precarity.

2.3.2.3. Health and safety

Precarious work has been associated with an array of harmful consequences for workers' health, safety and wellbeing. Stress alone is enough to produce negative health outcomes, with some research finding associations between stress and physical complaints, from neck, stomach and back pain to respiratory issues to fatal and non-fatal coronary heart disease (Brosschot and van der Doef, 2005; Tully, Cosh and Baune, 2012). High stress levels can lead to individuals becoming overly detail-oriented to the exclusion of the bigger picture or more holistic information about a decision (Remmers and Zander, 2018). High stress can also impede task performance where decision-making is involved, but also those requiring multi-tasking, remembering and using information (such as weighing up variables or performing calculations) (Leblanc, 2009). Elevated levels of stress harm cognitive processes across the board, (particularly in demanding lines of work and where little support is available), both at the individual process level, and at the higher level where multiple cognitive processes are involved.

Meanwhile, pressures arising specifically from precarious work and feelings of insecurity heighten workers' susceptibility to potential risks, which also directly affect their own contribution to their health and safety. Working long hours, under stress and constantly worrying about working and living conditions can negatively affect workers' judgement and decision-making, especially when it comes to hazardous practices (Landolt et al., 2017; Remmers and Zander, 2018; Robinson, Bond and Roiser, 2015).

Temporary work can also affect workers' health and safety. A study by Virtanen et al. (2005) on employment instability shows an association of temporary work and occupational health. After reviewing 27 studies of temporary employment and health outcomes, they found evidence of temporary employment damaging health mentally and physically, which they linked to "*erosion of income, job insecurity, deficient benefits and on-the-job training, lack of prospects for promotion, and exposure to hazardous work conditions*" (Virtanen et al., 2005, 610-620). Likewise, Schumann and Kuchinke (2020) found that there were tremendous psychological costs associated with fixed-term employment. In their study, emotional wellbeing was lower for fixed-term workers in general but transitioning from permanent to fixed-term contracts was linked even more strongly with increased anxiety and sadness, while the reverse was true for those moving out of fixed-term work and into permanent employment. Exiting fixed-term work into a permanent job was also correlated with increased satisfaction with life. Unsurprisingly, the increase in fear when moving into fixed-term work was mediated by job security, demonstrating the harm done by precarious work. However, the effect on sadness was not mediated by job security, leaving workers in fixed-term employment

dissatisfied regardless of the perceived stability of their position, which makes it clear that there is no form of precarious or unstable work that is free of psychological and emotional risk to workers.

Other factors contributing to the increased risks for workers health and safety are lack of training, intense competition for work and lack of unionisation (Underhill and Quinlan, 2011). Virtanen et al. (2015) also link temporary work with the context (e.g. country) and the workers' living conditions.

2.3.3. Precarious work and supply chains

This study focuses on the wind power industry in Brazil. The wind power sector was chosen because it is an important and growing part of the economy and one where there are challenging labour conditions across its supply chain. The focus of the study is on the labour process and precarity in the Brazilian part of the supply chain, although some of the case study companies were foreign-owned and/ or part of multinationals. C1 was Portuguese; C2 was a Brazilian engineering group; C3 was a Brazilian engineering conglomerate which manufactured wind turbines; C4 was originally part of a commonwealth group of investors, but in 2019 was acquired by a Chinese group. C5 was Danish, and C6 was a Brazilian transport company. This means that some firms were part of global commodity chains.

Earlier studies of Global Commodity Chains (GCCs), such as that by Gereffi and Korzeniewicz (1994) suggest that lead firms can be instrumental in bringing about economic upgrading of firms in the Global South that are further down the supply chain, especially where firms become more technologically able and therefore more profitable. This thesis focuses on the wind power supply chain sector in Brazil – a producer-driven chain, where lead firms normally enforce what, when and how to produce (Gereffi and Lee, 2016). In this respect, it differs from what might happen in other forms of supply chain where, for example, a monopsonistic supplier might be more powerful than the buying firm.

Although literature on GCCs helpfully explains the relationships between buyers and suppliers, and lead firms within global supply chains, this body of work has also been criticised. Authors such as Sturgeon (2009) instead used the term Global Value Chains (GVCs), explaining how it is important to understand how and where there is value accumulation across the supply chains, and highlight the importance of different forms of governance. These forms of governance can affect the extent to which countries in the Global South might benefit from involvement in the Global Value Chain.

Subsequent work has criticised both GCC and GVC analyses, tending instead to use the term Global Production Networks (GPNs). Authors of this work have focused on how surplus value is created and captured across the chain, and how power is exercised. Authors such as Smith, Rainnie, Dunford, Hardy, Hudson and Sadler (2002), Henderson, Dicken, Hess, Coe and Yeung (2002) and Rainnie, Herod and McGrath-Champ (2011) argue for greater understanding of the role of national governments as well as other stakeholders such as trade unions, and the need to pay more attention to the labour process. Newsome, Taylor, Bair and Rainnie (2015) point to how Labour Process Theory can help to provide a more bottom-up analysis of global chains.

However, research studies into GCC, GVC and GPN have still often paid insufficient attention to labour and employment relations in their frameworks. It is important to analyse the capitalist labour process whereby changes in working conditions are determined by a balance of power between the labour and the capital, and, furthermore, to analyse how states institutionalise such power (Selwyn, 2013; Taylor, Newsome and Rainnie, 2013). In analysing the labour process, it is also important to acknowledge that workers are not necessarily "passive victims" (McGrath-Champ et al., 2015, p.628), and might instead be viewed as "*active agents in the accumulation process"*, shaping different cultures of work and being capable of resisting change. Donaghey et al. (2014, p.231-238) outlines three factors that influence labour power in supply chains:

> *"The structural power of workers is high when workers are not easily substitutable, when they have effects on other parts of the economic system, and when knowledge of the structure of a supply chain enables workers to upset the flow of the chain to claim better wages and employment conditions".*

In other words, the more skilled the workers are and the more knowledge they possess, the better chances they have of being able to successfully negotiate working terms and conditions.

Labour processes may differ at different points of the supply chain. Lakhani, Kuruvilla and Avgar (2013, p.440) argue that *"different value chain configurations will evidence different employment relations patterns".* This thesis focuses on the wind power supply chain sector in Brazil – a producer-driven chain, where lead firms normally enforce what, when and how to produce (Gereffi and Lee, 2016). In this respect, it differs from what might happen in other forms of supply chain dynamics where, for example, a monopsonist supplier might be more powerful than the buying firm.

Lead firms are important actors due to their ability to dictate how workers are treated within supplier firms, but their workings and behaviour are influenced by various internal and external motivations, barriers and pressures. Firms' capacity to control workers and their working conditions, therefore, make it necessary to understand the power relations between firms in order to understand the process of social and economic upgrading (Donaghey et al., 2014; Pegler, 2015). It is also important to understand the nature of inter-/intra-firm networks, and whether the firm is operating as a national or international business (Taylor, 2012), the legal context (Beck, 2000; Berlinger et al., 2015), geographic and economic contexts (Taylor, 2012); and market pressure (Donaghey et al., 2014). For instance, lead firms may be driven by market pressure to reduce costs and maximise profits at the expense of workers (Donaghey et al., 2014). Thus, not only is understanding the power relationships between firms crucial, but so is understanding the external forces, such as those exerted by the market, which act upon firms and influence their behaviour. Lead firms may be subject to market pressures that impose competitive standards of cost reduction, so that they, in turn, introduce measures that include staff cuts and lowering wages, among other violations of worker well-being (Locke and Romis, 2007).

Further factors influencing how a lead company behaves with regard to employment relations include new laws enforcing or reducing workers' within and across supply chains (Beck, 2000; Berlinger et al., 2015). Entities such as the International Labour Organization (ILO) promote the adoption of fundamental principles that global companies should follow. These principles aim to respect freedom of association, eradicate child and forced labour, and eradicate discrimination in employment (ILO, 1998). Companies have since developed their own codes of conduct (Locke, Rissing and Pal, 2013). Yet companies may fail to execute them in reality. Companies create codes of conduct not only to improve working conditions but also to increase their competitive advantage and prevent damage to their reputation (Barrientos and Smith, 2007). Codes can vary considerably in scope and may not cover all of the ILO's core labour standards. There is little evidence that private initiatives like these lead to sustained improvements in labour and environmental standards, although this engagement has brought important resources to bear on monitoring and auditing (Barrientos and Smith, 2007; Locke and Romis, 2007; De Colle, Henriques and Sarasvathy, 2014; Locke et al., 2013). Better working conditions for all workers (permanent and temporary) should ideally be achieved via private initiatives and public regulation. These should complement each other with necessary interventions to enforce labour standards within the global supply chain. However, in reality, workers in most developing countries tend to find themselves working for agencies and have limited freedom of association (Locke et al., 2013). Meanwhile, at least insofar as reporting is concerned, large multinationals can tend to focus on HR within their

companies and neglect the human rights of workers across the supply chain (Ehnert et al, 2016), including precarious workers based in the Global South.

The next section will discuss the relationship between precarious work and the labour process in countries such as Brazil which form part of the 'Global South'.

2.3.4. Precarious work in the construction industry

A lot of the work in the wind power industry involves construction. Work in construction is generally considered to be one of the most precarious forms of employment (Quinlan, 2012). In Brazil, most of the work in the construction phase of wind farms is carried out by unskilled male workers coming from the construction industry. One of the ways in which construction work is precarious is in relation to health and safety. In particular, the worker's first 30 days on a construction site are considered to be at the greatest risk of injury because they are being familiarised with the job and its potential hazards. Therefore, this should be time where they are closely monitored in order to prevent injury (Breslin and Smith, 2006, cited in Sparer et al., 2015).

A further way in which construction work is precarious is that workers have had protections given by trade unions limited. In Britain, employment in construction is considered to be weakly regulated, and unions have failed to influence change, with employees facing increased insecurity and vulnerability (Winch, 1986; Mustchin, 2014). Temporary contracts from work in construction projects means workers are constantly moving from job to job, from one place to another. The temporary nature and mobility of jobs influences the way in which workers are able to relate to unions, making effective collective representation more difficult. Moreover, if the job is in a remote area as is the case in the Brazilian wind power industry, it can be harder for workers to reach out to union representatives and vice-versa (Berntsen, 2016). In Brazil, as in many parts of the Global South, unions have faced significant challenges in coordinating across regions and in trying to reach workers who are based in difficult-to-reach locations (Fox-Hodess, 2022). When construction is in remote locations, employers usually provide housing facilities and, sometimes, transport from home to work. With jobs tied closely to accommodation and transport, workers may be subject to more control from employers (Berntsen, 2016).

This section analysed the literature on precarious work and the labour process to provide an understanding of how the concept has been developed since its inception, also referring to aspects of precariousness in the context of Brazil, and in the wind power industry in Brazil. This is covered in more depth in the next section.

2.3.5. Precarious work in the Wind Power Energy Sector and its supply chain in Brazil

This section firstly discusses the wind power industry in Brazil, pointing out the challenges it was facing in order to remain competitive as well as explaining the key features of the wind power supply chain as relevant to this thesis. It then moves on to focus a little on the heavy construction element of the wind power industry. Since the wind power sector in Brazil is starting to develop its operations also offshore, the last part will point out similarities of the wind power industry with the oil and gas industry offshore. This latter part is important since if the wind power industry moves toward more offshore working, the future wind power industry offshore in Brazil may face additional forms of precariousness that are largely experienced by workers in the Brazilian oil and gas industry.

2.3.5.1. Wind power energy sector and supply chain in Brazil

In Brazil, the wind power energy industry has become an important part of the economy and in 2016 represented 6.8% of the country's energy generation (Brazilian Power System Operator, 2016). Based on the Global Wind Energy Council report (2016), the country's cumulative capacity moved from 15th position worldwide in 2012 with 2.5 Gigawatts to occupy the 8th position in 2018 with 14.7 Gigawatts. Clearly, the wind power industry was growing rapidly, and growth was accelerating.

The supply chain in the wind power industry in Brazil is relatively new and it has been suggested that it has many bottlenecks, and so can be sensitive even to relatively minimal situations affecting production. For example, any failure in an equipment delivery schedule can produce knock-on effects for the entire chain as substitution of parts and components are scarce and non-viable (Wind Energy Industry Manufacturing Supplier Handbook, 2011). The largest wind farms in Brazil are concentrated in the north-eastern and southern regions of the country, but many of the industry's supplier companies are located in São Paulo, in the southeast. The transport of equipment is slow, requiring specialist transportation because most of the cargo is large in size (most of the times overpassing the body of the truck) and heavy in weight, requiring special skills to drive the trucks (ABEEOLICA, 2017).

The wind power industry supply chain includes big corporations and small businesses. Large commercial utility-scale turbines were first developed in the United States in the 1970s and thereafter the industry developed globally. Major infrastructure development evolved in order to meet the growing demand for components, such as blades, shafts and towers that compose a wind turbine as well as sub-components, machinery and technology. Lead companies need suppliers who promptly follow high specifications (Wind Energy Industry

Manufacturing Supplier Handbook, 2011). Lead firms have specific requirements because any failure to conform with the zero-defect quality specifications could result in operational delays and high repair costs. This high-pressure situation generates tensions that can have an impact on employment relations throughout the entire supply chain. Because of the high specifications, the location of suppliers is secondary. As a result, relationships in this sector are often established among organisations in different countries, with distinct cultures and business practices (Wind Energy Industry Manufacturing Supplier Handbook, 2011).

The industry's rapid technological advance requires constant staff training. There is also concern regarding occupational health and safety in this area as working with wind power is considered to be extremely high risk. Operational and maintenance workers, for example, are susceptible to high and low voltage equipment and many technical activities that require heavy lifting of objects on a regular basis (Rawcliffe, 2017). Some employees work in remote and/or offshore sites where access to specialist medical treatment is limited. Employers are aware that in the event of an incident, depending on its gravity, losses suffered by companies could be significant, particularly in relation to downtime and suspended production (ABEEOLICA, 2017) because of the domino effect on the rest of the supply chain (Wind Power Energy Council Statistics, 2016). Training of workers is important to minimise the impact of worker error on the wind energy supply, but this is challenging to maintain due to the lack of training available.

It is commonly recognised that the wind power industry relies heavily on a number of temporary jobs which frequently force workers to relocate, causing regional population 'booms' and 'busts'. When these workers move from job to job under big contracts to build wind farm sites, for example, one consequence has been some small cities growing fast without adequate urban planning, inevitably applying pressure to and creating chaos in the local infrastructure. Meanwhile, some places became 'ghost towns' when all the workers have left (Geofísica Brasil, 2014). The drive to remain internationally competitive has bred competition within the Brazilian wind power industry, and the Brazilian Government also requires companies to bid for contracts (Bayer, 2018; Bayer et al., 2018). This has also had implications for companies within the supply chain and for precarity.

2.3.5.2. Work in the wind power and heavy construction industry

The wind energy industry includes the heavy construction sector, which generally accounts for most of the low-skilled jobs within the wind power supply chain (Oliveira, 2013). In the wind power industry, it is common for a single company to be engaged in multiple simultaneous wind farm projects in distinct locations, distant from one another and at different phases of

execution. Companies establish contracts with different suppliers for each project. The region which offers the best wind conditions is often remote and hard to access, far from any towns and cities and with scarce labour resources, thus hindering the recruitment of workers.

The phase involving the highest level of recruitment is the construction of the wind farms. In this phase, wind farms engage hundreds of people in the jobs of bricklayer, painter, machine operator, heavy equipment assembler, load vehicle driver, stockroom manager and others. Large projects usually start by building and wreckage activities to clear and prepare areas for the concrete and metal structures that will support the wind turbines (Oliveira, 2013). These construction projects have an estimated timeframe for conclusion and each contract usually generates a portfolio of various employees. This high turnover requires the company's HR department to deal with a high-volume of contracting processes, which in the vast majority of cases culminates in hundreds of employees losing their jobs almost simultaneously at the end of each farm's construction (Geofísica Brasi, 2014).

Many workers work for less than 18 months at each company. People hired to work on these jobs have no expectation of being rehired in future projects. Workers frequently move from site to site, often in remote locations with little or no infrastructure (Gato and Salazar, 2018). In larger and more complex projects, it may mean that most workers will be moving temporarily to the job site, living in accommodation provided or outsourced by contractors.

In countries such as Brazil, employment in the heavy construction industry is considered weakly regulated. Deregulation has involved, for example, fewer employment protections and collective rights for workers, while there has been increased flexibility in terms of the ability for employers to hire and fire their employees (Oliveira, 2018).

Unions in heavy construction have shown particular concerns with the health and safety. Since different jobs and skills are required at each phase of a project, this forces workers to move from job to job, which is considered to involve a high risk of accidents. It is also the case that when workers are hired quickly, and not properly trained and not provided with enough safety equipment, the hazards of handling heavy tools and electric components pose a major threat to workers' lives (Força Sindical, 2015; Sindicato dos Metalúrgicos, 2019). One example of how dangerous the work can be is that during the construction of the Jirau and Santo Antonio hydropower stations in Rondônia – in northern Brazil – there were 43 deaths formally registered and 10 missing workers between 2010 and 2014 (Castro, 2014).

As part of an investigation into the abusive treatment of workers in that region, public prosecutors found that many workers were not only being treated unfairly, but some were

risking their lives in extremely precarious working conditions. They revealed that workers were disappearing for days without the required processes of formalisation or a search. Workers also reported colleagues dying of malaria without any official medical report and testified to others being mutilated or tragically falling from high buildings into giant pools of wet concrete. As well as this it was reported that when someone had gone missing, they were basically assumed dead, but nobody would do or say anything about it (Castro, 2014). It has also been found that construction workers in Brazil "*rush to get the work done, with total negligence in relation to the work conditions. Subcontracting and sub-subcontracting are the order of the day", with "excessive working hours" and "hostility of the bosses"*" (Penelas, 2015).

Concerned with the conditions of unskilled labourers in construction, unions have reported a range of practices that need to be changed, including recruitment and retention. Rather than keeping the existing workforce, companies have tended to hire local workers to reduce costs, regardless of their skills or previous experience, providing a small amount of training (if any) to locals since it costs less than having to pay the expenses of moving the existing workforce from one place to another. New developments have often attracted hundreds of inexperienced candidates desperate for a formal job opportunity. Companies have also taken advantage of the 2017 Labour Reform (2017) as well as the local workers' desperation and poor living conditions, to offer them low salaries under poor working conditions (Oliveira, 2013; Véras, 2014; Força Sindical, 2015; Sindicato dos Metaúrgicos, 2019). For example, studies based on the northern region of Brazil have found that some of the local workers were previously employed in harvesting sugar cane plantations. They were excited about starting a new job in construction for a well-established company, despite being initially offered exactly the same wage as they were paid when working on the farms. However, they soon realised that the company was paying them less than others in the same job who came from other regions. The workers also found that although they were now working for a large company rather than local farmers, they continued to face similar precarious conditions such as poor accommodation, long journeys, no breaks, lack of training, excessive working hours, working under a lot of pressure and fearing for their safety (Oliveira, 2013; 2014). In addition to this, the jobs were still temporary, and possibly more dangerous.

2.3.5.3. Comparing work in the wind power industry with the Brazilian oil and gas offshore industry

In the wind power industry, and likewise in the oil and gas industry, there has been a movement to offshore production. However, these positions still rely on temporary contracts. Woolfson (2004) argues that precarious employment remains intrinsic to the oil industry, with high levels of injury and death at work on offshore platforms. While some aspects of work in

onshore wind are similar to those in heavy construction, work in offshore wind is considered to be even riskier in terms of health and safety (Figueiredo et al., 2009; GWEC, 2021).

There are further links between the two industries. Offshore wind is proving particularly attractive to oil and gas companies entering the renewables sector. Oil companies won half of the tenders for offshore wind projects in 2019-2020 worldwide, and oil majors were involved in 30% of offshore wind final investment decisions in 2020. The main reasons for that could be the operational experience, the understanding of the environmental conditions and the expertise that can be applied in related areas such as offshore wind pipelines (Mackenzie, 2021; Foxwell, 2021).

Studies projecting new jobs within the wind industry over the next five years suggest that the number of jobs to be created for offshore wind will be triple the number of onshore jobs (IRENA, 2021). However, the focus within the literature to date has been on the number of jobs created, not on working conditions (Schulte et al, 2022). Given that offshore production usually adds more complexity to activities such as construction, assembly and installation than onshore, it heightens concerns over how offshore wind activities may impact workers' safety and wellbeing (GWEC, 2021). Another concern is how prepared the managers are for shifting to offshore sites in dealing with workers in more precarious conditions. At the same time, the wind power industry has seen increased subcontracting of equipment and services, ranging from supply to distribution (Druck, 1999; Siqueira and Haiana, 2005; Figueiredo et al., 2009).

In summary, there are some similarities with regards to precarious working conditions between the heavy construction, the oil and gas and the wind power industries. These similarities include: a variety of highly specialised tasks; the sequential, short-term nature of many of the activities; and the performance of operations in remote locations often distant from each other. All three sectors are known for the underreporting of accidents and injuries. There is a high prevalence of temporary contracts; the common execution of high-risk operations; workers are constantly away from family, sometimes in isolation; and most workers face poor working conditions and job insecurity.

2.4. Worker resistance and the power resources approach

The concept of worker resistance as applied in the Labour Process Theory debate has historical origins which have been attributed to Braverman's Labor and Monopoly Capital (1974), with numerous scholars throughout the years contributing to the development of the theme (for example, the work of Friedman, 1977; Thompson, 1989; 2010; van den Broek and Dundon, 2012; and Anner, 2015). Although indispensable, Braverman's explanations of resistance have drawn critique. He was strongly influenced by Marx's views of exploitation in

the nineteenth century, as mentioned by Thompson (1989). At the same time, he (Braverman) looked into resistance, observing different aspects of exploitation and degradation of work found in twentieth-century Taylorism. In Labor and Monopoly Capital, he attempts to give an objective definition of resistance. In neglecting the concept of subjectivity, he can be accused of ‘a self-imposed limitation’ in observing capitalist class conflict (Braverman, 1974, p27).

Various authors have asserted the importance of contextualising how and under what specific circumstances power and resistance are attributed or experienced (Hodson, 1995; Thompson, 2010). Some authors (Hodson, 1995; Whitston, 1997; and Thompson, 2010), concerned with the importance of everyday forms of resistance argue that new technologies and globalisation changed the mode of production, introducing new routines and procedures that led managers to implement direct forms of control.

The theme of resistance has regained momentum both in industrial relations and in managerial studies, with authors moving away from the objective views of Marxism and toward more subjective analyses of power. These new paths include the use of empirical methodologies seeking to understand the situation of resistant workers from different angles within working relationships (Jermier, Knights and Nord, 1994). Hodson (1995), for example, calls for more research on these new forms of resistance. Based on his reflections, the new forms of work developed in the 20th century demand new systematic approaches. Particular circumstances may impact resistance differently, or rather could be making it more difficult for workers to resist control (Jermier, Knights and Nord, 1994). The use of more subjective perspectives could be beneficial for this understanding (Hodson, 1995). While some critics may dispute the appropriateness and risks of taking subjective views, it has in fact led to the identification of power clashes within working relationships.

The reconceptualisation of worker resistance by Hodson (1995) reflects the changes happening in the workplace in the 1990s. The new concept includes observing the changes in the deskilling of the workforce, increased usage of electronic surveillance and the monitoring of work. All of these pose challenges for the study of resistance in assessing how the new forms of control affected workers’ ability to resist. As a result, Hodson (1995) argues that meaningful understanding of these changes in the workplace is necessary for the advancement of Labour Process Theory, if new types of work relationships which deviate from traditional, industrial-era ways of working are to be included. One example of how subjectivity can be successfully applied to the analysis of resistance is the work of Mark Anner (Anner, 2015). In his study of labour regimes and worker resistance in the apparel global supply chains, he argues that the way workers resist control is partially shaped by how they are controlled by different labour regimes. In his study, he found that in countries with strong State

regimes, workers experienced resistance differently from those coming from market-controlled or employer-controlled regimes. For example, in market-controlled regimes, labour regulations tended to reduce workers' power of bargaining. He also found that forms of resistance were influenced by how labour unions behaved and by workers' lived experiences (Anner, 2015).

This study analyses workers in distinct phases of wind power production to identify similarities and which aspects of LPT (such as deskilling, direct controls, cultural controls, market controls) inform the way workers within the wind power sector in Brazil resist control. In the wind power industry, the increase in fragmentation, outsourcing and the use of flexible contracts, has changed how workers interact. Through the use of anti-union strategies, managers have instilled fear among workers of becoming union members, thereby influencing their ability to resist control. Dividing and fragmenting the workforce can destabilise workers' sense of unity and harm their ability to collectivise (Thompson, 1989; 2010; Martinez Lucio, 2010; Hodson, Broek and Dundon, 2012; Anner, 2015b).

2.4.1. Forms of worker resistance

Workers might challenge managerial control through forms of resistance such as 'misbehaviour' (Godard, 2004; Thompson, 2009; Lloyd, 2017), or through voicing concerns directly or through a trade union. For example, tracking/checking on employees' performance and behaviours might make workers feel watched and more intensely controlled. In order to combat the discomfort and the excessive exposure, workers may refuse to allow surveillance, reject the increasing use of sociometric practices to track bodies by means of wearable self-tracking devices, reject telepresence, and refuse to share data (Moore and Robinson, 2016). Alternatively, they might work together collectively through trade unions. All of these forms of worker resistance may be valuable in theory but difficult to implement, given the ever-increasing number of mechanisms used to control workers, both within firms and down supply chains. Recent studies by Nowak (2019) and Bieler and Nowak (2019; 2021a; 2021b) have drawn attention to how forms of resistance, and their likely success, might depend on workers' position in the supply chain. Moreover, the precarious conditions of work in the Global South can result in trade unions' lack of ability to effectively represent workers.

Nowak (2019) argues, for example, that the transnationalisation of production in capitalism has not only widened the gap in wages between the North and South but has also increased precarious conditions for both (North and South). Employers benefit from the flexibilisation and outsourcing along the production chain. Meanwhile, this division of work has put workers into a situation of having less ability to organise themselves collectively, at the

same time as unions have found it more difficult to represent them (Nowak, 2019; Bieler and Nowak, 2021a; 2021b). The following (Section 2.3) explores these aspects further.

2.4.2. Workers in the Global South and the power resources approach

Both labour process theory and the power resources approach (PRA) have been applied to the situation of workers in the Global South. According to Schmalz et al (2018, p.115), the PRA is "*founded on the basic premise that the workforce can successfully defend its interests by collective mobilisation of power resources in the structurally asymmetric and antagonistic relationship between capital and labour*".

Most notably, discussion of how the power resources approach can be applied to workers in the Global South is evidenced in the book entitled, 'Recasting Workers' Power: Work and Inequality in the Shadow of the Digital Age' by Edward Webster and Lynford Dor. The book includes chapters explaining how precarious workers across different parts of Africa have experienced access (and often lack of access) to different forms of power resources. The book covers workers in the public sector, informal sector and private sector. In this book it is explained how workers may lack *structural power* due to their labour position in the economic system and production process but do have some degree of *associational power* from their collective involvement in political or trade union associations.

Early authors on the power resources approach who discuss structural power and associational power include Olin Wright (2000) and Beverley Silver (2003). However, later, Webster et al. (2008) also refer to how workers might have *logistical power*, in that they can disrupt flows of capital and people, and *symbolic power*, through influencing culture and public debates. As Schmalz et al (2018) explain, a further form of power that labour can have is *institutional power*, through institutionalised labour rights and dialogue procedures, provided through labour regulation, and *societal power* which can involve changing the discourse around the value of trade unions – persuading the public that they are fighting for just causes, and also working through networks with other social actors (e.g. non-governmental organisations).

The different power resources are not stand-alone resources. This is explained by Schmalz et al (2018) but also discussed in other recent work. For example, Fox-Hodess and Santibáñez Rebolledo (2020) explain the interaction between societal, structural and associational power in the case of Chilean dockworkers. Their important role in representing workers' rights is partly since they were positioned in 'chokepoints' and therefore they had structural power, but their achievements were only possible because of their previous organising (associational power) and strategic links to other social actors (societal power).

This thesis engages with labour process theory (and management controls) as well as precarious work. Of particular relevance to this thesis is the chapter by Dor (in Webster and

Dor, 2024) which explains how precarious work can be used as a control mechanism, when the workforce is dispersed as a result of geography or shiftwork, and deskilling takes place resulting the degradation of labour. Also relevant is the chapter by Fikile, who explains how in platform work, an app can be used to monitor performance and consequently to determine pay. But also mentioned is the way in which workers can create worker-driven messaging apps and chat groups to engage in some forms of resistance, and make use of associational power, even though it is not through a trade union. Also of relevance is the discussion of the dualization thesis, drawing on work by Visser (2019). In simple terms, the idea of the dualization thesis is that unions may be tempted to defend existing strongholds (i.e. core workers in stable jobs) but neglect the majority of workers who are in precarious jobs. As explained earlier, many workers in the wind power industry are in precarious jobs, are subject to instruments of control, and also lack various forms of worker power.

This thesis focuses on the wind power industry in Brazil which is known for having good jobs, but where in fact there is a lot of precarious work. In this context, it is important to consider how and if workers can use different power resources. Schmalz et al (2018) refer to how, in using structural power, workers can disrupt the production process by refusal to work (e.g. through strikes or industrial sabotage). Meanwhile, if they have rare skills (and unemployment is low) they can be in a better position to bargain with employers as they can move jobs if they do not obtain what they demand in their current job. Workers might have associational power where they unite together, for example through a trade union. Here, membership numbers can be really important. But also important are financial resources, effective organisational structures, members' willingness to take action, and collective identity. Institutional power can include freedom of association, the right to go on strike, and the right to engage in collective bargaining, but these can be overturned when different political parties come into power, as will be seen in the next chapter in the context of Brazil.

2.5. Summary

This chapter has presented a review of the literature on LPT, dormitory labour regimes, and precarious work. Although many of the case study organisations are Brazilian, it has also included brief coverage of literature on global commodity chains/ global value chains/global production networks as to some extent, the position within the (global) supply chain can affect the labour process and precarity. The chapter then moved on to discuss worker resistance and access to power resources. The next chapter (Chapter 3) explains how these might be affected by the political and economic context in Brazil.

Chapter 3: Literature Review (2)

The Brazilian experience in the realm of employment rights and working conditions is deeply rooted in its historical, political, and social dimensions. This chapter aims to provide an analysis of this multifaceted journey, examining key historical milestones, political ideologies, and social dynamics that have moulded the Brazilian workforce. By understanding this context, we might better grasp the contemporary challenges and opportunities facing workers in Brazil more generally and better understand how employers are able to exert controls over workers, how unions are limited in power resources, and the precariousness which workers in the wind power industry are facing.

First, this chapter will briefly discuss Brazil's social, economic and political history in Section 3.1. It will then, in Section 3.2. cover the historical origins of modern labour law in Brazil, explaining developments in Brazilian labour law, starting from the 1980s and moving up to more recent times. Next, the repercussions of these laws will be discussed in terms of precarious work and workers' rights and protections.

3.1. Brazil's social, economic and political history

Brazil's labour relations history is deeply intertwined with the country's broader socio-economic and political trajectory. The country has a colonial legacy marked by the exploitation of indigenous peoples, and the introduction of African slaves laid the foundations for an unequal and exploitative labour system. This legacy continues to reverberate in contemporary socio-economic structures, impacting employment rights and conditions. The abolition of slavery in 1888 was considered a pivotal moment, prompting the emergence of labour movements seeking to address the rights and conditions of the newly liberated population. However, the transition from slavery to wage labour was fraught with challenges, and exploitative practices persisted, shaping the early contours of Brazil's labour struggles (Antunes, 2005).

The 20th century witnessed significant industrialization and urbanization in Brazil, which in turn transformed the nature of work and labour relations. The advent of industrial capitalism brought about economic growth, but it also exacerbated social inequalities, thereby setting the stage for intensified labour activism and the formulation of labour laws. From the authoritarian rule during the military dictatorship to the democratic transition, each era has left

an indelible mark on labour policies, reflecting the ideological underpinnings of the ruling powers (Mayer, 2006).

Prior to the 1980s, Brazil experienced rapid industrialisation, which fostered the growth of a strong labour movement. This movement was instrumental in advocating for workers' rights and shaping the early labour laws in the country. However, the military dictatorship (1964-1985) significantly altered the industrial and labour landscape, which imposed strict controls on unions and labour activism.

The transition to democracy in the mid-1980s heralded a new era for Brazil's economy and labour relations. The 1988 Constitution marked a significant milestone, introducing a range of labour rights and protections. Despite these advancements, the subsequent decades saw a gradual shift towards economic liberalisation and privatisation. These changes, often driven by global economic trends and domestic fiscal policies, led to a decline in union power and a fragmentation of the labour movement.

Despite strides in labour legislation and the establishment of regulatory frameworks, contemporary Brazil grapples with persistent challenges. Informal labour markets, precarious working conditions, and unequal resource distribution continue to hinder the realization of equitable work rights.

3.2. The historical origins of modern labour law in Brazil

Historically, the Brazilian state had an active role in organising labour. The Federal Constitution of 1988 and the Consolidation of Labour Laws (‘Consolidacao das Leis Trabalhistas – CLT’) are the main sources of legislation/regulations about labour and employment in Brazil. However, over the years, several federal laws have been introduced that relate to more specific provisions of employment relationships. It is worth noting that employment policies are governed by supplementary laws, which means that legislation does not depend solely on political agendas (Gonzaga, 2003).

As mentioned above, in the 1980s, Brazil underwent a process based on opening commercial and financial relations, the implementation of rigorous fiscal adjustment laws, and privatisation. The concerns raised by the Economic Commission for Latin America and the Caribbean (CEPAL) regarding less technological barriers were largely ignored. Industry's share in gross domestic product (GDP) fell (Weller, 2000; Oliveira and Proni, 2016). Marked by inflation and stagnation, the decade was also characterised by a decline in productivity and wage rates, which meant that workers were deeply affected, creating tensions between Union leaders and the Government.

In terms of labour relations, after 21 long years of dictatorship rule (1964-1985), in 1988 there were constitutional reforms and new collective labour rights. These rights included limiting state interference in unions, prohibiting the dismissal of union members, allowing public employees to constitute union representation and most importantly, requiring employers to bargain collectively (Anner, 2008). The re-introduction of democracy and market liberalisation in the 1990s, however, did not change the extent to which Brazilian firms were still dependent on continued state intervention. Although the state still played an active role in organising labour, there was a gradual shift in how the industry perceived this role. During the military rule, the industry benefited from having labour repressed, with militarists moving away from the industrialists' influences and closer to state control.

Labour markets were organized by "Sindicatos", which refer to both labour unions and business unions. Around that time, all workers were required to become members of a trade union/syndicate, but trade unions representing steelworkers, workers in automobile assembly, dockers and construction had more power and were more active than others (Sibal, 2014). Although politically strong, unions in general represented different labour interests and had high turnover rates, which may explain why some formalised institutions only existed on paper but did not meet the labour market demands such as training and development. Instead, the most inactive unions centralized their actions mainly around wage bargaining.

However, after this a decline in industry led to a significant reduction in union power and a fragmentation of the labour movement, particularly following the coup that resulted in the impeachment of President Dilma Rousseff – elected to continue the President Lula da Silva's worker party government (Beck, 2000; Anner, 2008). More recently, there has been a process of disruption and deregulation of the labour market, increased informality and deterioration of job quality (Oliveira, 2018). In particular, workers have been impacted by the 2017 Labour Law, which will be discussed in the next section.

3.3. The impact of the 2017 Labour Law on working conditions in Brazil

Under the primary argument of generating new jobs through more flexible labour standards, the National Congress approved Law 13.467 in 2017, commonly known as the Labour Law Reform Act (Filgueiras, 2019). Many workers found themselves in much more vulnerable positions and were now being offered jobs with more precarious working conditions (Krein, Véras and Filgueiras, 2019). The law involved more than 100 changes to workers' rights, representing a significant loosening of regulations and weakening the power of the workers. Among the most dramatic changes were the reduced worker rights in relation to annual leave and overtime, the removal of a guaranteed minimum salary (or national minimum wage),

reductions to the amount received upon dismissal, and increased difficulty in accessing the courts. The worker, rather than the company, was now responsible for paying initial court costs. There was also the elimination of union representation in some cases where it had previously been compulsory. In addition to this, there was the creation of the category of work, known as the '*exclusive independent contractor',* which limited the employee to remaining available to work exclusively for a given company, but without any right to annual leave as they were only paid for hours worked. As a result, workers were now more vulnerable to pressure to accept more precarious working conditions and lower salaries (Filgueiras, 2019 *in* Krein, Véras and Filgueiras, 2019). In essence, these labour reforms in recent years in Brazil normalised precarity even more, making it a far more widespread part of employment, the consequences of which will be discussed in Section 3.4.

3.4. Implications of the 2017 Labour Law for precarious work

The 2017 Labour Law contributed toward increased precarity in various ways. For example, the law encouraged informal employment by changing how different forms of work were recognised. For example, under the law work as an independent contractor performed at a company might be considered employment without the person having any employment relationship with the company. At the same time, new and stricter criteria meant reduced access to labour or social insurance benefits despite being employed.

New forms of employment were introduced, such as *interim employment contracts*, the contracting of workers as *legal entities*, *part-time employment contracts* and *home office* employment. Prior to this law, for a company to hire an employee on a temporary basis, it had to justify the nature of the activity in accordance with the list of atypical activities determined by the government. With the new legislation, any activity could be contracted temporarily, and because of this, the number of temporary positions (defined as interim workers) expanded. These positions included the professional categories of metal cutting and welding, as well as industrial machinery maintenance and mechanics which are professions mainly associated with the construction and energy industries, including the construction of wind farms and offshore work (Krein and Oliveira, 2009).

Since interim workers often received lower pay than permanent workers, companies had an incentive to dismiss permanent workers in favour of interim workers. The new interim employment contract allowed these employees to be officially hired as temporary workers with less guaranteed worker rights, reduced severance package benefits and a reduced role for the union in relation to dismissal. Moreover, payment for *in intinere* working hours was

eliminated, allowing the employer to not pay the employee for time when they remained on-call and at their disposal.

The Reform also affected social security. The required period for social insurance contributions for employees to have the right to receive benefits, was adjusted. An 18-month minimum social insurance contribution period was established along with the required registration of the employee's social security card in order to qualify the employee for unemployment compensation. The law also resulted in deskilling. Technicians were used to replace engineers, which may explain why, twenty months after the Reform, more than 5,400 engineers had lost their jobs (O Globo, 2018). Workers therefore suffered a great deal in ways which were further compounded by the additional changes discussed in the next section.

3.5. Implications of the 2017 Labour Law for access to the courts, unions and labour inspectors

The labour reform described above also affected many of the ways in which employees could access the justice system. On the one hand, the law now meant that a decision made between employees and employers prevailed over that decided in the Courts. If the employee signed a termination agreement that did not encompass all of their rights the matter could not be pursued in court, as the agreement made with the employer prevailed. Workers in desperate situations could therefore sign such an agreement, not only permitting but enabling and legalising their exploitation. Furthermore, this assumption of dismissal by mutual agreement allowed the implementation of a 20% reduction in the *FGTS* penalty (the Government severance fund for employees) and halved the paid notice period that companies were required to pay upon termination of employment (Dutra, 2019 *in* Krein, Véras and Filgueiras, 2019). In addition, if the court's decision went against the employee, they were burdened with the court costs making access to the courts, in practice, prohibitive financially, acting as a natural deterrent to poorer workers. In the first year after the rule was introduced, from 2017 to 2018, the number of labour lawsuits was reduced by almost a third (Filgueiras, 2019 - REMIR). Finally, the employer could dismiss an employee without the need for giving any formal grounds.

The reform weakened union representation by: making union fees optional rather than mandatory; opening the path for the formation of employee representative committees in companies; and hindering the collective bargaining processes. Consequently, there was a fall in the number of collective agreements (Sindicato dos Metalurgicos, 2019). The inspection of employment and working conditions also underwent critical changes. Provisional Measure MP905 amended inspection rules, such as increasing the minimum number of employees that a company needed to have (from 5 to 20) in order to be required to formally record and control

its workers' working hours. Moreover, while previously a labour inspector was allowed to visit a company without prior forewarning or announcement, and, if applicable, impose a fine for any violations found during that inspection, following the reform, companies were entitled to be notified in advance. A fine could then only be imposed if the company was found to still be in breach of the law after the first notice. This diminished the power of inspection by reducing the circumstances under which it could be utilised while also increasing violations of the rules by companies (Galvão, 2019 *in* Krein, Véras and Filgueiras, 2019).

3.6. Further factors affecting Trade Unions in Brazil

Trade unions have historically served as crucial advocates for workers' rights, acting as a collective voice to negotiate fair wages, safe working conditions, and labour policies. In the Brazilian context, the role of trade unions in protecting workers' rights is complex and nuanced, marked by both significant contributions and challenges. This section explores the structural and associational barriers that trade unions now encounter in Brazil, shedding light on the factors that shape their effectiveness in safeguarding the interests of the workforce.

Trade unions in Brazil face structural impediments that affect their ability to effectively protect workers' rights. One notable challenge lies in the diversity of economic sectors, each with distinct labour dynamics. The heterogeneity of the labour market makes it challenging for unions to formulate unified strategies that cater to the varied needs of workers across different industries. Additionally, according to Mayer (2016) the legal framework governing union activities is restrictive, influencing the organizational structures and bargaining power of unions. In President Lula's second mandate, between 2018 and 2019, there was a move towards transforming the organisational structure of labour away from deregulation and flexibilisation. However, Lula's intentions were suppressed by the Brazilian Congress (Mayer, 2016, p.112).

The representational role of trade unions is central to advocating for workers. However, in Brazil, representation of workers is hindered by factors such as low union density and the informal nature of much of the workforce. Many Brazilian workers operate in the informal economy, where unionization is challenging due to the lack of formal employment contracts. As a result, a substantial portion of the workforce remains outside the radar of traditional union representation, limiting the ability of unions to represent workers.

Trade unions' ability to represent workers through collective bargaining is one aspect of their institutional power. However, in Brazil, the effectiveness of collective bargaining is constrained by legal and institutional barriers. Regulatory frameworks limit the scope of negotiations, and the enforcement of agreements reached through collective bargaining can

be inconsistent. Additionally, the influence of political forces and the economic interests of employers shape the bargaining landscape, making it challenging for unions to secure meaningful concessions.

