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強制性永續報告揭露對員工待遇及創新之影響

The Effects of Mandatory Sustainability Reports on
Employee Treatment and Innovation

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The Effects of Mandatory Sustainability Reports on
Employee Treatment and Innovation

本論文係廣田隼平君(R10722053)在國立臺灣大學會計學系、所完成之碩（博）士學位論文，於民國112年7月14日承下列考試委員審查通過及口試及格，特此證明

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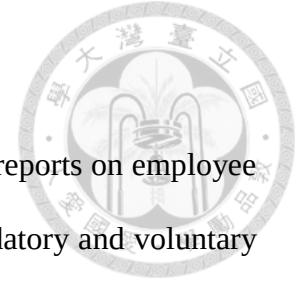
中文摘要



本研究探討強制性揭露永續報告對企業員工待遇之影響。過去的研究探討強制性及自願性永續報告揭露的影響，但本研究專注於強制揭露所產生的結果。台灣自 2014 年起要求特定上市公司揭露企業社會責任報告。雖強制性揭露可以減少資訊不對稱，但也可能導致員工之不佳行為。本研究發現，被強制揭露永續報告的企業將改善對員工之待遇。即使考慮到殘障員工人數、員工離職率和平均薪資之因素，此結果仍然具有顯著性。此外，本研究亦發現員工待遇與創新之間的正向關係。總體而言，受強制揭露永續報告之企業會提升員工待遇，進而改善創新。

關鍵字：員工待遇，永續報告，強制揭露，創新，全球永續性報告協會

Abstract



This study examines the effects of mandatory sustainability reports on employee treatment. Previous research has explored the impacts of both mandatory and voluntary disclosure of sustainability reports, but this research focuses specifically on the consequences of mandatory disclosure in Taiwan, where certain limited companies have been required to disclose CSR reports since 2014. While mandatory disclosure can reduce information asymmetry, it may also result in adverse employee behaviors. The empirical findings of this study demonstrate that companies subject to mandatory sustainability reporting enhance their employee treatment. This result remains robust even after examining dependent variables such as the number of employees with disabilities, employee turnover rate, and average salary. Additionally, this research identifies a positive relationship between employee treatment and innovation. Overall, the findings suggest that companies compelled to disclose sustainability reports not only improve employee treatment but also experience enhancements in innovation.

Keywords: Employee treatment, Sustainability report, Mandatory disclosure, Innovation, Global Reporting Initiative

Table of Contents

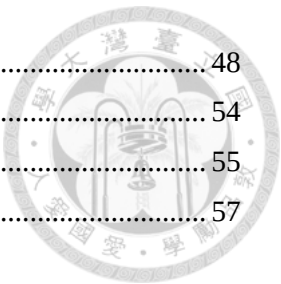
謝辭.....	i
中文摘要.....	ii
Abstract.....	iii
Table of Contents	iv
List of Table	vi
1 Introduction	1
2 Regulation of Sustainability Reports in Taiwan.....	6
3 Literature Review.....	8
3.1 Literature of Disclosure of Sustainability Reports.....	8
3.1.1 Positive Effects: Mandatory Disclosure.....	9
3.1.2 Negative Effects: Mandatory Disclosure	13
3.1.3 Positive Effects: Voluntary Disclosure	14
3.1.4 Negative Effects: Voluntary Disclosure	16
3.2 Employee Treatment.....	16
3.2.1.1 Determinants of Employee Treatment	16
3.2.2 Literature of Employee Treatment	18
3.2.3 Positive Effect: Employee Treatment	20
3.2.4 Negative Effect: Employee Treatment.....	22
4 Hypothesis Development.....	24
4.1 Mandatory Disclosure of Sustainability Reports and Employee Treatment	24
4.2 Mandatory Disclosure of Sustainability Reports and Real Behaviors	26
4.3 Employee Treatment and Innovation.....	27
5 Research Design.....	29
5.1 Variable Constructions	29
5.2 Main Research Design	32
5.2.1 Difference in Difference	32
5.2.2 Test for H1	33
5.2.3 Test for H1a	34
5.2.4 Test for H2	34
6 Empirical Results	36
6.1 Data and Sample Collection	36
6.2 Descriptive Statistics and Correlations	36
6.3 Regression analysis for H1	37
6.4 Regression analysis for H1a	37
6.5 Regression analysis for H2	38
7 Conclusion.....	39

References 48

Appendix 1: Variable Definitions 54

Appendix 2: GRI Standard - Social Topic 55

Appendix 3: Practical Examples of GRI Social disclosure 57



List of Table

Table 1: Time and Requirement of the Regulations for Sustainability Reports in Taiwan	42
Table 2: Descriptive Statistics (N=4,921)	43
Table 3: Correlation Matrix	44
Table 4: Mandatory Disclosure of Sustainability Reports and Employee Treatment	45
Table 5: Mandatory Disclosure of Sustainability Reports and Real Behaviors	46
Table 6: Employee Teatment and Innovation: Post Adoption Periods for the Mandatory Adopters	47

1 Introduction

Employees are the most valuable treasury of the company, and they are one of the most important factors in maintaining companies' sustainable and competitive advantage, thereby contributing to its success (Hall, 1993; Coff, 1997). Prior literature has documented the determinants for employee treatment, such as working environment (e.g., May, Gilson, and Harter, 2004), team relationship (e.g., Kahn, 1990), training (e.g., Paradise, 2008), compensation (Saks and Rotman, 2006), etc. However, limited attention has been given to addressing the influence of external shock on employee treatment, such as the regulation of mandatory sustainability reports.