The role of trade unions in safeguarding workers' rights in Brazil is shaped by a complex interplay of structural and associational barriers. While unions play a pivotal role in advocating for fair labour practices, they encounter challenges rooted in the diverse nature of the labour market, low union density, and legal constraints.

One way to overcome these challenges is to engage in dialogue with policymakers to address regulatory constraints on collective bargaining, ensure agreement enforcement mechanisms, and advocate for labour laws that are responsive to the evolving nature of work in the wind power industry. However, unions seem to be unable to do this, with one of the main factors being their lack of institutional power given the legislative changes that have taken place in recent years. Meanwhile, fear of job loss, combined with the lack of robust safety regulations, can dissuade workers from speaking out about safety concerns, perpetuating a cycle of precarious working conditions.

The table below shows major Brazilian legislation since the consolidation of labour laws, including those that affected trade unions, and indicates the key changes that occurred as a result.

Table 1- Major Brazilian employment legislation since the Consolidation of Labour Laws

Legislation and Policies	**Key Changes**
Consolidation of Labour Laws (‘CLT’)	Created a state corporatist structure of interest intermediation, which remained largely intact until the Federal Constitution of 1988: • The state played a central role in determining Brazilian labour relations, based on representation hierarchy, exclusive unionizing, union tax, labour courts and the Ministry of Labour.
Federal Constitution 1988	Labour protection became fully institutionalised and implemented. • Expanded the states’ instruments of labour market regulation in the country

	• Established the Workers' Support Fund and wage supplement • Acknowledged the heterogeneity of the national labour market, allowing initiatives focusing on lower-skilled workers from both formal and informal sectors • Access to public health was no longer restricted to a worker formally employed and became universal to all Brazilians and foreigners • Companies with more than 200 employees must elect a representative for the exclusive purpose of promoting direct understanding between employees and employers • Companies must set up internal committees for accident prevention, formed by representatives of employers and employees
'Plano Real' (The Real Plan), 1994, created by former president Fernando Henrique Cardoso	Significant impact on labour relations, reforming the structure of labour organisation away from corporatism: • Flexibility of labour contracts • Reduction of social costs • Reduction of the cost of labour, incentivising hiring, formalizing the labour market and combating unemployment with the objective of consolidating the economy
Labour Reform of 11 November 2017, proposed and approved during the government of former President Michel Temer	Updated the Consolidation of Labour Laws, reshaping the relationship between employers and employees. • Unions no longer required to be involved in negotiating overtime compensation for individual workers • Mass layoffs or large-scale terminations no longer require bargaining with the applicable union before implementing such terminations

	• Unions' representation is no longer necessary in ratifying the termination of an employee with more than one year's service • Employers can seal private agreements with workers voluntarily and obtain a judicial seal that prevents future labour claims under the same procedure terms • High-skilled employees can freely negotiate the terms and conditions of their working contracts with their employers. In this case, it prevents the worker filing a labour claim even when the law prescribes better solutions favouring employees' interests • Possibility to divide vacation periods into up to three periods within the year worked • Companies may outsource core business-related activities without this being considered illegal • Workers and employers are now allowed to terminate their contract by mutual agreement • Reduction in labour inspectors by a third • Redefinition of what counts as modern slavery, dismantling protections against forced labour • Young workers under new fixed-term contracts which exempt employers from social security contributions • Former president Bolsonaro dissolved the Ministry of Labour and Social Security
Federal Law n. 14.261 of 2021	Creates the *Domicílio Eletrônico Trabalhista* (Labour Electronic Domicile), a system that allows the Ministry of Labour to notify employers via electronic communication of administrative acts, tax audit actions, court and other notices. Through this mechanism, which dispenses of the need for publication in the Official

	Gazette and physical postage, the employer can also send electronic documentation required in tax audit actions or file defence and appeals in administrative proceedings
Law n. 13,874 of 2019 - The Brazilian Economic Freedom Act	Exempts companies with 20 employees or less from reporting working hours. Consequently: • labour inspectors are unable to check the payment of overtime wages; • Workers in small firms are no longer able to dispute violations of working hours rights in court • employers can evade rules governing the length of the working day
Law n. 14,611 of 2023 - Gender Pay Parity Law	Reinforced the prohibition on different salaries for women and men
Law n. 14,442 of 2022	Working hours control became mandatory for teleworking, including the payment of extra hours
Decree n. 11.513 of 2023 – Gig Economy Workers	Marks the emerging trend in the regulation of work in the platform economy. Establishes the creation of a Working Group at the Federal Government level to develop proposals for regulating activities carried out through online platforms

3.7. Parallel overt anti-union ‘reform’ in other countries

The recent period of reform in Brazil seems to parallel anti-union and deregulatory reform that took place in other countries in recent years. For example, in the UK, between 1979 and 1997 there were a range of reforms, accompanied by political rhetoric and ideology.

The 2017 Brazilian Labour Reform caused an important change in the country's social-political and economic scene. It has broader parallels with the anti-union reform period of the United Kingdom from 1979 to 1997. In both cases, these reforms were introduced under the appearance of labour market flexibility and economic modernisation, aiming to reshape the industrial relations system fundamentally.

Under President Michel Temer's administration (2016-2018), Brazil's reform arose amidst an economic downturn and corruption scandals. It sought to revive the economy through labour cost cuts and increased competitiveness. The reform package substantially undermined workers' rights by changing collective bargaining structures, reducing trade unions' roles, and increasing temporary contracts. This undeniably contrasted with historically protective labour laws like the Consolidation of Labour Laws of 1943, which emphasised safeguarding worker rights.

Similarly, reforms during the Thatcherite era in the UK marked a major shift in labour relations, transitioning from the post-war collective bargaining consensus to a free-market model that dismantled union influence. Initiated under Thatcher, these reforms weakened unions by restricting strikes, weakening collective bargaining, and increasing flexibility. High unemployment, declining manufacturing, and globalisation justified a rollback of regulations, creating a more market-driven labour environment but leaving a legacy of rising income inequality and precarious employment (Blyton and Turnbull, 2004).

Both nations' reforms have commonalities. Political leaders pursued neoliberal agendas against unions and reduced labour protections to secure macroeconomic gains. Dismantling regulatory frameworks was rationalised as necessary to recalibrate labour markets in a globalised economy. Corruption scandals in Brazil and public discontent with union power in the UK created fertile grounds for these reforms. However, they were criticised for disproportionately affecting the most vulnerable workers, worsening labour conditions, increasing job insecurity, and weakening bargaining power.

Despite differences in historical and socio-economic forces, the political motivations and labour consequences of these reforms are similar. Both deregulation movements prioritised economic competitiveness over social equity, reflecting a global wave of neoliberal governance.

In summary, this chapter synthesizes the historical, political, and social dimensions of Brazil's worker rights and working conditions. By contextualizing the present within this intricate path, we gain insights into the challenges that persist and the potential avenues for progress. As Brazil navigates the complexities of its socio-political landscape, the pursuit of equitable worker rights remains an ongoing imperative, requiring concerted efforts from various stakeholders. The prevalence of informal labour markets, precarious working conditions, and the unequal distribution of resources continue to impede the realization of truly equitable employment rights.

3.8. Theoretical framework, research gaps and research questions

Having reviewed literature to address the overall aim, this section presents the theoretical framework underpinning the current research, the literature gaps it seeks to address, and the research questions that guide this research. The theoretical framework consists of literature on labour process theory, dormitory labour regimes, precarious work, and worker resistance and power resources. In terms of labour process theory, it draws on concepts such as division of labour, deskilling, hierarchical controls, market controls, cultural controls, monitoring and surveillance, and technocratic HR. This is used to help to understand the nature of precarious work and how mechanisms of control are used in the wind power supply chain in Brazil. Through use of labour process theory I aim to understand the power relationships between the actors in the employment relationship (managers and workers) and the role of different stakeholders in influencing these power relationships, as well as how workers are being exploited and the different forms of managerial controls (Thompson, 2010). However, much of the literature on labour process theory focuses on the Global North and does not take account of the ways in which employers can control workers through control over their living conditions. In critiquing labour process theory, which focuses on the experiences in work, I have therefore also drawn on literature on dormitory labour regimes.

Previous literature has suggested that precarity might manifest itself in forms such as job insecurity, poor working conditions and a lack of adequate health and safety. This study therefore also draws on literature on precarious work. The theoretical framework provides the background to this study which will show how an understanding of the precarious working and living conditions in the wind power industry in Brazil influences how managers exert control over workers.

Workers have agency, and therefore I also draw on the power resources approach to discuss structural, associational, societal and institutional power, focusing on literature from the Global South. The table below illustrates the main literature used in attempting to demonstrate how LPT, dormitory labour regimes, precarious working, worker resistance and the power resources approach are linked in this study.

Table 2. Labour process and precarity in the wind power industry supply chain in Brazil

	Worker experiences	**Mechanisms of control**
Precarious working conditions	Majority low-skilled	Market controls
	Temporary work	Market controls

	High operational risks	Similar practices within the heavy construction industry
Precarious living conditions; dormitory regimes	Employer control over where workers live	Cultural controls; exploitation of social relations
	Remote locations lacking infrastructure	
	Sense of isolation	
	Away from family	
Workers' resistance and access to power resources	Lack of union representation	Increased surveillance; cultural controls
	Union weakened by labour reform so limited structural power and institutional power Workers isolated and considered to be in 'good jobs'; limited associational and societal power	

The review of literature identified four main gaps in knowledge in relation to:

- the ways in which mechanisms of control were used across supply chains, within and outside the workplace;
- the weak evidence base on employment relations, and particularly the nature of precarious work and the extent to which workers have access to power resources in the Brazilian wind power industry;
- how the political and regulatory context affect mechanisms of control, precarity of work, and workers' access to power resources in Brazil
- methodologically, the lack of longitudinal research on the changing nature of employment within supply chains.

Consequently, the key research questions were:

1. How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace?
2. To what extent can work in the wind power industry in Brazil be characterised as precarious?

3. To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control?
4. How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil?

These research questions were used to inform the research methodology and research methods. The next chapter of this thesis will set out the research philosophy and explain the research methods used to undertake this study.

Chapter 4: Methodology

In order to address the research questions set out in the previous chapter, this research adopts a critical realist ontology and interpretivist epistemology, a longitudinal case study design, and semi-structured interviews as well as observations. It also includes my reflexivity, helping me demonstrating the ways I made sense of this research. This chapter will explain these things in more detail, for instance, first it will explain the theoretical underpinnings of the methods and general strategies I undertook for this case study. The chapter also includes how the data was analysed; how my research outcomes or explanations were generated; and how my contribution was made or achieved. Some of these explanations include descriptions of how decisions were made in relation to my data collection, which is intended to provide transparency and demonstrate accountability in executing such tasks. References are included in order to ensure that readers can follow my arguments and to demonstrate to readers the rigour and replicability of my research based on the past precedent I drew from in existing research.

This study aimed to evaluate mechanisms of control within the Brazilian wind power industry and across the supply chain and assess how workers' precarious working and living conditions might influence how managers controlled them. The previous two chapters presented the literature used to inform this research, which this chapter builds on by presenting how this research was undertaken. This chapter first explains my ontological and epistemological perspectives (Section 4.1), explaining why I chose to combine a critical realism ontology with an interpretivist epistemology. It follows to explain my choices of a qualitative study over quantitative, using longitudinal case study research design (Sections 4.2 and 4.3), including the decisions made about how construct the best possible selection criteria to answer my research questions. In Section 4.4, I explain the data collection methods in more detail, including how semi-structured interviews and observations took place. Section 4.5 moves on to explain how conclusions were drawn, how the themes were identified and how research contributions were made. Section 4.6 describes how I managed and accessed the data collected, concluding with the ethical considerations accounted for during the study design process. The final section (Section 4.7) delves into my own reflexivity, showing how I paid careful attention to the reasons as much as the approach and methods when thinking theoretically about the procedures, policies etc., surrounding my topic. All of the various considerations given during the process of designing and undertaking this study, which aimed at providing good-quality answers to research questions, are explored in the final section of this chapter.

4.1. Research Philosophy: Ontological and Epistemological Perspective

When studying social sciences, we select methods to align with our research questions. With this purpose in mind, this study was underpinned by a critical realist ontological perspective and an interpretivist epistemological approach which, in my view, resulted in themost relevant and appropriate possible research outcomes.

Very briefly, the term *ontology* refers to theories of what we believe exists and what we assume is there, while *epistemology*, from the Greek word *episteme* meaning 'knowledge', and *logos*, meaning 'explanation', refers to what can be known and how knowledge can be acquired (Moser, 1995; Phelan, 2011). In essence, ontology is defined as one's world-view or belief about the world, while epistemology is defined as beliefs about the process of knowledge creation.

4.1.1. Critical realist ontology

This study was undertaken from a critical realist ontological perspective, aiming to understand power relationships in the workplace, even when workers were not even aware of these forces. My research sought to explore the impact of forces outside the awareness of the individual, upon the individual, which is consistent with this critical realist view of the world (Bhashkar, 2016; Bhaskar, Danermark and Price, 2018).

This perspective was also relevant to understand how precarious working conditions affected workers' choices and the way in which managers controlled them, to be able to evaluate if workers were aware of the use of different mechanisms of control. At the same time, I wanted to investigate how managers were taking advantage of the precarious working situation to make workers work harder and faster, to better understand how factors outside the power relationships (such as the precariousness of the work environment) influenced managers decisions.

Finally, I needed to explore worker resistance and the extent to which unions were able to represent workers in the wind power industry. What were the causes of any failures of representation, and why might workers reject union membership? This approach was to enable me an explanation of puzzling events happening that were impacting workers ability to resist.

My research position is consistent with Bhaskar's (2016) critical realist assumptions of reality as being stratified, emergent, and transformed by agents. This means that my philosophical assumptions take into consideration the everyday experiences and

presuppositions to explain reality. Thus, there are assumptions made about the roles played by both agency and structure, which allow me to enhance reflexivity and be more critical of the ways in which we engage with certain practices and why. With this, I believe that a critical realist ontology is transformative. As Bhaskar (2018) argues, this critical realist philosophy can play a potential emancipatory role in making a better sense of what is happening in the workplace that are explicit or implicit to the power relationships I am observing.

Moreover, by assuming that reality as being stratified, I believe that the process of acquiring knowledge is multi-layered. Mechanisms or causes lead to an event being triggered by the actions of individuals and the context in which the condition occurs. In other words, there are different realities out there that can be more truthful to some than to others (Bhaskar, 2016; Bhaskar, Danermark and Price, 2018). Fletcher (2017) has suggested that this can be illustrated using the iceberg metaphor, showing reality as existing at different levels in terms of the empirical, actual and real - what is visible on surface level is generally first-hand experiences and observable phenomena. Just below the surface is the events occurring which underpin the lived experience represented by the layer of ice above it. The deepest, most hidden level exists below this, comprised of the forces, processes, or other actors or 'agents' referred to by Bhaskar (2016), which give rise to the events show in the Actual Level.

The iceberg is a useful metaphor since, in ontological terms, it demonstrates how reality exists independently of what we believe or know exists. As a researcher, I seek an understanding of the forces determining the reality of workers' conditions and how managers may be using power to control their workers' behaviour and performance. It is imperative that I consider the existence of a wider spectrum of causal mechanisms interacting with each other. For example, in my study, it was necessary to consider the broader political and economic context influencing the precarity of work, and the roles of multiple stakeholders within the wind power supply chain. The individual workers that I interviewed, however, may not have been aware of this wider context, despite being affected by it and living and working within it. For instance, the laws around work and the weakening of workers' ability to resist precarious aspects of temporary work in the construction of wind farms led to mechanisms of control to act on the Real Level, causing job insecurity to happen on the Actual Level, which workers directly experienced at the Empirical Level especially when the construction of the wind farm was near conclusion.

Taking a critical realist approach is consistent with past research (Thompson and Vincent, 2010). By viewing the case study organisations through the lens of Labour Process Theory in this way, this enabled me to explore how labour processes might be influenced by both transitive (the conditions of 'knowing' and 'being') and intransitive dimensions (i.e.

external conditions and interactions that happen outside of the labour process) (Thompson and Vincent, 2010). This was valuable because this perspective allowed me, for example, to interpret intriguing findings in ways that enriched the answers to my research questions.

4.1.2. Interpretivist epistemological approach

Interpretivist epistemological approaches are comprehensive and/or holistic, deploying interpretative methods (Saunders et al., 2009). For instance, Interpretative Phenomenological Analysis (IPA) comes from interpretivist philosophy, which is grounded in the idea that one cannot eliminate their bias entirely, the best they can do is be reflexive and acknowledge and declare their bias (Smith, Flowers and Larkin, 2009). As such, interpretivists believe that not only is the participant interpreting and viewing the world subjectively through the lens of their own experiences (such as through the Empirical Level or possibly the Actual Level as in Fletchers' (2017) iceberg) depending on how much they know about the context of their experiences and the events unfolding around them), but they as the researcher are also interpreting them. This concept is referred to as the 'double hermeneutic' (Giddens, 1984; Da Silva, 2014).

In this study, my subjective experiences are linked with how my research was undertaken. My view of the world as objective yet experienced subjectively meant that I made subjective meaning of my data (i.e. the comments of interviewees and my observations of them) based on how I relate to the external world and make sense of it. In other words, I interpreted my interviewees and made observations in light of my previous knowledge and experience, however, being reflexive and aware of biases. More accurately, I am interpreting their interpretation of their experience – I can never truly access the objective reality of their experiences, and so I will always view it through two layers of interpretation when analysing their comments. I can attempt to reduce the impact of this by entering the environment in which their experiences occurred, enabling me to potentially remove one full layer of interpretation or hermeneutic using my observational method. However, I still was not there for the original events and nor subject to the same power dynamics when I enter that environment. However, interpretivists accept that this is always the case, and that the best they can do is utilise triangulation – that is, multiple methods, angles and perspectives to create a fuller, more holistic picture over time (Saunders, Lewis and Thornhill, 2009, p383; Gill and Johnson, 2010, p.161). This view is aligns with the methodological choices in my study, since I use multiple methods of data collection, and the observational method enables me to reduce or mitigate some of that second, outsider layer of interpretation.

Although taking a critical realist ontological perspective, this study also assumes the subjectivist proposition that phenomena are socially created from the perceptions and

consequent social interactions of social actors (Saunders, Lewis and Thornhill, 2009, p.110). For example, if and how participants interpreted their working environment as being precarious due to the lack of infrastructure and how this affected their understanding of risks in operations.

In terms of epistemology, the research was undertaken from an interpretivist perspective. The study sought to understand how employers and workers in the wind power industry in Brazil made sense of their workplace, the social context within which they were integrated and their existing working conditions. In order to gain access to this knowledge, this study therefore used *verstehen*. That is, being aware of "*the social influences that impact upon that sense making and the ongoing social construction of meaningful action*" (Gill and Johnson 2010, p.155). Developing the above example further, I anticipated that the lack of infrastructure meant there would be no hospitals closer to the windfarms. Thus, in the event of an accident, workers would be at more risk. However, ideally, there should be private ambulances at the workplace (provided by employers) or ambulances available in nearby towns. Because these small towns also lacked infrastructure, sufficient ambulances were not available. With this, it was important that I observed what this meant to workers, if they felt more vulnerable, if concerns regarding health and safety were raised in relation to it and if they attributed the lack of medical assistance merely to the nature of the industry rather than the locations in which they worked.

Since humans are aware of what they are doing when they are doing it, to some extent, this awareness affects how they adapt their actions to their practices. Therefore, based on this understanding, they are able to reflect on their acts and to be conscious of their changing way of thinking and acting (Da Silva, 2014). In the event of an accident, were there any measures in place to mitigate the fact there was no ambulances locally? As a researcher, I sought to understand the meanings of research participants, but also aimed to be reflexive in considering my role in the research process (see Section 3.7) in order to act with awareness of my position in making sense of these experiences. I was constantly reminding myself of being aware of my position, my contribution of my own interpretation to the research process, and the ways my own perspective may inform my analysis. Interpretivism in this case was beneficial to my understanding of the power in the workplace, for instance. It was important that I interpret the role of external forces interfering in the relationships between managers and employees, such as the lack of infrastructure that left workers with no internet connection and leaving them feeling isolated from the world outside work. Meanwhile, also acknowledging the wider political context I am aware of and balancing against my own values/drives to study power was also essential.

4.2. Qualitative and inductive research

In order to answer the study's research questions, a qualitative research approach was undertaken (Whitfield and Strauss, 1998). In quantitative inquiries, researchers often use a deductive approach to social phenomena, concerned with testing a theory by operationalising it through quantifying variables that are measured with numbers and the use of statistics. They (researchers) apply reality as objective and external, often committed to a positivist epistemology (Bryman and Bell, 2015). Qualitative studies, on the other hand, tend to utilise words rather than numbers. Researchers doing qualitative research are usually more concerned with the generation of theory instead of testing it. They (researchers), apply a different view of social phenomena, inductively, often oriented by an epistemological interpretivism concerned with the ways in which individuals make sense of their social world (Bryman and Bell, 2015). Although reading informed the research questions, new findings were also allowed to emerge during data collection.

As a researcher, I agree with the idea of doing exploratory research using subjective qualitative studies, especially with the use of semi-structured interviews and observations. Not only do these data collection methods facilitate the use of induction, they also enabled me to comprehend different realities existing in the same situation. For example, while the literature offered me strong indications of the precarity of work happening in the wind power industry in Brazil, and work legislation also helped my understanding of the role of Government in allowing such precarity to take place, I was also aware that power relationships between workers and managers are strongly associated with high levels of precarity at work. However, I also anticipated that those power relations may not be viewed the same by workers and unions as how managers and the government saw them. To be able to understand and answer the research question about the ability of different groups of workers to resist mechanisms of control, I needed to give my interviewees the chance to expanding their knowledge as much as they felt like it during my interviews.

I also took advantage of observational methods, as these allowed me to identify circumstances that could be influencing the way workers and unions were making sense of precarity. By leaning on this aspect of my critical realist ontology, and with this access to type of data, I was able to notice and recognise patterns of behaviour among managers and workers. I was also able to gain a better understanding of the "why"s and "how"s of stakeholders in making sense of the reality studied using these methods.

Hopefully, these examples demonstrate that critical realism matched with my way of conceiving reality, at the same time as how interpretivism was the best way of extracting different realities that helped me form my knowledge and understanding of the investigated phenomena of precarity, labour processes, control and resistance.

4.3. Research design: Longitudinal case study research

The research design involved longitudinal case study methods. Case study organisations were selected, and the research involved multiple research phases. This enabled me to see how the changing dynamics of the supply chain impacted on the precarity of work, to assess the mechanisms of control used, and understand how working conditions changed over time.

In my view, opting for a longitunal design was essential for exploring Labour Process Theory in the context of the wind power industry in Brazil. This decision aligns with past precedent, as previous research has successfully used case studies to explain the impact of precarious work on the use of management controls (Johnstone and Wilkinson, 2018; Checkland, McDermott, Coleman, and Perkins, 2016). Other main factors influencing this decision (to be discussed here) were the time of research; the context of the wind power indutry supply chain; the multiple choices of data for triangulation; and flexibility to include revealing or unexpected findings during data collection.

Firstly, this study looks into the changes in temporary work at the workplace to investigate if precarity manifested differently (worsened, for example) due to it. As explained in the literature review, the wind power power industry in Brazil supply chain is growing quickly, with a boom in the construction of wind farms. However, the literature has also highlighted that the different phases of wind power production require a variety of different skills, making it challening to analyse the labour process of the wind industry as a whole. In designing a case study that involved participants from different phases, it was important to understand the different aspects of the market influencing working conditions. More importantly, by utilising a longitudinal approach, I was able to investigate how precarity affected workers before and after the phases of construction, operation and maintenance. These quick changes to working conditions affected workers differently, which I was able to capture thanks to my temporally flexible research design. Furthermore, I believe that this case configuration provided me with an in-depth analysis that is rich in elements offering generalisability that can be applied to future research.

Secondly, longitudinal approaches facilitated my interpretive epistemology by expanding the time-frame for the analysis of the context to include cultural, social and

economic factors that were shaping the working practices. Thirdly, I collected multiple sources of data from workers and managers of different parts of the chain, and data from multiple stakeholders. This approach allowed for more triangulation, which in turn help developing aspects of generalization. Fourthly, I was drawn to the flexibilty of the longitudinal case study that, combined with the semi-structured interviews, allowed me to explore unexpected findings which enrich the quality of the answers to my research questions. Finally, longitudinal case studies allowed the inclusion of multiple situations happening at different workplaces in the data. Consequently, this allowed for a comparative analysis of how precarity influenced managerial practices of control that worsened precarious working conditions in general.

Overall, this design offered opportunities for better triangulation by including different areas of the supply chain, in different phases of production, such as the opportunity to include analysis of how the temporary nature of jobs generally affected workers, even workers whose jobs were supposely more permanent in nature.

4.3.1. Selection of case study organisations within two wind power supply chains

Wind power companies in Brazil are mainly international or multinational, particularly the ones that fabricate big pieces of equipment and components. Although there has been an increase in the national manufacturing of components, national companies are mainly involved with services such as the construction of wind farms, transportation, and operation and maintenance of the finished power plants. Some of the case study companies were forein-owner and/ or part of multinationals. However, the focus of this study was in the Brazilian part of the supply chain. Interviewing managers and workers in the wind power industry was essential, as well as interviewing stakeholders from government, trade unions, and employer organisations, to provide me with a broader understanding of what other forces outside the company environment could influence those relationships. In essence, by speaking to a variety of people, this enabled me to triangulate, and to delve into the external factors at play and access the Real and Actual Levels of the iceberg per my critical realist approach (Fletcher, 2017).

The research strategy involved a longitudinal case study, focusing on companies that belonged to a supply chain within the wind power industry but was time-limited due to the constraints of the PhD programme. The supply chains (and companies within them) were intentionally chosen in order to cover different aspects of the wind power supply chain:

I- one company and its' suppliers operating in the phase of construction of the wind farms;

II- one company and its' suppliers in the operation and maintenance of the wind power plants.

The Brazilian wind power industry is relatively new, meaning there are many projects of wind farms in the phase of planning and construction. The choice of the supply chains helped to show differences between the nature of work in construction and in operations and maintenance. These projects (construction and operations and maintenance) are commonly found to be happening simultaneously within the same region, with a configuration that is very much determined by the bid the companies were involved in. Different companies form distinct groups/clusters of chains. However, sometimes companies are involved in a range of projects.

In WINDFARM1 there were three companies working together in the phase of construction. For the purpose of this study, they are named C1, C2 and C3, belonging to SUPPLY CHAIN A (SCA). C1 was a multinational in the field of heavy construction company with its headquarters situated in Portugal. During my first visit in 2018, C1 was in charge of building the concrete bases that would hold the wind turbines. At C1, they were also in charge of coupling and installing the wind towers. At the time of my visit, the majority of their workers were under temporary contracts that would last until the end of that project. Company C2 was also in the field of heavy construction, and a well established national company with its headquarters situated in the Northeast of Brazil. The company also held a relatively new company sister (called C2Tower Systems) that built wind towers. At C2, they were responsible for the preparation of the land, opening roads that would give access to the land, and building the facilities that accommodated people and materials on site. C2 also provided the wind towers that would be coupled to the other parts of the wind turbine. These towers, however, were manufactured in Sao Paulo in the south of Brazil, being brought at the beginning of the project to the site by a transport firm (C6, which was visited and interviewed in the second field work trip). C2 then kept these towers under a hangar located in the windfarm plot. There, C2 would provide final painting, make adjustments and prepare them to be installed. The other company belonging to CHAIN A is C3, another national company with its headquarters situated in the South of Brazil. For this project, C3 manufactured wind generators and gearboxes for the turbines.

Workers (and managers) of C1 and C2 had accomodation provided by their employers. The transport from the accomodation to work was provided by the employer, although managers would normally be given or share a company car. The majority of workers would be working in the field, while a few, mostly managers, would work in improvised containers turned into offices. Among these containers, one was used by C3's project manager and his small team of technicians who were responsible for making sure that the installation of motors, rotors

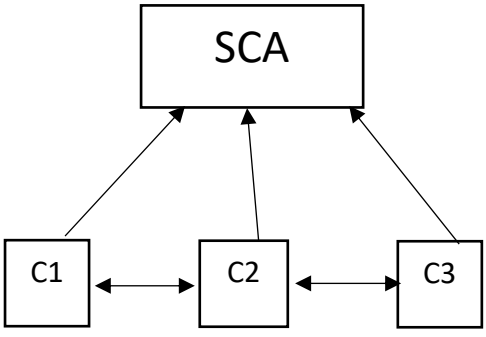
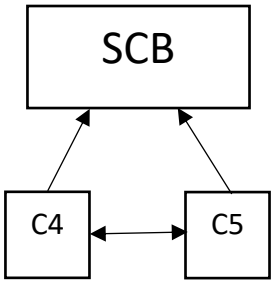
and nacelles was done properly by workers at C1 and C2. They also provided tests on the wind turbines to evaluate how ready they were to start operating.

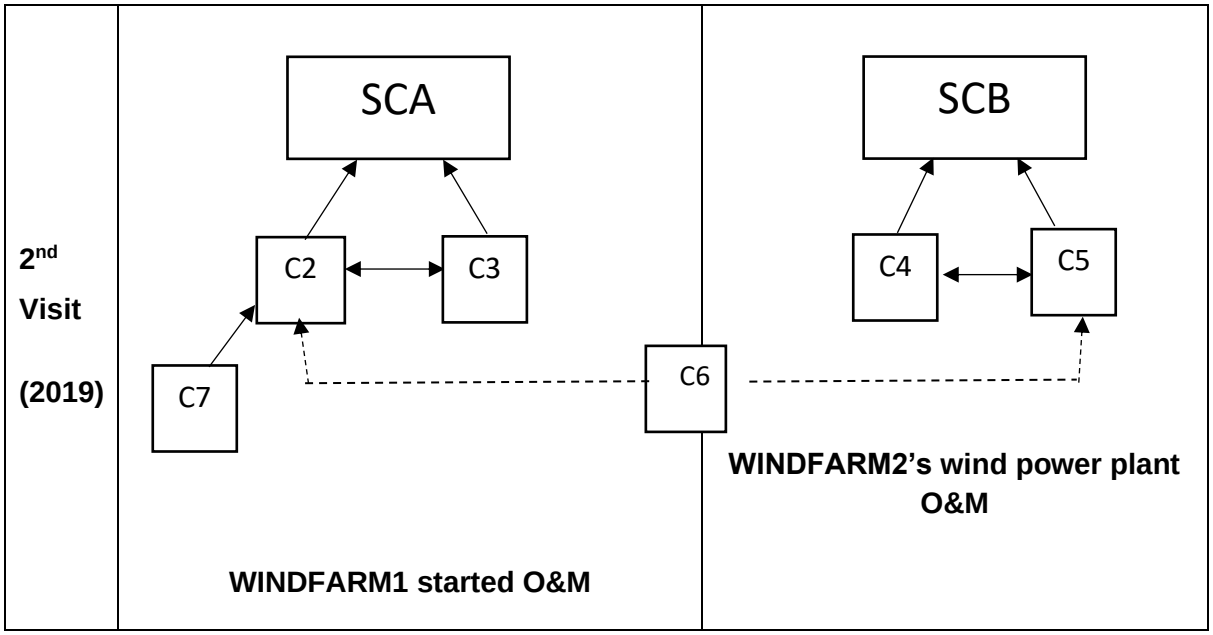
At WINDFARM2 there was SUPPLY CHAIN B (SCB) compromised of companies C4 and C5, working together on operations and maintenance. The two companies shared the same office situated on the grid site. C4 was a Danish engineering company providing wind turbine services to various windfarm projects in Brazil. They (C4) hired technicians on a permanent basis to work on operations and maintenance at WINDFARM2. C5 was the company that owned WINDFARM2 and also provided technicians to work alongside C4 workers, sharing O&M group tasks and activities. Acommodation was no longer provided by the employer, although works were given company cars.

In terms of working patterns for each wind farm, work at WINDFARM2 was mainly done in the day time, mostly on week days (apart from when there was an unpredicted equipment fault). During the night, the control of operations by C4 and C5 was done remotely, via computer systems. In contrast, at CHAIN A, work was done on a 24/7 basis, divided into day and night shifts. During the period of contruction of WINDFARM1, workers alternated between shifts and over weekends and the operations were set to only stop once the building of the windfarm was completed.

The two supply chains visited in this case study are outlined in Figure 2 below.

Figure 1. Supply Chain Framework

	Case Study SCA– SUPPLY CHAIN A	**Case Study SCB– SUPPLY CHAIN B**
1st Visit (2018)	 **WINDFARM1's construction site**	 **WINDFARM2's wind power plant O&M**



As mentioned above, the first supply chain is referred to as CHAIN A (SCA), and the second group, is CHAIN B (SCB). During my first visit in 2018, CHAIN A (SCA) consisted of a construction site of WINDFARM1, and three companies (C1, C2 and C3) where working together on the building project. Meanwhile, at CHAIN B (SCB), two companies (C4 and C5) provided operations and maintenance to WINDFARM2. By my second visit in 2019, CHAIN A had changed configuration, as planned, becoming a wind power plant under operations and maintenance. At CHAIN B, the companies within the chain had remained the same.

Companies C1, C2 and C3 were suppliers to the same company (where no interviews were conducted), and contracted specifically to build a wind farm, hence the collaboration on the project between the three of them. On my second visit, the wind farm was nearly completed, and C1 had left because the part of the construction they had been responsible for handling was complete, while C2 and C3 remained behind as they were responsible for making the final adjustments necessary in order for the wind power station to become operational. During the second visit, I also interviewed C7, a company that provided outsourced services to C2.

In relation to CHAIN B, I interviewed the same companies on both visits. They provided operations and maintenance to a wind power plant that belonged to a third company. They (CHAIN B) worked in collaboration, sharing the same premises comprising the wind power station, a computer control room, a stockroom, a meeting room, a kitchen and small facilities.

On my second visit, the team of employees had changed, as some technicians had left, and others had slightly changed position. I also interviewed and observed C6 - a transport company based in Sao Paulo, carrying different heavy pieces of equipment for the wind power supply chain nationally and internationally. They provided services to both chains.

Table 3 below shows how the data collection for the case studies was executed. Each row represents a company or a stakeholder. The columns indicate the research phase and the number of interviews and observations provided. C1-7 were the companies I visited, some of which were manufacturers and others were contractors or clients; Consult1-2 were consultancy firms; A1 was a senior executive at the Brazilian Wind Power Association; R1 was a senior executive at the Energy Research Centre for the Northeast Region; Gov1-2 were local government representatives; and Union1-3 were Union Representatives for workers in the sector.

Table 3. Case studies and data collection phases

Company		**Phase 1 (2018)**		**Phase 2 (2019)**	
Pseudonym	**Role in supply chain**	**Observations**	**Interviews**	**Observations**	**Interviews**
C1	Company - Manufacturer	Yes	9		
C2	Company - Manufacturer	Yes	1	Yes	3
C3	Company - Manufacturer	Yes	1	Yes	1
C4	Company - Client	Yes	1	Yes	3
C5	Company - Contracted	Yes	2		2
C6	Company - Contracted			Yes	7
C7	Accountant (C2 outsourced)			Yes	1
Consult1	Consultancy firm	Yes	1		
Consult2	Consultancy firm	Yes	1		
A1	Wind Power Association	Yes	1	Yes	
R1	Research Centre	Yes	1	Yes	1
Gov1	Clerical Office	Yes	1		
Gov2	Labour Inspector			Yes	1

Union1	Union Representative			Yes	2
Union2	Union Representative			Yes	1
Union3	Union Representative			Yes	2

As the table suggests, the fieldwork was conducted during two visits to Brazil. In the first visit, in 2018, I interviewed and observed five companies which operated in two different supply chains. At the same time, I also talked to representatives from the national association for wind power, a research centre for renewable energy and a municipal clerical officer. The officer represented the City Council for the city in which the companies' activities were located. During the second visit in 2019, I carried out interviews and observations in five companies (three of which were visited for the second time) and six stakeholders (two of which I visited for the second time). I also conducted interviews with trade unions that represented workers from the companies.

4.4. Research methods: Semi-structured Interviews, Observations and Documents

The case study research involved interviews, observations and documents provided by managers of some participant organisations. This enabled more in-depth triangulation of data sources (Woodhams, Xian and Lupton, 2014).

4.4.1. Semi-structured Interviews

Interviews were conducted in Brazil between 2018 and 2019 in the wind power sector. The fieldwork involved 48 interviews with managers and workers in nine companies, in addition to stakeholders in the wind power sector, including union representatives, industry associations, a labour inspector and government officials.

Interviews are the most widely used method of qualitative research. Qualitative interview techniques offer a variety of advantages to researchers. One of these advantages relates to the information they provide access to, for instance, interviews can provide interviewers with access to respondents' cultural beliefs and personal value system (Woodhams, Xian and Lupton, 2014). They can also allow for the investigation of the employment relations in their natural setting, which I believe improved my interpretations beyond reliance on conventional thinking about what is visible at surface level. By using semi-structured interviews, I also had the opportunity to adapt my interview techniques and be open to capture events in more unconventional and flexible ways, for instance by timing the

interviews accordingly. This flexibility was ideal for my ontological perspective, since it allowed me to uncover features of the power relationships hidden beneath surface. It also resonated with my interpretivist epistemology, especially because it enabled me to include unique findings and to further develop my analysis.

There are, however, some disadvantages in the use of qualitative research, including generalisation, induction and transparency (Whitfield and Strauss, 1998). Qualitative studies tend to focus more on particular nuances of a problem, while quantitative studies search for more general concerns.

Moreover, to better understand the ways that power influenced behaviour, it was important to be able to investigate the power relationships closely and explore the different perspectives of workers and managers and how they made sense of their workplace.

4.4.2. Observations

From a critical realist perspective, qualitative methods using observations provide researchers with the opportunity to explore reality making sense of reality through stratification and emergence of entities that can be real in different ways (Edwards, O'Mahoney and Vicent, 2014). The inclusion of participant observation technique added to the richness of my data, allowing me analyse of workers and managers behaviours at the workplace.

The observations conducted for this study included attendance of meetings and site visits. Both involved semi-structured observation to accommodate my research questions in a way that allowed me to be open to what I could not predict I was going to find (Gill and Johnson, 2010). Relevant areas for me to observe were: the behaviours of workers and managers to gain insights into hierarchical controls; how work was carried out, which enabled me to see weaknesses in health and safety; conversations where workers complained about the ineffective role of trade unions; various meetings which provided me with insights into how the strategy was determined and the ways in which organisational politics affected changes to practices. In summary, observing working practices and spending time with workers, for example, during lunch breaks, gave me a broader idea of the workplace environment, working conditions and the extent to which health and safety policies were in place.

Saunders, Lewis and Thornhill (2019) describe this form of observation as being characterised as the researcher being an '*observer as participant'*, in which participants involved in my observations knew about my research and that I wanted to observe them. My participation was restricted to being present at meetings or activities in order to be able to

observe it, with limited interaction with informants, nonetheless, I was there in the environment in which the precarity and labour processes I was investigating manifested or took place, which in Section 3.1.2. I argue is an epistemological advantage.

4.4.3. Documents

While the implications of using documents in qualitative studies might be considered with scepticism, it can be argued that the use of organisational documents such as minutes of meetings can help to enhance the triangulation of data (Lauri, 2011; Bryman and Bell, 2015). In this case study, this is possible by observing what the document shows matches what is perceived by the actions of managers and the effects of these actions upon workers. In this case study, I asked and was given access to copies of documents such as payrolls; performance measuring tables; companies' career plan (where applicable); companies' mission statements; and some of the job specifications.

I interpreted these documents as a valuable font of data because they linked to what was said during the interviews. For example, in one of the payrolls there was information regarding how many times each worker was away to visit family; likewise, in one of the companies' mission statements, religious beliefs were listed among the companies' values. Such information helped me establish triangulation with data from interviews and observations, not only by reinforcing some of the convictions expressed by participants during observations, but also for confirming certain control practices used by managers.

4.5. Data analysis

The use of Thematic Analysis is common in qualitative studies (Bryman and Bell, 2015; Saunders et al., 2019). I chose this method due to its' flexibility in terms of how to approach and analyse data as well as to help me comprehend data longitudinally (Hermanowicz, 2013). The use of qualitative longitudinal study helped me understanding the labour process and to locate my explanations of behaviour and social situations including certain changes in the precarious nature of jobs over time. Longitudinal participant observations helped me identifying how the changes in workers' settings while the use of longitudinal qualitative interviews allowed me to evaluate if workers (and managers) interpreted and responded to precarity differently over time. It also allowed for the analysis of how precarious working conditions worsened over time, such as the increase in health and safety risks; heightened job inequality; lack of career development; and the increase in job insecurities.

Although Thematic Analysis is often used atheoretically and without ties to any research philosophy (Saunders et al., 2019), mixing large and small data sets from various observations and interviews in the same explanation (of each theme), helped me in making sense of most of the stratified realities that emerged, improving the richness of my analysis.

To analyse my data, I made use of Thematic Analysis to identify commonalities and patterns related to my research questions. This method is considered a versatile tool for interview data, allowing for familiarisation with the data, searching for and reviewing themes (Nowell, Norris, White and Moules, 2017). The process required me to identify and refine my themes, and then finally to allocate the key findings into three thematic groups: precarious work, managerial forms of control, and worker resistance.

For this study, I chose this method for two main reasons. Firstly, it allowed me flexibility to revisit and refine codes, especially because data were collected longitudinally. More specifically, some interviewees were interviewed twice (in my first and second visits), so the use of thematic analysis allowed integrate related data drawn from different transcripts and notes. In addition, during the second visit to Brazil, I anticipated that important data could emerge as a result of the typical sorts of changes in the working conditions related to the nature of the industry. Such changes required me to revisit both sets of findings (from the first and second visits) to provide a discussion that reflected how the new circumstances developed and affected workers distinctively.

Secondly, although Nowell et al. (2017, p. 2) argued that the same "*flexibility can lead to inconsistency and lack of coherence*" of themes, I believe these challenges can be overcome. By applying a critical realist ontology, I made use of subjectiveness to form my understanding of what other factors could be underpinning the precarious situations I was examining. I believe this has brought the much-needed *"coherence to underpin this study's empirical claims*" (Nowell et al., 2017, p. 2).

4.6. Ethics, data management, and access

Ethical approval was obtained through the University of Sheffield prior to commencing data collection (Appendix 1), and care was taken to prevent harm to participants, especially during face-to-face interactions. For example, I was careful to be sensitive to power relationships within the workplace and also be aware of where there might be conflicts of interest between organisations in the supply chain, and between the two supply chains (if organisations are competing for business).

I aimed to ensure confidentiality during fieldwork, which I attempt to achieve by keeping my notes to myself and being discrete when approaching people. To preserve anonymity I made use of pseudonyms (again, being aware of commercial sensitivities). Data, both text and recorded interview audio, was stored in accordance GDPR, for example, using a password-protected computer and encrypting data where appropriate. I also adhered to the principle of informed consent, by ensuring that all participants were provided with an information sheet (Appendix 2) and asked to either sign (Appendix 3) or verbally consent to taking part in the research and being recorded after they had read this information. Participants were also informed that they could withdraw from the research at any time up until the data were anonymised, to ensure participation was understood as voluntary.

Access was obtained through personal contacts using purposive sampling in order to select organisations and associated supply chains that I expected would enable me to address my research questions (Saunders, Lewis and Thornhill, 2012). As illustrated in the supply chain framework (Fig. 3), I carefully selected companies to include organisations participating in a variety of activities across the supply chain. The aim behind this was to enhance the quality of the sampling in the hopes of being more representative of the wind power supply chain as a whole. In turn, this also enhanced the generalisability of the findings.

During site visits, I ensured that companies had my personal details in order to be able to contact others in the event of an incident. In Brazil, in general, risks to one's personal safety are greatly elevated due to it being an emerging country where crime rates are considerably higher compared to the UK. Some of the sites were very remote which accentuated these risks to my safety. I was aware of these risks and took precautions such as seeking to plan ahead for visits, checking locations and opening times ahead of time, checking general accessibility and making use of registered taxis. Personal contacts were made aware of the detailed schedule that I followed, and I checked Foreign Office advice before travelling. However, given that I am a Brazilian citizen and have lived in Brazil for many years, I was able to rely on ample relevant past experience to ensure my personal safety, and this made these additional measures easier and more natural for me to use.

The process of cataloguing data from both visits to Brazil (in 2018 and 2019) was similar each time: after each interview, I downloaded the digital recorder file to my password-protected laptop. On each day of interviews, files were labelled in a numerical and chronological order, then backed up onto an external drive. At the end of each day, I also downloaded the encrypted files to my university-owned data storage, known as 'Unidrive', as an additional backup that is also password-protected. These measures provided my data

collected with sufficient protection from data loss and also allowed me to access data online, without the need for my laptop, in case necessary.

4.7. Reflexivity

Reflexivity in management studies helps demonstrate potential bias that can be brought to research due to the researcher's own identities, providing meaning to how researchers make sense of the lives and experiences of others (Johnson and Duberley, 2003).

Since the early stages of this PhD, I engaged in much reflexive thinking about how my thoughts and discussions could help me understand my research in possibly different ways. These thoughts also helped me in delineating my epistemology, at the same time as gaining more confidence in using critical realist ontology. However, I knew the challenges I could face when applying neutrality to my study. In my understanding, reflexivity is an exercise that is essential to implement from the beginning of the research until its' end.

There are some techniques that help researchers in this matter, such as adopting a reflexivity journal or keeping notebooks. In my case, I opted to collect a series of notes. In addition, I added comments that I kept to myself as a reminder of the importance of reflexivity within particular passages during the writing process.

Engaging with reflexivity eventually became a habit. I was constantly reminding myself of my own position in this study. As a woman of mixed-race background, plus considering that I was born in Brazil, I fully acknowledged that these identities positioned me in specific ways in relation to data that I may not have taken note of had I not been who I was. For example, I knew I could be sensitive to how women and/or people from different ethnic backgrounds were treated differently. I am also aware that I may have received different treatment from male participants during the data collection than if I was another male coming in and asking them questions. Likewise, other People of Colour, such as workers, may have responded differently to me than the managers who were generally Caucasian. Despite this, I am also aware that I had excellent access to the field, at all levels, in this kind of every day behind the scenes because of my Brazilian heritage and native Portuguese fluency.

I am also aware that my participants demonstrated feeling relaxed around me, sometimes acting as if I was not there, to realise then that I was and apologise or look a bit more apprehensive of their own behaviours. The presence of a researcher was somewhat unusual, so it may be natural that they did not always know how to respond to me or to remember when I was there. For example, when workers made jokes about each other to

alleviate awkward situations, they could become flustered afterwards upon realising I was there and had heard. I acknowledge that I had good access to the ‘shop floor’ and employees and to numerous managers’ meetings, which are more challenging to observe in their daily lives. At the same time, I am aware that participants’ stakeholders had their own agendas in mind when being interviewed, which demanded that I tweak my questions, justifying the use of semi-structured interviews again.

Finally, I acknowledge that aspects of my educational background in law associated with MBA studies in the oil and gas industry have converged to form some part of these identities, resulting in the externality of particular views that informed how I conducted myself and this research, especially in relation to how I interpreted my findings. For example, this might have shown up in this work in relation to the attention to detail I gave to certain findings that I believe were similar to or comparable to precariousness happening in other sectors (construction, oil and gas and offshore wind power).

4.7.1. Impact of the study: how might my research impact society?

The dissemination of research projects contributes to impact. However, currently, there have been no journal publications accepted for publication from the research of this thesis. Nevertheless, I argued that this thesis makes its own contribution through engagement with a variety of stakeholders within the wind power supply chain in Brazil. For example, during my second fieldwork visit to Brazil, I had the opportunity to take part at the annual event promoted by ABEEOLICA – the ABEEOLICA Business Meeting, in Sao Paulo. There, I was able to explain my research to a wide range of individuals from approximately 140 different companies representing the entire chain, as well to other researchers and members of the Government representing the energy sector officially. On this occasion, I explained my research to a wide range of stakeholders (including managers of multinational companies) and was able to answer questions and provide additional insights regarding my study. In this way, I engaged with a significant number of people and told them about my research as this event was attended by over 450 people. The reach of my work likely extended beyond these individuals, through the spill over that usually occurs when people shared the research with their colleagues, some of which did share it while still talking to me during the event. This may already have inspired people or contributed to enhancements in practice.

Furthermore, when engaging with participants during the research interview, some requested that I provide them with a copy of my thesis, if published. Union representatives showed even greater interest in my research. At unions, some interviewees showed surprise that a PhD student wanted to interview them, since they considered it rare for them to be taken

into consideration by studies in the energy sector. Some of my interviewees gave compliments about how familiar I was with the problems faced by workers within this sector. With this, I believe that this case study allowed participants and non-participants to gain further insights into the precarious working conditions to which workers within this sector are subjected. This precarity was observable even in the lack of attention the union representatives perceived as being directed at workers in the industry.

Lastly, at the Research Centre for Renewable Energy in Natal-RN, they also expressed interest in having me present my findings after finishing my PhD. In this way, although I am still working towards the publication of the key findings of this study, I may argue that this thesis has already had some impact on the wider community. Following the submission of this thesis, and ideally the conferment of my doctoral degree, I intend to publish several papers based on the findings of this study, including work on the use of longitudinal case studies to investigate the precarity of work in supply chains; the mechanisms of control used by managers and how these affected workers within the wind power industry in Brazil; and another on how precarity affects worker resistance in the wind power industry in Brazil.

4.8. Summary

This chapter has presented the philosophical lenses used in my methodology, informed by a critical realist ontology and interpretivist epistemology. It also included details of the selection of a qualitative longitudinal case study design and its importance to answer my research questions. I explained how I focused on companies within the wind power industry supply chain and how I executed the data collection of companies and stakeholders. Then, the chapter moved on to explain how the case study was undertaken, including the use of semi-structured interviews, observations and documents. The use of a longitudinal approach helped me conducting a thematic analysis that was more flexible in terms of revisiting and refining themes, plus how to comprehend data, mixing different data sets in the same explanation (of each theme). This helped me making more sense of the how precarity affected workers, enriching my analysis.

Future studies could enhance the generalisability of studies like this by conducting comparative studies in different contexts and industries. This would allow researchers to identify common themes and patterns across different settings. Other contributions could increase sample sizes by including surveys and other quantitative methods, allowing the researcher to test for statistical significance and explore the generalisability of these findings in larger groups. Another contribution could be research to establish partnerships with industry stakeholders to gain access to more comprehensive data.

Chapter 5: Findings

This chapter presents the key findings collected during my fieldwork. I visited Brazil in 2018 and 2019 to conduct 46 semi-structured interviews and observations of managers and workers from seven companies within two supply chains and various stakeholders in the wind power industry. As explained in the Methodology chapter, my research was longitudinal, covering seven case study organisations involved in different aspects of wind energy production (plant construction, maintenance and logistics).

The longitudinal approach helped me to better understand the precarity of working and living conditions, mechanisms of control and forms of worker resistance at different stages of wind power production. By conducting a longitudinal study, I was able to track changes over time. For example, during my first visit WINDFARM_1 was under construction. At the time of my second visit, it was already completed, and the wind farm was starting to operate. This enabled me to observe and ask questions about participants' experiences with labour processes and precarity as their circumstances changed. As the Findings will now show, precarity varied depending on whether workers were employed in the phases of construction, operation or maintenance. For example, workers employed during the construction phase experienced employment insecurity, a lack of skills and precarious accommodations, while those working in companies once fully operational and in need of maintenance experienced a lack of career progress, job insecurity and safety risks. The use of longitudinal case studies provided the opportunity to interview workers before and after companies' changes between these phases, enabling the analysis of the effects of different precarious conditions on workers in greater depth.

In addition to interviews in the case study companies, I also interviewed a range of stakeholders, including:

- the research centre ("R1"),
- consultant companies ("CONSULT1 and CONSULT2"),
- and the Brazilian Wind Power Association ("A1"),
- a labour inspector for the Federal Government ("GOV2_INSPEC").

They provided me with relevant information related to a) how the wind power industry in Brazil was structured; b) the key factors influencing the industry's institutional environment; and c) the extent to which the wind power industry was characterised as precarious. Furthermore, union representatives at Union1, Union2 and Union3 were crucial in helping to analyse how workers faced difficulty in resisting mechanisms of control and why unions were failing to represent workers' interests. The longitudinal approach was imperative for the quality of this data collected. It enabled the researcher to formulate questions about current precariousness affecting workers and gain more in-depth answers about what they (unions) saw was the root of the problem and what could possibly be a solution.

Overall, the major findings were divided in relation to precarious working conditions; precarious living conditions; the different mechanisms of control put into place; and workers resistance.

As with previous chapters, the Findings chapter is divided into four main Sections, before which is a table showing the list of participants and their company/ organisation followed by a summary. Participants' names have been replaced with codes for the sake of anonymity. This chapter groups the key findings of this study into four subsections: 5.2. mechanisms of control; 5.3. employer control over living conditions; 5.4. precarious work; and 5.5. worker resistance and (lack of) power resources.

5.1. Participant Information

Interviewees' codes and relevant company and supply chain information are shown in the table below, beside the code used to refer to them within the thesis.

Table 4 Interviewee codes and organisations

Participant Code	Role	Company	Supply Chain Code
C1_HRM	HR manager	C1	WINDFARM_1
C1_PRO_MGT	Project manager	C1	
C1_ALMOX	Warehouse manager	C1	
C1_HR_ASSIST_1	HR assistant	C1	

C1_HR_ASSIST_2	HR assistant	C1	
C1_QUALASSIST_1	Quality assistant	C1	
C1_QUALASSIST_2	Quality assistant	C1	
C1_QUAL_MGT	Quality manager	C1	
C1_TRAINEE	Trainee in quality assistance	C1	
C1_TECH_1	Technician	C1	
C2_PRO_MGT	Project manager	C2	
C2_H&S_MGT	Health and Safety manager	C2	
C2_MGT	Manager	C2	
C2_WTOWER_MGT	Wind tower manager	C2	
C2_HR_MGT	HR manager	C2	
C2_MGT	Manager	C2	
C3_PRO_MGT	Project manager	C3	
C3_TECH_1_FROMC1	Technician who used to work for C1 then moved to C3 (at the time of my second visit)	C3	
C4_PRO_MGT	Project manager	C4	WINDFARM_2
C4_O&M_TECH_1	Operation & Maintenance technician	C4	
C4_O&M_TECH_2	Operation & Maintenance technician	C4	
C4_O&M_TECH3	Operation & Maintenance technician	C4	
C5_TECH_1	Operation & Maintenance technician	C5	

C5_O&M_TECH_1	Operation & Maintenance technician	C5	
C5_TECH_2	Operation & Maintenance technician	C5	
C5_O&M_TECH_2	Operation & Maintenance technician	C5	
C6_CHAIR	Chairman	C6	
C6_DIRECT	Commercial Director	C6	
C6_CEO	CEO	C6	
C6_AFM	Administrative Finance and Legal manager	C6	
C6_HR_MGT	HR manager	C6	
C6_ADMIN	Administrative – drivers' cost control	C6	
C6_H&S_MGT	Health & safety manager	C6	
C7_ACCOUNT	Accountant (outsourced by C6)	C7	
R1_CONSULT	Energy Research Centre	R1	A research centre
R1_EXEC	Energy Research Centre	R1	
CONSULT1_MGT	Energy consultant	CONSULT1	Consultant companies
CONSULT2_MGT	Energy consultant	CONSULT2	
GOV1_HEASSIST	Health Secretary/Finance assistant	GOV1	Municipal Administration
GOV_2_INSPEC	Labour Inspector	GOV2	Federal Administration
A1_CEO	CEO	A1	The Brazilian Wind Power Association
A1_MEDIA_MGT	Media manager	A1	
UNION1_EXEC	Executive leader	Union1	

UNION1_MEDIA	Media manager	Union1	Union Representative
UNION2_MEDIA_MGT	Media manager	Union2	Union Representative
UNION3_EXEC	Executive leader	Union3	Union Representative
UNION_3_MEDIA	Media manager	Union3	

5.2. Mechanisms of control

This section relates findings on the controls placed over workers, including direct controls such as time management and goal setting. Workers were being excessively monitored and under surveillance, and consequently experiencing high levels of stress. They were also subject to technocratic HR and cultural controls whereby managers manipulated workers' behaviour, as well as market controls related to the legislation in place and the nature of the industry, but also through controlling their access to certain information to prevent turnover.

5.2.1. Direct controls

Mechanisms of control focused on time management and goal setting. Performance management did not usually exist in the way that we might think of it (with an annual appraisal where the employee was involved in setting objectives). Where appraisals were present, they were based on paired comparisons or checklists, generally unstructured and carried out subjectively. Planning and monitoring were constant features, but reviews were generally inexistent, even at companies where work tended to be permanent. The monitoring was ongoing and had implications for reward (see later section), promotion and dismissal.

At the wind farm construction site (WINDFARM_1), managers from the three companies (C1, C2 and C3) were constantly checking operations and workers on an hourly basis. During my visits, I saw them talking on the radio most of the time, giving instructions and having to leave the office to go into the field many times throughout the day. Line managers kept track of workers' hours and tasks, passing information to the project manager throughout the day. Everybody was rushing around, and they seemed to be under a lot of pressure. When asked, most workers did not even know what an appraisal was but were sure that they were closely monitored. In the past, the evaluation had tended to be team-based, and the team would collaborate to achieve goals, but it had moved toward being more individually based, which had added to feelings of insecurity.

When asking the project manager at C1 if he made use of any tool or had a method in place to evaluate the performance of his subordinates, he answered:

> *"Yes, we follow the company's career plan. I classify workers individually every six months. I am allowed to raise each of their salaries every three months. I ask line managers how their workers are developing. Together, we (me and the line managers) make monthly evaluations based on their performance. Every month, I pick a few workers so that in six months, all workers will have received a raise in salary (as long as they are reaching their goals). So, theoretically, after six months, workers who are not achieving their personal goals will be dismissed" (C1_PRO_MGT).*

In most cases, there was little or no transparency regarding how workers were assessed. For example, the work done by technicians at C4 was supervised by one manager who would report all activities to their superior, who was in charge of measuring their performance. The superior worked remotely, and the workers never received any feedback on their performance. They could not tell me how the company used the information.

Suppliers could directly influence how employees' performance was measured. The project manager at C3 gave one example of this. He told me that a client's manager gave input on how well or badly an employee was working and whether someone who was considered to be too slow or incompetent should be dismissed. The HR manager at C1 added:

> *"Every three months, supervisors evaluate workers based on their behaviour (such as assiduity) and performance. Our client also takes part in the evaluation process and, together, we decide if, for example, someone who is doing a good job deserves a promotion" (C1_HRM).*

In the transport company C6, planning a single trip was time-consuming, and C6 managers had to rush to complete a checklist in minute detail. Client companies would usually issue a route survey with complete details of the entire operation, from the minute the equipment left the factory to the point that it was delivered at the wind farm. Managers felt pressured in having to analyse and triple check all details of each trip, providing reports. They usually handled several trips simultaneously for different routes. It was challenging as different routes required trucks with certain body types or axles and different numbers of tyres. These preparations impacted managers' decisions on which drivers to allocate to which jobs.

In sum, performance management (where present) focused on evaluating workers performance in unusual ways. Companies evaluated employees based on paired comparisons, basically focusing on time management, with growing monitoring of workers at

individual level for a similar purpose. No feedback was given to workers whatsoever. Instead, managers used performance management as micromanagement and continuous monitoring.

5.2.2. Continuous monitoring of performance

Workers were subjected to constant monitoring and surveillance. Most described how they always felt pressured to get the job done, and they ended up working really long hours on most days. In general, they looked tired, with some of them showing exhaustion.

At C1, workers were constantly being watched by a manager to ensure that tasks were completed on time. Low-skilled workers referred to their project manager as their 'God'. They kept line managers at a distance, showing respect to them. One participant explained that:

> *"There are rules here, and we must obey. I am just a builder, and they are the boss". (C1_TRAINEE).*

Another worker participant echoed:

> *“The rule is simple: the boss orders; we obey!” (C1_TECH_1).*

At C1, C2 and C3, the project manager had the common habit of meeting with different teams daily about five to six times. Some interviewees argued that they (managers) were doing this to keep workers on track and make sure that they worked quickly. At C4, C5 and C6, project managers were using tracking systems to measure workers’ performance. At C6, the project manager monitored the team closely. At C4 and C5, the project manager controlled them remotely by phone and email. At the same time, the companies were installing new tracking systems to monitor workers individually.

The project manager in C1’s relationship with low-skilled workers seemed to be contradictory. On the one hand, he reported that his relationship with low-skilled workers was good, and he regarded them as his friends. He added:

> *"Here we are a family – the ‘C1 Family’. We only have ourselves, so it's better to establish a good relationship, relaxed and friendly. Last month, I organised a football tournament among all workers from all three companies on this site (C1, C2 and C3). It was a good opportunity to get to know them in a social environment and generate a bond between us".*

However, he also added that:

> *"It's also difficult for managers to work with these people because they are not used to a more professional environment where they are checked, double-checked. That's maybe why we managers establish a certain level of informality. Otherwise, it would not work. For example, if managers want to assess them, the majority of workers would not even know what an assessment is" (C1_PRO_MGT).*

Moreover, although the project manager at C1 referred to workers as part of a 'family', he explained that one of the reasons for why the company's performance was improving was due to the fact that he was constantly evaluating the teams and dismissing those who were not productive. As he put it:

> *"For the past eight months since we started here, I have evaluated workers. On many occasions I had to dismiss someone. Keeping the best ones and getting rid of those who were not doing so well has increased productivity while at the same time creating a better synergy among teams. Now that they have become a selected group, we have a great interaction. I care for them; I treat them like my brothers." (C1_PRO_MGT).*

This contradiction between familiarity and close monitoring appeared to be replicated across C1, C2 and C3. At each site, managers repeatedly described their workplace to workers as their second home. During my observations, they (managers) used relatively informal language, including usage of jargon and jokes, to communicate with the less-skilled workers. When asked about this particular use of language, managers were unanimous in the view that this was an excellent way to make themselves clearer to workers, especially the ones with low levels of education. They argued that it also helped to develop a closer relationship with them and helped them to feel more relaxed. At the same time, they were involved in constant monitoring of and talking with subordinates. They justified this by saying that some workers could only understand very basic orders and had difficulty communicating what they were thinking technically. However, in one case, this familiarity disappeared over time. During my first visit to C3, the project manager was behaving in a friendly way toward workers. During my second visit to C3, one year later, I noticed that the project manager was behaving differently. He seemed to be a different person and looked upset. When asked about how things were at the workplace, he explained that the construction phase was over, and that they (C3) were now providing operation and maintenance to the turbines. He added:

> *"I used to be friendly, to help to arrange ways for them to see their families and give them the hours they asked. But they started to abuse my*

openness, being stubborn, lazy and disrespectful towards me. My job is to make them do a good job. I decided to be stricter, stopped listening and put pressure on them and made them work harder and faster. I had no choice. The company doesn't care if I treat them one way or another, as long as I show good results "(C3_PRO_MGT).

It was interesting also to observe how workers behaved toward the managers. While managers treated workers informally, there was still a sense of distance and hierarchy between them and their subordinates. I noticed workers keeping their hands back and heads slightly down when speaking to their superiors. Additionally, the less experienced workers were constantly being monitored, having to report back to the most experienced peers on a task-by-task basis, sometimes via radio. There were some suggestions that they were under much stress learning new things almost every day.

Managers also experienced intense surveillance by their bosses. Project managers in all visited companies look tired and under a lot of pressure. At C1, for example, the project manager reported to the owner of the company – who lived abroad - four times daily by phone or video conference meetings to check that they were sticking to the schedule. I was present a few times when those follow up meetings took place and could observe some tension on every occasion. If there was a delay, this meant more pressure on the project manager, and this would then be cascaded down. Any delay meant extra hours for everyone during the following weekend and weeks to come.

In construction (C1), there was another form of monitoring of low-skilled workers. Some of the more experienced workers seemed to guide newer ones in their roles. They were asked to act as supervisors, helping newcomers to do the job better and quicker. They also kept their eye on how they performed, ensuring that workers were doing their job correctly and observing how quickly they learned. They seemed to follow the project's deadlines more closely and reported to their line managers with frequency. Supervising others was considered to be an additional responsibility but it did not mean getting extra pay. Some participants felt that this was unfair and confusing. They said that the only thing they might get in return was appreciation from their bosses and a better chance to be relocated in the case of future contracts or to be recommended for another job.

This continuous monitoring of performance was confusing and stressful to workers (and managers). Micromanagement and numerous daily meetings were also an attempt to teach workers on the job. In turn, workers felt confused about whether they should feel

uncomfortable for being watched so closely or thankful for being prevented from making mistakes which could harm or cost them in the future.

5.2.3. Surveillance using technology

Workers were subject to intense scrutiny at each of the case study sites. To maintain discipline among workers, they were monitored with the help of management information systems and peer-to-peer forms of surveillance. The majority of participants were watched and checked as a form of control almost all the time.

Some companies were benefiting from the latest technologies to increase their scope and obtain more detailed data. For example, at the transport company C6, the administrative team monitored all drivers using software that had recently been acquired. As part of workers' assessment, four employees, including the HR manager, gathered this data to report back to the project manager. I visited their office in Sao Paulo. They showed me the tracking systems on different screens and how they processed the data to complete the reports. In order to evaluate drivers' performance, managers at C6 monitored drivers by combining the data gathered by the software with notes taken by them and the administrative team about punctuality and behaviour, generating tables to compare and rank driving performances and the truck's condition after each trip. The computer software could keep track of all 180 drivers' movements individually and simultaneously. To measure performance, managers analysed and compared how trucks were driven. Data showed how much petrol was consumed (to compare the driver with other drivers on similar routes), how much of the break was used and the need for repair after each leg of the trip. This integrated tool used cameras to recognise facial expressions and emitted alarm sounds when drivers appeared to be getting tired or looking distracted. At the end of each trip, trucks were inspected to check on tyre tread depth, and drivers reported road conditions and recorded all relevant information for future trips.

At the construction site, many workers were new to the job. Used to building houses and having to start promptly, they needed to learn how to use different materials. Because the concrete base for wind turbines had to follow certain specifications that they were unfamiliar with, they needed engineers and technicians alongside them to calculate everything. Monitoring in those cases seemed to compensate for the lack of training.

The exception to the intense monitoring was in operation and maintenance activities, where the O&M manager worked remotely, monitoring five plants in different regions simultaneously. There, technicians felt good about being less closely monitored daily. They found that there was a sense of autonomy in what they were doing.

5.2.4. Technocratic HR

During my first visit to the operation and maintenance company C4, one employee mentioned that their HR department had been relocated from the northeast (where they were based) to the south of the country, making it hard to establish a personal connection with the department. Any requests and complaints were now dealt with through emails, chats or their online system, including payment, vacation, training, changes in journeys or shifts. Some information was required to be inputted by the employee directly, whilst other information would require his manager's approval.

On my second visit to C4, things had changed. There was no personal contact between workers and HR since the new integrated HR system was implemented globally and internationalised. Everything from overtime to training was dealt with online. They said that the platform worked well for payment related issues, but only compulsory training was available for booking, and there was no one they could speak to about career development, apart from their line manager. The line manager himself complained that he was not allowed to make any decisions about moving anyone up. He referred to his manager as the one responsible for creating a bridge between line managers and HR. However, that manager also worked remotely and only visited them occasionally to check that everything was going according to plan. One technician mentioned:

> *"Here at this station, we have no feedback whatsoever about anything related to career development. I found out the other day that a person with less time and experience than me was promoted to a position I was expecting to take for so long. Unbelievable! It is so frustrating… I'm furious with them" (C5_O&M_TECH_2).*

Therefore, dialogue between workers and their managers was less likely to impact their career development positively. A worker seeking a change in position or activity, to be promoted or even relocated, was less likely to have their request granted. The communication channel had broken down. This had led to workers feeling even more insecure. One said:

> *"On the one hand, you could apply internally for a job position in a different country. But on the other hand, extra hours not paid would be checked by 'God knows who on this planet'. There was a case when a worker waited for months to solve a miscalculation of his payment " (C4_O&M_TECH_1).*

Another interviewee added:

> *"We must apply for different job positions through the intranet or simply be surprised by someone else taking the place you expected. Once I found out that someone else took a promotion and was relocated instead of me. I was expecting to be the next in line for promotion because I had more qualifications and time working for the company than the person who got the job. I now see my career growth with no prospects. I got really frustrated" (C4_O&M_TECH_2).*

Unions argued that technocratic RH made it difficult to negotiate with companies. At Union3, they explained that most companies in the region were multinationals and usually only had an office in the south or the southeast of Brazil, if not abroad. One interviewee said:

> *"Here, most companies come from abroad (the US, Spain…) making it harder to solve problems that would otherwise be easier if we could, for example, pay them a visit here to discuss case by case with the HR manager" (UNION3_CHAIR).*

In this case study, companies cut costs by moving their HR abroad and/or operating remotely. At the same time, big companies within the industry admitted publicly that among the many bottlenecks the industry faces resulted from the lack of skilled people available to meet the growing work demand. Interestingly, managers had no answers other than cost reductions when asked about why HR departments were distancing themselves at a time when the workforce was being pointed out as one of the biggest issues preventing the Brazilian wind power industry from growing.

5.2.5. Cultural controls

Early every morning, workers and managers of C1, C2 and C3 met for breakfast at the refectory (where they usually had lunch) on their way to work. Most workers arrived on buses hired by the companies, while managers and a few technicians would be driving company cars. During my first visit, I had the opportunity to join them at (their) breakfast three times. They finished eating breakfast around 7:30am then gathered outside under the trees for an assembly meeting. Initially, they formed small groups of around eight people to discuss the team's issues. A few minutes later, they all formed a big circle for discussion. Both small and big circles were facilitated by managers who would come and go visiting different groups. As they described it, it was an opportunity to plan the day, reflect on what happened the day before and how they were in terms of timescale.

The big circle lasted for about 15 minutes. A manager gave a brief talk then opened the floor in case a worker wished to say something or make any comments or suggestions there at the meeting. The leader often invited workers to ask questions, present difficulties and challenges in order to try and solve them. In response, there were sometimes questions and observations made by workers, mostly in relation to struggles that they faced when handling the machinery. On one occasion, they were discussing the case of an incident, reiterating the importance of using health and safety equipment. Everybody was listening carefully to what workers had to say about it.

In general, workers from the northeast region are very religious. At the end of each briefing, they would ask for a volunteer to lead the prayers. They thanked God for the opportunity of being there, for having a job, and to be working with such a nice group of people. It always finished by asking for God's protection and expressing motivational thoughts. There was a sense of unity among these workers. This view was echoed by one participant who explained:

> *"We are common people. We must hold on to these beliefs to enable us to work in such conditions, away from family and home. You know, we suffer a lot, it's a hard life. Job insecurity is part of our lives. You can see, for example, on the one hand, the youngest starting their careers who are very excited about their job opportunities (considering it is tough to begin a career within the industry in Brazil without previous experience). On the other hand, we eldest feel tired of travelling so much and for spending so many years away from our relatives" (C1_ALMOX).*

These assemblies provided workers with the chance to exchange experiences and try to become friends, helping each other to go through loneliness and insecurity. Many workers told me that some peers had become their family. At the same time, it was clear that managers attempted to use the occasion to create a sense of belonging, enhance motivation, and to quell anger and anxiety. The religious thoughts also helped to instil a form of motivation and encouraged good behaviour, such as avoiding the practice of excessive drinking outside work, which had usually been associated with increased aggressiveness at the workplace.

As the project manager at C1 put it:

> *“When we are done with the talk, we pray together in a circle, as a chain making us feel strong. Workers leave the place feeling motivated. I*

can tell they are feeling more excited than when they first arrive for breakfast" (C1_PRO_MGT).

During the morning assemblies, the participants, on the whole, seemed relaxed and to be having some fun. They were very friendly, constantly making fun of each other. However, underlying this friendly atmosphere, there were some negative comments. They had given each other nicknames. Sometimes, the name was related to a famous actor or pop star. At other times, names were based on their appearance or personality traits. I heard them calling one person 'weak' and 'lazy like a turtle', because they thought the person was too slow. The refectory environment was predominantly masculine, and I often heard homophobic jokes. They would also sometimes act as if they were women, singing songs or making feminine gestures, and everybody would laugh.

Managerial behaviour was often problematic also, for instance at meetings. Managers would get workers' attention in an indirect manner, trying not to single them out, yet everyone still knew to whom the manager was referring. On one occasion reprimands were given non-verbally and theatrically, accompanied with descriptive comments. Specifically, the manager comically mimed ear-pulling/ would mention *"puxao de orelha"* (C1_PRO_MGT), *which translates to 'ear-pulling',* the Brazilian equivalent of '*a slap on the wrist'.* This was generally done possibly to soften the fact that the worker was being publicly reprimanded by the manager in front of others. However, it was obvious that the manager was disciplining the man at the same time as humiliating him. Ear-pulling was also used during the working day when a delay was caused by something that the manager believed could have been prevented.

Managers, therefore, reinforced the use of different cultural controls to change workers behaviour and keep them motivated.

5.2.6. Market controls related to the nature of the industry

Although their jobs could be regarded as uncertain or precarious in a number of ways, the majority of workers seemed to be grateful to have a job. They often told me that they were proud to have a job in the wind industry.

One technician put it as follows:

"Oh, I'm very grateful for having this job. If you travel around the region, you'll see what I mean about poverty and unemployment everywhere. If it wasn't for this job, I don't know. I would probably be doing bits here and there, never enough to raise my children. In fact, even if I

wanted to look for something else/somewhere else, I don't think I would find anything better than this. I was lucky to find an opportunity in the wind market, and there are hundreds out there wishing to have my place" (C1_QUALASSIST_1).

Similarly, a member of a city council reported that:

"Our local economy is based on artisanal fishing and agriculture. There are no jobs here. Most people who work find it hard to reach the equivalent of a minimal salary and barely survive. When wind companies arrive, they normally hire locals only for low-skilled jobs. I think that most wind companies take advantage of the situation and the fact that locals are in such poor conditions. They offer them very low salaries, knowing that people will take it" (Gov1_HEASSIST).

The jobs were also very insecure (as indicated in Section 5.2.1 above). This meant that workers were at the mercy of managers who would decide whether or not they would be kept in employment. When interviewing the project manager at C1, he mentioned that all workers knew that the work was temporary although they were hired permanently. As he put it:

"Once the contract is finished, it means their job is finished. Nobody here is a fool to trust that the company will bring everybody to their next project after completion. Some will stay, but most won't. It all depends on if they really stand out in what they do" (C1_PRO_MGT).

Part of the reason for the uncertainty was related to government policy. When interviewing members of the Research Centre for Renewable Energy in Brazil (R1), a common view among interviewees was that the way energy contracts were handled in Brazil impacted job uncertainty and precarity. They explained that a new contract in wind energy was dependent, initially, on a bidding process (auction) that the Government controlled, determining which companies could do what and when. There was much secrecy around the auction, and companies were legally required to keep their bids confidential until the auction was open. Consequently, managers kept information about the company's possible expansion to themselves. However, the announcement of who won was open to the public, resulting in speculative guessing of which companies in the supply chain would join forces to carry out specific developments. As mentioned above (Section 5.4.7), HR managers also tried to keep

the company's plans secret to prevent employees from leaving prematurely. Contracts could be concurrent or after the actual building project was completed.

Another reported problem was that the supply chain bottlenecks of the industry (as well as poor project management) could impact on job security and working conditions. If there were delays, managers demanded that their teams worked harder and faster to finish in time. One informant commented:

> *"Here, we are constantly juggling with a series of small, sometimes big delays here and there. For example, if something goes wrong with a machine or the material hasn't arrived, I have to put my team on hold. Stopping means cost. I handle dozens of 'micro' problems like this every week. No matter what, we are constantly running against the clock with the boss wanting my head chopped off" (C6_CEO).*

Recently, C6_CEO had experienced a lot of pressure from main clients to reduce their transportation services' costs. Talking about this issue, he said:

> *"Sometimes they complain about a driver with the intention that we dismiss them. How dare they! They want to pay us as if we were still colonised but at the same time requiring a first-class service provided as 'partners'. This is quite common, and it's humiliating! I feel under a lot of pressure, especially because I deal with excellent professional drivers who have worked for the company for so many years. We invest lots of money in training, and we pay them reasonably well to retain them. I cannot let them down. This puts me in a tough position because at the same time, the owner (my boss) wants his clients happy at the cost of my leaver" (C6_CEO).*

A further problem resulted from the increased use of joint ventures. The government policy of bidding to acquire rights to operate plants meant that sometimes companies formed multiple joint ventures across the supply chain. This enabled companies to combine operational expertise and share risk. In this research study, two clusters of companies had signed this type of contract: construction was formed by C1, C2 and C3, and the operation and maintenance side was the result of an agreement between C4 and C5. Managers were more positive about joint ventures than lower-level workers, since they seemed to be able to keep a job in one or other of the companies as new contracts came along. This was conditional on them being prepared to move jobs and location, regardless of whether this was 700 km away from the current site or 500 km away from home. Managers also reported that the joint

venture arrangements were similar to what happened in heavy construction and major infrastructure projects. For them, temporary contracts were inevitable, and they had to get used to it. One project manager pointed out that they made career choices and these choices had a price (C1_PRO_MGT). Workers, on the other hand, struggled to cope with the constant changes. They argued that it could be confusing at times to identify the role of each company, particularly in determining who was responsible for what when executing a task. They emphasised that they were conscious that it was crucial to keep a good relationship with all companies because they never knew who their next boss would be. They added that sometimes it could be awkward reporting to superiors, especially if a mistake had been made. As one interviewee explained:

> *"They need to know who is responsible for what in case something wrong happens. It may sound like we are trying to get away with murder when we actually think we were right in what we were doing. But it's not easy pointing fingers at people, especially if they belong to a different company" (C4_O&M_TECH_2).*

Another example of how joint ventures increased job insecurity was found in the case of C4 and C5. At the time of my first visit, C4 owned the wind farm where C5 worked in partnership, providing maintenance services. During my second visit to them, I was told by a technician that another company had joined forces with them on another wind farm belonging to C4, next to theirs. This change had meant that the project manager who used to be in charge of them had been substituted by someone else. The new manager was looking after three different farms simultaneously. At the time of the change, there was a lot of uncertainty in the air, as many workers had been relocated. As well as being concerned about what they should be doing and who they should report to, they were also worried about losing their jobs. This event had created such distress among them that, eventually, the owner of the third company came to pay them a visit in person. As C4_O&M_TECH_2 explained, it was an attempt to reassure them that things would stay as they were. But in reality, things had changed a lot after that. Some technicians had moved to the other site, while others were working in both sites simultaneously. The workers also said that they were under more pressure and being monitored in new and different ways.

5.2.7. Market controls: company secrecy about contracts

Companies involved in wind farm construction maintained secrecy regarding future contracts and would not tell workers when or where the company was planning to start a new project. All human resource managers who I interviewed told me that this was a strategy to avoid

raising workers' anxiety about the end of their contracts and reduce speculation. Yet, managers also admitted that keeping new projects secret up until the last minute helped to reduce staff turnover. As one interviewee put it:

> *"For example, if workers get to know where the next project will be set up, they might start talking to each other about it and do some research. A few of them will even quit their actual job if they manage to find another company establishing some activity within the region". Another interviewee said: "When a contract is about to finish, workers are more anxious and start speculating, looking for new jobs. If they get to know about a new development, they will not think twice and go for it, leaving everything behind in search of a new opportunity" (C1_HRM).*

As mentioned above (Section 5.1.4 on reward), the secrecy also impacted on rewards given, because companies were able to keep pay lower than foreign competitors.

The fears of HR managers were also confirmed by interviews with workers. Workers from most companies visited said that they would risk quitting their job and spend some time unemployed while waiting for a new project to start somewhere else (preferentially closer to family). Workers seemed used to the idea of losing one job to move somewhere else close to the time that the new company arrived and started hiring people. During my visit to C1, I met three workers who were just about to quit their jobs and move to another town about 200 km away. One interviewee said:

> *"We know that when a company is about to start a new contract, the process of hiring new workers goes like a flash, taking a week or two to be completed. We must take the risk because the company we are in does not care where we will be when they finish here. We are alone in this" (C1_TECH_1).*

Another interviewee said:

> *“The best vacancies are usually filled very quickly. If we don’t act fast, we can miss a good opportunity by a day. It’s how the industry works. Companies keep it secret, but we keep alert. Just another thing to keep me awake at night. Because it’s not only about me, I fear for my colleagues. We must help each other in communicating these things” (C1_QUALASSIST_1).*

Workers complained about the lack of transparency and excessive surveillance. The distancing of HR departments represented an issue to most workers, negatively impacting their career development. Findings revealed managers made use of several cultural controls aimed at changing workers' behaviour and making them work harder. Market controls were also found to cause precariousness, increasing job insecurities and a lot of uncertainty related to the nature of the industry. These uncertainties included the temporary nature of jobs and use of secrecy around new contracts to prevent/limit workers' speculation that could induce workers' turnover.

Section (5.3) turns to the findings related to employer control over living conditions.

5.3. Employer control over living conditions

Findings revealed that workers lived in poor accommodation provided by employers and lacked access to basic health and wellbeing. In addition, working remotely increased the sense of solitude and led to sadness. Most workers also felt unsafe living surrounded by poverty in small towns with little infrastructure. Some workers experienced violence, developing anxiety and fear of driving to and from work. Each of these topics will be addressed in the four sub-Sections to follow. Lastly, the end of this Section will explain how managers looked into these circumstances as an opportunity to manipulate workers' motivation and intensify work.

The next Section (5.3.1) on poor accommodation will touch on some aspects of poor accommodation directly affecting workers' health. This included sharing bedrooms and bathrooms among many workers at once; with some of the houses with internal walls covered with mould and leaks.

5.3.1. Poor accommodation

Companies building wind farms paid for the costs of worker accommodation. Workers had no choice regarding where they would live, whether this was sharing a house or living in a bed-and-breakfast hotel. The workers at C1, C2 and C3 were allocated to different facilities within small towns nearby. Usually, low paid workers had fewer choices, and managers tended to stay in bed-and-breakfast hotels while others shared houses. On one occasion, at the refectory, C1_TECH_1 commented that changes in accommodation were common. When he first started on that job, he used to share a three-bedroom house with five other workers, but at some point, there were nine people living in the same house. The house had only one bathroom. He added that getting ready in the morning was tricky and they ended up using a hidden corner in the back garden.

If companies rented accommodation, this was usually in poor condition. It was not very common in Brazil to have short-term rental contracts, which were also more expensive. There was also much bureaucracy associated with renting places in the long-term, requiring significant deposits. Landlords would require up to six months' rent fees in advance. If the company decided to quit and leave before ending the term, the landlord would keep the deposit. To avoid bureaucracy and paying tax, some landlords offered to rent for short periods, but usually, these places were in terrible condition and in poor areas. Some of the workers who I interviewed lived in houses with water leaks, where some walls in the bedrooms were mouldy, and the electric shower did not work. Because there was nothing better on the market the companies still ended up renting these places. At C2, the project manager complained about the lack of accommodation nearby, referring to the lack of infrastructure available within the region. He added:

> *"There was a main bed and breakfast place in Sao Bento, for example, but we (the company) had to build a new roof there because when we first moved here, two of the bedrooms had collapsed ceilings as a result of rain. Luckily, there was no one inside when it happened. Then, at the weekend, they allow visitors to use their facilities, the restaurant and the pool. We don't even know who these people are. They listen to loud music. We can't rest or have peace at weekends" (C2_PRO_MGT).*

The situation was somewhat different for technicians who worked in operation and maintenance at C4. Most workers in C4 rented homes privately and moved with their families to the region. They told me that the company used to cover the costs for accommodation, petrol, and food, but about three years ago, companies decided to cut these benefits. This caused more job insecurity and made them feel devalued by the company. Some were visibly quite upset when talking about it, looking down nodding their heads.

Poor accommodation was, in general, affecting workers living conditions which, in turn, affected workers' quality of work. Workers felt isolated from family and social life living so remotely. They were also insecure about their physical health but seemed to downplay the powerful effects of such precarious accommodations upon their mental health.

5.3.2. Health

The next two Sections are highly inter-related, as the living and working conditions contributed to injury and illness. Illness and injury unrelated to living circumstances will be covered in this Section, and issues related directly to accommodation will be covered in the next.