To bridge the gap, this study aims to demonstrate the effects of the mandatory adoption of sustainability reports on employee treatment. Previous literature has highlighted disclosure reduces the information asymmetry between companies and stakeholders (Hung, Shi, and Wang, 2013; Simpson and Tamayo, 2020). The literature explores that reducing information asymmetry may mitigate adverse behaviors such as shirking, resigning, and moral hazard. The impact of disclosure can be categorized into voluntary and mandatory disclosures. The effects of mandatory disclosure have been examined through various channels. On the positive side, mandatory disclosure can mitigate information asymmetry (Hung et al., 2013; Simpson and Tamayo, 2020), motivate companies to engage in more ESG activities (Fiechte, Hitz and Lehman, 2020; Jouveno and Krueger, 2020; Downar et al., 2021), and enhance accounting quality (Hoi Wu, and Zhang 2013; Kim and Lee, 2019). However, mandatory disclosure also incurs proprietary costs (Berger and Hann, 2007; Breuer, Leuz, and Vanhaverbeke, 2021) and can lead to adverse behaviors (Simpson and Tamayo, 2020), including shirking (Frey, 1993). These findings underscore the substantial impact that mandatory disclosures have on stakeholders, companies' behaviors, and the economy. While numerous studies

have utilized voluntary disclosure to identify effects (Clarkson et al., 2008; Dhaliwal et al., 2011), there are potential challenges associated with voluntary disclosures, such as self-determination of which activities to report, considering cost-benefit considerations (Christensen et al., 2021). Collectively, the prior studies document the influence of disclosure, including the issuance of sustainability reports.

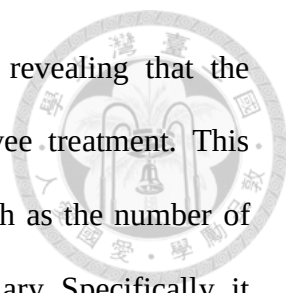
I argue that the mandatory adoption of sustainability reports can enhance employee treatment for the following reasons. First, implementing mandatory disclosure reduces information asymmetry between the company and stakeholders, including employees. Secondly, employees will inevitably assess their current company compared to other alternatives, regardless of their skills and positions (Flammer and Luo, 2016). As information asymmetry decreases, employees gain greater access to information, allowing them to make more comprehensive comparisons among the companies they are considering for commitment. If employees perceive better treatment in other companies, it may lead to adverse behaviors, such as a decrease in interest or attentiveness toward their job responsibilities (Rusbult et al., 1988) and "shirking" (Frey, 1993; Holmstrom, 1979). Finally, in order to effectively retain valuable employees, foster a stronger sense of employee identification with the firm, and mitigate adverse employee behavior, companies need to enhance employee treatment by implementing various approaches, such as improving employee satisfaction (Stamolampros et al., 2019), enhancing the attractiveness of current job positions (Flammer and Luo, 2016), and cultivating a fairer work environment (Freeman and Kleiner, 2000). Therefore, the mandatory adoption of sustainability reports can enhance employee treatment. To be more specific and further investigate the real effects of mandatory disclosure of sustainability reports on employee treatment, I develop another hypothesis stating that mandatory disclosure should be associated with an increase in the number of employees

with disabilities, a decrease in the turnover rate, and an increase in the average salary of employees.

However, the reduction in information asymmetry can lead to managerial myopia (Simpson and Tamayo, 2020), where short-term financial goals take precedence over long-term strategic decisions and investments. This behavior often results in neglecting long-term value creation and innovation, including employee treatment. Consequently, companies may allocate fewer resources to employee well-being, potentially reducing overall employee treatment.

Additionally, I argue that after companies implement the mandatory adoption of sustainability reports, their innovation tends to increase in line with employee treatment. Innovation is widely acknowledged as a long-term process, and it is crucial to increase employee satisfaction and decrease the turnover rate (Chang et al., 2015). Fair treatment enhances employee satisfaction levels, thereby increasing the likelihood of employees' long-term commitment to the company and reducing employee turnover rates (Stamolampros et al., 2019).

In 2014, sustainability reports became required for specific listed companies in Taiwan, which provides a natural experiment for academics to investigate the effect of sustainability reports. Following previous studies (Kim, Wang, and Wu, 2022), this study applies the difference-in-differences (DiD) method using data from 2013 to 2021 in Taiwan. The DiD analysis allows for the exploration of the causal relationship between employee treatment and the mandatory adoption of sustainability disclosure. For the regression analysis of the effects of employee treatment on innovation following a study conducted by Mao et al. (2019), patent and citation data are collected from the Taiwan Intellectual Property Office (TIPO) database.



The empirical results are consistent with my hypothesis, revealing that the mandatory adoption of sustainability reports can enhance employee treatment. This result remains robust even after examining dependent variables such as the number of employees with disabilities, employee turnover rate, and average salary. Specifically, it is found that there is an increase in the number of employees with disabilities, a decrease in employee turnover rates, and an increase in the average salary of employees. Regarding the relationship between employee treatment and innovation, the results are also consistent with the hypothesis, demonstrating that higher levels of employee treatment are associated with increased patents generated and improved patent quality. These findings align with a study conducted by Mao et al. (2019).