As explained by GOV1_HEASSIST, most jobs that were created in the local community near the wind farm were low paid and would only last until the building work was finished, unless another company arrived to build another wind farm. However, besides the temporary nature of jobs, another problem was related to health facilities. The city only had a clinic, and the nearest hospital was located about an hour's drive away. This clinic was not equipped for major traumas or surgeries, and they had only two ambulances. There were cases of workers being involved in accidents and having to be transferred to the hospital. There were times when patients had to wait hours to be taken by ambulance, although they were in a critical condition. This situation meant that work was even riskier for employees, and they had to prepare their families for possible endangerment to life. In GOV1_HEASSIST's understanding, a company with more than 200 hundred workers, therefore, represented a risk for the health of their workers and the community. I was given examples of times when they had to treat an average of eighty workers a day for bad food poisoning or virus outbreaks and many people needed care simultaneously. There were no doctors or nurses available even to provide primary care, such as administering drips. They had to borrow chairs from the secondary school to sit patients on while being treated because the clinic had only a few beds. Most patients had to stay at the clinic for more than two days, and the situation was critical, with insufficient drips, tubes and medication. Some workers were very ill. They said:

> *"It was almost apocalyptic what we experienced here. We realised then that if some serious accident involving workers happened, we would have been in real trouble […] The Mayor has no money to hire a second doctor or nurse, and the company is refusing to contribute to providing a new ambulance. They promised us a new one, but it always comes with excuses when we ask them about it. I know that they are finishing building soon and will leave town. All companies are the same, smiling whilst keeping all promises on ice." (GOV1_HEASSIT).*

This incident involved workers at WINDFARM1. Workers, when asked, told me that the food poisoning event was frightening. Some of them thought they could have died. They mentioned that apart from this big event, there were many other individual cases of workers falling ill, such as with dengue fever, chest infections, or viruses. In most cases, the only treatment they got was being given antibiotics and/or put on drips while sitting down for mere hydration. There were no beds available and workers collapsed while sitting in corridors.

Managers at WINDFARM_1 were aware of the situation but avoided talking about it in more detail. When asked about the lack of ambulances, they tried to get away with it by stating that, in the event of an accident, companies' cars were the best available option for

transporting workers to hospital in the region's capital city, Natal, which was roughly two hours away.

The case of technicians from WINDFARM_2 was similar. Although they lived in slightly better accommodation they arranged themselves, the small towns where they lived also lacked infrastructure. Most towns in the region had no hospitals, but only small medical practices available. If any of the interviewees needed a specialist for some reason, they would have to travel to the capital city two hours away. Although companies at WINDFARM_2 offered workers the benefit of joining the corporate private health insurance (at a cost to be deducted from their salaries, if chosen), workers would not benefit from it due to the main medical facilities insured by it was located many miles away from them, in capital cities.

Most workers from WINDFARM_1 and WINDFARM_2 also completely lacked any access to mental services if they needed. When asking workers whether they would consider seeking out mental support themselves (if there were any services available), they considered it to be out of question. Most workers laughed when asked about it, saying that mental illness was associated with weakness and could damage their reputation both socially and at work.

With generally poor health facilities, living in poor accommodation did not help, especially if someone got ill. There was no way a worker in such a precarious situation could self-isolate to prevent the spread of covid-19, for example. As they mentioned during informal conversations, what usually happened was that in most infectious cases, once one worker got ill, others would soon fall ill, too.

The following Section (5.3.3) relates to how poor living conditions affected workers (and managers personal relationships). It also explains findings about workers who, experiencing loneliness when living away from family, ended up finding some comfort in sporadic relationships.

5.3.3. Personal relationships

Personal relationships were generally worsened by the precarious working and living conditions workers were experiencing. Both workers and managers found that insecurity and uncertainty impacted on their personal relationships. Managers, for instance, did not know whether they would start working on a new project, where or when, and could be required to move away from the area. Some managers said that they would not bring their families with them as they could be suddenly asked to move jobs. In this situation their families would struggle to have to move again, establish new friends and find a way to be part of a different

community. So they instead preferred their families to live permanently closer to relatives and friends. A senior manager interviewed added:

> *"It is a hard decision to make. I know I will probably be away from them for a year or two in a particular job, visiting them occasionally. I miss them a lot. It's better if they stay living permanently closer to our relatives. Sometimes I cry about not seeing the children grow. I'm missing everything, and that hurts. It hurts a lot" (C2_PRO_MGT).*

Due to the long working hours and the distance from home, workers could only usually see their families on Bank Holidays. A worker at C1 explained:

> *"To visit my family, I must catch two coaches and it would take me about 9 hours to get there. It is expensive, tiring and simply not doable over a weekend, really. I need at least four days off to make it work. Most of my peers are in a similar situation…we are trapped" (C1_RH_ASSIST_2).*

During my interviews, I asked many workers what they did to socialise. Many interviewees told me that they had very little entertainment but could go out for a drink or two. Some of them (married or not) would eventually get involved in brief relationships. In some cases, the woman would get pregnant, but the relationship would not continue, and women were abandoned with a child to look after. They referred to these children as 'sons of wind', saying that although sad, this had become a common expression among workers in the wind sector. The government clerical officer commented:

> *"These women were irresponsible but have not made the baby alone. They are usually from a poor background, and some are quite young. After they give birth, they find themselves having to look after the child at the same time as not being able to work and provide for them" (Gov1_HEASSIST).*

They (the clerical officer) continued by emphasising that the 'sons of wind' phenomenon was not local. According to them, it was common knowledge that since they started building wind farms, these relationships started happening throughout the Northeast region, leaving traces of what is considered another phenomenon affecting small towns when big wind companies leave them for good: the creation of 'ghost towns', as explained in next Section (5.3.4).

5.3.4. The creation of ‘ghost towns’

As most of the wind farms in Brazil were built remotely, there was minimal or no infrastructure available when the project started. Usually, the areas occupied by wind farms were surrounded by small towns with low infrastructure and communities living basically off artisanal fishing and / or agriculture. When wind projects arrive in such areas, hundreds of workers arrive simultaneously. Some could see this temporary growth in population as an opportunity for development, with many jobs being created. However, in reality, what happened in most cases was that most of the jobs that were available to locals were temporary, low-skilled jobs. At the time of my first visit, Sao Bento do Norte had approximately 2,700 inhabitants, the majority of them of working age. However, only 22% of the population was occupied in a formal job (Geofisica Brasil, 2014).

Local communities and local authorities had to adapt very quickly to the demand for food, accommodation and health services from the new influx of workers. In theory, companies were required to present a plan on mitigating the impacts of a big project on the local community. This plan may include, for example, providing new roads, donating ambulances, improving water and power supplies. In reality, despite companies' efforts in establishing a good relationship with local authorities, efforts in developing sustainable growth were left to the authorities. Companies ended up not complying with most of what they had initially agreed to do.

When companies left, the towns and villages were left practically empty. On my way to visit the country's northeast region in 2018 and 2019, I saw many small villages that looked as if they had been abandoned. Surrounded by wind towers, some areas were located near the coast with beautiful white-sand beaches. The photos below were taken while I passed through the region in 2019. The lack of infrastructure was noticeable, and the houses near the motorway showed the conditions in which these people lived.

Photo 1. Improvised houses built next to a motorway by people made redundant and homeless within Parazinho region where there are a few wind farms already in operation

Photo 2. Improvised houses built next to a motorway by homeless people within Sao Bento do Norte region

Photo 3. Road opened in rural area giving access to a new wind farm.

Photo 4. Sao Bento do Norte beach – the largest artisanal fishing community in the country – now sharing the landscape with dozens of wind towers.

Although this last picture (photo 4) displays a contrasting landscape from the other ones (photos 1, 2 and 3), it illustrates how contrasting life can be for these workers. They hardly have time or feel entitled to enjoy this beautiful beach so close to where they live. Moreover, some workers find it somehow surreal coming to work in such beautiful regions and

not feeling privileged to experience it. Some of them have mentioned that the reality of living surrounded by the poorest of living conditions, in such precarious situations, hit them extremely hard.

The Section below (5.3.5) moves on to findings related to crime and violence experienced by workers and how this affected them negatively.

5.3.5. Crime and violence

At the time of the interviews in 2018, companies were investing in higher levels of security to contain crime. When visiting C1 in 2018, the construction of the wind farm had almost been completed. Managers were having problems with some material being stolen from the storeroom, which was open-air due to the size and amount of materials. The warehouse manager told me that he had introduced a range of measures. Firstly, they fenced the entire area and installed a gate with a 24/7 guard in place. Secondly, workers needed to provide documentation authorising their access to and use of any materials. He said that former workers and unemployed people were involved in stealing materials. He added:

> *"These are people who know very well what is here and how much this material is worth. They come in the dark. Only those who know this region well can come here in the dark because it is already almost impossible to find the park in the daylight, so imagine what it is like at night. We know these are workers who got frustrated and lost their jobs" (C1_ALMOX).*

For security reasons, my access to the WINDFARM_1 had to be previously authorised by someone, and I needed to show my identity card at the main gate. At the entrance, as required by law, there was a sign containing information such as the company who owned the complex, the reference number of the contract registered at the Ministry of Energy and the name of the site (traditionally, wind farm complexes are given a name that usually refers to some geographic characteristics of the region).

Although the three companies (C1, C2 and C3) were sharing the same area where they located their offices, I noticed that only C2 was fenced and had a guard at the fence gate controlling people's access. The other two companies had their offices side-by-side but not fenced and with no guards. C1 and C3 had their offices made of adapted containers, with very basic equipment (some desks, computers and a printer). C2 had brick layered facilities that seemed to offer slightly better working conditions to the administrative workers using its

offices. According to C2's project manager, the brick building would later serve as the operation and maintenance office for WINDFARM_1.

When I returned to visit the wind farm in 2019, the building work had been completed, and most containers and facilities had gone. There were only a few containers left to serve as an office for C3 (the turbine manufacturer responsible for connecting the components of the wind towers). The manager of C3 was the same person as the one who I interviewed in 2018 and they had been there since the beginning of the project. The big team of technicians he used to lead had left. Together with a small team of six technicians and a cleaner, they were working on the site to provide operations and maintenance to the turbines for two years while the motors were still under warranty. After that, the client would assume responsibility for the wind farm and provide the maintenance themselves, meaning that the manager of C3 (C3_PRO_MGT) would probably have to change jobs. Compared with the construction phase, the area was much quieter, and the team felt isolated, fearing for their safety. At C3, they had their security cabin burgled a couple of times, once with the security guards being under threat of gunfire. On one of these occasions, they took the security guard's car, wallet and watch. C3's manager was also ambushed once on his way home from work. He said:

> *"I was fortunate that they only took my wallet and watch. It could have been much worse. I know cases of colleagues who had their cars taken and were left in the middle of nowhere. A vehicle was shot on the same route that I usually take to go home, but I think the driver was ok. They usually come in pairs on a motorbike. They take your car and leave you there for the vultures. I recently got married and brought my wife from the south of Brazil to live here with me. Now she is scared of me being robbed again. We don't feel safe going anywhere anymore; we also stay home most of the time I'm not working. Is this life?!" (C3_PRO_MGT)*

They had had to increase security at C4, and workers mentioned that the rise in violence in town was worrying them:

> *"There is a lot of unemployment here since they finished building the wind farm. When they first arrived, these locals started earning some money. Now that they have left, most places are abandoned. The youth is lost here, so they end up engaging in crime" (C5_TECH_1).*

Another worker reported:

> *"There are no police patrolling the region. Nobody feels safe around here. There were cases where workers were assaulted at the wind farm. We now have security patrolling the areas where we are providing maintenance, but I know about the case of two colleagues who were robbed inside a turbine!" (C4_O&M_TECH1).*

Such precarious occurrences seemed to have become part of most workers' daily lives, increasing feelings of insecurity by working and living remotely.

Section 5.3 dealt with a series of findings on living conditions: poor accommodation and health care; issues of precarity affecting workers personal relations; the phenomena of 'ghost towns'; and the rise in crime and violence. Interestingly, managers, on many occasions, took advantage of these living situations to exploit workers. For example, workers at WINDFARM_1 had their accommodation provided by their respective companies (C1, C2 and C3). Because of this, workers felt like they should not complain much about the poor conditions. In addition, managers knew that workers felt sad about being away from family and were uninterested in having social lives. With this in mind, managers convinced workers to work extra hours as a means of making time pass quicker and helping to distract them from their realities. Considering what has been explained in Section 5.2 about how managers dealt with workers in relation to the extra hours, there are strong implications that workers were manipulated by managers to think that working extra hours helped them *alleviate* the difficulties that they were experiencing. Most workers at WINDFARM_1 seemed to agree with managers in this respect, emphasising how working harder, especially over weekends, acted as an antidote to their struggles.

The next Section (5.4) moves on to discuss findings related to precarious working conditions.

5.4. Precarious work

A sense of job insecurity was evident in every visit that was carried out. Workers tried to be optimistic about having a job, but at the same time, their facial expressions revealed uncertainty, stress and sadness. Workers experienced precarity in various forms, simultaneously. This Section will uncover the main themes involving the precariousness of the working conditions found in this study, which will be addressed in the following eight sub-Sections.

Firstly, an important aspect of most of the jobs across the supply chain was temporary work. Although temporary jobs were the norm, the reasons why workers contracts ended were not necessarily tied to the nature of the jobs, as Section 5.4.1 will further explain.

Section 5.4.2 will explain how workers from both supply chains felt confused about who their bosses were, due to characteristics of their working environment and how managers belonging to different companies within the supply chain interacted with each other. Then, the findings will move on to Section 5.4.3 to explain how lack of training and career development impacted workers job insecurities.

Findings in relation to reward will be addressed in Section 5.4.4, revealing surprising mechanisms used by managers to increase job intensity. This, to a certain extent, links to findings found in Section 5.4.5, which reveals how managers took advantage of the precarious situation to convince workers to engage in overwork.

Another important set of findings relates to workers (and managers) health and safety. Workers showed visible signs that the working environment negatively affected their health, which is a core characteristic of the industry, as the majority of jobs in the wind power industry involve working with heights and other risky operations and threatened their safety. Section 5.4.6 will describe the main precarious conditions that, associated (or not) with the circumstances posed by the nature of the industry, increased the risk of accidents while simultaneously reducing access to emergency services.

Section 5.4.7 moves on to look into the inequalities found within all companies. This Section will show that, in general, companies were not inclusive, and the way that workers and managers perceived inclusivity was often equivocated.

Finally, findings in Section 5.4.8 revealed similarities between the wind power industry and the oil and gas offshore industries. This was uncovered in interviews with stakeholders who raised concerns regarding similar precariousness and supply chain bottlenecks in both industries. They enumerated a series of problems workers tended to face working offshore, especially in terms of the lack of training, poor health and safety practices and precarious working conditions.

With uncertainty and unpredictability found to affect so many workers in this case study, this Section will conclude by summarising how precarious working conditions were interpreted as mechanisms of control, impacting negatively on workers' quality of work.

5.4.1. Temporary contracts

Most jobs in the wind industry were temporary. Workers were constantly moving jobs, especially the low-skilled workers and the technicians. Although managers tended to move less from job to job, often moving from location to location to work on new projects. On one occasion, during the first visit to construction company C1, when asking a worker if he felt secure about his job, he said:

> *"The only security that we have is insecurity […] we are ever so lucky that this wind farm complex is big and, therefore, we may take longer on the job this time. But usually, in most wind farms out there, the job lasts for three or four months" (C1_QUALASSIST_1).*

The intonation C1_QUALASSIST_1 used when saying this implied a degree of irony when carefully choosing to use the word "*security*". He did this when explaining that he could only be sure about one thing, which is that he would soon be dismissed and become unemployed. In essence, his only certainty was the uncertainty of his long-term situation.

Interestingly, workers at C1 and C2 were more open to talking about job insecurity once outside the workplace. In Sao Bento do Norte, on weekdays, only one restaurant stayed open in the evenings. On one occasion, I went there for dinner and sat next to a few workers from C1 and C2 who I had interviewed earlier that day. They started talking to me as if they wished to add more to what they had told me before. I noticed a behaviour change, with some workers showing anger and impatience and complaining about feeling tired of doing such hard work. They explained that being away from family led to them experiencing low mood, lack of perseverance, confidence and commitment to the company, though they asked me not to mention this at the workplace. However, the workers seemed to be resigned to their situation. As one worker explained,

> *"What is happening here is the same as what happens in heavy construction; once we finish building the wind farm, there's nothing else there for us to do. We have to move and search for another job. Most of the time, I end up somewhere I had never thought I would be, meeting new people, and having to start it all over again. It is what it is" (C1_TECH1).*

In their openness to talk about it, although the sense of resignation was evident, workers also looked upset. Their heads drooped down while telling me about their feelings of disillusion and loneliness, which gave a rather dejected, hopeless and desperate impression.

When a company established its new operations in an area, HR managers hired dozens of people to fill the opened vacancies. Using the argument of company's corporate social responsibility (CSR), HR managers initially gave preference to hiring local people and then opening vacancies to non-locals. Controversially, they (HR managers) seemed not to be concerned with the fact that they had dismissed hundreds of other low-skilled workers from the previous project before moving to the new site. However, it also became apparent from interviews with HR managers that they would not even keep those with specialist skills, mainly as a way of avoiding any extra costs associated with hosting or providing for them, such as accommodation and transport.

Such ways of handling the hiring process caused workers to feel insecure. The workers at C1 and C2, for example, felt trapped in a vicious cycle. They said that companies used the excuse of having to give preference to hiring locals, but they did this without acknowledging that they would also be avoiding the extra costs that would have been incurred if they had kept the existing workers employed.

According to the HR manager at C1, new operational contracts were usually in a different town or a different State, many miles away from the previous site. However, people were willing to travel far for opportunities because there were never enough local people with relevant experience in the field and there were fewer job opportunities in remote areas which drove potential workers away to more urban areas. Workers interviewed confirmed this, explaining that when new information about a new project is spread, there was a lot of excitement among workers. This excitement showed up in them either when sharing information with others in search of jobs, or because they themselves would sometimes consider quitting their existing jobs in favour of a new one to avoid becoming unemployed after one construction project finished. According to some workers, typically when the HR of a company starts the hiring process, dozens of job seekers would start their march, travelling to the new site carrying their CV with no guarantee of being hired on arrival. It all happens very quickly. As they put it:

> *"High unemployment rates are common in this region. When it's time to hire a new team, we easily fill, 200, sometimes 400 job positions within a week if we want. We spread the news, and they come from everywhere. Here, for example, I have people from all regions, some are local, but the majority come from relatively far away. They got used to travelling (C1_HRM).*

"Like ants, they queue outside this 'provisional HR office' and just hope for a place" (C1_ALMOX).

This situation meant that people had to take on tremendous personal risk and simply travel without a confirmed job offer, just hoping that after they go to the enormous effort of uprooting themselves and their lives completely, that they would actually end up with work. In other words, many workers risk being stranded.

Another aspect that complicates things for workers (and HR managers) is that by law, companies cannot hire the same person again immediately after dismissing them if they had held a permanent contract. To help the understanding of this situation, further explanations are useful to add here in relation to the legal context of employment. As mentioned in the literature review, the new Labour Reform (2017) brought a lot of flexibility to employers in terms of using temporary contracts. However, HR managers in this study explained that– for work in construction at the time of my interviews – different laws prevented them from hiring these workers temporarily. In essence, the flexibility that came with these labour reforms did not fully apply to this sector, forcing employers to seek other, legal ways of offering temporary work to workers and continue the precarious situation of their workers as a result. Therefore, HR managers were obligated by law to hire them under permanent contracts, despite the work they were hired for being finite and temporary in nature. Although this law was designed to prevent firing and re-hiring the same permanent workers, this rule also applied to most low-skill workers in construction, even those in what were temporary jobs in reality because HR managers hired the majority of these workers under permanent contracts.

These labour regulations which prevent companies from re-hiring an employee when they are dismissed from a permanent job position had repercussions for finances and working conditions. This rule was *intended* to protect the rights of workers on permanent contracts, including their pension rights. The law also protected them (workers) from companies who may 1) use readmission to avoid paying taxes or benefits related to the prolonged time of an employee on the job, or 2) fraudulently dismiss someone as a means of renegotiating different working conditions and salaries that companies intent to put into practice at the start of the new contract.

As a result of this legislation preventing the firing and re-hiring of workers, there was a detrimental knock-on effect for workers in the sector investigated in this study, which contributed further to the precarity of their position. HR managers explained that workers would often quit or be dismissed when they tried to get a similar position in another company. The company would then be prevented from hiring the same person immediately after. This

meant that people might quit for another job and then fail to obtain it, going back to the old company only to be told the company is not legally allowed to rehire them. This left these workers unemployed, which was the exact issue that they had attempted to prevent. This creates a catch: 22 for workers in this study wherein both staying in a job to the end of the construction phase, as well as trying to secure a new one somewhere else (which might involve quitting and travelling), risked their job security and getting stuck somewhere remote. This situation was therefore perpetually insecure. However, this law also meant that if a company needed to employ an existing worker on a new project, they had to keep the worker employed (and continue paying them) even if the employee was not working.

Companies naturally wanted to avoid the cost of dismissal (which includes payment of taxes and bureaucratic fees), but under some circumstances might occasionally be prepared to cover it. For example, during my visit, one of the companies was ending one project that employed 242 workers but was about to begin another contract of a similar size in a different area. The HR manager began organising the hiring process for the new project while the old project was still on. She mentioned that some of the people from the previous project could continue working for the company at the new site, but she would have to keep the worker officially employed, paying them their usual salary, during the transition period.

From the worker's perspective, they held permanent contracts only so that the company would be covered by law. In reality, both companies and workers knew that it was very likely for those contracts to end at some point, but the law prohibited transparency about it. One way or the other, workers pointed out how they felt insecure about their employment situation since day one on each new job. This is an interesting finding because it reveals that managers take advantage of the law to make their decisions regarding dismissal, at the same time they (managers) hide themselves behind a façade of caring.

One exception to this phenomenon of artificially inflated contract duration was in the event of a joint venture at WINDFARM_2, which affected technicians in a slightly different way, due to work in operation and maintenance usually being more permanent, while also being precarious as a result of the project being shared between companies. Temporary joint ventures and acquisitions were prevalent in the sector but typically created a sense of uncertainty among employees. They generally expected that they may simply lose their job without being offered another one with the new company, as the new company might bring their own staff. Because legislation prevents existing companies from firing and rehiring workers, when two companies join for the purpose of a shared project, the home company is typically unable to rehire the worker if they were unable to keep them on payroll during the

transition period. In this case, the second company could instead hire the worker - who would then move on to another job doing practically the same thing, sometimes in the same location.

For example, when a joint venture was announced at C4, workers had expressed concerns regarding job retention. Workers became so apprehensive that the new owners decided to visit C4 to reassure the workforce. Workers mentioned that they had been under much stress during the transition period as they feared being substituted for other workers. In fact, during my second visit, workers told me that after the new owners' visit, they started making changes that contradicted the assurances they had given during the visit. For example, workers mentioned that soon after, the project manager C4_PRO_MGT was transferred to a different site belonging to the new venture. The technicians mentioned that he was not happy about it but did not have a choice. Since then, they mentioned that they somehow felt betrayed, despite acknowledging the lack of agency he had. This situation also made them feel more insecure about similar or worse happening to them.

Temporary contracts created uncertainty for workers and managers alike, often forcing some to accept poor working conditions in order to secure longer term contracts. For instance, managers also shared concerns about their own job security, although they more often had permanent contracts. In order to keep their job, they often had to accept being relocated for each project. Not only did this leave managers in precarious, unstable positions, but because of the nature of the industry, this also meant they had to endure poorer quality working environments.

In this regard, HR managers faced even more precarious circumstances. Usually, the company would send the HR manager (predominantly women) to the new site in the early days of a new construction project. Because sites were not yet complete, working conditions were often deplorable at this stage. Most sites would start by opening roads and levelling the area – in other words, they would be sent out to the middle of nowhere. Three HR managers interviewed during my first visit mentioned how precarious these situations commonly were. For example, to start recruitment for WINDFARM2, they initially rented a room in a commercial building in a nearby town where dozens of new contracts were signed in their first week. Meanwhile, the company adapted a container to serve as their office for the period of construction of WINDFARM2. Eventually, when the HR managers got there, all they could see on site was dust. At this point, they knew that for months they would be working in a low air quality environment, sharing one portable toilet and lacking the most basic infrastructure.

In summary, the temporary nature of work was prevalent among workers (and managers) in construction and operations and maintenance sites. Regardless of the longevity

of their contracts, workers in general faced uncertainty, contributing to high levels of stress and anxiety. The next section relates to how workers' confusion about the way authority was utilised by managers of different companies, affecting workers negatively.

5.4.2. Who is the employer?

A number of workers had difficulties with knowing who to report to and or take instruction from, due to managers' confusing behaviour. Namely, in the case of WINDFARM1, managers from C2 and C3 were giving instructions to C1 workers in relation to how to do their jobs. In addition, they (C2 and C3 managers) discussed the performance of C1 workers with managers of C1. At WINDFARM2, workers at C4 and C5 provided maintenance together, as a team. Quite often, managers from C4 and C5 would instruct the teams, including workers from the other company, regardless of who their official manager actually was. As explained in the previous Section (5.2.6), the case of joint ventures and mergers also caused confusion since both workers and managers experienced working for two companies (although belonging to the same owner) simultaneously. This Section will cover the causes behind the confusion, showing that although reasons behind confusion varied between WINDFARM1 and WINDFARM2, both cases involved precariousness, affecting the quality of work.

At WINDFARM_1, the warehouse manager at C1 (C1_ALMOX_MGT) experienced confusion in terms of who employed him. He was hired by C1 to supervise the storage and distribution of materials belonging to both C1 and C3 to be used in construction. These materials were placed in a designated area at WINDFARM_1. It is worth noting that C1_ALMOX_MGT, when he started on the job, had raised the issue, informing the project manager that controlling both stocks was problematic. Materials from both companies shared the same space, but were all mixed up. At some point in the construction, he continued, they noticed that some parts went missing and police got involved. It turned out that were being stolen, over weekends, at night time. Since this event, the area was fenced and had a gate that was kept locked at all times. Next to this gate, there was a container used as the warehouse's office. Although it was clear to him that he worked for C1, he was often asked to report back to C3's manager. He explained:

> *"Here, I work for C1, but I'm in charge of controlling all the materials used in the project, including those belonging to C3. The engineer at C3 comes to check the delivery of C3's materials with me. And, although he is not my boss, he acts as if he is. Then I am regularly asked to report back to my boss at C1 on how I am receiving C3's material/equipment. I don't mind*

looking after their stuff, but why should I be reporting to them if I don't work for them?! Shouldn't they double my salary after all?" (C1_ALMOX_MGT).

The situation brought to light the issue that managers from both companies (C1 and C2) made C1_ALMOX_MGT responsible for looking after all these materials, receiving orders and reporting to managers from both companies. In addition, although he considered himself competent at the job, he had mixed feelings about what might arise if something happened to things belonging to C3. He also felt pressured by people he did not recognise as his bosses.

Similarly, project manager C1_PRO_MGT found it difficult to report to two bosses, rather than one. The owner of C1 asked him (C1_PRO_MGT) to provide regular reports to a different company, to update them on certain details of the operations. This request was because the companies would start working together with them on a new project in the near future and needed to have an idea of the real time frame of a similar project. Although the project manager could understand the purpose of the reports, he was clearly unhappy with the situation because the other manager (designated for the new project) had already started to treat him as if he was his boss.

C1_PRO_MGT felt under pressure to produce and demonstrate good results in terms of finishing his own project in time. He felt like the stressful situation was imposed by the owner of the company, who also took advantage of it to encourage him to rush things. He looked very anxious and was constantly worrying about workers' performances on a daily basis. This, in turn, increased the pressure on workers at C1 more generally.

Another practice that made it confusing for workers to know who they worked for was evident in how workers were evaluated. At C1, the client (C3) regularly evaluated C1's workers. When I asked the HR manager at C1 how workers were evaluated, she explained that C3 usually took part in evaluating C1's workers on site. As she put it:

"Our supervisors evaluate our workers with the help of our client (C3). They go together in the field to inspect them. C3 wants to make sure that they (our workers) are doing a good job" (C1_HRM).

The warehouse manager at C1 also experienced this confusion many times:

"I am regularly asked to evaluate my relationship with C3's manager. They want to know if I am being obedient, respectful and reliable to them. I know that he (C3's manager) does the same in relation to me, but I never get any feedback. I'm just glad that I'm doing a good job so that they have nothing to complain about. It's a bit awkward because I don't work for them,

but they keep bossing me around as if they were, all the time. My actual boss sees this as normal, but I think it's wrong".

He also added at another point in the interview,

"These managers from other companies…they drive me mad. Fancy them telling me what to do or what they think I did wrong. They act as if they are my bosses, but I do not work for them. I just hate it. This is one of the things that makes me sometimes want to quit!" (C1_ALMOX_MGT).

During observations, it was also apparent that there was confusion at WINDFARM_1, where C1, C2 and C3 were operating at the construction site. Although officially hired by different companies, they worked together as a team. I noticed that workers in general were receiving orders from managers of all three companies simultaneously. Also, during observations of meetings, managers of the three companies made decisions on whole teams of workers, deciding who should be allocated to do what based on workers' skills, regardless of which company they were employed by. Observation also confirmed the confusion indicated above. There were many occasions where one of the managers gave direct instructions to a team of workers belonging to another company. Workers showed uncertainty regarding whether they were supposed to follow these instructions, or not. In addition, no formal conversation about chain of command had ever taken place. During the interviews, I asked workers about how they felt in relation to receiving orders from other companies' managers. They explained that they did not like having multiple bosses and were unhappy about this practice. They worried that an eventual miscommunication among companies could end up in a mistake, causing them to lose their own jobs.

At WINDFARM_2, there was also confusion regarding who the employer was, but this was due to Companies C4 and C5 recently having merged, changing the companies' ownership. As a result staff, at one point during the merger, worked at the same site but for one of three different immediate employers. At the Operation and Management site, 14 people from C4 and C5 were providing O&M activities in partnership. Four of them worked exclusively for C4, and the other 10 were technicians who worked for C5 and provided maintenance to generators in two wind farms simultaneously – operated by C4 and a third party, which were located close to each other. They (the technicians) sometimes found it difficult to determine who they were working for. One participant commented:

"At the beginning of my contract, I worked for C4 on one site. Today I work at two sites that belong to the same company. I always share the same

office base with other colleagues working for C4 and C5, too. It can be confusing sometimes. We work together as a team, but for different bosses. Luckily, the communication between us is very good. I can tell that if it was a different team, things could get a lot complicated." (C5_TECH_2).

This murky situation meant that the company was reliant on workers to pick up the slack, in terms of compensating for poor organisation, by communicating extremely effectively. As a result, it was just a matter of chance whether workers would be able to get along, avoid personality clashes and work effectively enough together to avoid problems.

"We respect both managers, but officially we must report to the one who works in my company. Also, companies keep changing names, and each contract is a new configuration. Come back next year, and everything will be different again!" (C5_TECH_2).

As C4_TECH_02 mentioned during my first visit, he would not be surprised if he came to work the next day to find out that the company he worked for changed owners again. This finding was confirmed during the second visit to C4 in 2019 when a new company had acquired C5 and made a few changes to its workforce. For example, C5_TECH_2 was now working at two different sites belonging to the newest iteration of C5, and reporting to two new bosses, each at a different site.

In summary, findings showed that workers (and managers) felt confused about who their worked for, causing them feelings of insecurity. At the same time, they tried to make sense of it as if this was all due to the nature of the industry and the precariousness they faced.

5.4.3. Lack of training, career development and progression

Training was considered a big problem faced by the wind industry, resulting in many of the supply chain bottlenecks. The Chair of the Research Centre (CERNE) explained during his interview that lack of training is a challenge that may put the future of the wind industry in Brazil into risk. He added:

"There is a problem we must tackle in the entire supply chain: the lack of people qualified for the jobs. We have agreements with some educational institutions to provide training to young students, and this helps to close the gap in the industry a little. The problem is that the technology changes too fast, and we need to train these young lads again, and that is not often

possible once they have left to work in projects away from the technical schools" (R1_CHAIR).

For workers, the lack of training led to feelings of uncertainty. The case study companies, in general, had very little to offer workers in terms of upskilling. The only types of training available was compulsory by law - anything else was considered costly and unviable. This was found among workers at every level, from the least skilled to the most experienced ones and even in managers. Similar happened in relation to career development for all workers. Even in jobs that tended to be more permanent, workers felt there was little chance of progression.

The majority of workers working during the construction phase of the wind farms were builders or young technicians. Most of them had no previous experience in the field, coming from housing construction, and sometimes from small businesses. Some had never worked in an industry environment previously and had never seen a wind turbine so close before. Some of them even mentioned that they did not know how to behave in an industry environment. Some had previously built houses while self-employed, and were unfamiliar with the managerial dynamic. Others were previously hired by a construction company, giving them more experience in navigating management processes and knowing how to report to their managers.

Some worker participants at C1 and C2 told me that most newcomers started quickly, with or without previous experience. As the building process developed, new stages required different skills and managers usually allocated existing workers to do the job if they could, avoiding the bureaucracy of hiring a new person. However, several workers explained to me that they had struggled as a result of this because, most of the time, they were allocated to different areas without necessarily knowing how to do the job. For example, one participant mentioned that he started working with concrete and then was suddenly moved to industrial paint, having never worked with it before. He said that this was a widespread practice. In essence, in order to avoid any administrative burden, untrained and inexperienced workers relied on relatively more experienced workers which managers already knew and in different ways as the construction project unfolded. In this way, the precarity of the working environment reduced access to training and forced managers to make staffing decisions that were potentially detrimental to the quality of work and the safety of workers.

However, it was clear that the skill shortage that led to this situation was being ignored by managers and company owners. Managers knew that this caused more risks for both the workers and the operations, yet at the same time they were under pressure to keep costs low

and finish construction on time. According to them, company owners were aware of the skill shortage but seemed to ignore it at their convenience. It is possible that because they were commissioning the construction on their site only, they viewed these construction projects as too temporary to be worth investing in the work force long-term. This short-sighted perspective was taken across the industry, becoming standard, leading to the skill gap proliferating.

Furthermore, at one site, it seemed that the skill shortage was a widespread issue. At the C1 construction site, most workers had no experience or did not know what they were doing. One stated that they "*pretend they know what they're doing and just pray for the best*" (C1_TRAINEE). Another informant echoed this view:

> *"Sometimes I answered questions not knowing exactly what I was talking about. Learning new things 'on the job' can be risky sometimes, we have to be very careful, but there is usually someone more experienced next to us to give us some instructions" (C1_TECH_1).*

Evidently, lack of training led to uncertainty and reliance on other, more experienced or skilled workers to lead the way. During the visit, I noticed that workers were constantly discussing and asking each other about issues experienced during their work. There was a sense of insecurity regarding whether what they were doing was the right thing. These doubts were raised in numerous short meetings that managers held with workers on-site. I often saw workers getting confused during these meetings as well as whilst they were in the process of doing their jobs.

In the field, I noticed that they became especially anxious when something went wrong, because they did not know if what happened was simply their fault or if something else could have contributed to it. This manifestation of their skill shortage made it difficult for them to evaluate mistakes and identify the actual causes, whether it was faulty equipment or misuse of the equipment due to being under-trained. They seemed worried that they might be responsible for things that were not actually their fault. Their expressions showed worry, especially when the manager in charge of the operation was not present and not able to determine who had been at fault.

This was true across levels of experience in the industry. Some workers had been working in the wind power industry since its boom in 2009, working for different companies, in different jobs and activities. One of them once mentioned to me:

> *"They won't necessarily ask us what we know. They tell us what they want and what they need us for and ask if we can do it. We say yes, even if*

> *we have never worked with a turbine because we know the basics of construction skills and need the job. Very rarely someone comes and gives us training, when the machine is too difficult to use, for example. Later, someone will give us some tips and teach us how to adapt some techniques or use the equipment, and that's how we learn. We know it is all expensive materials, but we learn quickly" (C1_TECH_1).*

These finding suggests that workers were not paid much attention at all. It seemed that this organisational neglect was intentional in order to cut costs and avoid protracted and unwieldy administrative processes. In addition, as explained earlier (in Section 5.4.1), temporary jobs made work more precarious because companies did not want to invest much in workers who were unlikely to carry on working for them.

Moreover, during observations, I witnessed the inadequacies of the informal training that was happening on the job. For example, one employee mentioned that he was working as almost the equivalent of a line manager, supervising the less experienced or those who were new to the job. Yet, he did not gain any status or bonuses for doing it - in other words, he was being overworked and underpaid. However, he continued guiding and watching others to ensure that they were doing their job, at the same time as carrying out his own work, which was industrial painting. When he first started this job about a year ago, he knew nothing about industrial paint or the necessary techniques. He just watched and learned with someone else doing it next to him and who had also started the same day. He thought that over this period, he had developed the skills to use the spray and hose pipe in what he thought was the best way of doing it, which he then shared with newer or inexperienced workers.

On another occasion, one employee mentioned that he started in the industry by building the concrete structure that was used as a base for the turbines. His previous experience was in residential buildings. He had to watch and learn from others and as he said:

> *“That was it. Risky? Yes. But what could I do? I needed the job. No point in making a fuss about it but getting on with it" (C1_QUALASSIST_1).*

In this case, workers’ precarious employment situation made some feel that they had no option but to silently comply, despite the potential for accidents or danger. There was, however, reportedly some training in place where expensive equipment was used. The project manager at C1 explained that,

> *"Here, we constantly provide training to our workers because the risks are high. Eighty per cent of our activities involve working in heights, dealing with extremely expensive equipment. We make sure that we train our people to use this equipment well because it is much cheaper than having to buy new ones" (C1_PRO_MGT).*

Overall, lack of training had implications for career development. Some workers reported that they would have liked to take some technical training courses, but one problem they faced was uncertainty regarding course selection, as they were unsure what would be useful. They did not know which course would be helpful for future jobs, arguing that sometimes, even if it happened that the new job was not with the same company, they could be doing something completely different, depending on the demand. For example, a worker at C4 explained how different manufacturers used different technologies, each requiring a specific skill. Therefore, training would not necessarily help him in gaining a new job because the experience in handling one type of rotor could be irrelevant to a different manufacturer or technology.

On top of this, there seemed to be different views on what constituted relevant training. Through the interviews and some informal conversations, low-skilled workers seemed to view training in terms that are more practical and appeared to define training has having the sole objective of teaching them how to do the job. Technicians, on the other hand, showed awareness of their capacity to learn and that a level of specialist expertise was both valuable in their development and also transferrable in their career. So while lower-skilled workers tended to take a shorter-sighted approach and viewed training as a means of enabling them to perform their current job and tasks sufficiently, technicians viewed training as professional development that offered them long-term benefits beyond their current role. However, some technicians added that it was difficult to access education or special training because they worked remotely, far away from the centres where courses were run. Online training was also difficult to do due to the lack of time available to undertake training, combined with companies' reluctance to pay for workers to do such things. They mentioned that this gap in career development caused frustration and demotivation for many colleagues who started looking for new jobs in other places in the hope of better opportunities.

For these technicians in operation and maintenance activities, there was considerable job insecurity. They were working in small groups of technicians per workstation. The farthest a technician could go was to become a supervisor. However, for this, the previous supervisor would have to leave his post for some reason. They were aware that as a technician, there

was little chance for them to grow in their career, reportedly causing demotivation and high turnover in most companies that they knew in the area.

At managerial level there were also challenges related to training and career development. The project manager at C3 told me that since he had assumed a managerial position in the company, he had never undertaken any training. He often asked his superiors about one particular training course in '*coaching'*, but they refused to pay for it. He said:

> *"I even negotiated a good price for the training, but they turned it down, saying that I was already doing an excellent job; my team was doing really well. I do my best; I work many extra hours. In this project, I spent the first two years working 12 to 14 hours a day, seven days a week. I asked for training that I consider useful for my job, and they turned it down. This is what we get." (C3_PRO_MGT).*

He also blamed the site location for his lack of career development opportunities, since the site was located in the north and the company's headquarters were far away in the south. He added:

> *"It makes a difference not being around the office. As much as I work hard here, nobody sees it. They only know five to ten percent of what we do here. It makes it harder to network and to show them why I deserve a promotion" (C3_PRO_MGT).*

Not only this but working remotely from the company's office was considered a problem for C3_PRO_MGT, who struggled to adapt to the distance between workplace and the office of his superiors, which was located in the South of Brazil. He felt that working in such precarious working conditions was harming his long-term development. He was eager to learn new things, but lacked training opportunities and opportunities to learn from peers because he did not spend enough time alongside them, while also not being recognised for the hard work, which made him feel undervalued. According to him, this has affected not only his self-esteem but changed his views about the company.

5.4.4. Reward

Workers said that what compensated them for working so far away was their salary. They believed that they were well-paid, compared to the job market in general, and, most importantly, they reiterated that overtime was well-rewarded. The extra hours could double the salary for low-skilled workers if they worked long hours, especially over weekends.

It is worth noting that the amount paid for overtime was detached from the salary displayed in payslips. In the event of dismissal, payment received for extra-hours worked was not considered integral part of workers salary, therefore, it would not be reflected in compensation, holiday pay among other figures. However, the law protected overtime payment when extra hours were regular instead of exceptional. HR managers, when asked, were not comfortable talking about this, but tried to reassure me that they paid workers correctly. Their discomfort in discussing this appeared dubious to me, raising the question of transparency and integrity in payment processes.

Workers considered themselves lucky to have a job and to be able to send money back to provide for their families. However, the pay was deliberately kept lower than that paid by foreign competitors. When asked if workers were paid fairly, the project manager at C1 said:

> *"I'm afraid you must ask this of the company's director. There is a lot of secrecy in the wind market. Companies abroad want to know how much I pay workers because this can be decisive for gaining a future bid. If I have an expensive payroll, it means I'm less competitive" (C1_PRO_MGT).*

Although pay was deliberately kept lower than the pay given by competitor firms, it was still higher than the pay given in other forms of work. Pay was so important to them that when asked about how they would rank their company, the majority of low-skilled workers interviewed stated that their respective company was an excellent employer to work for and mentioned payment as the key reason for this. A worker at C1 said:

> *"We like working here because they pay well and the extra hours have good rates and are calculated accurately every month, with no delays. I know there are some companies in this region delaying payment […] nobody likes it" (C1_QUAL_MGT).*

All of the human resource managers who I interviewed mentioned that they made sure that they strictly adhered to the monthly payday. They acknowledged that if extra hours were not calculated correctly, it could become an issue, correctly identifying a major selling point of the company in the eyes of workers. So, they aimed to be as accurate as possible and include as many extra hours as possible in the current payroll, which workers clearly valued quite strongly. For this, one of the companies had a specific book, where employees signed in the hours that they had completed at the end of each day, in person, at the office. I observed that when queuing to sign the book, workers smiled and made comments such as "*good, extra*

cash is always good" or "*this is the only queue I don't mind waiting in [laughing]*" (C1_QUALASSIST_1).

As mentioned above, workers considered that the extra pay justified being away from family. At the same time, workers also felt that taking time off to visit family was a type of reward in some companies. However, it meant that they needed to work hard and for very long hours. One worker explained:

> *"I would rather work full-time and do as many extra hours as I can to make the most of this contract than have breaks. I can't afford to go anywhere. Apart from work, there is nothing else to do here anyway. If I have a relatively long break, I can ask to visit my family" (C1_QUALASSIST_2).*

In general, the practice of rewarding was precarious. Firstly, it was used as a mechanism of control against low-skilled workers, who at the same time conflated reward with being lucky. Secondly, workers considered the regular overwork a good thing. Among the more religious workers, some would even interpret overwork through the lens of their faith as a form of 'penitence' or 'self-punishment' for being way from family which they often felt guilty for (again, understanding it as a good thing, because it alleviated their guilt).The ways in which managers used this to control workers by encouraging faith at work through prayer will be discussed further in the cultural control Section of the Findings (5.2.5). Finally, most managers were also affected by precarious reward, with project managers at all companies questioning themselves if it was worth all the dedication over long hours of hard work, if they were not being recognised for it.

5.4.5. Working hours

Despite permanent contracts guaranteeing 30 days paid holiday per year worked, this seemed to be just a formality for workers building a wind farm. They did not get anything close to this. However, there were times when the company had an official break, such as two weeks at Christmas or a week at Easter. Apart from these official breaks, workers tended to 'sell' their holiday pay and had the money instead. In reality, as they said, to avoid project delays, they could not stop working until the project was finished.

More generally, the official line was that working hours per week were limited. When I asked the HR manager at C1 the maximum hours that workers usually did per day in the company, they told me that the workers worked a maximum of ten hours a day up to a maximum of 44 hours a week (C1_HRM). A worker in C1 admitted that in their case they would work about 60 hours a week usually (C1_QUALASSIST_1).

Although normal working hours were limited, most workers worked extra hours. Extra hours could 'allow' workers a day off between bank holidays. In Brazil, bank holidays are celebrated on the exact day that it falls. For example, if a holiday fell on a Tuesday or a Thursday, companies would sometimes let workers take the day off in between, who then ended up with a four-day break. Long weekend holidays such as these could happen around three times within a year. Workers' main goal was to see their families. In this way, they could travel long distances and be able to see their families for a day or two and still get back to work in time. As a result, they often saw these long holidays as prime opportunities to visit their relatives.

To this end, workers sought to work extra hours so that they could build up time off. However, the other reason was that they were otherwise stuck at the site for long hours without anything to do. For example, this was especially true at C1, as managers were provided with company cars, but most workers depended on company-provided buses to get to and from work every day as well as to the refectory at lunchtime. The reliance on company-provided transport meant that workers felt trapped while at work. There was no way that they could leave the place to go anywhere without spending two or three hours walking in the middle of nowhere. It was also dangerous to do so, because when big trucks or buses passed by, the dust cloud was so dense that it was almost impossible for a pedestrian to see anything. At the same time, this made it difficult for a driver to see ahead of them properly, especially if there was another vehicle driving ahead of them, which was common. As one worker mentioned:

> *"You see those buses covered in dust…we depend on them to come here and leave, and also to eat and sometimes to move between regions. This wind farm occupies an area with a 50 km radius" (C1_TECH_1).*

Because working extra hours was the norm, it meant buses would be kept waiting for workers to finish their day's work. With the wind farm being so large, these buses were the only means for workers to enter or exit the site, which meant that sometimes, to go home or back to the accommodation, a team would have to wait for some time until the bus filled up enough. Usually, teams would stay at work and continue working together, only walking back to the bus once they had all finished, creating a subtle form of pressure to work overtime. In addition, depending on buses to get back to their accommodation made them realised they were trapped, and sometimes, working more hours seemed to feel better than simply waiting for others on the bus.

Likewise, managers tended to work very long hours. According to the Consolidation of Labour Laws (CLT) in Brazil, managers in general had a certain degree of autonomy to decide

upon their working hours, therefore, they did not receive overtime pay for extra hours worked. Instead, for holding a position of trust, they were entitled to compensation in addition to their salary (of at least 40% more than the salary paid to their subordinates). Also according to the law, there was a limit of ten hours a day for managers. One manager at C1 said:

> *"I usually work ten to twelve hours a day. I think the limit is 11 hours, isn't it?! But it will depend on the day. If I stay longer one day, I get paid extra hours or get some time off." (C1_QUAL_MGT).*

At C3, the team also worked long hours, including the manager. For the first two years of the project, the team at C3 was working an average of 12 to 14 hours a day. As the project manager explained, they operated on day and night shifts, seven days a week. He (the project manager) commented:

> *"For two years, I worked about 14 hours a day making sure the team was doing ok. Every weekend I had to be 'on call' because there was always a problem or something more serious they needed to ask me about. I was on the phone all the time, without being paid for that" (C3_PRO_MGT).*

C3_PRO_MGT explained that he was not rewarded for all the extra work he did, and that even without being paid, he hoped that it would be recognised and viewed as a sign of devotion to his work. He tried to use this dedication to work as a means to pursue training or to get a pay rise, but both had been denied many times. This made him feel upset, undervalued and ignored by his superiors.

At the same time, both workers and managers considered working extra hours to be inevitably part of their routines, which closely reflects C4_PRO_MGT's experiences. As previously mentioned, the industry's rapid growth led to wind farms to being built in a hurry against the clock. In addition to this, manufacturers and suppliers may lag behind, struggling to meet the demand to become operational and rushing to fulfil agreements. Thus, workers' unrewarded diligence and unpaid overwork may be perpetuated far beyond the construction phase, therefore representing a heavily relied upon staple of the industry.

To conclude this Section, it can be said that working long hours was a core part of workers (and managers) everyday lives. Company owners pressured managers to pressure workers to work harder and faster. Managers, under pressure, also worked extended hours as they needed to be closer to workers all the time to ensure that they were doing the work right. On the one hand, workers saw themselves as deserving the arduous work as penance or justice for being away from their families. On the other managers took advantage of workers'

resignation to a life of overwork, using the chance of visiting family after completing a series of long hours uninterruptedly as a motivator and reward. Finally, managers knew how much the extra hours made up for their (workers) salaries and manipulated the long hours through pseudo-rewards as a means of making them work harder.

5.4.6. Health and Safety

The long working hours had reportedly led to higher rates of accidents. During my first visit, I interviewed a member of the City Council at Sao Bento do Norte, who was concerned about wind workers' health and safety, primarily because they worked extra-long hours. While working at the health department, she witnessed many occupational accidents involving workers who had their hands or feet crushed when handling equipment. She added:

> *"I can see that the long hours are contributing to these accidents, leaving workers debilitated" (GOV1_HEASSIST).*

She continued by explaining:

> *"Companies, by law, can't dismiss an injured worker soon after being discharged from treatment. The law protects workers from being dismissed indiscriminately. In reality, companies get rid of them as soon as they are no longer 'obliged' to keep them by the terms of the law. It's a common practice. I know many cases of workers who lost their jobs, regardless of whether it was a minor or major injury" (GOV_1_HEASSIST).*

GOV1_HEASSIST also referred to a fatal incident in 2017 involving a worker who was painting a concrete base. He was smashed by a heavy machine and died instantly. The body was then taken by ambulance to the clinic for a post-mortem examination and occupational insurance purposes. The doctor, accompanied by a labour inspector, required workers to come forward and testify about the event and explain the circumstances of the incident. The doctor had called GOV1 to come to the clinic to help to deal with a manager (who was not invited to the meeting) who came and sat next to these two workers while giving their testimony to the labour inspector. It was clear that the manager should not be there. Gov1 explained the situation in more detail:

> *"We knew that the manager was there in an attempt to keep workers silent and not say much about what had happened. I then asked the labour inspector and the workers to move to a private room and talk away from the manager. The manager did not like it and gave the workers a funny look*

before they moved room. In the end, we found out that the worker who died had no previous experience of doing the job and was new to the job" (GOV1).

The participant added:

"Companies seemed to adopt similar behaviour in cases like this, commonly sending managers to accompany such cases and exert their power over workers to silence them, avoiding testimonials that may complicate things" (GOV1).

When asking workers at C1 and C2 about this particular event, most interviewees knew about it and felt sorry for the young man who had left behind a wife and children. In general, participants in these companies as well as in others such as C4 and C5 were unanimous in expressing concerns regarding their health and safety. For example, C4_O&M_TECH_1 said:

"We don't have an ambulance; the closest fire brigade is in the capital city Natal, miles away. Firefighters would take at least two and a half hours to get here. There isn't a hospital to give us treatment nearby. Where I'm living, for example, the practice has only one doctor working at night shifts. They only take emergencies, no clinic appointments, nothing" (C4_O&M_TECH_1).

Another worker at C5 similarly commented,

"Another problem is that the nearest place only treats emergencies. If we need treatment or a procedure, we need to be relocated to Natal". A further technician added: "If we get snake-bitten, for example, there isn't antivenom available in the region. I know about a fatal case when a snake bit a worker while working in the field. They took him to hospital, but there was nothing they could do" (C5_O&M_TECH_2).

Union3 leaders reported incidents where they had been involved in assisting workers who had suffered accidents. They had notified companies of technicians who developed knee, ankle and back injuries at work. UNION3_CHAIR said:

"Once, we had to notify a company that ignored the fact that workers were getting injured because of the working conditions they were subjected to. The case was that they had to climb towers 100 meters high, six to seven times a day, most times carrying equipment along with them. At that time,

> *the company argued that they were having problems with elevators but were trying to solve it by installing new types" (UNION3_CHAIR).*

Health and safety issues had therefore arisen as a result of long working hours, the nature of the job as well the isolated location of sites. Other health and safety concerns related to the dusty environment. Given the commonly held view (see the literature review) that wind power industry jobs were 'green jobs', I asked workers if they considered themselves as having a green job. A common view among interviewees was that there was nothing green about their jobs. The majority laughed about it, recurrently pointing me out the terracotta-coloured dust in the surroundings. One participant commented:

> *"Ha! They use the green appeal of clean energy saving the planet but at the cost of our lives. It's a crazy world we are living in. Nobody sees what we are going through here. Still, we cannot complain. We need jobs to feed our families. It is what it is" (C1_QUALASSIST_1).*

During the observations, it was noticed that working patterns and the working environment significantly impacted workers' health and safety. Workers were frequently coughing and sneezing, spitting out mucus onto the floor. Their eyes were red, often appearing to have conjunctivitis. Wind power production is usually located in remote areas, with workers facing adverse weather. In the Northeast region of Brazil, drought is a common phenomenon resulting from a severe lack of rain associated with high temperatures throughout the year. Therefore, one of the aspects of the work environment affecting their health was the constant exposure to dust. Metaphorically, they associated the terracotta colour of the soil with negative things and thoughts. Workers referred to the expression *'green jobs'* as mistaken, pejoratively calling it *'red jobs'* instead. As one interviewee said:

> *"The red symbolises our blood being given to work. I feel so tired…I see my energy dissipating within the dust"* (C1_QUALASSIST_2).

During the case study visits, the dusty wind was so dense that it made it difficult for me to see things sometimes. The red soil can be seen in the two photos below.

Photo 5. ‘Red workers’’ car park: the dusty car park at C1 where red soil was metaphorised in relation to poor health and poor working conditions.

Photo 6. ‘Red work’ in progress: the turbines under construction at C1 surrounded by the red soil associated with poor health and poor working conditions.

Issues related to health and safety did, however, vary depending on the part of the industry. With regard to the construction phase, at the time of my first visit to C1, there was dust everywhere. Workers were covered in it. They were constantly coughing and sneezing, and their eyes were red, irritated. They were provided with security equipment and wore masks and glasses when dealing with paint or welding. But this equipment did not prevent dust, and they breathed that in all day. Some workers had developed breathing problems; others had problems with their eyesight in some cases workers had both. They worked in the open air most of the time. Containers served as offices for managers and the administrative team. Workers rarely used those facilities. The area of the containers was the only place where there were toilets. One interviewee mentioned:

> *"If we need the loo whilst in the field, we deal with our business there somewhere behind a bush or not. Sometimes the company hires portable toilets for some parts of the field, but it's a rare thing to see" (C1_TECH_1).*

In addition, workers were barely connected to the rest of the world. An internet connection was only available for managers via their computers. Phone signal in the area was weak, and workers would use radios for communication. Considering that WINDFARM1 and WINDFARM2 were so remote, the lack of infrastructure was seriously dangerous to workers in the case of an accident, with workers being unable to access any infrastructure for meeting the most basic survival needs, such as ambulances or any medical assistance able to provide first aid.

At operation and maintenance facilities, workers were usually provided with better conditions. For example, C4 had a building situated inside the park where technicians had desks, a kitchen and other essential facilities at their disposal. They had access to the internet as most of the operations were done remotely during the night shift. All workers drove to work, some with cars provided by the company and others in their private vehicles. Each technician had a desk space and communicated via radio with other technicians if they needed to. However despite these comparatively higher quality conditions, they spent most of the time working in the turbines, and it was hard work. Most of these turbines had no lift, meaning they had to climb up and down many times a day. This caused some workers to develop joint injuries, which made them fear that it would become more difficult to do their job as they grew older.

At the logistics company C6, I observed that the company's facilities were generally good, both clean and organised. This was where the line managers and administrative team worked. It was also where all truck maintenance that was required was performed. The

majority of workers at C6 were drivers, spending most of their time on the road. The project manager explained that most of the blades they carried were 60 metres or longer. For such dimensions, federal authorities demanded private escort, but recently it had become normal for a police car to accompany the vehicle at the company's expense. The company had to rely on the availability of a police escort, and this was often decided at the last minute. There were also rules regarding the times or days of the week that trucks were allowed to drive in certain areas. This forced drivers to stop, wait and sleep inside the cabin near the checkpoint station, or on the side of the motorway. Another manager told me that this had become a problem that had generated much anxiety, affected workers' quality of sleep, and led to a lack of attention while driving.

A further issue in relation to health and safety was related to the complexities of who worked for whom (see Section 5.4.2. on 'Who is the employer?'). During my initial observations at WINDFARM_1, I found some difficulty in identifying who worked for which organisation. Many workers from companies C1 and C2 kept borrowing each other's uniforms, safety equipment and company cars. During interviews, I asked workers and managers about the exchange of equipment. On the one hand, workers did not consider mixing equipment or uniforms as a problem. On the other hand, managers were aware of the issue, but instead of dealing with it, they preferred to ignore it. They argue that it did not matter much what uniform they used because they were in the middle of nowhere, and that workers did not always want to wear the equipment anyway. However, when interviewing unions about this issue, they pointed out that this was not ideal because the use of uniform should provide workers' identification in the case of an accident or in the case of trade unions or labour inspectors visiting the sites (not that this happened very often). Union representatives also added that managers were clearly failing in making sure that all measures were in place to protect workers' health and safety.

In this case study, health and safety issues were clearly alarming. The majority of workers and managers visited dealt with heavy material or worked around heavy machinery, posing risk of mechanical accidents. Those working with heights developed occupational injuries from the start. The sense of unsafety caused by the precariousness of working conditions was evident for various reasons: a) workers lacking skills and training felt unsafe when handling heavy equipment; b) workers had no access to ambulances or medical assistance nearby; c) workers worked long hours to exhaustion; d) workers were exposed to adverse weather; e) constant heavy lifting, caused workers to develop back injuries. Although workers were conscious of the operational risks, they were also aware that precarity was exponentially elevating the chances of injuries and accidents.

5.4.7. Equality and inclusion

Most workers in the companies were young mixed-race males. No openly disabled people worked for them, and ageing was associated with significant concerns for health and career development. Most of the workforce lacked diversity and inclusion training.

Uncertainty was found to be worse among the older workers. Some older interviewees said that they did not have the same amount of energy as the younger ones. There were concerns that, with time, it would get harder to climb towers and more tiring to travel for long hours to see family. They also felt less familiar with using the internet so were not able to access job opportunities online. Typically, they were the ones who tried to get closer to managers because they felt that they needed to do this to enhance their chances of working for the same company in new contracts or being recommended to work somewhere else. At the same time, as mentioned previously in the Findings Section in relation to temporary contracts, they felt a lot more employment insecurity than the young, expressing their worries about becoming considered unfit for work.

In relation to ethnicity, during my observations, there was a clear line drawn between the low-skilled and the high-skilled workers. The vast majority of low-skilled workers seemed to be mixed-race, while all managers appeared to be white. Workers understood this as part of the countries' culture, where mixed-race people are usually placed in low-skilled jobs, while white (or white-looking) males tend to occupy high-skilled and managerial posts. During informal conversations, there were mentions of this in terms of normality. Workers were used to this in many levels of their lives (work, social and even family). Managers, on the other hand, avoided commenting on this.

Regarding gender equality, most of the women I came across on my visits held administrative or cleaning jobs. I met only one young woman who was working in the field as a technician. On that occasion, the men were proud to introduce me to her, commenting that she was "*the only woman in the field getting her hands dirty*" (C1_QUALASSIST_1).

Men found it very unlikely for a woman to get these jobs. Most low-skilled workers shared the opinion that working in the field was not suitable for women. In C6, 154 workers were hired to work locally on crane operation and truck maintenance, while 180 truck drivers were employed to transport blades and generators throughout the country, mainly from the southeast to the northeast region. Of these 234 workers, only two were women. One of them was working at reception and the other as the HR manager. Some interviewees argued that work in transport was a male-dominated environment but added that they would be receptive to hiring women, demonstrating concerns about the gender gap in the market.

In terms of disability, most workers expressed difficulty in envisioning how a person with a disability could be working with them. One interviewee commented how he feared that he could lose his job forever within the sector in the event of a severe accident. In C6, there were no workers on record had been hired that had a disability. When asked about it, the participants were unanimous in the view that this type of activity was not suitable for a person with a disability. Moreover, stigma was apparent in discussions about access to mental health support, with most workers opining that mental health was akin to weakness, and that seeking such support would harm them interpersonally both in and out of work. This demonstrates that although there were issues with the inclusiveness of the work environment, workers also contributed to a sense of hostility towards disabled workers, making it unsafe to admit to. In response to my question in this regard, one manager changed the subject by saying:

> *"Although we have no people with a disability hired, we have a program for young apprentices in partnership with the Government's education system. These teenagers are hired on a part-time basis to learn aspects of the maintenance of the vehicles, acquiring some experience that will help them find a better job in the future" (C6_CEO).*

This avoidance of my question reflects a taboo, stigma or prejudice in Brazilian culture, where people avoid touching on the disability subject at work, possibly in order not to cause any sort of embarrassment to whoever has a disability themselves or knows someone with a disability or otherwise reveal them against their will. During conversations with the project manager at WINDFARM1, he argued that although the country's legislation is well advanced in guarding the rights of people with disabilities at work, there is still a long way for the heavy industry to go to integrate policies of inclusion and put them into practice (C1_PRO_MGT).

4.7.8. Offshore wind production increasing precariousness

During my visits to Brazil, I interviewed CERNE – Centre for Renewable Energy Research in the northeast. This institution took part in many national debates in the wind energy industry that were organised both by the private sector and the Government throughout the country. CERNE provided studies and regular roadmaps for both onshore and offshore wind supply chains. It has also helped in formulating government policies and legislation for wind energy market regulation, as well as templates for auctions and public private partnerships within the wind energy industry in Brazil. At CERNE interviewees were asked a series of questions regarding work within the wind sector, particularly about working conditions, the precarity of work, job insecurity, health and safety, career development, and recruitment.

They all suggested that the precarity of work in Brazil's wind power industry was a reality and that more should be done to mitigate this problem. Although they recognised that the working conditions within the wind sector were poor, little had been done to include this reality in the debates for the industry's future. They were aware that workers were left in poor accommodation, with inadequate infrastructure, were away from their families, were poorly qualified, and had insufficient training. As mentioned in the training Sections, the senior member of the Research Centre CERNE emphasised how workers in the wind industry needed more training. He added that offshore wind would create many new jobs, but if stakeholders were not careful, the industry would face a gap in the market that could represent production delays.

In R1_CHAIR's view, although there was an understanding among stakeholders of the precarity of work and poor working conditions in the wind power industry, it seemed that creating (any form of) new jobs was what mattered most for companies and the Government. Unions, on the other hand, expressed concerns regarding work in offshore wind. Senior union officials interviewed at Union3 pointed out that workers faced even more health and safety risks when operating offshore.

As its President put it:

> *"There is no local highly skilled workforce in the region. This means people are coming from all over the country to work remotely. It will be even harder to reach these workers and convince them to join the respective unions within the region. I'm positive about that, unfortunately" (UNION3_CHAIR).*

The start of offshore wind power production coming closer to reality in Brazil will put the industry to a test. In 2019, during my second visit to collect data, I attended the 8o. Business Meeting promoted by Brazilian Wind Power Association - ABEEOLICA. This annual meeting brings wind power companies and government institutions together to discuss future developments in the wind industry, revealing economic strategies and business outlooks at national level. During the event, Government entities presented an agenda including strong incentives to the production offshore, advertising their aim in helping the industry with the creation of hundreds of jobs. Employers, however, based on private consultancy research looking into the markets' workforce, argued that although the offshore industry estimates hundreds of new job posts, there would be no sufficiently trained workers available to meet the demand and there would be no time to train such an amount of people needed. It is worth

noting that the offshore wind industry worldwide relies on the transition of workers from offshore oil and gas industries, making this an international problem.

During my interview with the CEO of the Research Centre (CERNE), he confirmed the relevance of those debates, reiterating his concerns regarding the availability of enough workers to transit between these industries (oil and gas to wind). He added that many skilled workers from the Brazilian oil and gas industry are entering retirement age, representing another problem in relying merely on this transition. This is especially relevant in the face of the inclusion issues discussed in the previous Section (5.4.7) which demonstrate that the wind industry is an environment in which older workers do not feel secure. The wind industry therefore may not present an attractive opportunity to older workers, and if their oil and gas counterparts are opting to retire, the chance of transition at greater ages may be even lower.

Moreover, the work in the offshore wind power industry offers even more precariousness to future workers in the field due to the issues of adverse weather and risks workers may face in working at sea.

In summary, workers in the offshore wind power industry might face additional challenges to those onshore. The nature of wind power projects often involves working in challenging environments, such as remote locations or at great heights. Workers face occupational hazards, ranging from falls and equipment malfunctions to exposure to harsh weather conditions. Inadequate safety measures and insufficient training exacerbate the risks associated with these conditions. Moreover, a lack of adequate representation by trade unions makes workers more susceptible to such deficiencies. The temporary nature of jobs also creates a power dynamic that inhibits workers from expressing their concerns or demanding improved conditions for fear of jeopardizing their current employment status.

5.5. Worker resistance and (lack of) power resources

Findings in this Section are looking into how workers within the wind power industry resist control. As described in Chapter Three, in general, unions in Brazil were struggling to represent workers since the changes in the Labour Reform of 2017. Findings from three interviews with union representatives of workers (being one national and two regional union organisers) within the wind power industry revealed interesting aspects interfering in the ability of unions to act in workers' defence. Basically, unions lacked knowledge of the wind industry and how its supply chain is organised. They also found it difficult to visit wind farms due to their remote locations. But the main problem seemed to be the way unions were systematically organised in Brazil, with each category of workers (such as construction, manufacturing, operation and maintenance) being represented by distinct unions. The temporary nature of

work was also pointed out as a major factor interfering with how close they could get to the proximity with workers, since they move from job to job, eventually changing union respective subscriptions. In addition, workers' perceptions of trade unions are negative, influenced by managers who verbally campaign against unionisation at the workplace. As an alternate way of organising, some workers made use of non-unionised ways of resisting control across the industry.

The next Section will explain the challenges faced by unions in trying to represent workers within the wind power industry.

5.5.1. Union organising

It is important to note the political context at the time of my interviews, because all my union interviewees were very keen to emphasise, even before we started the formal interview, that it was a historical moment for the decline of union power. They seemed to be attempting to justify the difficult situation that they were going through. As previously mentioned in the literature review, the labour reform of November 2017 was the most significant change to the Brazilian Labour Code since its enactment in 1943. Since the new law had been enacted, it had severely impacted workers' rights, having serious consequences for unions. At the time of my interviews, unions were struggling with the employer-friendly legislation and questioning whether it was constitutional.

In order to gain the union perspective on work in the wind power industry, I carried out interviews with three union leaders. UNION_1 represented workers in construction and was affiliated to the Central Workers Union Confederation. It was recognised nationwide as one of the most influential unions at the federal level. The other two unions (UNION_2 and UNION_3) acted at the regional level, representing metalworkers in the southeast and the northeast of Brazil.

Concerns were expressed about the situation that some unions were experiencing throughout the country with some facing extinction while others were considering merging to avoid closure. In an attempt to deal with the political crisis, interviewees told me how unions, in general, were trying to convince more workers to unionise, however it seemed that they were failing. They suggested that the move toward austerity and decentralisation were effectively disempowering unions.

A further challenge that stemmed from the labour reform (Law No. 13,467/2017) was that the law had eliminated mandatory union dues. These dues were considered to have been the primary source of the union's income since the 1940s. One participant said that all unions

were struggling since the participants union's earnings had decreased by more than 80 per cent after the new law. This change had forced the union to sell some of their property and fire some of their personnel. Eliminating mandatory dues had severely impacted the number of union members, while the economic crisis made it harder to convince more workers to join unions.

An additional challenge was related to unions' knowledge of the wind power industry. Interviewees of the two regional level unions (UNION2 and UNION3) admitted not having any in-depth understanding of the wind industry, although they knew that a few of their members worked for companies in the wind sector. Leaders in Union3 argued that their lack of knowledge was partly since the wind power industry was not represented at senior level. As one said:

> *"Our board has no members coming from wind power. This absence creates a problem because it becomes more difficult to identify issues related more specifically to the nature of work in the wind industry. It also doesn't help not being known by workers in the field. Honestly, I wish we had someone from the wind industry as one of our board members." (UNION3_CHAIR).*

Leaders of UNION2 and UNION3 also argued that part of the reason for not effectively representing workers in the wind power industry was that the wind power industry was relatively new to the market, and most activities were very remote from the city centres. As one interviewee described the companies' model of moving from place-to-place with the workers, this made it hard to keep track of them and weakened unions' ability to communicate (UNION3_MEDIA).

Their inability to keep track of companies was also one of the reasons for the lack of engagement with HR. They suggested that there was now less than half the number of informal negotiations that there used to be between unions and companies' HR. Other reasons for this lack of engagement included the increase in outsourcing, general decentralisation of HR departments in companies, and new reforms. This had resulted in less out of court negotiations and settlements. As one interviewee said:

> *"We used to negotiate workers' rights with many companies without the need for formal procedures which are both costly and slow. On the one hand, the new law makes it harder for workers to go to court. On the other*

hand, informal negotiations have become more difficult. Our hands are tied." (UNION3_CHAIR).

He continued by adding:

"With the new regulation, unlimited forms of outsourcing and new types of work contracts became available, offering workers fewer rights in more precarious working conditions. The law prevents companies from changing their working agreements in the course of the contract. To get away with it and take advantage of the new forms, they informally agree with their outsourced partners to assume that worker and hire them on the new terms and regulations. In real terms, workers move jobs, but carry on where they are, doing the same thing, working for the same people, sometimes even using the same old company's uniform." (UNION3_CHAIR).

Another issue that they raised was that most of the time, the interests of one category of workers did not necessarily reflect the reality of all workers in the wind sector. Most interviewees found it hard to give me an example of an issue that they thought could be related to workers in the wind power sector as a whole. A further reported problem was the temporary nature of work in the sector. As one union leader said:

"With workers moving from job to job, in different places, this means that they need to transfer subscriptions. Depending on the case and jurisdiction, this not only becomes costly but impractical." (UNION2_MEDIA_MGT).

When asked if they intended to attract more members from the wind industry, they all pointed out difficulties primarily associated with the nature of the wind industry. One participant commented:

"We have a big problem here. The fact that different categories of workers each belong theoretically to a different union weakens us. For example, builders belong to construction; technicians have their union; manufacturers belong to another union. We – the unions – are trapped in this bureaucratic matter. Companies, on the other hand, are very well organised. Companies of different segments join forces and have their own wind power associations and federations." (UNION3_CHAIR).

It seemed that unions were not prepared to work together. This was the case particularly for unions representing manufacturers and wind farm workers. Although union

leaders appeared to be aware of the industry, they were not keen to interact with other unions. UNION1_CHAIR suggested that this could be linked to the fact that there had always been some kind of competition for power among unions historically, leading to more fragmentation of the labour movement and weakening unions' power of representation.

5.5.2. Worker perceptions of trade unions

When asking workers about their perceptions of trade unions or whether they were a member of a union some felt indifferent in relation to unions. However most generally made negative comments especially regarding the cost of fees and impracticalities. When I asked lower-level workers about unions, the majority would pull a face suggesting low interest in the subject. Some workers expressed that unions were useless to them, while others were keen on criticising the role of union leaders. As one interviewee said:

> *"Leaders only think about money and themselves. I'm in the middle of nowhere, working hard. They are in the city centres, enjoying the air conditioning." (C1_QUALASSIST_2).*

When I asked him to clarify which Union he 'theoretically' belonged to, he said:

> *"I don't know. It doesn't matter anyway; they won't get my money for nothing." (C1_QUALASSIST_2).*

Managers, when asked, shared similar views and criticised unionism, suggesting that it was something that did not help companies or workers. As one manager put it:

> *"I hate unions; they only exist to cause trouble and complicate things. Workers in this industry are well-paid, and they consider that they have good jobs. I don't see any advantage in them being unionised. Most workers agree with me. Ask them!" (C1_PRO_MGT).*

At the construction site, respondents as a whole (including builders, technicians and managers) demonstrated having no interest in talking about union membership. Some did not even know which union would represent them. In general, when asked, they argued that membership was costly, unions were bureaucratic, and membership would not bring them any advantages. There was a sense of discomfort when talking about unions. The chair of UNION3 shared his view on how workers see unions in general in Brazil. As he put it:

> *"Workers are grateful for having a job. They don't see the need for being unionised or represented. It is also a matter of an individualistic*

> *ideology combined with many organisational cultures where they see the company as 'theirs' instead of seeing themselves as employees. They only recognise our existence when they get involved in an accident or develop an injury, when feeling pain or worrying about losing their jobs." (UNION3_CHAIR).*

In general, workers' perspectives of unions were negatively impacted by companies' anti-union cultures. This, associated with the costs of fees, seemed to be the major obstacles stopping workers from organising collectively.

5.5.3. Non-unionised worker resistance

As noted above (Section 5.5.2), most workers were not members of a trade union. Indeed, participants reported that as far as they knew, at that time, none of the workers were members of any trade union. However, I also probed further on whether they engaged in any other forms of collective organisation or resistance. The theme of worker resistance was received with great disbelief from low-skilled workers. One participant suggested that workers in construction (WINDFARM_1) avoided talking about resistance in front of others, fearing being tagged as 'problematic' by managers. In contrast, workers in operations and maintenance at C4 and C5 had a different view on worker resistance. They sounded more aware of their rights, and some of them were using an online network to find out if other companies were treating workers differently in the local area. In this regard, there was a clear difference in their attitude. They questioned their ability to voice concerns and the nature of their working conditions.

There were, however, some ways in which workers acted collectively. As mentioned above (Section 5.2.7), managers tried not to tell workers where or when the company might start a new project to prevent them from trying to leave before the existing contract had been completed. During my visits, it became evident that most workers did lack information about the future of their companies. However, to try to keep track of what was going on in the market, workers showed me how they used networking by phone through WhatsApp groups, sharing information about new job opportunities. They saw these networks as an excellent way to find out about new developments. Once someone knew about a new project, they would post it there in the chat. At C1 most workers took part in these types of groups, getting to know things about many different regions.

The use of WhatsApp groups was frequent after work, maybe because there was no internet connection and a terrible signal at the workplace. I often heard them talking about new developments or job opportunities, mentioning the names of the companies arriving and

networking about who in the group could possibly know someone who would help with recommendations for the job.

On one occasion, a group of three workers were planning a trip together to a location where a new project was just about to start. Being quite sure about starting the new job, they had already rented a place to live together in the nearby town in question. The plan was to tell their boss about quitting on the day of departure. One of them said:

> *"This already happened before and will probably happen again. There is a lot of turnover in this industry, as you may know. We can't predict anything. I would rather take this risk because I want a new job before this one finishes. It's always the best option." (C1_TECH_1).*

In summary, precarious working conditions altered workers' perspectives of resistance, which were highly influenced by the companies' culture. Some workers showed little interest in union affiliation, while others felt inhibited from expressing their opinions and feared being tagged as problematic. Compounding the issue, working in remote locations made it almost impossible for unions to access the workplace and to check on workers' precariousness. However, workers found ways of resisting control by making use of non-unionised methods to communicate with each other, achieving a certain level of connectedness.

5.5.4. Labour reforms and their impact on labour relations

Under the presidency of Jair Bolsonaro (2019-2022), Brazil experienced significant changes in its labour laws and employment relations landscape. His administration's agenda, shaped by a strong pro-business inclination, enacted reforms that reshaped the dynamics between employers, employees, and trade unions.

One significant impact of Bolsonaro's legal reforms was weakening the trade unions' bargaining power and financial resources. One notable measure was abolishing the mandatory union tax (Contribuição Sindical). Previously, this tax was a significant source of income for trade unions, allowing them to operate efficiently, support their members, and engage in collective bargaining effectively. The removal of this tax resulted in a precipitous drop in union funding, creating severe resource constraints that curtailed their ability to represent workers.

Furthermore, the new regulations introduced changes to collective bargaining practices. The reforms emphasised individual agreements over collective bargaining, undermining the collective power of workers represented by trade unions. This shift

encouraged employers to negotiate directly with individual employees, often leading to contracts that eroded labour rights in favour of the employers. By diluting the role of collective bargaining, trade unions were further marginalised, leaving them with limited avenues to safeguard workers' interests.

The legal reforms under Bolsonaro also significantly empowered employers to revise their employment practices to maximise profitability, but often to the detriment of employees. The reforms allowed employers greater flexibility in determining wages, working hours, and benefits. For example, the increased prevalence of intermittent work contracts offered employers a means to reduce labour costs by hiring workers only when needed, circumventing the obligations and protections of traditional employment contracts.

Another reform that emboldened employers was the weakening of labour inspections. By reducing the capacity and mandate of labour inspection agencies, the Bolsonaro administration enabled employers to implement less stringent workplace safety practices and overlook minimum wage regulations. The enforcement of labour laws became more sporadic, giving employers greater freedom to redefine their employment practices with minimal fear of reprimand.

From a critical perspective, the long-term implications of these reforms are multifaceted. For trade unions, the financial constraints and erosion of collective bargaining rights are likely to restrain their ability to attract and retain membership, further diminishing their influence. This loss of bargaining power could result in a labour force that is more susceptible to exploitation and inequitable employment practices.

On the other hand, employers may experience immediate financial gains from reduced labour costs and increased flexibility. However, erasing labour protections could undermine workforce morale and productivity, potentially leading to higher turnover rates and increased workplace disputes. Moreover, the decline in labour rights could widen income inequality and exacerbate socio-economic disparities, posing a broader risk to social stability. In summary, trade unions have been financially affected, leaving workers more vulnerable, while employers face the risks of reduced productivity and increased socio-economic inequality.

5.6. Summary

In summary, the findings in this chapter suggest associations between the precarious working conditions and the nature of the wind power industry. Findings have shown that working conditions influence how managers are able to control workers. Although the literature on labour process theory and dormitory labour regimes has previously indicated how workers can

be controlled both inside and outside of work, there were emergent themes in the findings in relation to how cultural controls can be used, as well as how workers in already precarious jobs are controlled outside as well as inside work. Managers were found to be taking advantage of high levels of job insecurity and poor working conditions, as well as poor living conditions in employer-provided housing to apply control mechanisms over workers. Moreover, the nature of the wind power industry affected workers' ability to resist control and engage with unions, as have changes to labour reforms. Finally, it seems that there was low interest from workers in joining unions at the same time as the unions were failing to represent workers within the wind industry.

5.6.1. Revisiting the Theoretical Framework

Table 5 below illustrates how the findings from this case study contribute to existing research on Labour Process Theory, dormitory labour regimes, precarious work, and worker resistance and power resources. The new insights gained from the findings are shown through using italics.

Table 5. Revisiting the Theoretical Framework: adding findings from this study

	Worker experiences	**Mechanisms of control**
Precarious working conditions	Majority low-skilled	Market controls *Direct controls: various forms*
	Temporary work; *permanent work that is in fact temporary*	Market controls *used as an excuse to dismiss/ not re-employ workers*
	High operational risks	Similar practices within the heavy construction industry *Increased surveillance; adopt learn-on-the-job methods to save costs and minimise the risks to operations*
	Lack of career development *Working extra hours and weekends* *Low performance*	*Technocratic HR (HR management at a distance/ use of online platforms)* *Under high pressure to finish projects, managers take advantage of precarity to increase work intensity* *Low performance punished with dismissal and quick replacement*

Precarious living conditions; dormitory regimes	Employer control over where workers live Remote locations lacking infrastructure Sense of isolation Away from family	Cultural controls; exploitation of social relations *Employers provide employees with unsafe living accommodation near the workplace which accentuates their control over workers* *Managers take advantage when deciding workers' days-off; use days off to visit family as a reward for good performance*
Workers' resistance and access to power resources	Lack of union representation Union weakened by labour reform so limited structural power and institutional power Workers isolated and considered to be in 'good jobs'; limited associational and societal power *Workers find alternative ways of organising-associational power*	Increased surveillance; cultural controls *Managers do not like unions' interference and suggest that union affiliation is a waste of time and money (union contributions) – affecting societal power*

The next chapter returns to the research questions and interprets the findings in relation to existing literature, indicating ways in which the findings move knowledge forward.

Chapter 6: Discussion

6.1. Introduction

The aim of this thesis was to evaluate how employee performance management was used as a mechanism of control within the Brazilian wind power industry and across the supply chain. Following the literature review, four research questions were formulated: 1) How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace? 2) To what extent can work in the wind power industry in Brazil be characterised as precarious? 3) To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control? 4) How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil? This section will briefly overview the content of the thesis thus far to give context for the subsequent sections of this Discussion.

The literature review in Chapter 1 explored relevant literature in LPT and managerial controls, accompanied by a critique of LPT that included discussion of literature on dormitory labour regimes. It then considered precarious work and the labour process in the Global South. This was followed by an analysis of worker resistance, drawing on literature on power resources. This chapter will discuss the thesis findings and the implications of these results in the context of this literature. It will also show how managerial practices under such precarious working conditions were used to exploit workers, and how taking advantage of precariousness played an essential role in suppressing workers' ability to resist control.

As described in the Methods Chapter, Chapter 4, this study used a qualitative longitudinal case study including various stakeholders and companies within different stages of wind power production. Data from 46 semi-structured interviewees and observations was collected during two fieldwork visits in 2018 and 2019, with interviews totalling 23.55 hours. This approach provided rich insights into how precarious working and living conditions affected workers in different contexts of wind power production (construction of wind farms, maintenance and logistics); enabled a better understanding of the control mechanisms and current forms of worker resistance; and enabled me to gain a better understanding of how workers experienced informally delivered disciplinary actions, such as through non-verbal communication. Many of these ways in which the research was enhanced by the research methods I chose would not have been as beneficial or accessible through other methods.

Applying a critical realist approach, as described in Section 4.1.1, facilitated the investigation of power relations between workers and managers and how external factors influenced the way in which workers experienced employment.

While the Findings Chapter described the findings emerging from this study, this chapter interprets these findings in the context of existing literature and indicates how the study contributes to debates in a number of areas. In doing so it answers the original research questions. First, this chapter will explain in Section 6.2 how mechanisms of control (including market controls and cultural controls) were used to increase work intensification in precarious working conditions. It then explains in Section 6.3 how employer control over living conditions increased precarity, echoing to some extent the literature on dormitory labour regimes. Together, these two sections answer the first two research questions: RQ1) How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace? And RQ2) To what extent can work in the wind power industry in Brazil be characterised as precarious? After this, in Section 6.4, the chapter moves on to explain how, across the supply chain, work was precarious for both workers and managers but in different ways. This is followed in Section 6.5 by considering how precarious working conditions and labour reforms affected worker resistance and unions' power resources. These two remaining sections together help to answer the latter two research questions: RQ3) To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control? And RQ4) How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil? Each Section is also used to explain how the study's findings help to support, refute or extend existing bodies of research.

6.2. Mechanisms of control used to increase work intensification in precarious working conditions

This study contributes toward theory on the intersection between labour process and GVCs by revealing the way in which workers were controlled across the wind power supply chain in Brazil. In particular, it moves away from Eurocentric research, exploring these issues within the Global South where precarious working conditions are considered the norm.

To better interpret findings on the different mechanisms of control applied to workers within the wind power supply chain in Brazil, this research drew on the three main strands of Labour Process Theory : 1) division of labour; 2) deskilling; and 3) hierarchical controls. Previous research has found that during industrialisation, the separation of manual from intellectual labour saw an increase of forms of managerial control that, combined, led to

worsening the quality of work for workers (Braverman, 1974; Armstrong, 1989; Lawrence, 2010; Thompson, 2009, 2010). Subsequently, through rating workers' performance and using various mechanisms of control, this resulted in intensifying work. This study confirms previous findings linking post-industrial changes to worsening working conditions (Brown and Benson, 2003; 2010), but explores this in the Brazilian context, situating it within the context of political turmoil and labour deregulation under the Bolsonaro government.

Findings in this section help to answer RQ1 which asked how workers across the Brazilian wind power industry are subjected to mechanisms of control within and outside the workplace. This study revealed how workers were controlled through mechanisms of surveillance, monitoring, market controls and cultural controls. These were facilitated by the remote nature of the work, and the lack of long-term job security in the industry. The study contributes to theory by using a theoretical framework of LPT, dormitory labour regimes, precarious work and power resources. Drawing on these theoretical underpinnings provides an in-depth analysis of how managers took advantage of precarious working conditions to control workers' performance.