My research makes three contributions. First, I integrate the viewpoints of Simpson and Tamayo (2020), which question the positive or negative impacts of accounting disclosure on innovation by reducing information asymmetry. This integration provides a new perspective on the impact of mandatory disclosure of sustainability reports on employee treatment and innovation. The result indicates that companies enhance employee treatment following the mandatory disclosure of sustainability reports. This explanation has important theoretical and practical implications for understanding the role of mandatory disclosure of sustainability reports in shaping firm behavior. Second, my study enhances the understanding of the real effects of mandatory adaptation. I examine the influence of mandatory disclosures on employee treatment from different perspectives, such as the hiring of employees with disabilities, turnover rates, and the average salary of employees. This contributes to the broader literature on the mandatory disclosure of sustainability and its impact on real behavior. Lastly, the mandatory disclosure of sustainability reports may prompt

companies to focus on long-term profits. This highlights the potential for sustainability reports to influence corporate behavior and strategic decision-making.

The subsequent sections of this paper are organized as follows: Section 2 offers a development of sustainability reports in Taiwan. Section 3 presents a comprehensive literature review. Section 4 delves into the development of hypotheses. The research design is elucidated in Section 5. Section 6 shows the regression results for each hypothesis. Lastly, Section 7 concludes the research, emphasizing its findings and addressing potential limitations.

2 Regulation of Sustainability Reports in Taiwan



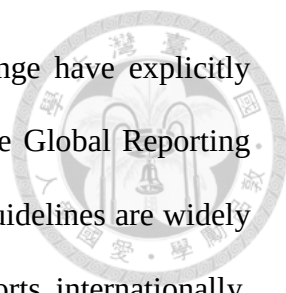
History of Sustainability Reports in Taiwan

In 1999, the Business Council for Sustainable Development of the Republic of China (BCSD-Taiwan) published an "Environmental Performance Brochure" that featured 13 member companies. This release marked a significant milestone for companies in Taiwan, as it represented their initial step towards disclosing non-financial information.

To ensure alignment with global trends, the Industrial Development Bureau of the Ministry of Economic Affairs has actively engaged in collaborations with various counseling organizations since 2000. However, there were no enforceable regulations regarding sustainability report disclosures by 2014. In response to this gap, the Taiwan Stock Exchange Corporation (TWSE) introduced a requirement for specific industries and listed companies to submit sustainability reports.

In line with the international trends surrounding sustainable development, authorities in Taiwan have implemented several sustainability policies. These include the "Corporate Governance 3.0-Sustainable Development Roadmap (2020)" and the "Sustainability Development Roadmap (2022)" introduced by the Financial Supervisory Commission (FSC). Additionally, the National Development Council published "Taiwan's Pathway to Net-Zero Emissions in 2050," and the Environmental Protection Administration released the "Greenhouse Gas Reduction and Management Act (Climate Change Adaptation Act)." These initiatives prompt enhanced actions to increase companies' disclosure of business sustainability practices.

Regulation of Sustainability Reports in Taiwan



In Taiwan, the Taiwan Stock Exchange and Taipei Exchange have explicitly stated that regulated entities should refer to the latest version of the Global Reporting Initiative (GRI) guidelines when preparing their reports. The GRI guidelines are widely recognized as the mainstream framework for preparing CSR reports internationally. GRI standards are divided into three series of Standards: GRI Universal Standards, GRI Sector Standards, and GRI Topic Standards. GRI Topic Standards encompass a series of modules divided into three distinct series, namely GRI 200 - Economic Topics, GRI 300 - Environmental Topics, and GRI 400 - Social Topics. These series are designed to aid businesses in effectively reporting specific disclosures related to each material topic. GRI Topic Standards encompass the disclosure requirements for social-related topics. Specifically, when it comes to employee-related activities, the disclosures are guided by GRI 400 - Social Topic standards. Appendix 2 provides an overview of all the topics included in GRI 400 and Appendix 3 presents practical examples of adaptation of GRI 400.

3 Literature Review

3.1 Literature of Disclosure of Sustainability Reports

The disclosure of sustainability reports has a significant impact on various aspects. Numerous studies examine the effects of sustainability report disclosure. In this section, I begin by providing an explanation of the distinction between mandatory disclosure and voluntary disclosure. Under voluntary disclosure, there are both positive and negative impacts to consider. I categorize the positive impacts into three areas: signaling, information asymmetry, managerial behavior, and reputation. Regarding mandatory disclosure, which also presents advantages and disadvantages, I categorize the positive effects into three aspects: information asymmetry, ESG behaviors, specifically focusing on social and environmental considerations, and accounting quality. Furthermore, the negative effects can be attributed to proprietary costs and managerial myopia.

Differentiating between voluntary and mandatory disclosure is crucial for conducting research on the effects of sustainability report disclosure. Voluntary disclosure allows companies the freedom to make choices based on their individual consideration of costs and benefits. However, this can lead to variations in reporting practices and pose challenges when accurately evaluating CSR activities and establishing a clear causal relationship between CSR disclosure and its effects. Additionally, stakeholders may express concerns that voluntary disclosures are selectively provided, particularly when the disclosed information is favorable. Therefore, it is important to exercise caution when interpreting results obtained from voluntary disclosure (Leuz and Wysocki, 2016). Figure 1 provides an illustrative overview of the research landscape by presenting a simplified categorization of sustainability report



disclosures, capturing the diverse research areas explored in existing literature.