6.2.1. Direct controls

This study has found many that many strategies being used to control workers were variants of what is found under Labour Process Theory. For example, the use of close monitoring of workers at individual level to intensify work and measure performance that can be compared to others (workers). Findings extend current knowledge of the labour process by showing that managers in the wind power industry in Brazil take advantage of the precarious working conditions when using direct controls as a means to intensify work. In this Section, the more direct methods will be introduced and discussed, including performance management and appraisal, continuous monitoring of performance, and technocratic HR.

6.2.1.1. Performance management and appraisal

Studies in performance management show that performance appraisals can help companies with the process of identifying training needs, career development and rewards, promoting motivation and increasing performance (Brown and Benson, 2003; Kavanagh et al., 2007; Marchington and Wilkinson, 2012). Literature also provides criticisms that measuring individual performance is vulnerable to bias and inaccuracies influenced by inequalities. (Fletcher, 1999; Prowse and Prowse, 2009; Evans and Tourish, 2017). Findings in this case study add new insights to research in the area of performance management, revealing how measuring performance has the potential for further worker exploitation.

Existing research studies have already shown that measuring an individual's performance is vulnerable to bias and inaccuracies (Fletcher, 1999; Prowse and Prowse, 2009; Evans and Tourish, 2017). As mentioned in the findings chapter, none of the companies adopted annual appraisals. Where appraisals were present, they were generally unstructured, and given without any feedback. Most forms of performance measurement were carried out subjectively, focusing on time management and goal settings. Managers used performance in a summative manner, sometimes to justify firing people, and at other times to encourage them to work faster.

Findings showed that planning and monitoring were the most common features in place, extensively applied on a daily basis, leading workers to feel stressed. Literature explains how appraisals are often seen as a tool to encourage workers to work harder for their employers, increasing their workloads with more extra hours and work over weekends (Grint, 1993; Collings and Wood, 2011). Findings in this case study confirms this understanding, with managers using performance measurements simply to induce workers to work harder. In other words, performance was used as a form of exploitation, and the lack of constructive feedback generated more insecurity among workers.

There was a clear sense that managers and workers found the operations generally challenging. The level of detail and skill needed was considered high, and most workers felt insecure about whether what they were doing was correct. Managers chose to keep a close eye on workers' every step, and

Negative evaluations in C1, C2 and C3 meant that workers were usually sacked. Vacancies were commonly filled within days by new workers who started promptly. Managers considered this tactic the most effective in making workers work harder. However, workers felt that they were mistreated and feared being let go. Workers keeping the same pace did not get better paid, and managers openly mentioned using payment rewards to make them work faster. At C4 and C5, technicians' performance was measured based on how fast a team could fix a turbine. Workers were concerned about the introduction of individual tracking, and were under immense pressure due to job insecurity and competition.

In summary, the tools developed by managers increased the sense of insecurity and demotivated workers rather than improving working conditions. In some cases, these tools were used simply to justify dismissals, demoralising workers. To some extent, these findings align with that of previous research (Litter, 1982; Taylor, 2013) showing how performance management can be used as a form of managerial control, which is detrimental to working

relations, increasing precarity and job insecurity. However, it also revealed new insights into how these controls were used for those who were meant to be in ‘good’ jobs.

6.2.1.2. Continuous monitoring and surveillance of worker performance

This study confirms previous arguments that performance management can be used as mechanism of control to increase pressure and intensify work (Friedman, 1977; Litter, 1982; Evans and Tourish, 2016). One way this was done in this study was with surveillance systems and technologies, but constantly monitoring workers in this way led to disadvantageous consequences for workers and managers alike. This was especially true where traceable technology was used in companies, which was found to be detrimental to workers, yet it served the purpose of monitoring (Litter, 1982; Taylor, 1982; Moore and Robinson, 2015). Findings in this study confirm this statement by revealing how managers induced certain behaviours or controlled workers based on how they used data to measure performance. In some respects, this monitoring echoes what has been found in platform work in the Global South (Webster and Dor, 2024). However, this was in an industry that ostensibly provides ‘good’ work.

Most companies used mobile phones or radio equipment to communicate in the field and arranged daily meetings to keep track of performance, which was measured by how well and fast something was done or fixed. An interesting practice found in all companies was that managers included the performance of the equipment as a base to judge their workers performance, regardless of which other factors could have contributed to the damage/malfunction of equipment workers handled. For example, At C6, the drivers were monitored with the help of cameras and sensors installed inside and out the trucks. The performance of each driver was measured including data from levels of damage caused to the vehicle. Similar practices happened at C4 and C5, where performance was measured based on the performance of wind turbines after maintenance services. In both cases, external factors contributing to malfunctions of equipment was disregarded for the purpose of attributing equipment functionality to worker performance.

Some companies also used tracking systems. At C1 and C2, for example, lack of training meant that workers were constantly taught what to do on-site and on-shift, with most newly trained or in-training workers requiring extra hours to complete tasks. The training gap made it difficult for managers to manage their own workload, who found it hard having to teach them something new every day. They (managers) did extra hours to compensate for time spent tutoring. To avoid delays, managers increased micromanagement and control, asking more experienced workers to help supervise it.

Despite the increased workload it entailed, managers who dealt with low-skilled workers felt the need to control all activities systematically. They argued that most workers had low experience and lacked training, and therefore, required watching closely. Otherwise, according to them, many things could go wrong, causing delays. As a result, managers monitored employees, counting every minute and requiring performance reports to be made daily, to control workers' behaviour in relation work performance.

All of this monitoring and surveillance left workers feeling tired and starting to change their behaviour. Some became aggressive towards colleagues, and others felt less compelled to do a good job or work extra hours. In turn, managers also changed their behaviour, becoming stricter and increasing performance targets.

Surprisingly, digital methods of closely monitoring workers was experienced as less intrusive. Where used, workers felt more autonomy when being tracked by computers instead of closely watched by managers like in construction and production activities. However, this perception started to change once the company announced a new system which monitored individuals rather than teams. Workers started to realise that this would make the job more competitive as a result, and this would cause more friction between workers.

6.2.1.3. Technocratic HR

The use of new technology also influenced the way that human resources management practices increased precarity for many workers in this case study. An interesting finding revealed that HR departments of companies acted differently according to their goals. On some sites, companies had HR managers present at the construction site, closely checking workers' payroll and helping analyse their performances. Workers felt controlled by it. On other sites, workers had never met with a HR manager in person at operation and management sites. There, issues were dealt with remotely via email or by phone. Workers, in this case, felt abandoned by companies. For sites where, HR departments had always been remote, transitioning to remote left some workers frustrated. As workers at these sites argued, it was already challenging to discuss their careers, and had now become almost impossible. For example, some workers at C4 were very frustrated because they found out people with less work hours and experience were being promoted first, without any explanation, which is an issue HR usually would have tackled. In both cases, the ways HR managers dealt with issues were found to aggravate job insecurity. Moreover, unions saw the move of HR departments online as limiting their ability to communicate and negotiate with companies, making it more challenging to reach better deals informally as they had done in the past. Although the workers were not engaged in platform work (Webster and Dor, 2014), some of them nevertheless felt

controlled by technology rather than by a person, with implications for how they experienced insecurity. This study therefore complements existing research which highlights how technocratic HR can increase insecurity.

6.2.2. Market controls

Market controls can be effective in intensifying pressure where workers are in insecure or precarious jobs. According to Kalleberg (2009), precarious work can involve *"employment that is uncertain, unpredictable, and risky from the point of view of the worker, resulting in distress*" (Kalleberg 2009, p.2). Precarity can result from changes in employment rights and a decline in unions (Kalleberg, 2009). In situations such as these, market forces can play a greater role. This Section will explain how the way in which the industry was set up increased levels of precarity via its' impact on behaviour around contracts, and that of the supply chain.

6.2.2.1. Company secrecy regarding contracts

Brazil's regulations of the wind industry require companies to bid for contracts, with competition within companies at the higher levels (Bayer, 2018; Bayer et al., 2018). It is similar to what happens in the oil and gas industry, where companies avoid opening up about their planned investments in order to avoid market speculation that can put the acquisition of new contracts at risk. This study adds new insights into how the secrecy around contracts can decrease workers' ability to find new jobs.

To avoid turnover, managers at C1, C2, C3, C4 and C5 maintained secrecy about new contracts. HR managers explained that workers become anxious when a contract neared its end and usually started looking for other job opportunities. As they mentioned, if workers were offered a new contract somewhere else, they would quit their current work without thinking twice, leaving the company short-staffed and struggling to complete the construction on-time. This was a common problem, which may explain why there was so much secrecy during the first visit when the construction of WINDFARM1 was about to be completed.

Workers generally saw this coming. After working on many projects in jobs in this industry (and similar) for so long, most workers were well aware of companies' intentions to hold them for as long as they could up to the point where work was complete. They also knew that after finishing that contract, the vast majority of workers would be dismissed.

Interestingly, workers found ways to resist this, and fight precarity, by developing their own social networks to help each other find out about new jobs. Using WhatsApp groups and

digital mailing lists, workers shared the job opportunities they managed to find. As indicated below, this meant that to some degree, workers had new forms of associational power.

6.2.2.2. Nature of the wind power industry

Findings in this study showed the nature of the industry to be important in influencing the way in which work was organised, as was being part of a supply chain. Managers were aware that supply chain bottlenecks were causing most of the production delays, which translated into more pressure to cut costs such as living expenses (food, accommodation) and training. Although used to the pressure of constantly running against the clock, managers admitted that working (and living) in such a way damaged their well-being. They argued that some developed high levels of stress over time, becoming more impatient and more condescending towards workers. At the same time, they also felt grateful for having a job at all and recognised that their salaries were quite competitive within the market. As mentioned in the literature review and in the findings, high levels of general unemployment within the country meant that any worker could be easily and quickly replaced. Thus, we see that a combination of the insecurity inherent to work in the Brazilian wind power industry, the pressure it places on managers and workers alike, and the natural attitude and stress these circumstances create, lead to a situation that encourages desperate loyalty out of necessity from managers to the point that they become willing to use market controls and general hierarchical controls to exploit workers and intensify work.

The temporary nature of most jobs in the industry was seen as inevitable to most workers. Much like managers, workers were happy to even have a job, but with the added burden of feeling insecure knowing that it was temporary and that they soon would become unemployed again.

Unfortunately, bottlenecks in the supply chain caused delays to production, and poor project management exacerbated its' impacts. Just as the pressure and time constraints faced by managers to try to force workers to work harder, client companies were also harsh with suppliers, demanding cost reductions, regardless of whether this translated into the exploitation of workers.

Joint ventures in particular generated job insecurity. Although such arrangements are typical within the wind industry, they affected workers negatively. A new acquisition was made affecting C4 and C5's company structures during the data collection. Some workers moved workplaces, and all needed to adapt to a new company's culture. Some workers felt unhappy with the situation, but they had no choice other than to accept the changes and show gratitude.

Feelings of insecurity and lack of leverage created desperate dependency and obligation to obey and comply. At the time of the transition, levels of uncertainty were so high among workers that some developed anxiety and stress as the managers did.

6.2.3. Cultural controls

The final aspect of workplace-based control to be discussed relates to ways in which managers took advantage of the social aspects of interactions with and between workers. Various cultural controls were used at C1, C2, C3 and C6, often exploiting social relations. One of these involved instilling a false sense of community, and another invoked religion, as a means of influencing the behaviour, feelings and performance of workers. Managers knew that workers were deeply religious people and took prayers very seriously, so they made use of this common ground in their dealings with workers to encourage workers to work harder and behave well. These findings confirm the importance of beliefs, identities, rituals and myths for the understanding of culture within an organisation (Pettigrew, 1979; Ouchi and Wilkins, 1983), showing that managers can take advantage of these forms of culture to change workers' behaviours. Workers, in turn, seemed to be unaware of how powerful cultural controls were in keeping them more obedient.

In explaining how workers experienced both market controls and cultural controls, these findings help toward the answering of RQ2, which is 'To what extent can work in the wind power industry in Brazil be characterised as precarious?' However, in order to more fully answer this research question, it is also necessary to consider conditions outside of the workplace, and this is addressed in the next section.

6.3. Employer control over living conditions increasing precarity

6.3.1. How living remotely affected working conditions

Evidence from the data in the findings suggests that the precarity of living conditions derived from the nature of the jobs. These findings contribute to knowledge by bringing light to the extensive ability of managers to intensify work through workers' precarious living conditions. These findings are relevant for the study of precarious working conditions in the wind power industry, since the living in remote areas is an intrinsic aspect of most jobs in the wind industry supply chain. Workers agreed that living in such areas was gradually damaging their mental and physical health. Furthermore, these findings support the argument that, due to the impact that precarity has for wellbeing, dislocation negatively affects workers' behaviour and ability to make decisions (Virtanen et al., 2005). Findings showed that workers missed family members

and worked hard to compensate for it. But after some time working and living in such precarity, they soon realised that all the hard work was not sufficient to make them feel better about having left their families behind. Evidence from this study contributes to the understanding of how precarity increased job insecurities, which in turn affected workers lives and social relations beyond work. To some extent, this study has similarities to the previous literature on dormitory labour regimes, as employers were able to control employees both at work and in the social environment. However, there are differences, including, for example the way in which the workers were also subject to cultural controls at work, in addition to market controls, limiting their options for alternative work. Therefore, this study develops knowledge in this area.

Interestingly, this study's findings on living conditions provides insights into how different age groups experienced the aforementioned health and safety issues differently, at the same time as affecting workers' perspectives about working remotely. Younger workers interviewed often valued the freedom of moving away from home for the first time. One explanation for this may be that culturally, it is common for Brazilians to live with their parents throughout early adulthood. The reasons for this may vary, but in the cases of the poor younger workers, for example, they would continue living with their parents as long as they could, saving money to buy their first property. Young Brazilians from poor backgrounds commonly help their parents financially as soon as they start working. In this study, young workers had mixed feelings regarding living away from their families. On the one hand, they enjoyed feeling more independent. On the other hand, they felt the burden of having to send money monthly to their family to help them pay bills, at the same time as paying the unavoidable extra cost incurred by living on their own. For some, living with family made contributing financially more justifiable and less obvious. In contrast, older workers felt different in relation to family. They seemed unhappy and tired of living in remote areas, leaving their families behind for so long. As they got older, they feared suddenly becoming unemployable. They also felt vulnerable, worrying about being forced to stay in remote locations indefinitely, regardless of their feelings of homesickness accumulating for so many years. Moreover, they also gave many examples of how living in such areas was becoming less safe. Some developed anxiety problems associated with the idea of not being able to provide for their families in the event of a fatality.

Another problem affecting workers was the poor living conditions faced by low-skilled workers who could not afford the cost of accommodation, but companies provided them with a place to live. Literature shows (and these findings confirm) what happens to workers in heavy construction (Quinlan, 2012; Oliveira, 2013; Berntsen, 2016) is also happening in the construction of wind farms: the need to live in accommodation provided by employers also

affected workers conditions, because workers felt that since they were not paying for it, they should not complain about the quality of it. Data from Section 5.2.7 describes that the facilities were precarious, with poor quality amenities. Most workers had no privacy living in the provided accommodation (Quinlan, 2012; Oliveira, 2013). For example, workers from C1, C2 and C3 had to share bathrooms and bedrooms with people new to them.

Curiously, workers were unanimous in considering that that type of accommodation was neither suitable nor safe for female workers to stay in, since they would be forced (by circumstance) to share it with male workers. Considering that accommodation was arranged and provided by the companies, this may have potentially influenced the decision to avoid hiring a large female workforce.

6.3.2. Personal relationships

Living remotely, job after job, affected workers' personal relationships. Findings in this study showed that some relationships between workers and locals had resulted *in "the sons of wind".* They used this expression to refer to the children born from brief relationships between local women and temporary workers. Once these workers left for good, they would leave these women and children unsupported. Interestingly, workers seemed comfortable talking about it as if these women ought to have predicted this would happen. Although there is no literature exploring the phenomenon "the sons of wind", some newspapers in Brazil have reported that the problem is considered recurrent in the Northeast Region (Costa, 2023; Fellet, 2022). These findings bring light to some social problems that ultimately derive from the precarious working and living conditions of workers within the supply chain.

6.3.3. Ghost towns, crime and violence

After building the WINDFARM1, workers from companies C1 and C2 left town. The impact of this emptiness on the local community was severe, resulting in and the phenomenon of 'Ghost Towns'. The small business that attended their demand for food and accommodation was closed. Low paid jobs were no longer required, and the local community experienced a rise in unemployment, violence and crime. Authorities interviewed explained that the phenomenon of "ghost towns" is well-known across the region. According to them, companies are aware of the consequences of suddenly packing everything up and leaving for good. Allegedly, they simply ignored the consequences of it in order to avoid being expected to pay compensation to address the social problems their presence and departure had caused.

However, as the authorities explained, wind power companies that stayed to provide operation and maintenance also experienced some of the ‘ghost town’ effects. Companies C3, C4 and C5, for example, had equipment stolen many times after the end of the construction phase. With only a few technicians replacing the hundreds of workers that built the wind farm, they found themselves more vulnerable to violence and were forced to increase security to guard their premises. Technicians and managers felt especially targeted, becoming isolated and fearing for their safety at all times. Cases of burglary, carjacking and workers ambushed on the way home concerned them. They knew that when companies left people unemployed who decided to stay in the region for some reason, these ex-workers often ended up getting involved in crime. Because the town was practically abandoned so suddenly, burglars started targeting technicians and managers at their old workplaces, because it was quiet and remote, making it difficult for the police to reach them. Some interviewees were even robbed while working inside a wind turbine, demonstrating that in some cases, locals allegedly enticed former workers into stealing by using their knowledge of the area to steal from their previous employers and potentially endanger ex-colleagues. In summary, this study reveals how there were a wide range of ways in which working conditions and living conditions were precarious.

6.4. Work was precarious for workers and managers, but in different ways

The findings contribute to the existing body of literature on precarious work by explaining: a) how the aspects of precarious work affected workers differently throughout the supply chain; b) how managers saw precarity as a means to further control workers; and c) how management controls, along with employment regulations, was used with the aim of suppressing workers powers of resistance and union representation, which together with the broader regulatory context were impacting on workers’ power resources. In addressing these concerns, this section helps to answer RQ3 ‘To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control?’ and RQ4) How are mechanisms of control, precarity of work, and workers’ access to power resources affected by the regulatory and political context in Brazil?

Previous literature expanded the concept of precarious work developed in Bravermans’ Labor and Monopoly Capital (1974) to accommodate a widened debate on aspects of workers resistance, labour mobility and the fragmentation of employment contracts, among other themes (Friedman, 1977; Bray and Litter, 1988; Litter, 1982; Winch, 1986; Godard, 2004; Kallberg, 2009; Thompson and Smith, 2009; Thompson, 2010). To be precise, this work indicated ways in which workers are controlled through the labour process (Friedman, 1977; Thompson and Smith, 2009; Thompson, 2010) and pointed to how workers suffer from precarious work (Kalleberg, 2009). A more recent but also more limited body of work

investigates precarious working conditions, focusing on contemporary jobs in the context of global value chains and/or economic market flexibility. Particular attention has been given to job insecurities featuring the ‘gig economy’, moving the definition on to embrace new forms of precarity, such as the move towards temporary contracts as a norm and the growth in informality of work (Selwin, 2012; Standing, 2011, 2014; Newsome, Taylor, Bair and Rainnie, 2013; Anner, 2016). In both the Global North and the Global South, concerns have been raised about new forms of precarity, such as the move towards temporary contracts as a norm and the growth in the informality of work (Selwin, 2012; Standing, 2011, 2014; Newsome, Taylor, Bair and Rainnie, 2013; Anner, 2016; Mosoetsa et al., 2016; Webster and Dor, 2024).

However, to date, there has been little research done on precarious work under Labour Process Theory analysis. Few articles conceptualise precarious work more broadly in ways that include workers’ social context, such as their family status or their social networks, nor do many articles show how these aspects may affect precarity (Berntsen, 2016; Campbell and Price, 2016). In this thesis, the need to consider workers’ living conditions was achieved through discussion of existing evidence on dormitory labour regimes. Other articles touched on related themes that proved relevant in this research, such as: deskilling, the intensification of surveillance and monitoring associated with self-tracking systems (Moore and Robinsons, 2015); workplace resistance (Lloyd, 2017; Pulignano and Signoretti, 2016; Anner, 2016); temporary work (Benassi, 2016; Gato and Salazar, 2018; Oliveira, 2018); precarious work in the Global South (Mosoetsa et al., 2016); the importance of contextualising precarious work (Kalleberg and Vallas, 2018); and income insecurity (Rubery et al., 2018).

Findings in this research provide new insights into how managers exploit the precarious workforce. It does so by shedding light on workers and managers’ perceptions of precarity as an inherent unchangeable aspect of the employment relationship within which they are immersed. Moreover, this research also highlights job insecurities that appeared to be either (notably) ignored or openly acknowledged, possibly as tactics to be used by managers at their convenience.

In general terms, findings showed that workers’ and often managers’ working conditions could be described as precarious. This study found that there were a number of key ways in which precarious work manifested itself in the case study organisations. As expected from existing literature on the construction industry in Brazil (Winch, 1986; Breslin and Smith, 2006, cited in Sparer et al., 2015; Quinlan, 2012; Mustchin, 2014; Berntsen, 2016; Gato and Salazar, 2018) and limited literature on working conditions in the wind power industry more generally (Rawcliffe, 2017; EWEA, 2020; Global Wind Energy Council, 2021), this study contributed by extending previous findings regarding the role of the industry and the

Government in the precarity of workers working conditions and their ability to resist mechanisms of control. Firstly, it developed our understanding of how the nature of the industry contributed to increased precarity. Secondly, this research adds to our understanding of how the role played by the Government in setting up the industry meant that employers had more power over workers (reducing their structural and institutional power), at the same time as reducing unions' power of representation (and their associational power).

However, workers (and sometimes managers) seemed to be unaware of how precariousness was negatively influencing their decisions. In other words, most workers acknowledged the bad working conditions, but did not question why this was the case, instead accepting that the negative conditions were balanced out by the benefit of having a job. Workers seemed to believe that companies did not have a choice about how work was organised. They accepted how companies arranged day and night shifts on a 24/7 basis to finish the contract as quickly as possible, the lack of training since it would incur a high cost, the prohibitive cost of permanent contracts, and the lack of career growth. Instead of workers expressing concerns about their conditions, they tried to forgive it all because they felt grateful for having a job.

Managers' opinions about the working conditions seemed to be contradictory. During the interviews, most managers answered that the working conditions were ideal or good. Moreover, based on their circumstances and the nature of the business, they argued that companies were doing their best to keep workers happy and that they should be grateful. In other words, they felt that they had 'good' jobs. However, to reinforce this idea, most managers mentioned being 'in the same boat' as workers, living in precarious accommodation away from family with no social life. However, they experienced insecurity in very different ways to their workers. Unlike workers, there was a tendency for managers to carry on being employed by the same company, simply moving their job location. In addition, managers described their accommodation as being precarious; they did so by comparing the standard of the accommodation with their own homes. In reality, findings refuted this notion by showing a significant difference in the quality of accommodation provided to workers and managers. While workers were offered rented houses in poor conditions (in some ways similar to the conditions mentioned in the dormitory labour regimes literature), managers were allocated private rooms in local bed and breakfast facilities. There, they were offered services such as cleaning, laundering, and onsite catering providing good quality food on a 24/7 basis.

The following subsections tackle different dimensions of precarity, in turn, by summarising the existing research on each aspect of precarity and revealing how the findings help to extend our existing understanding of precarious work.

6.4.1 Permanent / temporary contracts

This study found two types of temporary work. One is in relation to construction workers who are officially given permanent jobs for contract purposes to comply with the law. However, the work itself was finite in duration, so while it functioned as temporary work from which workers would be dismissed once the project was over, officially, they held permanent contracts. The other type of temporary work was in relation to work in operation and maintenance which tended to be more permanent in nature. However, in reality, it tended to be more precarious due to insecurity around individual job contracts and long-term career progression.

The wind power industry has been praised for providing many jobs, particularly during the construction phase of a site (Winch, 1986; Oliveira, 2013; Castro, 2014, Penelas, 2015; Breslin and Smith, 2006, cited in Sparer et al, 2015). This also occurred in the current case studies, where the construction phase of the work provided a large number of jobs. Although jobs created in operation and maintenance were fewer, they also attracted workers to the region (Geofisica Brasil, 2014; Rawcliffe, 2017).

This perception of the wind industry as creating high quality and ‘green’ jobs was also echoed by managers in the case study organisations. They argued that the wind power industry also provided attractive salaries and good working conditions, emphasising this by comparing it to the terrible working conditions in heavy construction in the 1970s and 1980s. They alleged that today workers were treated a lot better and were given safety equipment that had not been available before. They seemed to want to believe that workers were in a much better situation than in the past, and therefore workers today should feel grateful.

The managers’ perception of good quality jobs, even in heavy construction, contrasts with both the findings of this study as well as existing literature on the construction industry. Here, and in existing research, it was found that the jobs requiring the lowest level of skills involved temporary work in remote locations that lack basic infrastructure (Breslin and Smith, 2006; Quinlan, 2012; Berntsen, 2016). In this study, union representatives, in particular, referred to how workers in the wind power industry were facing the same sort of extreme precarious working conditions as workers in heavy construction in the 1980s. Thus, the model of exploitation of the workforce applied in the 1970s and 1980s is still in place, including the prevalence of temporary work; lack of training; precarious accommodation provided by employers; and generalised poor working conditions.

There has been some discussion in the literature of the negative impacts of temporary work on construction workers, with focus on income insecurity, worker mobility and workers ability to organise themselves (Heyes and Lewis, 2014; Benassi, 2016; Pulignano and

Signoretti, 2016). However, this study provides new insights in that it reveals how the temporary nature of jobs enables managers to use the temporary aspect of job insecurity to make managerial decisions aimed at changing workers behaviours, at the same time as increasing the precarity of their working conditions. In this case study, managers interpreted the temporary nature of most jobs in the wind power industry as a justification for micromanagement and control over workers.

The wind power industry in Brazil being relatively new may explain why the majority of workers interviewed in this case study admittedly had little or no previous experience in the field. Even some more experienced workers coming from heavy construction were surprised by the amount of technical knowledge they needed to learn at the start. It is fair to point out that there are some distinctions between wind power and the heavy construction industry in relation to skills and training. Although jobs in both sectors are similarly temporary, the construction of wind farms require certain skills that are more specific (Berntsen, 2016). However, this study found that workers in the construction of wind farms are not being trained for such skills. Instead, if they happen to learn something, it will occur on the job. Therefore, workers in the wind industry experienced excessive close monitoring, greater exposure to risks and greater precarity.

Finally, workers became used to changing jobs twice sometimes three times in the period of one year. Starting new jobs so often meant they had to adapt to a new company's culture and in most cases, subjected again to intensive monitoring while learning on the job to avoid delays in production, as well as risks of damaging expensive equipment. On the one hand, managers saw training as costly, time consuming and difficult to be implemented, particularly given the short duration of project timelines. Workers, on the other hand, felt powerless and preferred being watched than failing and consequently, losing their jobs.

6.4.2. Who is the employer?

There has been much discussion in the literature about the problems that can arise for workers if they do not know who their employer is. For example, some have referred to how this can be a particular problem for agency staff who are generally in poor conditions and receive low pay, being deprived of the incentives and benefits (such as holiday pay, bonuses, career progress) compared to in-house workers (Locke, Rissing and Pal, 2013; Rubery et al., 2018). Others have focused on the problems associated with outsourcing labour, such as the increase in income insecurity and reduced access to benefits and union representation (Standing, 1986; Penelas, 2015).

In this study, problems occurred not because of outsourcing or agency staff, but for a range of other reasons that have received less attention in the literature. One problem involved managers from companies being allowed to discipline employees from different companies. Another problem in relation to identifying the employer was where companies were merging and changing ownership, making it difficult for workers to know who employed them.

The findings of this study indicate the extent of problems found throughout the supply chain. The longitudinal case study approach enriched the data collected, enabling a better understanding of the changing dynamics of precarity and insecurity, and how this affected the ways in which managers were able to control workers. The ways managers denied training and ignored career progression to workers demonstrated that precarious circumstances faced by workers were used as a means to control them further, and so were the tactics used by managers to handle queries. In addition to this, the control of workers was further enabled by the political and regulatory context, as explained in Chapter Three, which gave power to employers at the cost of workers.

This study's findings therefore added new and important insights on new managerial mechanisms implemented throughout wind power supply chains. As a result of these practices, managers increased workers' precarity which heightened levels of instability, confusion, and stress experienced by workers. It can be argued that many of the chain of command issues could be explained by poor communication from managers. It can also be argued that poor communication could be approached differently but instead was perpetuated throughout different phases of production within the chains, or that the different phases made effective communication harder. Nevertheless, workers considered subordination to other managers disrespectful and detrimental to working relationships.

6.4.3. Training and career development – new insights on temporary work

The growth of 'atypical' short-term work agreements over the past three decades has raised concerns among multiple scholars. Literature on precarious work has explained how temporary work is often related to a lack of training and career development, leading to feelings of insecurity among workers (Locke et al. 2013; Oliveira, 2013; 2014; Silva Filho and Queiroz, 2013; Heyes and Lewis, 2014; Sparer, 2015; Benassi, 2016; Pulignano and Signoretti, 2016; Queiroz and Vanderstraeten, 2018). Findings in this study confirmed this research to be relevant to the Brazilian context, showing that the majority of workers did not receive any sort of training apart from those regarding health and safety, required under labour law enforcement.

Most workers in the field had no previous experience, and consequently, training was seen as necessary by most workers. However, apart from transport company C6, the lack of training was generally significant in all companies, resulting in workers constantly feeling insecure and unsure about what to do or how to handle most heavy equipment on daily tasks.

Three new insights can be added to research on precarious work. One is how managers evaluated the cost-benefits for the project in considering whether to train temporary workers. In general, managers found that training was out of question. The reasons given were related to precarity: remote areas had no access to training facilities and even if they did, there was no specific training available that they were aware of. Managers also found it cheaper and more productive to delegate ‘buddies’ to teach them on the job rather than having to pay for workers travel expenses and accommodation at the big centres. Low-skilled workers relied on more experienced colleagues to give them clues about what to do, especially those with no previous experience. Learning new things 'on the job' was a common practice.

Workers expressed low expectations in developing their careers to their full potential. A possible explanation for this might be that they lacked training, and most had temporary jobs. However, although most workers complained about not having training opportunities, one unexpected finding was that some saw the lack of training not necessarily as an issue. Instead, they argued that different companies use distinctive methods and materials to manufacture the same type of equipment, such as blades or rotors. As workers and managers said, even minor variations would require different skills from workers. Therefore, some of the workers saw training as irrelevant to acquiring a new job or a more senior position at new jobs.

Another insight relates to workers frustrations about not having been offered any training that could improve their careers or experience in the field, even if they asked for it. Therefore, new insights are presented on how training deprivation was associated with aspects of temporary work and remote locations. Furthermore, managers’ cost-benefit analysis of training limited workers opportunities for developing skills and career prospects.

6.4.4. Reward

This study adds new insights into how reward was linked to a manager’s need to intensify work rather than used in the recognition of an employee’s efforts. This Section makes use of LPT to explain how reward was perceived differently by managers. Findings showed that managers used reward as a tool to make workers to work extra hours. It can be argued that this practice created a false sense of motivation among workers. Managers, in reality, aimed at increasing worker performance through extra hours/weekends worked (Thompson, 2012;

Moore and Robinson, 2015). To keep workers motivated, managers offered them the possibility to combine days off with bank holidays, extending the time they could eventually spend away from work at once. Managers knew that workers saw in this a great opportunity to visit their families.

To some, seeing the pay gained from extra work hours as integral to their salaries meant they were compensating for periods between jobs where they became unemployed. To others, working extra hours was more of a necessity – in order to gain enough pay to live. Adding to the fact, some have argued that if it was not for the attractive salary (extra hours included), they would perhaps prefer to try working with something else, closer to family. At the end of the day, they left home to work because they did not find any work where they could do better nearby. Workers felt guilty for living families behind and refused leisure of any kind because they felt they did not deserve it.

On the companies' side, paying extra hours was convenient. With many workers doing extra hours, this meant they ended up formally hiring fewer people, reducing the company's costs in terms of mandatory social security contributions. According to the Brazilian labour regulations, working extra hours and/or on weekends are considered an exception to full-time workers. In this case study it was treated as the norm. This suggests that even where protective legislation is in place, it may not result in additional rights for workers, and provide institutional power, since at the local level, it did not make a difference to how workers were treated. In other words, legislation is not sufficient without enforcement. The norm of over-work may explain why HR managers were keen to check the inclusion of extra hours on payrolls. They (managers) knew that workers considered the extra pay not only as an integral part of their salaries, but as one of the main reasons why they were working there. Minor mistakes on this matter could cause workers much frustration.

Managers reinforced the idea that extra hours benefited workers by including the work during this period as part of their performance evaluation. For example, it was considered good performance if the worker did not complain when called at the last minute to double the shift or being asked to work over weekends. At the same time, this meant that workers would take time off in different patterns each week. Managers saw this as an opportunity to reward workers, giving them the choice of working almost non-stop, until the point they accumulated enough to take a few days off to visit family.

In general, the reward for good performance was given by small increases in salary and there was little in the way of career development. According to the project manager, the time frame of projects was usually not long enough to create a proper career plan for

employees. The attempt to promote a pseudo career progression was, in reality, something improvised by managers as a means to motivate workers to work harder. Every three months, a few workers were granted a pay rise. With the end of the contract approaching, pressure was placed on them. Managers strategically planned such rewards to keep workers on the fast track. In the windfarms, salaries were initially attractive. With time, came changes in labour regulations exempting companies of the obligation of payment of on call periods which were no longer remunerated. The same happened to time spent travelling to and from work. These changes impacted negatively on technicians' motivations, who felt unhappy and mistreated by the income degradation. As time went by, they also noted that there was no progression in their careers. They also complained about not receiving any feedback on their performance and that they did not receive any reward for doing a good job.

In general, workers did not see rewards happening to them as a sign of good performance. Instead, rewards were given to alleviate the effects of precariousness caused by working remotely. It can be argued that the use of rewards by managers as a bargaining tool to negotiate worker time off was unfair to workers and increased precarity. In summary, this research demonstrated how rewarding workers may contribute to income insecurity. It also added new insights by showing that in precarious working conditions, the practice of reward can elevate managerial power and control over workers' both working and living conditions. The next Section offers insights into workers health and safety that extends our understanding of how this peculiar way of rewarding workers could actually be further increasing precarity, to the point of exposing workers to more risks.

6.4.5. Precarious working conditions: work environment, long working hours and health and safety

Wind energy is a relatively new industry in Brazil. Most of the literature found in this field dedicates the explanation of economic aspects of market development, infrastructure and engineering (Wind Energy Industry Manufacturer Supplier Handbook, 2011; Silva Filho and Queiroz, 2013; Geofisica Brasil, 2014; ABEEOLICA, 2016). Smaller amounts of literature found in engineering discuss the employment aspects, choosing instead to focus on training and bottlenecks in workforce demand across the industry's supply chain (Holman et al. 2012; Lakhani, Kuruvilla and Avgar, 2013; Rubery et al., 2004). Very little evidence was found in the literature regarding the working conditions in this field (Virtanen et al. 2005). As previously mentioned in the literature review, Underhill and Quinlan (2011) see precarious working conditions generating feelings of insecurity. Which they argue consequently increases workers susceptibility to potential health and safety risks. Therefore, findings in this study add new and

important insights into the characteristics of the working environment in most phases of production within the industry supply chain, revealing aspects of precarity that represented generalized risks to workers which are outlined in this Section.

During the observations, it was noticed that working patterns and the working environment significantly impacted workers' health and safety. One of the problems was related to the red dust. A second aspect was the sense of isolation felt while working in remote locations. Interestingly, workers sought to identify themselves with the suffering of the poor people living in the surroundings, primarily as nomads. Likewise, they felt sad for working so hard and needing to move constantly, searching for new jobs. A third was working long hours in risky operations, including climbing high towers on a daily basis. Most workers thought that the excessive long hours increased the levels of muscle lesions and fatigue, as well as increasing the number of accidents with life threatening injuries. Managers also worked long hours, despite not receiving extra payment for this. They worked as many hours as, or more than, their subordinates and considered this to be setting a good example, reinforcing ideas of dedication and motivation among workers.

All the companies visited encountered health and safety issues, causing workers physical and or mental health problems throughout the supply chain. Workers experienced high-stress levels, anxiety, isolation, loneliness, extreme fatigue, back and knee injuries, conjunctivitis, and breathing problems. Research findings also indicate that precarious working conditions were significantly and negatively related to those health and safety issues. Workers were generally pressured to work hard regardless of working conditions, such as poor lighting at night shifts and not having chemical toilets available in the fields. Furthermore, the nature of most of the jobs is risky. Although workers were submitted to health and safety training, findings showed that managers constantly needed to remind them of essential measures such as wearing the proper gear.

Most of the hard work involved heavy lifting or climbing, which led workers to develop occupational illness. On one occasion, Union_2 visited a wind farm to verify injuries of workers climbing towers 100m high or more. They (union representatives) tried opening a dialogue with the company, but it was in vain. They argued that it is common for companies to try to get away with it using excuses such as pointing out equipment faults needing maintenance. When, in fact, it was the case that some of the towers never had a lift installed or companies took months to get a repair sorted. Another factor affecting workers' health was the lack of local medical assistance. Many of the issues in this Section relate to distance from infrastructure and support services, which is not dissimilar from the situation of offshore working, which is discussed in the next Section.

6.4.6. Offshore working in future wind power firms may increase precarity

Work on oil and gas platforms remains highly risky to the health and safety of workers (Woolfson, 2004). There are risks of injuries and death commonly associated with these activities (Figueiredo et al., 2009; GWEC, 2021). Most skills required to operate in the offshore wind industry are considered similar to those applicable to offshore oil and gas. In addition, literature on the offshore industry indicates the widespread use of temporary contracts (Woolfson, 2004). With wind power offshore production in Brazil approaching its beginning, it raises concerns about how much more precarious workers safety and conditions can potentially be. This will be described in the context of the findings in this Section.

The role of the Government in setting up the wind industry offshore in Brazil seems to remain unfulfilled. Talks around developing and investing in the industry are limited and usually focus on advertising the creation of new jobs. Debate among wind company owners focus on facilitating the migration of workers from the oil industry (EWEA, 2020; Global Wind Energy Council Report on Jobs, 2021). Increasing basic health and safety training is their main priority in order to accelerate the transition and meet the job demand. Meanwhile, the prevalence of temporary contracts, high-risk operations, isolation and poor working conditions are likely to remain obstacles to workers' transitions between these fields.

It would appear that wind company owners' wishes were, however, being fulfilled. Stakeholders at Research Centre R1, Consult1 and Consult2 showed concern regarding the recent development of offshore wind production in the country, comparing the offshore sub-sector with the country's mature oil and gas offshore industry. They were concerned that since similar skills were required, workers from the oil and gas industry might try to seek work in the offshore wind power, as company owners had hoped.

Moreover, at CERNE, although they anticipated that the industry would soon follow the same path experienced by the offshore oil and gas industry, they also predicted a gap in the chain. They realised that in offshore wind, most jobs required considerably high-skill levels. As they observed, there is insufficient training available to fill pre-existing gaps in the supply chain in the Brazilian context. Furthermore, the majority of workers in onshore wind are not properly qualified to work offshore, which could put offshore wind production at risk of poor development.

Senior members at Union1 and Union3 shared similar views with CERNE concerning the offshore wind sub-sector. They expressed concerns about workers, raising three issues that may contribute to an increase in the precariousness of their working conditions. Firstly, with no skilled workforce available locally, they would be forced to hire workers from areas

even further away. Secondly, it would be harder for unions to reach workers at offshore sites (by the sea) in order to try to convince them to become unionised. Thirdly, and more interestingly, even if they were members of unions, it would be harder and much more costly for unions and labour inspectors to access workplaces in the ocean to oversee working conditions. As a result, they predicted that workers transitioning from onshore to offshore work will face an array of negative consequences, not only in terms of increased precarity of working conditions at sea, but also in terms of the impact on workers' power to resist mechanisms of control.

6.4.7. Work, equality and inclusion

Precarity in the wind power industry affects Brazilian workers even before they start on a job. This study adds new insights into work equality and inclusion, attesting to the existence of many barriers to both throughout its supply chain, regardless of the increasing demand for new workers (Global Wind Energy Council 2021; GWEC, 2021). Furthermore, unions are failing to represent workers in the wind power industry and this may promote inequality and not inclusive practice (Winch, 1986; Mustchin, 2014). Indeed, recent changes in labour legislation have negatively impacted on workers' institutional and associational power. Moreover, findings showed that the lack of union representation and reduced the power of labour inspectors impacted managers, who seemed disinterested in enhancing equality and inclusion and apparently remained unaware of problems in this regard.

Overall, the case studies revealed inequality in terms of gender, age, race and disability within the wind power industry. The majority of the workforce was predominantly young males. On average, respondents acknowledged that barriers do exist. It was acknowledged that most barriers in terms of these demographic characteristics revolved around the nature of the wind industry, although most respondents based their arguments on their own perceptions. They argued that women did not want to work in the industry, fearing for their safety. Older workers were concerned about their deteriorating health. Most low-skilled workers were dark skinned, and disabled workers were not welcomed or accommodated.

Concerning gender, managers argued that a lack of gender targets and educational backgrounds could explain why women were so rare in the field. To most managers interviewed, STEM careers appeal more to men than to women. They also suggested that most jobs in construction are hard work, and therefore, companies tend to hire younger men.

Women who were interviewed perceived the industry as predominantly ruled by male norms. In their view, the lack of job opportunities was worsened by cultural discouragement

from society in the face of the working being considered obstacles to women. They argued that men considered that in general, the working conditions (such as heavy lifting of equipment, working at/with heights, and working in remote areas) were inappropriate and especially unsafe for to women, who ended up occupying mostly administrative and cleaning jobs. With few jobs taken on administrative roles, they (respondents) felt oppressed, insecure and worried about their safety in such a masculine environment.