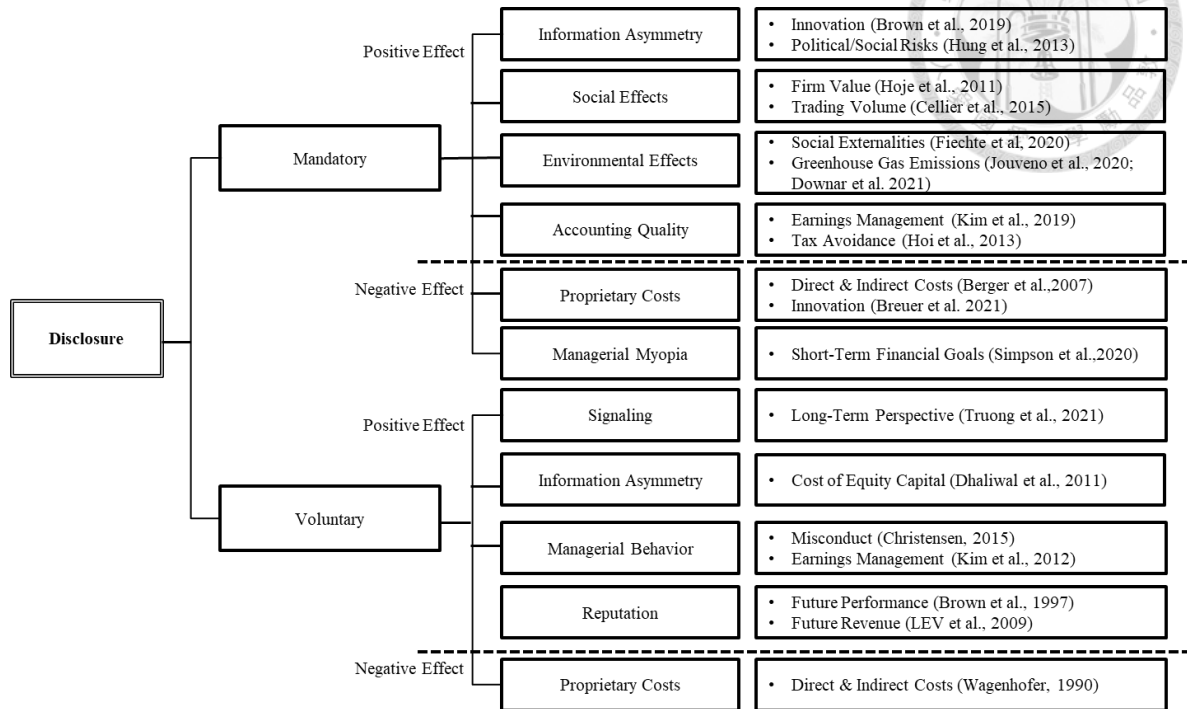


Figure 1: The domain of Disclosure

3.1.1 Positive Effects: Mandatory Disclosure

Information Asymmetry

Reducing information asymmetry is a key effect of mandatory disclosure of sustainability reports. Simpson and Tamayo (2020) suggest the effects of voluntary and mandatory disclosure on information asymmetry. The research finding highlights the influence of corporate disclosure, whether voluntary or mandatory, in mitigating information asymmetry between firms and investors. This reduction in information asymmetry may potentially foster positive outcomes for innovation, as transparency through increased disclosure can promote innovation by addressing the information imbalance between managers and external capital providers. Brown and Martinsson (2019) examine the relationship between corporate transparency and innovation. They

find that a richer information environment, characterized by greater transparency, is associated with higher rates of R&D and patenting, particularly in industries that rely on external equity financing. Additionally, transparency facilitates innovation by reducing the costs of information asymmetries in external financing.



Given that innovation often entails long-term processes and inherent risks of failure, issues such as adverse selection and moral hazards may arise. However, these challenges can be addressed by mitigating information asymmetry (Simpson and Tamayo, 2020). Hung et al. (2013) also propose that the mandatory disclosure of CSR reports can effectively decrease information asymmetry between firms and investors. This is achieved by providing investors access to crucial internal risk factors of firms, such as political and social risks.

Social Effects

Several studies demonstrate that the disclosure of sustainability reports has the potential to encourage firms to participate in social activities actively. Hoje and Maretno (2011) conduct a comprehensive study demonstrating the positive impact of CSR activities on firm value and internal social aspects. Their findings highlight the significance of certain social aspects, such as employee diversity and employee relationships contributing to higher firm value than external enhancements related to community and environmental concerns. This suggests that investors place importance on a company's treatment of its employees.

In a study by Cellier, Chollet, and Gajewski (2015), they investigate the impact of CSR disclosure on trading volume. They observe an increase in trading volume following the disclosure of CSR information. Furthermore, they find that specific topics, such as human resources and human rights, significantly influence investors' reactions and motivate them to trade more actively. They suggest that this could be attributed to

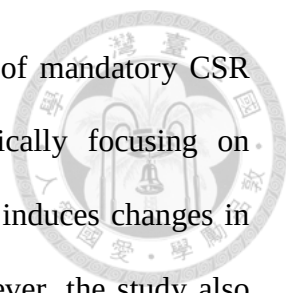
the provision of new information about the internal social dimensions of companies. Such information helps reduce ambiguity for traders and instills greater confidence in the companies they invest in. As a result, investors become more active in trading activities.

These studies highlight the importance of internal social dimensions, particularly employee treatment, in shaping firm value and investors' reactions. Additionally, the findings indicate that CSR disclosures, especially when addressing social aspects, can significantly impact investor behavior.

Environmental Effects

One impact of mandatory sustainability reports is adjusting a firm's CSR behavior on environmental activities (Fiechte et al., 2020). Related studies show that disclosure leads corporations to improve their environmental performance (Scorse and Schlenker, 2012) and food and water hygiene (Jin and Leslie, 2003; Bennear and Olmstead, 2008).

CSR reports enhance transparency by providing additional information about a firm's activities. This disclosed information serves as a basis for investors to monitor a firm's CSR activity and make decisions regarding their continued investment or potential withdrawal. Ultimately, the responses from these stakeholders to the disclosure create pressure on firms (Christensen et al., 2017; Chen, Hung, and Wang, 2018), prompting them to adjust their CSR activities in the future. Kim et al. (2022) also indicate that external information receivers play a crucial role in driving companies' behavioral changes, and these pressures exerted by stakeholders lead companies to adopt environmentally friendly activities.



Chen et al. (2018) conduct a study to examine the impact of mandatory CSR disclosure on firm performance and social externalities, specifically focusing on environmental pollution. They find that mandatory CSR disclosure induces changes in firm behavior, leading to decreased environmental pollution. However, the study also reveals a decrease in profitability following the mandatory CSR disclosure. This finding is consistent with the research conducted by Jouveno and Krueger (2020) and Downar et al. (2021). These studies demonstrate that mandatory disclosure of greenhouse gas emissions (GHG) in the U.K. reduces GHG emissions after implementing the disclosure requirements. Firms with higher GHG emissions are compelled to adjust their behavior, even if it requires costly operational changes.

Accounting Quality

Another potential effect of mandatory disclosure is a firm's accounting quality. Kim and Lee (2019) examine whether CSR firms behave differently in accounting and operating decisions. They reveal that firms that expend effort and resources in implementing CSR practices will likely provide more transparent financial information. In other words, firms with high CSR ratings are less likely to engage in earning management through discretionary accruals and operating activities. The result shows that firms with high CSR scores tend to be more conservative in accounting and operating decisions and provide more transparent information. Hoi et al. (2013) examine the relationship between CSR and tax avoidance. Their findings indicate that companies not actively involved in CSR activities are more prone to engaging in tax sheltering practices. Their study makes certain assumptions that although tax avoidance is not considered CSR activity, it is viewed as socially irresponsible behavior due to its detrimental impact on society. Additionally, they suggest that corporate culture plays a significant role in shaping company policies, implying that companies with

irresponsible CSR practices are more likely to engage in aggressive tax avoidance practices as well.



3.1.2 Negative Effects: Mandatory Disclosure

Proprietary Costs

However, there are associated costs with the mandatory disclosure of sustainability reports. These costs can be categorized into two types: direct and indirect costs. Direct costs encompass preparing, certifying, and disseminating sustainability reports. On the other hand, indirect costs arise in the form of proprietary costs, as various stakeholders, such as competitors, suppliers, and labor unions, can gain access to the information originally intended for investors (Berger and Hann, 2007). These proprietary costs can potentially hinder innovation.

Breuer et al. (2021) explore the impact of reporting regulations on corporate innovation. The results of their research indicate that firms required to disclose reports observe a decrease in the overall level of innovation within their organizations. They propose that mandatory disclosure requirements impose proprietary costs on innovative firms, diminishing their willingness to participate in innovation activities actively.

Managerial Myopia

Despite numerous studies that suggest a positive impact of reducing information asymmetry, Simpson and Tamayo (2020) present a different perspective by highlighting potential negative effects known as managerial myopia. Managerial myopia is managers prioritize short-term financial goals over long-term strategic decisions and investments. This behavior occurs when managers focus on maximizing current earnings or meeting specific earnings targets, often at the expense of long-term value creation and innovation. As a result of these short-term pressures, managers may sacrifice potentially

profitable projects with a positive net present value (NPV) to boost current earnings. For instance, managerial myopia can cause managers to divert resources away from innovative activities.



3.1.3 Positive Effects: Voluntary Disclosure

Signaling

Effective sustainability reports indicate that companies can operate with a forward-looking perspective and demonstrate attentiveness to the concerns of diverse stakeholders (Truong, Nguyen, and Huynh, 2021). These firms are commonly recognized for their emphasis on long-term goals and constant commitment to cultivating a positive reputation by adopting practices like CSR. Moreover, sustainability reports contain valuable information regarding a company's strategic assets, making them significant in conveying competitive advantages. Hence, sustainability reports are critical in effectively conveying information about a company's strategic assets to stakeholders and market participants (Ryou, Tsang and Wang 2022).

Information Asymmetry

Voluntary disclosure of sustainability information addresses the information asymmetry between companies, their shareholders, and stakeholders (Clarkson et al., 2008). By actively engaging in sustainability disclosure, companies aim to reduce this asymmetry and unlock several associated benefits, such as lower capital and debt costs, increased firm value, reduced risk, and enhanced liquidity (Simnett, Vanstraelen, and Chua 2009; Dhaliwal et al., 2011; Baloria, Klassen, and Wiedman, 2019; Truong et al., 2021). Consequently, sustainability disclosure plays a critical role in bridging the

information gap and enabling firms to reap the advantages of reduced information asymmetry.

For instance, Dhaliwal et al. (2011) specifically investigate the relationship between voluntary disclosure of CSR reports and the cost of equity capital. Their findings demonstrate that voluntary CSR disclosure can lead to a reduction in the cost of capital. This outcome can be attributed to the perception of investors and financial analysts who view firms with strong CSR performance as less risky, demanding a lower return on their investment. This reduction in the cost of capital is an observable effect resulting from the successful reduction of information asymmetry through voluntary CSR disclosure.

Managerial Behavior

Reporting sustainability activities can positively influence managerial behavior and firm operations. For instance, Christensen (2015) indicate that when managers disclose their corporate accountability efforts, there is a notable reduction in high-profile misconduct. This suggests that reporting fosters better management practices and risk control within firms. Additionally, disclosure of positive CSR performance constraints managers' earnings management (Kim et al., 2019). CSR disclosure also has an impact on employee treatment. Christensen et al. (2017) discover that when mining firms are mandated by the Securities and Exchange Commission (SEC) to disclose mine-safety records, there is a notable decrease in employee-related injuries.