In relation to ageing, older men interviewed were usually in senior roles. They felt exhausted, and some were quite open about feeling insecure and suffering from depression. After years of working away from family and moving jobs so frequently, they started to ask themselves if it was worth all the hard work and suffering. At the same time, the eldest felt that as the industry was becoming mature, with jobs becoming increasingly attractive to younger generations, more people were acquiring experience and climbing the career ladder quicker. With these, they fear of soon being replaced by younger strong man.

Inequality and inclusion were culturally attached to the country's history of racism. On the one hand, managers found the discussion sensitive, avoiding acknowledging that the majority of low-skill workers were dark-skinned while all managers were white. The argument used by managers to justify the situation was that the wind industry was no different from any other sector, as, culturally, it is common to associate the low-skilled workforce associated with race inequalities equating this to a general societal issue rather than a unique or specific one. On the other hand, workers seemed indifferent to the lack of inclusion. However, among some technicians who had slightly better skills, there was a feeling of discontentment in relation to this. This is because they knew that the better opportunities for them would be usually offered to the 'whiter' people (meaning mixed-race, Caucasian people) first.

Concerning inclusivity, managers' perceptions were that people with disability would be considered for administrative roles. However, they found it very unlikely that someone with a disability would seek a job in the middle of nowhere in such precarious conditions, lacking accessibility. They did not appear to be incorrect as, at both visits, I specifically asked HR managers about whether they employed disabled workers, and they stated that no workers had disclosed disabilities to either companies or stakeholders.

6.5. Precarious working conditions and labour reforms affected worker resistance and unions' power resources

Workers across the wind power supply chain in Brazil tried to resist forms of control, but this was prevented by unions' lack of institutional power, and societal perceptions of their efficacy.

As explained in Chapter 3, it is essential to consider that many aspects of the new labour reform of November 2017 stripped workers of a variety of their rights, reducing their institutional power resources. The reform also weakened unions' power of representation in many ways, and resulted in reduced levels of union membership, affecting their associational power. This section complements the previous section in helping to answer RQ3 To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control? And RQ4) How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil?

6.5.1. Unions and labour reforms – institutional power

As previously demonstrated, the wind industry in Brazil is considered a relatively new market, resulting in union representatives lacking knowledge of how the industry was being developed. Unions faced a number of issues when trying to represent and support their members, such as lack of industry-specific union representation, varied issues that made it difficult to identify actions to take, difficulty accessing workplaces and workers, and inter-union relations. The findings in this Section confirm how mechanisms of control were used to reduce workers' power.

There was no union representing workers specifically within the wind power industry. Instead, categories of work such as steel manufacturing, electricians and construction represented each category of workers' interests, separately. With many distinct unions and professions experiencing different issues, unions found it hard to identify workers experiencing similar problems that demanded action. This weakened their bargaining power, and the accumulated misinformation made it harder for unions to access companies and reach workers.

Findings in this regard support the re-conceptualisation of worker resistance by Hodson (1995), who defined resistance as "*any individual or small group act intended to mitigate claims by management on workers or to advance worker's claims against management*" (Hodson, 1995, p.80). This work provides evidence supporting Hodson's definition, which together advance the study of LPT, by showing how managers attempted to prevent and counter resistance by increasing surveillance and close monitoring of workers, controlling their attempts at resistance at the same time as persuading workers that unionism was something bad. Like Hodson's work, this work deviates from the traditional research focus on the industrial era of work, by exploring worker resistance in the context of modern exponential market growth within the global economy (Hodson, Broek and Dundon, 2012;

Mosoetsa et al., 2016). All of this has been explored in studies in the Global North (Thompson, 2010; Hodson, Broek and Dundon, 2012), however, this study moves the understanding of resistance forward by demonstrating that similar trends are happening in the context of the Global South.

The fact that many companies within the supply chain operated in remote locations contributed to the increased distance between unions and workers. This difficulty reaching workplaces and workers, particularly on a long-term basis, made it harder for unions to inspect working conditions at workplaces. On top of this, with most jobs being temporary, workers constantly changed jurisdiction, making it even harder for unions to keep track of members. The unions therefore lacked associational power. Although the workers could perhaps have had structural power in being able to disrupt the labour process, their atomisation and the precarity of their work meant that this was not feasible.

Another problem unions faced was the conflict of interests between unions of different work categories. At the same time, employers within the wind power industry were well organised and well represented by employer organisations and employer associations.

These findings supported the argument that market and cultural controls can influence managerial practices around changing workers' perceptions of union affiliation negatively, thereby harming workers' resistance (Anner, 2015a; 2015b). With the move of HR departments to online platforms, they made informal negotiations inaccessible. In addition, unions conveniently at distance led to general disengagement from unions.

6.5.2. Worker's perceptions of trade unions – societal power

Another factor affecting unions was the general perception of unions, and consequently their lack of societal power. According to Anner's study (2015b) on market control regimes, such as Brazil, workers tend to experience resistance in ways that are influenced by how the role of unions is depicted to society. In other words, if social conjectures are against unionism, the chances are that unions will tend to be referred to pejoratively within companies. This was exacerbated by market controls and labour reforms.

There was a general lack of interest among workers in unionising, and managers contributed to the way workers perceived unionism. They (managers) considered employees' union membership a waste of time and money and, tried to incorporate their views about it into the companies' values while arguing that companies were doing much more for the workers than unions would. Most workers, especially the low-skilled ones, expressed similar

opinions when asked about it. Sometimes, they simply repeated what they heard about it from their managers. However, most workers lacked basic knowledge of, for example, which union supposedly represented which workers, as well as not being aware of any inspections or negotiations previously made on their behalf.

Another relevant aspect to consider is the role of the Government in forming workers' views. For example, changes in labour regulations transferred some of unions' remit to employers, such as the power of negotiating dismissals. These changes dramatically reduced the presence of union members in the working environment as, before this change, union representatives would go to the companies to negotiate with managers over dismissals. Instead, managers had the power to negotiate directly with workers and settle agreements that would no longer be addressed in Court (once they agreed between them). Another example is that legislation favoured employers by reducing unions' power to represent workers in Court; bureaucracy made union fees/contributions costly. In summary, recent changes to labour regulation have impacted on workers' institutional power.

6.5.3. Non-unionised worker's resistance – associational power

Studies of workers' resistance show that workers often find ways to challenge managerial control (Godard, 2004; Thompson, 2009; Lloyd, 2017). Findings in this study confirm this by showing workers networking amongst themselves to find new job opportunities.

Lower skilled workers feared having a voice. For them, considering the ever-present risk of unemployment, having a job made them feel lucky enough. They were reluctant to question or take risks and this fear was widespread. However, in general, workers found a way to network using WhatsApp groups to help each other. Most enquires were regarding new job opportunities, comparing salaries and benefits offered by different companies for similar jobs. In other words, although lacking support of trade unions, workers were experimenting with some forms of resistance, suggesting a (limited) amount of informal associational power. In this respect, this study adds to previous research (see, for example, Webster and Dor, 2024) that has highlighted how workers in precarious conditions have been seeking new ways to organise which may not necessarily involve working with established trade unions.

6.5.4. Impact of labour reforms on labour relations

Jair Bolsonaro's legal changes significantly impacted labour relations, making workers' ability to exert influence more challenging. While workers theoretically possess substantial power due to their unique role in production and the economy, practical challenges have made it

difficult to translate this into effective leverage. Key factors that contribute to the practical and legislative barriers that significantly limit bargaining power include:

a. Labour Market Conditions: Brazil's high unemployment and informal labour market undermine workers' bargaining power. Job security concerns outweigh the desire to challenge poor conditions, leaving workers open to exploitation.

b. Declining Trade Union Resources: The abolition of the union tax under Bolsonaro significantly reduced funding for trade unions, limiting their ability to recruit, organise, and support workers. This has weakened unions' ability to retain skilled organisers and provide essential services. At the same time, workers saw this as a good thing since their paychecks were no longer automatically deducted.

c. Legislative Barriers: Reforms favouring individual agreements over collective bargaining have diluted union power, while weakened labour inspections mean less oversight and accountability for employer practices. This further marginalised unions and made it more difficult to safeguard worker rights.

d. Knowledge Gaps: Most workers in Brazil's wind power industry lack awareness of their rights and the role of unions, exacerbating the disconnect between unions and potential members. This lack of representation leaves workers without crucial support.

Workers face significant obstacles in collective organisation. The combination of market conditions, reduced union resources, legislative barriers, and knowledge gaps have constrained worker power.

6.6. Summary

This chapter has explained how this study has moved forward knowledge in relation to the use of managerial controls across the wind power supply chain. In doing so, it has answered the four research questions outlined at the beginning of this chapter. These research questions were 1) How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace? 2) To what extent can work in the wind power industry in Brazil be characterised as precarious? 3) To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control? 4) How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil? In answering the questions,

this chapter has demonstrated the importance of the interaction between managerial controls and precarity in working and living conditions. It has also emphasised the relevance of the nature of the industry and government legislation. In this respect, it has shown how it is not sufficient merely to examine the labour process, but also necessary to take account of the political, economic and social spheres.

Furthermore, this chapter has explained how it is important to consider how Brazil's wind power industry is structured and the nature of jobs within the wind power industry, as these conditions influence how workers are controlled. Most workers in this study experienced a series of insecurities (job insecurity, employment insecurity, income insecurity, health and safety insecurities and risks). In addition, workers faced a lack of training and career development, and the impact of the temporary nature of jobs on their physical and mental health, which were experienced as precarious.

An interesting contribution to the literature on good and bad work are the findings on precarious living conditions, and the ways in which these magnified employer controls. These findings suggest that when the nature of the work determines where and how workers live, it can be detrimental to working relationships, because it can force workers to accept employer-provided accommodation where they may be subject to increased levels of control and worse living conditions than are otherwise experienced. Employers use workers' living conditions as a means to intensify work. Although not living in dormitories (as per the literature on dormitory labour regimes), workers were still facing unsatisfactory living conditions, away from family. The findings of this study also contribute toward producing a clearer understanding of how employer behaviour, the nature of the industry, and the political and regulatory context can present challenges to workers' institutional, associational and societal power. Working regulations made work contracts more flexible, making it easier and cheaper for employers to hire and dismiss people. In this way, the Government played a role in facilitating managerial practices that were detrimental to workers' quality of work, health and safety, but they also limited workers' ability to challenge this.

Chapter 7: Conclusions, Limitations and Contributions

I conducted this research aiming to better understand how the precarious working conditions in the wind power industry in Brazil facilitated managers' ways of exerting control over workers. This chapter will reflect upon my research and demonstrate ways that I made an original contribution to knowledge.

The thesis addresses theoretical gaps in relation to the ways in which mechanisms of control are used across supply chains and the weak evidence base on the labour process and precarious work in the Brazilian wind power industry. This study also contributes to research methodology, addressing the lack of longitudinal research on the changing nature of employment, and how managerial controls are used at different time points within supply chains.

I will begin this Chapter with a Research Summary (Section 7.1). Section 7.1.1 will follow this by identifying the study's theoretical contributions on how precarious living conditions damage working conditions, and both (precarious working and living conditions) were exploited by managers to intensify work. Section 7.1.2 will offer my methodological contributions made through the use of a longitudinal case study while Section 7.1.3 will mention some of the study's implications for employers, trade unions and the state. Then, the Chapter will explain the limitations of the study (Section 7.2) that somewhat overlap with the final recommendations for future research (Section 7.3). This will be followed by a final conclusion to the thesis (Section 7.4).

7.1. Research summary: how this thesis was structured

The starting point of this study was to evaluate how mechanisms of control were used within the Brazilian wind power industry and across the supply chain. From there, I developed the more specific objectives of the study, which involved: a) analysing mechanisms of control across supply chains; b) investigating precarious work in the context of Brazil's wind power industry, and how this may influence the way in which workers are controlled; c) assessing how workers were subjected to and resisted control; and d) providing a critical analysis of the current status and future potential of legislation and policy governing work in Brazil.

The literature review chapter presents the theoretical framework supporting this study and underpinning the fulfilment of the research aim and objectives. This study uses a Labour Process Theory (LPT) lens combined with literature on dormitory labour regimes, precarious

work and the power resources approach to investigate work in the wind power industry supply chain in Brazil. This study defines ‘good’ work’ as that which includes work-related and non-work-related aspects such as working conditions, occupational skills, wage levels and worker empowerment and representation, dignity, job security, health, family life, and social integration (Kalleberg, 2009; 2015; UNEP, 2008).

To refine my analysis and provide a contextual perspective, I used literature on aspects of employment relations across supply chains and characteristics of the labour process in the Global South. Due to many similarities in precarious working conditions, I applied literature on work in the construction and the oil and gas industries. Finally, I looked further into the context of the research, by analysing labour relations in Brazil and the role of the Government in setting up the wind power industry. It became clear that the 2017 Labour Reform detrimentally impacted working conditions at the same time as weakening unions and the power of inspectors.

During the process of reviewing the literature, it was possible to identify the following research gaps:

- the ways in which mechanisms of control were used across supply chains, within and outside the workplace;
- the weak evidence base on employment relations, and particularly the nature of precarious work and the extent to which workers have access to power resources in the Brazilian wind power industry;
- how the political and regulatory context affect mechanisms of control, precarity of work, and workers’ access to power resources in Brazil
- methodologically, the lack of longitudinal research on the changing nature of employment within supply chains.

As previously noted (in Section 3.8), four research questions resulted from this initial phase of research:

1. How are workers across the Brazilian wind power industry subjected to mechanisms of control within and outside the workplace?
2. To what extent can work in the wind power industry in Brazil be characterised as precarious?

3. To what extent do different groups of workers have access to power resources that might enable them to resist mechanisms of control?
4. How are mechanisms of control, precarity of work, and workers' access to power resources affected by the regulatory and political context in Brazil?

Chapter 4 outlines the methods I used to obtain answers for these research questions. There, I explained how the use of an interpretivist epistemology allowed me to deploy my prior knowledge of power relations occurring at the workplace, and the way I made sense of reality and how I applied my ontologically critical realist perspective. As a critical realist, I designed a study that allowed me being open to identify whichever external circumstances influencing workers-managers relationships. For this, the use of a longitudinal study enabled semi-structured interviews and observations to take place throughout different phases of the construction and operational process and across different parts of the industry (which in turn provided me with evidence resulting from these rapid changes in the work environments throughout the chain). Although there seemed to be a lack of longitudinal studies on the changing nature of employment within supply chains, this method created the opportunity for me to interview some participants twice (before and after the changes in employment). Overall, I interviewed 46 people including workers, managers and a variety of stakeholders, including union representatives and a labour inspector.

Chapter 5 grouped the key findings of this study into four subsections: 5.2. mechanisms of control; 5.3. employer control over living conditions; 5.4. precarious work; and 5.5. worker resistance and (lack of) power resources. In general, the interviews and observations were revealing, for instance providing evidence of how workers' precarious living conditions were closely tied to the precariousness of their working conditions. Some of the conclusions I made based on my research were: that workers (and managers) were not even aware, sometimes, of the extent to which precarity of the working and living conditions affected their working relationships. Evidence was also provided for the ways in which managerial controls impeded resistance. Finally, findings on worker resistance revealed that the nature of the industry was linked to unions' inability to protect workers interests and explained how the political and regulatory changes had impacted on workers' power resources.

Chapter 6 interpreted these findings in the context of existing literature and also explained how each of the research questions was answered. This Chapter also explained how the study's findings helped support, challenge or extend existing bodies of research. In this Chapter, it was explained how this study contributed to our understanding of how managerial controls were applied through work and living conditions, and how precarious work might vary depending on the different phases of the supply chain production as well as how the structure

of the industry, changes to regulations and managerial controls placed limits on workers' power resources, and unionised resistance.

Chapter 7 builds on these foundations from Chapters 1-4, the findings in Chapter 5 and the understanding gained in Chapter 6, by demonstrating the contributions to theory, methods, policy and practice made by this research. This Chapter will conclude the thesis with an acknowledgement of the limitations of this study, and recommendations for future research.

7.1.1. Contributions to theory

One of the key contributions of this thesis is to bring together literature and knowledge around Labour Process Theory (LPT), dormitory labour regimes, precarious work, and power resources across the wind power supply chain in Brazil. Second, the study shows that precarious work can influence managers' use of mechanisms of control. Third, the study reveals how workers' precarious living conditions can affect how managers perceive control over workers, which, in turn, may worsen the working conditions, creating a vicious cycle. There is little relevant literature on the impact of living conditions on precarity and exploitation due to the newness of the Brazilian wind power industry. Thus, this research contributes to the literature around the use of precarious living conditions to encourage overwork, thereby exploiting workers. In particular, it helps to develop a different understanding of dormitory labour regimes. Fourth, the thesis also extends literature on employment relations in the Brazilian wind power industry supply chain in terms of workers' limited access to power resources. Moreover, it shows how the political and regulatory context affect mechanisms of control, precarity of work, and workers' access to power resources in Brazil. Methodologically, an important contribution is to provide longitudinal research on the changing nature of employment within supply chains. Cross-sectional or other non-longitudinal methods are unable to adequately capture this.

The following discussion explains in more detail the ways in which this thesis provides contributions to knowledge. As indicated above, this thesis extends theory on mechanisms of control (Friedman, 1977; Littler, 1982; Brown, Hyatt and Benson, 2010; Evans and Tourish, 2016). This study is the first to do so in the context of the wind power energy supply chain in Brazil, which has been previously under-researched. Indeed, prior work has focused on precarious work in the Global North, and that which has focused on the Global South (such as work by Webster and Dor, 2024) has not focused on Brazil. This study is innovative in examining this aspect of LPT in an environment which is often considered to be exemplary of 'good work' but where precarious working conditions is the norm. Rather than revealing examples of good work in terms of meaningful skilled work with high levels of autonomy (see

Laaser, 2022), the work is marked by insecurity, unpredictability, and instability, which seems to be further evidence of a degradation of work (Braverman, 1974). Taken together, the findings of this thesis question the assumption that green jobs are decent jobs (ILO, 2016). This study also reveals how workers are controlled not only at work, but also through employer control of their social environment. In doing so, it contributes to the burgeoning literature on dormitory labour regimes, providing both a critique and adding to the understanding provided by labour process theory.

Although Friedman (1977) and Littler's (1982) papers were very influential, their focus was on the labour process and industrial practices characterised by Taylorism and based on advanced economies. For example, Littler (1982) looked at how managers control workers' pace of work. In contrast, this study explored modern forms of work that, in this context (wind power industry), demand from low-skilled manual labourers a series of skills they lack when dealing with such high technology equipment. The repercussions of this are an increase in job insecurity and risks to workers' health and safety.

The study's findings also showed how performance management was used as a mechanism of control. To some extent, this study supports the work of Brown, Hyatt and Benson (2010) and Evans and Tourish (2016) who stated that performance management, even if carried out effectively, might not benefit employees. While these previous arguments portray performance management as unintentionally harmful to workers, this thesis shows how performance management and appraisals (where utilised) were actively used by managers as a means of exploiting workers and intensifying work. Workers faced excessively long hours and a prevailing sense of job insecurity. Measurement of performance was used as an index to assess whether workers were eligible for certain (pseudo) rewards such as taking days off. Thus, not only were these practices used to control the intensity of work, but also to control when workers would have the ability to cease working, and to connect with their families. Interestingly, the data suggested that managers were aware of the precarity affecting workers' working conditions. Instead of taking accountability of their actions as managers, they viewed precarity as inherent to the working conditions, blaming the nature of the industry. The precarity at work increased the power of managers to exert control over workers. This study suggests that in cases where accommodation is provided by the employer, analysis of precarious working conditions should include the living conditions as an aspect of the depreciation of job quality and the increase in control over workers.

There is existing literature on the labour process across supply chains which enhances our understanding of how employment relations might be influenced by the way that a company is situated within a supply chain and how this may vary between different supply

chain configurations (Lakhani, Kuruvilla and Avgar, 2013; Donaghey et al., 2014; Pleger, 2015; Gereffi and Lee, 2016). This study builds on and extends this literature. In this study, it was shown that the wind power supply chain in Brazil is a producer-driven chain with many bottlenecks. Data from this study extends the understanding of how Brazilian wind power firms interact within different supply chain contexts since it showed how companies intervened in managerial matters with suppliers, to the point of causing confusion among employees who received orders from among the various managers of different companies. Micromanagement throughout the supply chain therefore interfered with the effectiveness of operations on a local level and negatively impacted workers.

This study also helps to fill gaps in the general lack of evidence-based analysis of employment relations in the Brazilian wind power industry, and particularly that which engages with the labour process and precarity as well as considering workers' power resources. This study shows how in the wind power industry supply chain, the Government has helped to create a scenario wherein workers can be more easily exploited and rendered less able to resist control. A key factor has been changes to labour legislation. Consequently, unions have faced a deterioration in institutional, associational and societal power resources. While there are some examples of new forms of worker's associational power, this has tended to be non-unionised. This study therefore adds to the more recent academic debates on how workers might experiment in new forms of organising in the context of the Global South.

7.1.2. The novel use of longitudinal case study design in studies of control across the supply chain

In addition to contributions to theory, this study also made significant contributions to longitudinal research on the changing nature of employment within supply chains and studies of employment relations in the Brazilian context. Longitudinal case studies are popular in economics and medical sciences where researchers examine the same individuals to detect any changes that might result over a period. However, managerial studies can also include longitudinal cases in their methodologies to evaluate change in social contexts, such as the analysis of organisational change (Johnstone and Wilkinson, 2018; Checkland et al., 2016). However, there seems to be a gap in the literature in relation to the use of longitudinal case studies to investigate different mechanisms of control used by managers, especially in the context of supply chains. As explained in the methods chapter 4, in this study, the use of a longitudinal approach was beneficial for several reasons.

Firstly, I was investigating a relatively new industry, with little research on the effects of how precarity changes over time. With most jobs within the industry being temporary, by visiting suppliers twice, I was able to evaluate how the temporary nature of work affected

workers in terms of increased job insecurity, even in jobs that were considered relatively more permanent in nature (e.g. jobs in operation and maintenance of wind turbines). This method also allowed for better triangulation of data ensuring a richer analysis.

Secondly, as explained in the Methods Chapter, the second data collection phase was intentionally arranged to enable me to revisit some of the participants in different phases of production than they had been during the first visit. This was valuable because it enabled me to establish connections between the temporary nature of jobs and aspects of the managerial decisions that disregarded workers' career development (with the excuse of factors that allegedly resulted from the inherently temporary nature of jobs in the industry).

Thirdly, by repeatedly interviewing some participants, I was able to obtain information evidencing how workers (and managers) experienced increased job insecurities, health and safety issues, and employment insecurities. I was also able to identify how supply chain bottlenecks encouraged managers to cut costs by exploiting workers further. The longitudinal nature of this study allowed for the inclusion of unexpected and revealing findings relevant to this investigation. The longitudinal case study design enabled data collected from semi-structured interviews and semi-structured observations (Gill and Johnson, 2010; Woodhams, Xian and Lupton, 2014) at the same time as providing insights into causal mechanisms and processes which non-longitudinal methods cannot capture.

7.1.3. Implications for policy and practice: employers, unions and the state

This study has implications for researchers investigating employment relations in the wind power industry supply chain in Brazil. As noted before, there has been very little literature linking Labour Process Theory with precarious work in this context. Therefore, this theoretical framework provides new insights into aspects of precarious working (and living) conditions, extending the knowledge of mechanisms of control that emerged from past empirical research. Unlike most previous studies looking into precarious work, this thesis explored multiple dimensions of precarity happening across the supply chain. The new knowledge acquired in this study can help to make meaningful improvements to policy and practice which have the potential to ameliorate workers' quality of work. From this research, managers can learn about how their managerial controls are negatively affecting workers' lives and performance. Secondly, Union Representatives can learn from this research in terms of how to engage with the workers they represent. This research found that they tend to struggle with accessing workplaces and communicating with workers. Indeed, there were also some indications in this research that unions were failing to represent workers in the wind power supply chain for various reasons, as noted in the findings. The employee study participants often referred

negatively to unions while the union representatives interviewed tried to explain the reasons for the lack of adequate, impactful representation. Improvements in communication are essential so that unions are better informed about how the wind power industry supply chain is structured and what sources of precariousness workers are facing today. The use of technology and social media can benefit the proximity with workers, making them aware of the work of unions in representing their interests. As this study explains, workers are constantly moving jobs, which might require them to transfer their union subscriptions. Unions should discuss how to facilitate this. Although this may appear difficult, it seems that without embracing new strategies and structural changes, unions risk continuing to fail to represent these vulnerable groups of workers.

The more specific recommendations can be broadly categorised into three groups: those for employers and managers, for trade unions and for the state.

With regard to employers, companies in Brazil's wind power sector supply chain may wish to reevaluate their job retention strategy for their low-skilled workforce. One recommendation for employers involved in the construction of wind farms and their operation and maintenance, is to employ such workers on permanent contracts. This change in HR strategy can benefit employers by reducing the employer costs and workers' time in compulsory health and safety training while retaining good, talented workers who could make a difference when it comes to new recruits shadowing them. Moreover, this strategy might potentially reduce both operational risks and those related to health and safety. Workers would have reduced job uncertainty and could enable them to visit their families more often.

A further change for companies in the wind power industry might be to create new HR policies. The first would be an ‘HR Development and Transparency Policy’. This might involve establishing a transparent Human Resources policy to foster career development and clearly communicate project timelines. This will reduce uncertainty about future contracts, reduce turnover, and alleviate workers' anxiety about job security while building trust. Another initiative could be a ‘Remote Workforce Support Policy’. This policy would involve improved accommodation, health, and well-being for workers in remote locations. Further to this, managers should receive sensitivity training to avoid exploiting workers' isolation and provide consistent support. Additionally, they could foster a ‘Non-Punitive Culture Policy’, whereby dismissals are not the default for low performance. Moreover, it would require investment in training and professional mentorship programmes to address motivation without the need to appeal to cultural traits or religious beliefs.

Recommendations for Trade Unions include Sector-Specific Training and Coordination. There should be the development of training initiatives to familiarise union leaders with the wind industry and supply chain operations, improving their ability to represent workers in this industry. Furthermore, there should be improved coordination among unions representing different worker categories to address common challenges. Unions might also develop a 'Remote Site Access Policy'. This policy would prioritise reaching workers in remote locations through strategic partnerships with local entities or leveraging digital communication platforms, ensuring consistent representation regardless of location. Establishing online platforms for communication, engagement, and dissemination of information can facilitate broader outreach and foster a sense of community among union members. Embracing digital tools for collective decision-making and organising virtual events can enhance the accessibility and inclusivity of union activities, particularly for temporary workers in remote locations. A third initiative might be a 'Union Awareness Campaign' which might help to counter anti-union narratives in the workplace, educating workers on the benefits of unionisation and addressing misconceptions fuelled by management. Further to this, unions might engage in non-unionised organisation support. This would involve collaborating with alternative non-unionised groups that are organising workers to complement union activities and broaden the reach of worker advocacy. A fifth development might be for unions to educate their members about how – as found in this research study – mechanisms of control are affecting the working and living conditions of workers throughout the supply chain. This might then assist organising efforts, through members emphasising to non-unionised colleagues the benefits of collective organisation.

Recommendations for the state might first involve Labour Regulation Reform. This would involve updating labour legislation to address the challenges of precarious working conditions, especially for temporary or remote workers. The state might also mandate fair access to healthcare, mental health support, and career development opportunities. Secondly, there could be Workplace Monitoring Regulation. The intention of this regulatory change might be to reduce stress and limit excessive surveillance by establishing guidelines on fair performance assessments and permissible monitoring practices. This could be reinforced by social media campaigns illustrating how certain behaviours related to cultural controls, for example, should be avoided in the workplace. A third recommendation is to enhance union accessibility and representation. This would involve facilitating union access to remote wind farms by mandating employers to provide logistical support for union representatives, ensuring that even temporary workers receive adequate representation.

In summary, an array of potential applications of the findings of this study exist which have the potential to improve managerial practices, worker performance and union effectiveness.

7.2. Limitations of the study

As with any research project, there are always limitations to consider, such as where the study is not carried out as originally intended. Although every effort was made to carefully plan and execute each stage of the research, there were instances when, due to circumstances outside of my control, things did not go as expected.

The main limitations of this study relate to accessing participants and time constraints. Firstly, studying the wind power industry supply chain in Brazil was challenging, due to the vast distances between suppliers. My ability to travel to these locations was hampered by the same remoteness and lack of infrastructure that isolated participants. As a Brazilian, I was aware of cultural aspects of the Brazilian way to do business, who are well-known for being late to their appointments and for cancelling meetings on a last-minute basis, which meant that any risk to me that arose from being in a remote location was likely to be exacerbated by such circumstances.

In addition, the case study included visiting two States: Sao Paulo, in the Southeast (where manufacturers and stakeholders such as national union representatives were based) and Rio Grande do Norte, in the Northeast (where the majority of wind farms are located). As noted in my findings, on both trips I arrived in Sao Paulo, and then travelled to Rio Grande do Norte to conduct more fieldwork. In both places, I booked as many meetings as it was possible to fit into one day of data collection. However, organised I was, despite making sure to confirm with participants many times prior to the date, a few meetings were cancelled while others were rescheduled. To avoid losing a great number of participants, I intentionally booked extra meetings and planned for more interviews and observations than I anticipated was necessary. This gave me the chance to meet with as many participants as possible on each day, so that in the case of cancelations, I would still collect sufficient data. I also reserved an additional half a day on each field trip in anticipation of inevitable rearrangements, which turned out to be essential.

Another main problem resulted from the nature of the industry, due to wind farms being located far from even the nearest local towns. For instance, the logistical issues in accessing WINDFARM_1 and WINDFARM_2 were that individuals were dependent on the help of someone familiar to the place in order to make it to these sites. This is because, as noted in my findings, the roads which gave access to the wind farm were, themselves, also in

precarious conditions, with little or no signs offering directions and no infrastructure whatsoever nearby. Future researchers in this particular context must make sure to take similar safety measures and be aware of being potentially exposed to the same precarity experienced by workers, such as commuting in precarious circumstances; being exposed to adverse weather and the dust; being unable to return to the nearest town at a time of their convenience, and instead relying on the transport provided by the wind farms, usually at the end of the day shift. By planning for and anticipating data loss as a result of participant cancellations and lateness, I was able to mitigate many of the risks to data collection, but due to the precarious nature of the phenomenon being studied, I was also subject to precarity which posed a real risk to my study that I was fortunate and prepared enough to avoid.

One source of weakness in this particular study, which could have affected the results, is that the wind power supply chain in Brazil is spread out in different parts of the country, making it difficult to approach out a variety of suppliers within the chain. Due to newness of the industry, even activities such as the manufacturing of equipment could change hands suddenly, which was bad for the study especially in relation to the longitudinal aspect of the case study. In fact, this was the case of one of the factories I arranged to visit. About two weeks prior to the meeting, I tried to contact the unit to confirm the next set of interviews, but to my surprise, no one answered. Later, I realised that the unit had interrupted its operations due to payment problems with their main client supplier, resulting in the factory being shut in a matter of days. This event made me aware of how quickly large changes may occur within this industry. With this, I was unable to include participants working during the manufacturing phase of production, which would have been beneficial to this research. Future research looking into this sector's supply chain might benefit from the awareness of such dynamics in order to mitigate such risks when conducting fieldwork.

Another limitation was in relation to elite interviewing. Some of my participants were members of the senior leadership of reputable institutions. During the interviews, as a way of showing rich knowledge of the industry, they tended to talk more than sufficient to answer each of my questions. With this, interviews lasted more than the hour I had intended for, and on one occasion, it caused me a delay in attending another interview. Luckily, the next interviewee was also delayed and the interview followed as planned, so the culture of flexibility and lateness may have worked in my favour in this instance. Researchers ought to consider the risk of this in research that involves elite interviewing and allow for additional time between participants to account for this.

Finally, due to time constraints, I was not able to interview more stakeholders. The limitations in this respect relate particularly to Government and Union representatives that I

wish I had the opportunity to include as participants to investigate more in-depth the role of the Government in setting up the industry. Researchers might wish to extend this research, exploring avenues that focus on the role of Government and policy makers in changing the precarious nature of jobs in the wind power industry at both national and international level.

7.3. Recommendations for future research

Future research building on this study might engage further with some of its key findings and/or use of qualitative methods. For example, this thesis provides insights into the importance of contextualising the dynamic power relationships between managers and workers to better understand how workers are controlled. It may be important to understand the different types of control managers use to achieve the outcome of managing behaviour and intensifying work.

Secondly, future studies could further engage with supply chains to shed more light on the numerous dimensions of precarity. This would offer theoretical contributions to studies of supply chains by including aspects of precarious work throughout the chains, offering readers a better understanding of what issues workers are facing that relate to both working and living conditions. With this in mind, researchers might consider replicating this study to investigate the same context in a new time frame or the inclusion of new stakeholders that were not covered in this research (e.g. from manufacturing of equipment). This would be especially valuable as the industry is developing subject to rapid change. This poses real opportunity for observing a growing industry as events unfold and the offshore wind industry is about to start its operations in Brazil. Another aspect to take into consideration in future research is in relation to whether technological advancements confer more precarity to workers through the use of market controls.

Furthermore, future research could also be conducted that investigates how workers perceive different mechanisms of control. For example, as noted before, workers were grateful for being with rewarded days off. However, findings also revealed that in reality these workers were merely accumulating a bank of hours after working excessive hours that would entitle them to some time off anyway. In other words, managers were using pseudo-rewards and workers were not aware of it, or the fact that they were entitled to the time off they were accruing.

There are also some indications that unions are failing to represent workers in the wind power supply chain for various reasons, related to a range of power resources. The study participants often referred negatively to unions while the union representatives interviewed tried to explain the reasons for their lack of representation of workers across the wind power

industry. Further research that engages with Labour Process Theory and the Power Resource Approach can evaluate more deeply the unions' inability to reach these workers, how changes in employment legislation affect unions' powers negatively, and how and why workers' inertia can result in a lack of resistance to the various forms of managerial controls.

My final recommendation is in relation to extending research on jobs in the wind power industry to offshore sites. To date, there has been some valuable research conducted on just transition in offshore production in Europe and South Africa (Schulte, 2016; Schulte et al., 2022). This research has made brief reference to the number of jobs created, but as the current study shows, it is also important to consider the nature of those jobs. This proposed research should be important and impactful due to climate change and other pressures leading this industry to be likely to grow exponentially in future. This thesis paves the way for such work by offering specific insights into how work in the wind power industry offshore has the potential to offer not 'good jobs', but more precarious working and living conditions.

7.4. Final summary and conclusion of the thesis

In this final section of the thesis, I would like to offer my own insights and views on what I have taken away from my study and from my findings. This is also an opportunity to mention areas that I believe have given me the opportunity to improve and develop my skills as an independent researcher. This research started by stating that the aim of this study was to evaluate how mechanism of controls were used within the Brazilian wind power industry and across the supply chain. I believe this has been achieved because the findings provided rich insights into my research objectives and answered all my research questions.

This research provides new insights into the study of precarious working and living conditions, since it highlights a combination of mechanisms of control used by managers to exploit workers further, in turn, 'trapping' them (workers) in further precariousness. During the fieldwork, revealing findings (such as those on direct controls and cultural controls) were personally rewarding, but also disappointing since they confirmed how workers were being mistreated. Finally, I also believe that this longitudinal case study may have important implications for Brazilian industrial policies, employment legislation, and may provide unions with new insights into how to strengthen union representation.

7.5. Reference List

ABEEOLICA (2017). *Brazilian Wind Energy Association.* Available at: http://www.abeeolica.org.br/en/ (Accessed 26 June 2017).

Adamson, M. and Roper, I. (2019). 'Good' Jobs and 'Bad' Jobs: Contemplating Job Quality in Different Contexts. *Work, Employment and Society*. Vol. 33, 4, 551-559.

Andrijasevic (2022). The dormitory regime revisited: Time in transnational capitalist production. In Labour Regimes and Global Production. *Agenda Publishing*, 285-301.

Anner, M., (2008). Meeting the Challenges of Industrial Restructuring: Labour Reform and Enforcement in Latin America. *Latin American Politics and Society*. **50**(2), 33-65.

Anner, M., (2015a). Worker resistance in global supply chains: Wildcat strikes, international accords and transnational campaigns. *International Journal of Labour Research*, 7(1), 17-34,3. Available at: https://www.proquest.com/scholarly-journals/worker-resistance-global-supply-chains-wildcat/docview/1774151513/se-2 (Accessed 19 April 2023).

Anner, M., (2015b). Labor control regimes and worker resistance in global supply chains. *Labor History.* 56 (3).

Antunes, R. (2005). A desertificacao neoliberal no Brasil (Collor, FHC e Lula). *Editora Autores Associados*, 2ª. Ed. 178p. ISBN 85-7496-099-3.

Armstrong, P., (1989). Management, labour process and agency. *Work, Employment and Society.* **3**(3), 307-322.

Arnold, D. (2013). Workers' Agency and Re-Working Power Relations in Cambodia's Garment Industry. SSRN Electronic Journal. 10.2139/ssrn.2237494.

Baer, W. (1978). Evaluating the Impact of Brazil's Industrialization. *Luso-Brazilian Review.* Vol. 15, No. 2, Socioeconomic Change in Brazil (Winter, 1978). University of Wisconsin Press, 178-190.

Barrientos, S. and Smith, S., (2007). Do workers benefit from ethical trade? Assessing codes of labour practice in global production systems. *Third World Quarterly.* **28**(4), 713-729.

Bayer, B. (2018). Experience with auctions for wind power in Brazil. *Renewable and Sustainable Energy Reviews,* 81, 2644-2658.

Bayer, B., Berthold, L., & de Freitas, B. M. R. (2018). The Brazilian experience with auctions for wind power: An assessment of project delays and potential mitigation measures. *Energy policy*, *122*, 97-117.doi: https://doi.org/10.1016/j.enpol.2018.07.004

Beck, U., (2000). *The brave new world of work*. Cambridge: Polity Press.

Benassi, C., (2016). Liberalization Only at the Margins? Analysing the Growth of Temporary Work in German Core Manufacturing Sectors. *British Journal of Industrial Relations.* **54**(3), 597-622.

Berliner, D., Greenleaf, A., Lake, M., Levi, M., and Noveck, J. (2015). Governing Global Supply Chains: What We Know (and Don't) About Improving Labor Rights and Working Conditions. *Annual Review of Law and Social Science.* **11**, 193-209.

Berliner, D., Greenleaf, A. R., Lake, M., Levi, M., & Noveck, J. (2015). *Labor standards in international supply chains: Aligning rights and incentives*. Edward Elgar Publishing.

Berntsen, L. (2016). Reworking labour practices: on the agency of unorganized mobile migrant construction workers. Work, employment and society, 30(3), 472-488.doi: https://doi.org/.1177/0950017015617687.

Bhaskar, R. and Hartwig, M. (2016). Enlightened common sense: the philosophy of critical realism. Abingdon, Oxon: New York, NY: Routledge.

Bhaskar, R., Danermark, B. and Price, L. (2018). *Interdisciplinarity and wellbeing: a critical realist general theory of interdisciplinarity.* London; New York: Routledge, Taylor & Francis Group.

Bieler, A. and Nowak, J. (2021). Labour conflicts in the Global South: an introduction. Globalizations, vol 18, N. 8, 1323-1324.

Bieler, A. and Nowak, J. (2021). Labour conflicts in the Global South towards a new theory of resistance? Globalizations, vol.18, N. 8, 1467-1471.

Blyton, P. and Turnbull, P. (2004). The Dynamics of Employee Relations. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan (Management, Work and Organisations). [Online] Available at: https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=197496&site=ehost-live (Accessed: 9 May 2024).

Braverman, H., (1974). *Labor and monopoly capital: The degradation of work in the twentieth century*. New York: Monthly Review Press.

Bray, M., Litter, C., (1988). The Labour Process and Industrial Relations: Review of the Literature. *Labour & Industry.* **1**(3), 551-587.

Brazilian Power System Operator (Operador Nacional de Sistema Eletrico - ONS), (2016). Available at: Available at: http://www.ons.org.br/institucional/o_que_e_o_ons.aspx?lang=en (Accessed 27 June 2017).

Breslin, F. C., & Smith, P. (2006). Trial by fire: a multivariate examination of the relation between job tenure and work injuries. *Occupational and Environmental Medicine*, 63(1), 27-32.

Brosschot, J. F., & Van Der Doef, M. (2006). Daily worrying and somatic health complaints: Testing the effectiveness of a simple worry reduction intervention*. Psychology and Health*, 21(1), 19-31.

Brown, M., and Benson, J. (2003). Rated to exhaustion? Reactions to performance appraisal processes. *Industrial Relations Journal.* **34**(1), 67-81.

Brown, M., Hyatt, D., and Benson, J. (2010). Consequences of the performance appraisal experience. *Personnel Review.* **39**(3), 375-396.

Bryman, A. and Bell, E. (2015). *Business Research Methods*. 4th Ed., Oxford University Press, 37-39.

Campbell, I. and Price, R. (2016). 'Precarious work and precarious workers: Towards an improved conceptualisation'. The economic and labour relations review: ELRR, 27(3), 314–332. doi: https://doi.org/10.1177/1035304616652074

Carvalho, R. Q. and Schmitz, H. (1989). Fordism is alive in Brazil. IDS Bulletin, vol. 20, n. 4, Institute of Development Studies, Sussex.

Castro, J. C. (2014). 'Operarios mortos e desaparecidos em obras das usinas de Jirau e Santo Antonio'. *Correio da Cidadania,* 26.09.2014. Available at: Available at: https://www.correiocidadania.com.br/social/10090-26-09-2014-operarios-mortos-e-desaparecidos-em-obras-das-usinas-de-jirau-e-santo-antonio (Accessed 11 January 2021).

Checkland, K. et al. (2016) 'Complexity in the new NHS: longitudinal case studies of CCGs in England', BMJ open, 6(1), e010199 pp. doi: https://doi.org/10.1136/bmjopen-2015-010199

Collings, D. and Wood, G. (2009). *Human resource management: A critical approach*. London; New York: Routledge.

Collings, D. and Wood, G. (2011). Human Resource Management: A Critical Approach. *Industrial Relations*. 66(1): 165-167.

Consolidation of Labour Laws in Brazil. Consolidação das Leis do Trabalho (CLT) Decree n. 5.452, of 1st of May 1943.

Costa, H. S. (2023). *EcoDebate. Geracao eolica nao cumpre as boas praticas socio ambientais [Wind generation fails to comply with socio-environmental best practices].* [Online] Available at: https://www.ecodebate.com.br/2021/03/08/geracao-eolica-nao-cumpre-as-boas-pratica-socioambientais/ (Accessed 16 April 2023).