Reputation

Consumer responsiveness to sustainability activities in companies is noteworthy. Lev, Petrovits, and Radhakrishnan (2010) observe that consumers interpret charitable contributions as indications of a company's dedication to society, influencing their

decision to purchase products or services from companies actively involved in philanthropic endeavors. Consequently, a positive correlation emerges between consumer perception of CSR activities and future revenue. Brown and Dacin (1997) also examine that when consumers are aware of a company's socially responsible activities, such as commitment to diversity, community involvement, or corporate philanthropy, their CSR associations influence their perception of the company's overall evaluation. This, in turn, impacts how consumers evaluate the products produced by the company. Thus, those studies examine how CSR activities enhance consumers' reputations and increase future performance.

3.1.4 Negative Effects: Voluntary Disclosure

Proprietary Costs

The disclosure of information may incur proprietary costs. Proprietary costs refer to the costs incurred by a company when disclosing information about its CSR activities (Wagenhofer, 1990). These costs can arise from the potential loss of competitive advantage if competitors can imitate or replicate a company's CSR practices. In the context of CSR, proprietary costs can act as a barrier to companies disclosing information about their CSR activities. Firms may be reluctant to disclose information on resources allocated for CSR activities or the outcomes, as they may perceive disclosure to yield losing the competitive advantage (Radhakrishnan, Tsang, and Liu, 2018).

3.2 Employee Treatment

3.2.1.1 Determinants of Employee Treatment

Prior to presenting the literature review on the relationship between employee treatment and various factors, I present an overview of employee treatment. Multiple

determinants contribute to the enhancement of employee treatment. This section aims to categorize the impactful factors of employee treatment into four subcategories: work environment, team relationships, training, and compensation. The impact factors are represented in Figure 2 below.

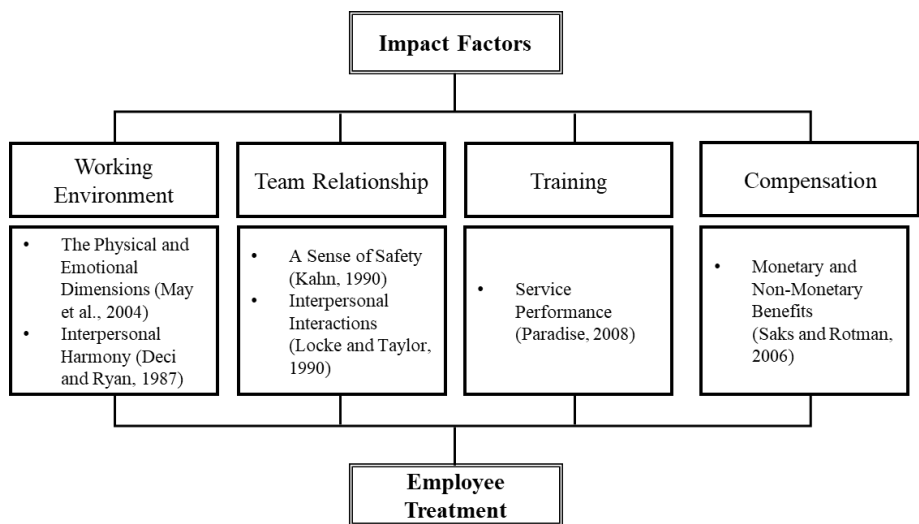


Figure 2: Determinants of Employee Treatments

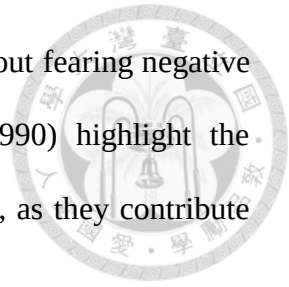
Working Environment

The working environment is widely acknowledged as a critical factor in the treatment of employees. It encompasses the workplace's physical and emotional dimensions (May et al., 2004). Deci and Ryan (1987) assert that effective management practices involve establishing a supportive work environment that emphasizes meeting employees' needs and emotions. This includes providing positive feedback, fostering open communication, facilitating skill development, and encouraging problem-solving. Consequently, a meaningful work environment that promotes focused work and interpersonal harmony is recognized as a pivotal determinant of employee treatment.

Team Relationship

Creating an open and supportive environment is essential for ensuring comprehensive employee treatment. Such an environment fosters a sense of safety and

allows individuals to freely explore, experiment, and take risks without fearing negative consequences (Kahn, 1990). Furthermore, Locke and Taylor (1990) highlight the significance of positive interpersonal interactions among coworkers, as they contribute to a greater sense of meaning in work.



Training

Training and career development are integral components of employee treatment. According to Paradise (2008), training improves service accuracy, subsequently impacting service performance and employee engagement. When employees engage in training and development initiatives, their confidence in the respective training areas is bolstered, resulting in heightened motivation and increased job engagement.

Compensation

Compensation encompasses the rewards and benefits an organization provides to its employees, encompassing monetary and non-monetary elements that serve as motivators. The importance of recognition and rewards in employee treatment is emphasized by Saks and Rotman (2006). Their research shows that when employees receive acknowledgment and rewards from their organization, it increases engagement. Additionally, employees' engagement levels are influenced by their perception of the benefits provided by the organization, as highlighted by Kahn (1990).

3.2.2 Literature of Employee Treatment

Employees are one of the most important factors in maintaining companies' sustainable and competitive advantage, thereby contributing to success (Hall, 1993; Coff, 1997). Employees are considered intangible capital for companies with distinctive characteristics that can contribute to a company's competitive strategy. Hatch and Dyer (2004) state that, to maintain a competitive advantage, the resources must be inimitable,

like human capital, and they find empirical evidence indicating that competitors face difficulties in easily replicating or replacing employees. Moreover, the distinctive characteristics of employees, characterized by their intangible, firm-specific, and socially complex nature, significantly impact a company's performance. However, due to the mobility in which employees can move between companies easily, preventing rivals from seizing or exploiting employees becomes challenging. Notably, higher employee turnover can result in substantial losses for a company (Steven, 1979) and incur significant costs for organizations ranging from 50% to 200% of the former employee's salary (Hebenstreit, 2008). Consequently, companies need to strive for a higher employee retention rate.

Within this context, employee treatment becomes a pivotal topic for discussion. This section offers an extensive review of the existing literature, aiming to gain insights into employee treatment's positive and negative effects. Figure 3 presents a simplified categorization of the employee treatment domain, depicting the diverse research areas.

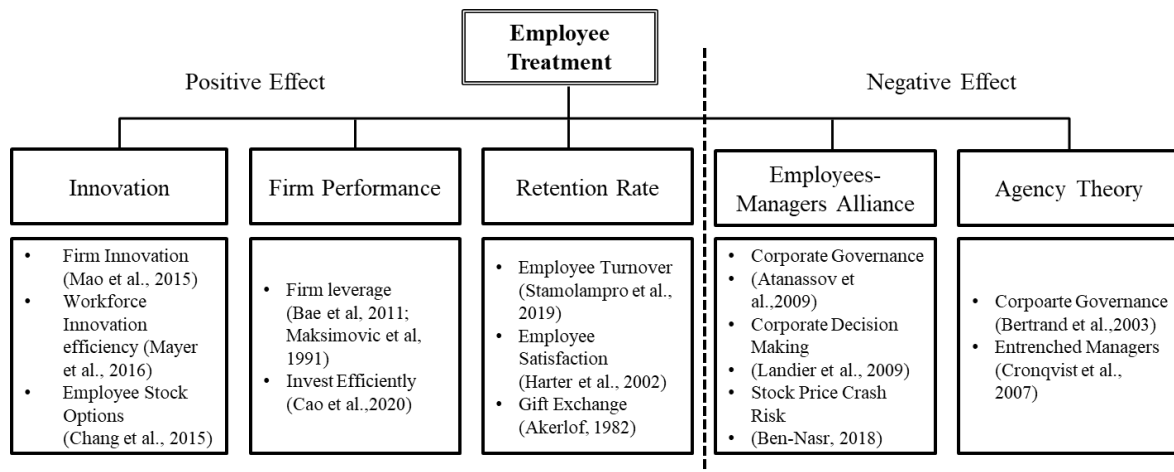


Figure 3: The domain of Employee Treatment

3.2.3 Positive Effect: Employee Treatment

Innovation

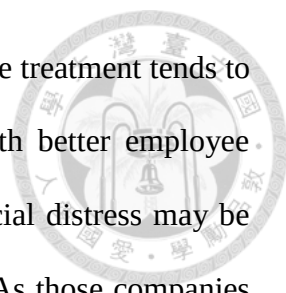
As the significance of human capital as an essential factor in the innovation process is widely acknowledged, numerous studies have explored the relationship between employee treatment and innovation. Mao et al. (2015) examine the positive effect of employee treatment on innovation, which is defined as quantity (patent count) and quality (citations per patent) in the study. In other words, those favorable employee treatments can faster companies' innovation. Chen et al. (2016) and Mayer et al. (2016) align with this result. Companies with better employee treatment produce more and better patents. Furthermore, they analyze the market value and operational performance of firms in relation to the patents they generate and find that employee treatment can enhance innovation within companies and improve market valuation and future operating performance. This finding indicates that the treatment of employees by firms has a substantial impact on their operating performance in terms of innovation.

Chang et al. (2015) examine the relationship between non-executive employee stock options and corporate innovation. The research findings highlight the importance of certain factors in the realm of innovation, including failure tolerance and a supportive working environment, which have significant roles in promoting innovation. These studies emphasize that how firms treat their employees is critical for achieving success in innovation.

Firm Performance

Maksimovic (1991) and Bae, Kang, and Wang. (2011) examine the relationship between employee treatment and performance from a company's capital structure perspective. Bae et al. (2011) find a negative relationship between employee treatment





and leverage ratio. In other words, a company with friendly employee treatment tends to have low debt. Maksimovic (1991) also points out that firms with better employee benefits must maintain a lower debt ratio. Companies facing financial distress may be motivated to cut costs, including layoffs, to avoid going bankrupt. As those companies possess the potential possibility for bankruptcy, employees demand higher wages as protection. Conversely, firms prioritizing employee-friendly policies are more likely to value their reputation and have incentives to ensure fair treatment. Consequently, these companies are expected to maintain lower debt levels than those not prioritizing employee-friendly practices. These studies indicate that friendly employee treatment is ultimately associated with increased productivity and firm value.

Retention Rate

Employee retention refers to the capability of an organization to retain its employees and prevent them from leaving the company voluntarily. Therefore, the retention rate is crucial for companies to understand employees' satisfaction and commitment. Employees satisfaction, therefore, is an important factor in attracting and retaining valuable employees.

Stamolampros et al. (2019) demonstrate that increased employee satisfaction significantly reduces employee turnover. Although their study primarily focuses on tourism and hospitality firms, the results align with previous research and demonstrate robustness across different studies. Implementing a favorable employee treatment policy enhances a company's capacity to attract highly skilled personnel, reduces employee turnover, and fosters a motivated and satisfied workforce. (Ittner and Larcker, 2001; Harter et al, 2002). Akerlof (1982) also provides additional insights by highlighting that employees' level of effort is influenced by the treatment they receive from their company. In other words, when employees perceive satisfactory treatment from their

company, they are more inclined to reciprocate by contributing to the company's success.