Costa, H. and Veiga, L., 2021. Local labor impact of wind energy investment: an analysis of Portuguese municipalities. *Energy Economics*, *94*, 105055pp. doi: https://doi.org/10.1016/j.eneco.2020.105055

Da Silva, F. R. R. (2014). Between epistemology and ontology: Anthony Giddens' structuration theory. *Tempo Social*. São Paulo, **26**(2), 123-136. Available at: https://www.revistas.usp.br/ts/article/view/97974/96774 (Accessed 18 August 2017).

Data Protection Act. (1998). Available at: http://www.legislation.gov.uk/ukpga/1998/29/data.pdf (Accessed 12 July 2017).

De Colle, S., Henriques, A., and Sarasvathy, S. (2014). The Paradox of Corporate Social Responsibility Standards. *Journal of Business Ethics.* **125**(2), 177-191.

Donaghey, J., Reinecke, J., Niforou, C., Lawson, B., Townsend, K., and Wilkinson, A. (2014). From Employment Relations to Consumption Relations: Balancing Labor Governance in Global Supply Chains. *Human Resource Management.* **53**(2), 229-252.

Druck, M (1999). *Terceirização: (des)fordizando a fábrica—Um estudo do complexo petroquímico da Bahia. (Contracting Out: Undoing Fordism in Factories—A Study of the Petrochemical Complex of Bahia*). São Paulo: Bontempo.

Edwards, P., O'Mahoney, J. and Vincent, S. (2014) *Studying Organizations Using Critical Realism: A Practical Guide.* Oxford University Press, 376pp.

Evans, S., and Tourish, D. (2016). Agency theory and performance appraisal: How bad theory damages learning and contributes to bad management practice. *Management Learning.* **48**(3), 271-291.

Ehnert, I., Parsa, S., Roper, I., Wagner, M. & Muller-Camen, M. (2016) Reporting on sustainability and HRM: a comparative study of sustainability reporting practices by the

world's largest companies, The International Journal of Human Resource Management, 27:1, 88-108.

EWEA, (2020). *Wind at Work Report (2020)*. [Online] Wind Europe Association (former European Wind Energy Association). Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Wind_at_work.pdf (Accessed 2 December 2020).

Fellet, J. (2022). *Por que as mulheres tentam barrar complexo de energia eolica na Paraiba. [Why women are trying to stop the wind power complex in Paraíba].* BBC News Brasil: Sao Paulo. [Online] Available at: https://www.bbc.com/portuguese/brasil-61302577 (Accessed 16 April 2023).

Figueiredo, M., Alvarez, D., Athayde, M., Suarez, J. D., Pereira, R., Soares, L. (2009). 'Productive Reorganization, Outsourcing, and Work Relations in the Offshore Oil Industry in the Campos Basin, Rio de Janeiro', *New solutions,* 18(4), 459–480. Available at: https://journals.sagepub.com/doi/pdf/10.2190/NS.18.4.d?casa_token=uxVt2K5QB0UAAAAA:j-CC-Za5sXSIrkDRe-8-txHmNmd_V8xj-FnkQCH74lAkMukBgI8yugrJNRYaz7bkNwspZ9ZiWP0XHQ (Accessed 19 April 2023)

Filgueiras, V. A. *in* Krein, J. D., Oliveira, R. V., and Filgueiras, V. A. (2019). Reforma trabalhista no Brasil: promessas e realidade. *Curt Nimuendajú Editors*. 15-52.

Fletcher, C. (1999). The Implications of Research on Gender Differences in Self-assessment and 360 Degree Appraisal. *Human Resource Management Journal.* **9**(1), 39-46.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: Methodology meets method. *International Journal of Social Research Methodology: Theory & Practice, 20*(2), 181–194.

Força Sindical (2015). [Online] Available at: https://fsindical.org.br/noticias/?year=2015. (Accessed 11 December 2015).

Fox-Hodess, C. and Santibáñez Rebolledo, C. (2020). The Social Foundations of Structural Power: Strategic Position, Worker Unity and External Alliances in the Making of the Chilean Dockworker Movement. *Global Labour Journal*, 11(3).

Fox-Hodess, K. (2022). The 'iron law of oligarchy' and North-South relations in global union organisations: a case study of the International Dockworkers Council's expansion in the Global South, Labor History, 63:4, 459-478.

Foxwell, D. (2021). Oil companies involved in 30% of offshore wind FIDs in 2020. Riviera News. [Online]. Available at: https://www.rivieramm.com/news-content-hub/news-content-hub/oil-companies-involved-in-30-of-offshore-wind-fids-in-2020-64332. (Accessed 10 May 2021).

Friedman, A. (1977). Responsible Autonomy Versus Direct Control Over the Labour Process. *Capital & Class*, 1(1), 43-57.

Gato, L and Salazar, N. B. (2018). Constructing a city, building a life: Brazilian construction workers' continuous mobility as a permanent life strategy. *Mobilities.* Vol. 13, 733-745.

Geofisica Brasil. (2014). Available at: http://geofisicabrasil.com/ (Accessed 27 June 2017).

Gereffi, G. and Korzeniewicz, M. (1994) Commodity chains and global capitalism [electronic resource]. Westport, Connecticut: Praeger.

Gereffi, G., and Lee, J. (2016). Economic and Social Upgrading in Global Value Chains and Industrial Clusters: Why Governance Matters. *Journal of Business Ethics.* **133**(1), 25-38.

Giddens, A. (1984). *The Constitution of Society*. Berkeley: University of California Press.

Giddens, A. (2015). Ulrich Beck obituary. London School of Economics. Available at: http://www.lse.ac.uk/sociology/pdf/Ulrich-Beck-obituary-by-Anthony-Giddens.pdf (Accessed 27 June 2017).

Godard, J. (2004). A Critical Assessment of the High-Performance Paradigm. *British Journal of Industrial Relations.* **42**(2), 349-378.

Gonzaga, G. (2003). Labor Turnover and Labor Legislation in Brazil. Department of Economics. *Journal of the LACEA*. Pontificia Universidade Catolica do Rio de Janeiro.

Goodburn and Mishra (2024). Beyond the Dormitory Labour Regime: Comparing Chinese and Indian Workplace–Residence Systems as Strategies of Migrant Labour Control. Work Employment and Society, 38(2), 505-526.

Grint, K. (1993). What's Wrong With Performance Appraisals? A Critique and A Suggestion. *Human Resource Management Journal, 3*(3), 61-77.

GWEC Global Wind Energy Council Statistics (2016) [Online]. Available at: https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources-Full-report-2016.10.03.pdf (Accessed 27 June 2017).

GWEC Global Wind Energy Council (2021) [Online]. Report on Jobs, April 2021. Available at: https://gwec.net/wind-can-power-3-3-million-new-jobs-worldwide-over-next-five-years (Accessed 11 May 2021).

Hammer, N. & Riisgaard, L. (2015). Labour and Segmentation in Value Chains. In *Putting Labour in its Place* (pp.83-99). Palgrave. 10.1007/978-1-137-41036-8_5.

Hammer, A. and Ness, I. (2021). Informal and Precarious Work: Insights from the Global South. Journal of Labor and Society, 24/1: 1-15. doi:10.1163/24714607- 20212000.

Henderson, J. et al. (2002). Global production networks and the analysis of economic development. Review of international political economy: RIPE, 9(3), 436–464. doi: 10.1080/09692290210150842.

Hermanowicz, J. C. (2013). The longitudinal qualitative interview. *Qualitative sociology*, *36*, 189-208.

Heyes, J., & Lewis, P. (2014). Employment protection under fire: Labour market deregulation and employment in the European Union. Economic and Industrial Democracy, 35(4), 587–607. doi: https://doi.org/10.1177/0143831X13491842

Hodson, R. (1995). Worker Resistance: An Underdeveloped Concept in the Sociology of Work. Economic and Industrial Democracy, 16(1), 79–110. doi: https://doi.org/10.1177/0143831X9501600104

Holman, D., Lamare, R. Grimshaw, D., Holdsworth, L. and Marchington, M. (2012). The Diffusion of 'Good' HR Practices Across the Supply Chain. *ACAS research paper*, Manchester Business School.

Hunt, N. C. (2010). *Setting Up and Running Effective Staff Appraisals and Feedback Review Meetings: Revised and Updated*. 7th Edition. Oxford: How To Books Ltd.

International Labour Organization (2016). What is green job? [Online]. Available at https://www.ilo.org/resource/article/what-green-job . Accessed on 10.05.2024.

IRENA International Renewable Energy Agency Outlook 2021 [Online] Available at: https://www.irena.org/publications/2021/March/World-Energy-Transitions-Outlook (Accessed 11 May 2021).

IRENA - International Renewable Energy Agency (2020). *Country rankings.* Available at:

https://www.irena.org/Statistics/View-Data-by-Topic/Capacity-and-Generation/Country-Rankings (Accessed 17 January 2020).

IRENA - International Renewable Energy Agency (2017). Available at: http://www.irena.org/menu/index.aspx?mnu=Subcat&PriMenuID=36&CatID=141&SubcatID=3852 (Accessed 02 May 2017).

Jermier, J. M., Knights, D., and Nord, W. R. (Eds.). (1994). *Resistance and power in organizations.* Taylor & Frances/Routledge.

Johnson, P. and Dubeley, J.. (2003). *Reflexivity in Management Research. Journal of Management Studies.* 40. 1279-1303. doi: https://doi.org/10.1111/1467-6486.00380.

Johnson, P. and Gill, J., (2010). Research methods for managers. *Research Methods for Managers*, 1-288.

Johnstone, S. and Wilkinson, A. (2018).The Potential of Labour−Management Partnership: A Longitudinal Case Analysis. *British Journal of Management*, 29(3), pp. 554–570. doi: https://doi.org/10.1111/1467-8551.12240.

Kalleberg, A. L. (2009). Precarious Work, Insecure Workers: Employment Relations in Transition. American Sociological Review, 74(1), 1–22. doi: https://doi.org/10.1177/000312240907400101

Kalleberg, A. L. (2018). *Precarious Lives: Job Insecurity and Well-Being in Rich Democracies*. Cambridge, UK: Polity Press.

Kalleberg, A. L. And Vallas, S. P. (2018). Probing precarious work: Theory, research, and politics. *Research in the Sociology of Work* 31.1: 1-30.

Kaufman, A. and Saravanamuthu, K. (2009). The dilemma in monitoring Voluntary Labour Standards: Labour's 'Muted' consent to Exploit Itself, in Saravanamuthu, K. and Lehman, C. R., eds. Extending Schumacher's Concept of Total Accounting and Accountability into the 21st Century. *Advances in Public Interest Accounting*. (14), 297-319.

Kavanagh, P., Benson, J., and Brown, M. (2007). Understanding performance appraisal fairness. *Asia Pacific Journal of Human Resources.* **45**(2), 132-150.

Krein, J. D., & Oliveira, R. V. D. (2019). Para além dos discursos: impactos efetivos da Reforma nas formas de contratação. *Reforma trabalhista no Brasil: promessas e realidade*, 81-126.

Kunda, G. (1992). *Engineering culture: Control and commitment in a high-tech corporation.* Philadelphia, PA: Temple University Press.

Laaser, K. (2016). 'If you are having a go at me, I am going to have a go at you': The changing nature of social relationships of bank work under performance management. *Work, Employment & Society*, 30(6), 1000-1016.

Laaser, K. (2022). Meaningful Work and Sociology: An Introduction to This Themed Issue. *Work, Employment and Society*. Vol. 36 (5), 791-797.

Lakhani, T., Kuruvilla, S., and Avgar, A. (2013). From the Firm to the Network: Global Value Chains and Employment Relations Theory. *British Journal of Industrial Relations.* **51**(3), 440-472.

Lauri, M. (2011). Triangulation of Data Analysis Techniques. *Papers on Social Representations.* **20**(2), 34.1-34.15.

Lawrence, P., Grant, A., Fried, Y., Parker, S., and Frese, M. (2010). The key job design problem is still Taylorism. *Journal of Organizational Behaviour.* **31**(2-3), 412-421.

LeBlanc, V. R. (2009). The effects of acute stress on performance: implications for health professions education. Academic Medicine, 84(10), S25-S33.

Littler, C. (1982). *The development of the labour process in capitalist societies: A comparative study of the transformation of work organization in Britain*, Japan and the USA. London: Heinemann Educational.

Lloyd, A. (2017). Ideology at work: Reconsidering ideology, the labour process and workplace resistance. *International Journal of Sociology and Social Policy.* **37**(5-6), 266-279.

Locke, R., Rissing, B., and Pal, T. (2013). Complements or Substitutes? Private Codes, State Regulation and the Enforcement of Labour Standards in Global Supply Chains. *British Journal of Industrial Relations.* **51**(3), 519-552.

Locke, R., and Romis, M. (2007). Improving work conditions in a global supply chain. *Mit Sloan Management Review.* **48**(2), 54 pp.

Mackenzie, W. (2021). Why are oil majors investing in offshore wind? Forbes. [Online] Available at: https://www.forbes.com/sites/woodmackenzie/2021/04/06/why-are-oil-majors-investing-in-offshore-wind/ (Accessed 10 May 2021).

Marchington, M., Rubery, J., and Grimshaw, D. (2011). Alignment, integration, and consistency in HRM across multi-employer networks. *Human Resource Management.* **50**(3), 313-339.

Marchington, M., Wilkinson, A., and Marchington, L. (2012). *Human resource management at work.* (5th ed., with Marchington, L. for chapters 9-11). London: Chartered Institute of Personnel and Development.

Martínez Lucio, M. (2010). Dimensions of internationalism and the politics of the labour movement: Understanding the political and organisational aspects of labour networking and co-ordination. *Employee Relations*, Vol. 32 No. 6, pp. 538-556. doi: https://doi.org/10.1108/01425451011083618

Mayer, J. F. (2016). The Limits of Labour Legislation Reforms: Rigidity, Growth, and Employment in Brazil (1995-2010). *Journal of Politics in Latin America*, 8, 1, 95-127.

McGrath-Champ, S., Rainnie, Al., Pickren, G., Herod, A., Kaine, S., and Wright, C. F. (2015). Global destruction networks, the labour process and employment relations. *Journal of Industrial Relations.* **57**(4), 624-640.

Moore, P., and Robinson, A. (2016). The quantified self: What counts in the neoliberal workplace. *New Media & Society.* **18**(11), 2774-2792.

Moser, P. K. (1995) Epistemology. In: Audi, R., ed. *Cambridge Dictionary of Philosophy (The).* Cambridge: Cambridge University Press. 233-238.

Mosoetsa, S. Stillerman, J., Tilly, C. “Precarious Labor, South and North: An Introduction.” (2016). *International Labor and Working-Class History*, vol. 89, Cambridge University Press, pp. 5–19, doi: https://doi.org/10.1017/S0147547916000028.

Munck, R. (2013). ‘The Precariat: a view from the South’, *Third World Quarterly,* 34(5), pp. 747–762. doi: https://doi.org/10.1080/01436597.2013.800751

Mustchin, S. (2014). Union modernisation, coalitions and vulnerable work in the construction sector in Britain. *Industrial Relations Journal.* 45:2, 121-136.

Newsome, K., Taylor, P., Bair, J. and Rainnie, A. (2015). ‘Putting Labour in its Place’: Global Value Chains and Labour Process Analysis. London. Palgrave: Ch.1.

Ngai (2008). The making of a global dormitory labour regime: Labour protection and labour organizing of migrant women in South China. In Labour Migration and Social Development in Contemporary China. *Routledge*.

Ngai and Smith (2007). Putting transnational labour process in its place: the dormitory labour regime in post-socialist China. *Work, Employment and Society*, 21(1), 27-45.

Nowak, J. (2019). *Mass Strikes and Social Movements in Brazil and India: Popular Mobilisation in the Long Depression*. Palgrave Macmillan. 319 pp.

Nowell, L. S., Norris, J. M., White, D. E., and Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods,* 16(1). doi: https://doi.org/10.1177/1609406917733847

O Globo (2018). Available at: https://oglobo.globo.com/economia/quase-metade-dos-jovens-empregados-com-nivel-superior-esta-em-postos-de-menor-qualificacao-23300271 (Accessed 14 February 2020).

Oliveira, T. and Proni, M.W. (2016). A heterogeneous and flexible labour market: a persistent problem in Brazil. *Revista da ABET*, **15**(2), 60-86.

Oliveira, R. Véras (2013). "Suape Em Construção, Peões Em Luta: O Novo Desenvolvimento E Os Conflitos Do Trabalho." *Caderno CRH* 26.68: 233-52.

Oliveira, R. Véras (2014). "Brasil Em Obras, Peões Em Luta, Sindicatos Surpreendidos." *Revista Crítica De Ciencias Sociais* 103.103: 111-36.

Oliveira, R. Véras (2018). "Brazilian Labour Reform in Historical Perspective." Global Labour Journal 9.3: *Global Labour Journal,* Vol.9 (3).

Ouchi, W. G., & Wilkins, A. L. (1985). Organizational culture. *Annual Review of Sociology, 11,* 457–483.

Pawson, R., & Tilley, N. (1997). An introduction to scientific realist evaluation. In E. Chelimsky & W. R. Shadish (Eds.), *Evaluation for the 21st century: A handbook* (pp. 405–418). Sage Publications, Inc. https://doi.org/10.4135/9781483348896.n29

Pegler, L. (2015). Peasant inclusion in global value chains: Economic upgrading but social downgrading in labour processes? *The Journal of Peasant Studies.* **42**(5), 929-956.

Penelas, R. G. (2015) [Online]. 'Acidentes matam mais operarios em Belo Monte e Jirau'. *A Nova Democracia.* June, 2015. Available at: https://anovademocracia.com.br/no-152/5963-acidentes-matam-mais-operarios-em-belo-monte-e-jirau (Accessed 11 January 2021).

Perry (2018). Living at Work and Intra-worker Sociality Among Migrant Farm Workers in Canada. *Journal of International Migration and Integration*. Vol.19, 1021-1036.

Pettigrew, A. M. (1979). On Studying Organizational Cultures. *Administrative Science Quarterly*, *24*(4), 570–581. doi: https://doi.org/10.2307/2392363

Phelan, S. (2011). Case study research: Design and methods. *Evaluation & Research in Education.* **24**(3), 221-222.

Pichler, S. (2012). The social context of performance appraisal and appraisal reactions: A meta-analysis. *Human Resource Management.* **51**(5), 709-732.

Prowse, P. and Prowse, J. (2009). The dilemma of performance appraisal. *Measuring Business Excellence.* **13**(4), 69-77.

Pulignano, V., and Signoretti, A. (2016). Union Strategies, National Institutions and the Use of Temporary Labour in Italian and US Plants. *British Journal of Industrial Relations.* **54**(3), 574-596.

Queiroz, A. S. and Vanderstraeten, R. (2018). Unintended consequences of job formalisation: Precarious work in Brazil's sugarcane plantations. *International Sociology,* Vol. 33(1), 128-146.

Quinlan, M. and Bohle, P. (2004). Contingent Work and Occupational Safety. The Psychology of Workplace Safety. J. Barling and M. R. Frone, eds. Washington, DC: *American Psychological Association*, 81-106.

Quinlan, M. (2012). 'The 'pre-invention' of precarious employment: The changing world of work in context', *The economic and labour relations review:* ELRR, 23(4), 3–23. doi: https://doi.org/ https://doi.org/10.1177/103530461202300402

Rainnie, A., Herod, A. and McGrath-Champ, S. (2011). Review and Positions: Global Production Networks and Labour. Competition & change, 15(2), 155–169. doi: 10.1179/102452911X13025292603714.

Rawcliffe, J. (2017). Evolving Workforce and Safety Practices for Wind Farms. *Power – Business & Technology for the Global Generation Industry.* Available at: http://www.powermag.com/evolving-workforce-and-safety-practices-for-wind-farms/?pagenum=1%20published%20on%2006.01.2017;%20viewed%20in%2004.12.17 (Accessed 5 December 2017).

Remmers, C., and Zander, T. (2018). Why you don't see the forest for the trees when you are anxious: Anxiety impairs intuitive decision making. *Clinical Psychological Science*, *6*(1), 48-62.

Robinson, P., and Rainbird, H. (2013). International Supply Chains and the Labour Process. *Competition & Change.* **17**(1), 91-107.

Rubery, J., Carroll, C., Cooke, F.L., Grugulis, I. and Earnshaw, J. (2004). Human Resource Management and the Permeable Organization: The Case of the Multi-Client Call Centre*. Journal of Management Studies, 41: 1199-1222. doi: https://doi.org/10.1111/j.1467-6486.2004.00472.x

Rubery, J., Grimshaw, D., Keizer, A., and Johnson, M. (2018). Challenges and Contradictions in the 'Normalising' of Precarious Work. *Work, Employment and Society,* 32(3), 509–527.

Saunders, M. N. K., Lewis, P. and Thornhill, A. (2009). *Research methods for business students.* 5th ed. Harlow: Pearson Education Limited.

Saunders, M. N.K.; Lewis, P. and Thornhill, A. (2012). *Research Methods for Business Students*. 6th ed. Harlow: Pearson Education Limited.

Saunders, Mark N.K.; Lewis, P. and Thornhill, A. (2019). *Research Methods for Business Students*. 8th ed. Harlow: Pearson Education Limited.

Schulte, L. (2016), Industrial Policy, Skill Formation, and Job Quality in the Danish, German and English Offshore Wind Turbine Industries [PhD Thesis]. University of Greenwich, London.

Schulte, L., Stephens, S., Klindt, M.P., Robinson, B., and Umney, C. (2022), Final Report: Wind Energy and the Just Transition. Political and socio-economic pinch points in wind turbine manufacturing and windfarm communities in Europe and South Africa. Project Report. Middlesex University, London; University of Aalborg; Nelson Mandela University; University of Leeds.

Schumann, P., and Kuchinke, L. (2020). Do (n't) worry, it's temporary: The effects of fixed-term employment on affective well-being. Journal of Happiness Studies, 21(7), 2557-2582.

Selwyn, B. (2012). Beyond firm-centrism: Re-integrating labour and capitalism into global commodity chain analysis. *Journal of Economic Geography.* **12**(1), 205-226.

Selwyn, B, (2013). Social Upgrading and Labour in Global Production Networks: A Critique and an Alternative Conception. *Competition & Change.* **17**(1), 75-90.

Shahzad, F., Luqman, R. A., Khan, A. R., and Shabbir, L. (2012). Impact of organizational culture on organizational performance: An overview. *Interdisciplinary Journal of*

Contemporary Research in Business, 3(9), 975–985. Available at: https://psycnet.apa.org/record/2012-22425-035 (Accessed 19 April 2023).

Schmalz, S., Ludwig, C. and Webster, E. 2018. The Power Resources Approach: Developments and Challenges. *Global Labour Journal*, 9(2): 113.

Sibal, D. R. (2014). Varieties of Capitalism and Firm Performance in Emerging Markets: An Examination of the Typological Trajectories of India and Brazil. [Thesis] Department of International Relations of the London School of Economics.

Silva Filho, L. A. and Queiroz, S. N. (2013). Sujeitos del trabajo precario: el caso de los protagonistas del mercado de la construcción en Brasil. Revista Faculdade de Ciencias Económicas, Vol. XXI (1). P.91-107.

Silver, B. (2003). Forces of Labour: Workers' Movements and Globalisation since 1870. Cambridge: *Cambridge University Press*.

Sindicato dos Metalúrgicos (2019). [Online] Available at: https://metalurgicos.org.br/noticias/ (Accessed 14 May 2019).

Siqueira, E. and Haiama, N. (2005). The Sinking of the Neoliberal P-36 Platform in Brazil. In: V. Mogensen, org. *Worker Safety under Siege: Labor, Capital, and the Politics of Workplace Safety in a Deregulated World*. Armonk: ME Sharpe.

Smith (2003). Living at Work: Management Control and the Dormitory Labour System in China. *Asia Pacific Journal of Management*. Vol.20, 333-358.

Smith and Ngai (2006). The dormitory labour regime in China as a site for control and resistance. *The International Journal of Human Resource Management*, 17(8), 1456-1470.

Smith, A. et al. (2002). Networks of value, commodities and regions: Reworking divisions of labour in macro-regional economies. Progress in human geography, 26(1), pp. 41–63. doi: 10.1191/0309132502ph355ra.

Smith, J.A., Flower, P., and Larkin, M. (2009), Interpretative Phenomenological Analysis: Theory, Method and Research. Qualitative Research In Psychology 6(4):346-347.

Sofroniou, N. and Anderson, P. (2021). The green factor: Unpacking green job growth. *International Labour Review*. Vol. 160, n.1.

Sparer, E. et al. (2015). Length of time spent working on a commercial construction site and the associations with worker characteristics. *American journal of industrial medicine.* 58,9.

Standing, G. (1986). Meshing labour flexibility with security: an answer to British unemployment? *International Labour Review*, 125: 87–106

Standing, G. (2011). *The precariat: the new dangerous class*. London: Bloomsbury Academic.

Standing, G. (2014). 'Why the precariat is not a "bogus concept"', OpenDemocracy: London. [Online]. Available at: https://www.opendemocracy.net/en/why-precariat-is-not-bogus-concept/ (Accessed 28 January 2023).

Sturgeon, T. (2009). From commodity chains to value chains: interdisciplinary theory building in an age of globalization. Industrial Performance Center. Massachusetts.

Sturgeon, T. (2001). How Do We Define Value Chains and Production Networks*? Bellagio Value Chains Workshop, September 25th – October 1st, 2000. Bellagio, Italy*. *IDS Bulletin,* **32**(3), 9-18.

Sumelius, J., Björkman, I., Ehrnrooth, M., Mäkelä, K., and Smale, A. (2014). What Determines Employee Perceptions of HRM Process Features? The Case of Performance Appraisal in MNC Subsidiaries. *Human Resource Management.* **53**(4), 569-592.

Taylor, P. (2010). The Globalization of Service Work: Analysing the Transnational Call Centre Value Chain. In: Thompson, P. and Smith, C. eds. *Working Life: Renewing Labour Process Analysis*. Basingstoke: Palgrave Macmillan, 244–268.

Taylor, P. (2013) *Performance Management and the New Workplace Tyranny: A Report for the Scottish Trades Union Congress*, Glasgow: University of Strathclyde.

Taylor, P., Newsome, K. and Rainnie, A. (2013) ''Putting Labour in its Place': Global Value Chains and Labour Process Analysis', Competition & change, 17(1), pp. 1–5. doi: 10.1179/1024529412Z.00000000028.

Tepper, B. J., Moss, S. E., and Duffy, M. K. (2011). Predictors of Abusive Supervision: Supervisor perceptions of deep-level dissimilarity, relationship conflict, and subordinate performance. *The Academy of Management Journal*, *54*(2), 279–294. Available at: http://www.jstor.org/stable/23045081 (Accessed 19 April 2023).

The Crown Estate Offshore Wind Leasing Round 4. Available at: https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/offshore-wind-leasing-round-4/ (Accessed 11 May 2021).

Thompson, P. (1989). The Nature of Work. *Macmillan Education Ltd*. 2nd edition, 310 pp.

Thompson, P. (2010). The capitalist labour process: Concepts and connections. *Capital & Class.* **34**(1), 7-14.

Thompson, P. and Harley, B. (2009). HRM and the Worker: Labour process Perspectives: The Oxford Handbook of Human Resource Management.

Thompson, P. and Smith, C. (2009). Labour Power and Labour Process: Contesting the Marginality of the Sociology of Work. *Sociology.* **43(**5), 913-930.

Thompson, P. and Vincent, S. (2010) Labour process theory and critical realism. In: Thompson P, Smith C (ed.). *Working Life: Renewing Labour Process Analysis. Critical Perspectives on Work and Employment*, London: Palgrave Macmillan, 47-69.

Tully, P.J., Cosh, S.M. and Baune, B.T. (2012). A review of the effects of worry and generalized anxiety disorder upon cardiovascular health and coronary heart disease. Psychol Health Med.;18(6):627-44. doi: 10.1080/13548506.2012.749355. Epub 2013 Jan 16. PMID: 23324073.

Underhill, E. and Quinlan, M. (2011). How Precarious Employment Affects Health and Safety at Work: The Case of Temporary Agency Workers. *Relations Industrielles / Industrial Relations*, *66*(3), 397–421. Available from: http://www.jstor.org/stable/23078363 (Accessed 19 April 2023).

United Nations Environment Programme Report - UNEP (2008). Green Jobs: Towards decent work in a sustainable, low-carbon world. *Worldwatch Institute* for UNEP. [Online] Available at https://www.unep.org/resources/report/green-jobs-towards-sustainable-work-low-carbon-world . Viewed on 08.05.2024.

van den Broek, D. and Dundon, T. (2012). (Still) Up to No Good: Reconfiguring Worker Resistance and Misbehaviour in an Increasingly Unorganized World. *Industrial Relations*, *67*(1), 97–121. https://doi.org/10.7202/1008197ar

Vincent, S. and Wapshott, R. (2014) *in* Edwards, P., O'Mahoney, J. and Vincent, S. *Studying Organizations Using Critical Realism: A Practical Guide.* Oxford University Press, 148-167.

Virtanen, M., Kivimäki, M., Joensuu, M., Virtanen, P., Elovainio, M. and Vahtera, J., 2005. Temporary employment and health: a review. *International journal of epidemiology*, 34(3), 610-622. doi: , https://doi.org/10.1093/ije/dyi024

Visser, J. (2019). Can unions revitalise themselves? *International Journal of Labour Research*, 9(102): 17-48.

Webster, E. and Dor, L. (eds). 2024. Recasting Workers' Power: Work and Inequality in the Shadow of the Digital Age. Bristol: *Bristol University Press*.

Webster, E., Lambert, R. and Bezuidenhout, A. (2008). Grounding Globalization: Labour in the Age of Insecurity. Oxford: *Blackwell*.

Weller, J. (2000). Reformas económicas, crecimiento y empleo: Los mercados de trabajo en América Latina y el Caribe. Sección de Obras de Economía Contemporánea. CEPAL (Comision Economica para America Latina y el Caribe). *Fondo de Cultura Economica.* Chile, 262p.

Wright, E. O. (2000). 'Working-class power, capitalist-class interests, and class compromise'. *American Journal of Sociology*. 105(4): 957-1002.

Wilkins, A. L., and Ouchi, W. G. (1983). Efficient cultures: Exploring the relationship between culture and organizational performance. *Administrative Science Quarterly, 28*(3), 468–481.

Winch, G.M. (1986). The Labour Process and Labour Market in Construction. *International Journal of Sociology and Social Policy.* 103-116.

Wind Energy Industry Manufacturing Supplier Handbook (2011). Available at: http://www.wire-net.org/pdf/WindEnergyMFGSupplierHandbook.pdf (Accessed 27 June 2017).

Whiston, K., (1997). Worker Resistance and Taylorism in Britain. *International Review of Social History* (4).

Whitfield, K., and Strauss, G. (Eds.) (1998). *Researching the World of Work: Strategies and Methods in Studying Industrial Relations.* Cornell University Press, ILR Press. 336p.

Wood, G., Dibben, P., and Meira, J. (2016). Knowledge transfer within strategic partnerships: The case of HRM in the Brazilian motor industry supply chain. *The International Journal of Human Resource Management.* **27**(20), 2398-2414.

Woodhams, C., Xian, H. and Lupton, B. (2015). Women Managers' Careers in China: Theorizing the Influence of Gender and Collectivism. *Human Resource Management.* **54**(6), 913-931.

Woolfson, C. (2004). Business Organisation, Precarious Employment and Risk Transfer Mechanisms in the Offshore Oil Industry, *Policy and practice in Health and Safety*, 2(2), 57–76. doi: https://doi.org/10.1080/14774003.2004.11667650

Appendix

Appendix 1 – Ethics approval form

The University Of Sheffield.

Downloaded: 13/04/2023
Approved: 06/07/2018

Paula Maria Silva Furtado Kohn
Registration number: 160224227
Management School
Programme: PhD

Dear Paula Maria

PROJECT TITLE: Performance management and the labour process in the Brazilian wind power industry: promoting organisational economic and social upgrading through the global supply chain?
APPLICATION: Reference Number 018606

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 06/07/2018 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 018606 (form submission date: 05/06/2018); (expected project end date: 30/04/2023).
- Participant information sheet 1045532 version 1 (04/06/2018).
- Participant consent form 1045521 version 3 (05/06/2018).

The following optional amendments were suggested:

There are a lot of interview questions for semi-structured interview of 40-60 minutes. Maybe make clearer which are research questions and which are prompts should the conversation go in that direction.

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Lucy Bartrick
Ethics Administrator
Management School

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/research-services/ethics-integrity/policy
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix 2 – Information Sheet

Information Sheet

I. **Research Project Title:** Performance management and the labour process in the Brazilian wind power industry: promoting organisational economic and social upgrading through the global value chain?

II. **Research Team and contact details**
Research leader: Paula Kohn - pmsilvafurtadokohn1@sheffield.ac.uk; Phone +44 (0)7803698381
Supervisors: Prof Pauline Dibben: pdibben@sheffield.ac.uk and Dr Juliana Meira: j.m.meira@sheffield.ac.uk

III. **What is the research's purpose?**

The main aim of this research is to evaluate how employee performance management is within the Brazilian wind power industry, and whether it is used to promote organisational economic and social upgrading within its supply chain.

IV. **Do I have to take part?**

Participation in this research is entirely voluntary, and participants are free to withdraw from the research at any time without any negative consequences to themselves. If you do decide to take part, you will be able to keep a copy of this information sheet and you should indicate your agreement by signing a consent form in the presence of the research leader.

V. **What will happen to me if I take part?**

You will be asked to be interviewed and / or be observed by the research leader at meetings and factory tours.

VI. **What happens if the research study stops earlier than expected?**

Should the research study stop earlier than planned and if you are affected in any way you will be informed of this, and will be told why this was necessary.

VII. **What if something goes wrong?**

If you have any complaints about the project, you can initially contact the research leader, followed by any other member of the research team. Alternatively, you can also contact the Research Office at Sheffield University Management School on Conduit Road, Sheffield S10 1FL, United Kingdom. Phone contact: +44 (0)114 222 3232. Website: www.sheffield.ac.uk/management.

Any information or complaints you may wish to take further, including details about how and why the University of Sheffield processes your personal information, how we keep your information secure, and your legal rights (including how to complain if you feel that your

personal information has not been handled correctly), can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

In order to collect and use your personal information as part of this research project, we must have a basis in law to do so. The basis that we are using is that the research is 'a task in the public interest'.

VIII. Will my taking part in this project be kept confidential?

Your name, position and organisation will be kept strictly confidential and will not be linked to the research materials. You will not be identified or identifiable in the reports that result from the research during the collection, analysis and storage of information.

IX. Who has ethically reviewed the project?

The project has been ethically approved by the University of Sheffield's Research Ethics Committee (UREC).

The project complies with the new General Data Protection Regulation (GDPR) in force across the EU, including the UK, since 25 May 2018 and replacing the current UK Data Protection Act 1998.

The University of Sheffield will act as the Data Controller for this study. This means that the University of Sheffield is responsible for looking after your information and using it properly.

Thank you for taking part in this research.

Research leader signature: _____ Date: _____

Appendix 3 – <u>Participant Consent Form</u>

Research Title: Performance management and the labour process in the Brazilian wind power industry: promoting organisational economic and social upgrading through the global supply chain?

Lead Researcher: Paula Maria Silva Furtado Kohn

Participant Identification Number for this project: _____

1. I confirm that I have read and understood the information sheet dated _____ explaining the above research project and I have had the opportunity to ask questions about the project. ❒

2. I understand that my participation is entirely voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. Also, should I not wish to answer any particular question or questions, I am free to decline.❒

3. I acknowledge that it will not be possible to withdraw already published findings or information that is stored in anonymised datasets. ❒

4. I understand that my responses will be treated in a strictly confidential manner, with the exception of confidentiality in the case where the organisation's practices present immediate or future risk to loss of life to themselves or others. ❒

5. I permit members of the research team to have access to my anonymised responses. I understand that my name, position and organisation will not be linked with the research materials, and I will not be identified or identifiable in the reports that result from the research during the collection, analysis and storage of information. ❒

6. I agree for the anonymised data collected from me to be used in future research and data should be submitted to the UK Data Archive, if required, in future research. ❒

7. I agree to take part in the above research project.❒

Please note that the lead researcher must sign and date this document in the presence of the participant.

Name of Participant	**Date**	**Signature**

Lead Researcher	**Date**	**Signature**

Appendix 4 – Interview questions

PHASE 1

Interview questions to managers (including HR managers, production managers, line managers, supply chain managers)

Background questions:

Please could you describe your job role, including your duties and whether you line manage any other employees?

Please can you describe to me the main functions of your division/department?

Does your division/department interact closely with any others? If yes, how often do managers meet to discuss and plan?

Performance management and appraisal:

What is your approach to delegating work to your employees?

How do you ensure that tasks are completed?

How do you assess the people who you manage (for example appraisals/reviews)?

Could you please describe the appraisal process?

To what extent do employee appraisals correspond to organisational Key Performance Indicators or overall strategy?

(HR managers only): What advice do you give departments regarding how to carry out appraisals?

(HR managers only): Do departments usually carry out appraisals in the way that the company recommends?

(Except HR managers): What advice does the HR department give you with regard to carrying out appraisals?

What are the main problems that occur with carrying out appraisals?

How do employees generally react to being appraised/ their work being reviewed?

Are employees asked their opinion on which objectives they should meet?

Are opinions asked for their opinion on how they should carry out their work?

Other than using appraisal, how do you ensure that employees are carrying out their work effectively?

Is the union involved with deciding how appraisal should be carried out?

Relationships with other departments:

(Except HR Managers): Could you please describe your relationship with the HR department?

(Except HR Managers): What degree of control do you have over the HR department, or what degree of control does the HR department have over the way in which you manage employees?

(Except SC Managers): Is there a specific supply chain (SC) department in your company? If yes, how often do you interact with the SC manager, and how would describe your relationship with them?

How would you describe your relationship with the accounting or finance department?

Supply chain:

Please describe where the company is situated within the supply chain.

How much do you know about your company's supply chain?

Do you have a special relationship with any supplier? If yes, how long have they been working with you, and how close is this relationship?

Do you share any information with suppliers? (which sort of information- HR, accounting, manufacturing processes etc.)?

Do suppliers share any information with you? (which sort of information- HR, accounting, manufacturing processes etc.)?

Do you share any information with customers? (which sort of information- HR, accounting, manufacturing processes etc.)?

Do customers share any information with you? (which sort of information- HR, accounting, manufacturing processes etc.)?

Do you think the company would benefit from knowing more information about its suppliers?

To what extent are you aware of the HR practices throughout the supply chain?

Do you interact directly with the HR department of companies in the supply chain?

Are you aware of how your suppliers manage the performance of their employees?

Have you shared information with your suppliers about how you manage the performance of employees?

Do your suppliers use performance appraisals?

Have you shared information with your suppliers about carrying out employee appraisals?

Interview questions for employees

How long have you worked for this company?

What are the good and bad things about working for this company?

Please describe your job role, including your duties.

Are you responsible for managing any other employees?

Who is your supervisor/ direct manager?

Are you a full-time or a part-time worker?

Do you work outside of the company? If yes, how far is your worksite from the office/factory?

Is there a maximum amount of hours you work per day?

How many hours do you normally work per week?

How would you describe your level of pay?

Do you receive any benefits such as training, health benefits, additional paid holiday or weekly day-off?

To what extent do you feel safe at your workplace?

To what extent do you feel motivated?

How secure do you consider your job to be?

Are you assessed by your superior(s)? If yes:

a) What type of assessment(s) and how often you are normally reviewed?
b) Do you get feedback from your assessor(s)?
c) Do you consider it an accurate process?
d) Can you anticipate anything that could be done differently to improve the quality and outcomes of the assessments?

How much do you know about your company's suppliers or customers?

Have you ever experienced problems in production due to suppliers, for example, not delivering in time or not observing certain specifications?

Through your job, have you ever contacted a supplier or shared information to help them to work better/more efficiently? If yes, what type of information?

Interview questions with unions reps:

How long have you worked here?

What are the good and bad things about working for this company?

How would you describe the way in which work is organised? (e.g. shifts, working hours)?

How would you describe the way in which employees are managed?

How is employees' work controlled?

How do managers ensure that workers perform well?

To what extent are workers well motivated?

How do managers ensure that workers are motivated?

How would you describe the appraisal process?

Have you been asked your opinion about the appraisal process?

Do you work with the unions of your company's suppliers or customers?

PHASE 2

Follow-up interview questions for managers

How have you used the toolkit since we last met?

Which parts have been most useful?

Have you experienced any difficulties when using the toolkit?

(HR managers only): To what extent did you change any HR practices?

If so, what have been the benefits? (e.g. productivity, better relationships with employees, cost savings)

Has the appraisal system changed since my last visit?

(Supply chain managers only): To what extent did you change how you work with suppliers?

(Supply chain managers only): To what extent did you change how you work with customers?

If so, what have been the benefits? (e.g. productivity, better relationships with suppliers, cost savings, higher profits, better quality products)

Can you identify any areas where the company could benefit from implementing further changes in practices?

Regarding the previous question, would/will you recommend such changes?

Can you anticipate ways in which the toolkit can help the company achieve more efficiency?

Follow-up interview questions for employees:

Have there been any changes in policies or practices put in place recently by the company?

In the last few months, have you noticed any improvements or worsening in the relationships between managers and employees? Can you see this happening (or continuing to happen) shortly?

Are you still being managed by the same person?

Do you see any positive or negative change in how you have been managed?

Have you seen any change in how you have been rewarded?

Have you seen any change in your level of training?

Has there been any change in how you have been appraised / your work has been reviewed?

Have you seen any improvement / worsening in your ability to do your job?

To what extent do you feel safe at your workplace?

To what extent do you feel motivated?

How secure do you consider your job to be?

Has there been any change in your work hours?

Has there been any change in where you work?

Have you noticed if in the last few months there was any change in the relationship between the company and its suppliers / its customers?

Follow-up interview questions with unions reps:

What are the good and bad things about working for this company?

How would you describe the way in which employees are managed?

How is employees' work controlled? Has this changed since my last visit?

Have there been any changes to the way in which work is organised? (e.g. shifts, working hours)?

How would you describe the appraisal process? Has this changed since my last visit?

Have you been asked your opinion about the appraisal process?

Do you now work with the unions of your company's suppliers or customers? Has this changed since my last visit?