Employee treatment also influences labor investment efficiency. Cao et al. (2020) find that employee-friendly treatment significantly facilitates labor recruitment and retention. This, in turn, reduces labor adjustment costs and ultimately contributes to more efficient labor investments.

These studies demonstrate that employee treatment positively impacts the retention rate, as employees who feel well-treated by their company not only exhibit higher retention rates but also demonstrate a greater willingness to reciprocate.

3.2.4 Negative Effect: Employee Treatment

Employees–Managers Alliance

Managers may employ favorable employee treatment to foster a supportive and collaborative relationship with their employees. Atanassov et al. (2009) discover that when top managers are at risk of being dismissed due to underperformance, they may create a collaborative relationship with the labor force by refraining from implementing measures such as employee layoffs or salary reductions. In turn, workers may actively support retaining these managers in their positions. Landier et al. (2009) also note that managers can utilize employee-friendly policies to enhance their social interactions with employees, leading to potential private benefits such as improved employee relations and increased loyalty. There are two interpretations behind this study. Firstly, managers may use generous employee benefits to divert employees' focus away from important issues. Secondly, managers can decrease the probability of employees blowing the whistle on misconduct by the management, considering that employees have a greater potential to identify fraud (Dyck et al., 2008). As a result, based on literature indicating

the negative impact of employee treatment, it can be inferred that employee treatment may diminish the motivation to report misconduct within the company.



Agency Theory

Agency theory suggests that management can employ labor-friendly strategies to advance its interests, potentially at the cost of shareholders. Specifically, these labor-friendly practices can cultivate a loyal workforce that disregards managerial improprieties and backs the current management during takeovers and other instances involving corporate control. Bertrand et al. (2003) and Cronqvist et al. (2007) discuss the inclination of managers to prioritize higher employee salaries over the maximization of shareholders' value. This managerial behavior can be attributed to two factors. First, managers may desire to expand their authority and impact within an organization, prioritizing the reputation and perception of being surrounded by competent and capable employees more than the company's owners or shareholders. Second, higher wages can contribute to a more favorable work environment, reducing turnover, minimizing negotiation efforts in a unionized context, and ultimately enabling managers to enjoy a “quiet life.”

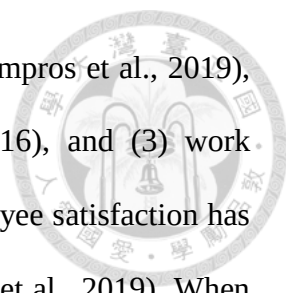
4 Hypothesis Development

4.1 Mandatory Disclosure of Sustainability Reports and Employee Treatment

I anticipate that mandatory sustainability report positively impacts employee treatment for the following reasons. Firstly, the mandatory disclosure of sustainability reports can help reduce information asymmetry between companies and stakeholders, including employees (Simpson and Tamayo, 2020). With decreased information asymmetry, employees receive more information about their current company and all possible alternatives.

Second, employees will inevitably evaluate their current company with other available alternatives, irrespective of their skills and positions (Flammer and Luo, 2016). With decreased information asymmetry, the employees would have more information to compare which company they are willing to devote to. When employees find other companies' treatment more appealing, it can lead to adverse behavior. In economic literature, adverse behavior is frequently employed to conceptualize the dynamic between employees and employers. In this framework, the employer (the principal) hires the employee (the agent) with the expectation that the employee will act in the employer's best interest and put forth a significant level of effort. (Holmstrom, 1979). However, when employees view treatment in other companies as more favorable than their current company, their job motivation tends to decrease, leading to a higher likelihood of engaging in adverse behavior. Adverse behavior includes decreased employees' interest, effort, or attentiveness toward their job responsibilities (Rusbult et al., 1988). Additionally, it may cause employees to exert less effort in their work, known as 'shirking' (Frey, 1993; Holmstrom, 1979).

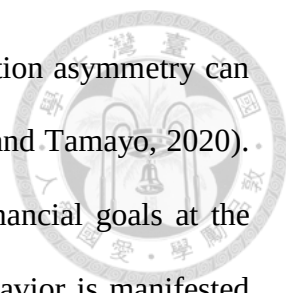
Therefore, companies employ various strategies to reinforce the benefits, retain employees, and mitigate the possibility of adverse behavior. There are three potential



approaches to solving this issue: (1) employee satisfaction (Stamolampros et al., 2019), (2) the attractiveness of the current job (Flammer and Luo, 2016), and (3) work environment (Freeman and Kleiner, 2000). Firstly, enhancing employee satisfaction has a significant impact on reducing employee turnover (Stamolampros et al., 2019). When employees perceive that they are being treated satisfactorily by the company, they are more likely to reciprocate by actively contributing to the company. Secondly, if employees perceive their current job as more favorable than other options, it increases their motivation and decreases the likelihood of engaging in adverse behavior (Flammer and Luo, 2016). Lastly, implementing employee involvement programs fosters a better work environment and promotes collaboration between management and employees (Freeman and Kleiner, 2000). These programs facilitate closer interactions, allowing managers to gain deeper insights into employees' motivation, abilities, and level of effort. Consequently, the risk of adverse behavior could be reduced.

In conclusion, mandatory sustainability reports reduce information asymmetry, which allows employees to be more capable of comparing their current company with other potential options. Employees' adverse behavior may occur once they realize alternative options are better than their current company. The company needs to enhance its employee treatment to retain the employees and reduce adverse behavior. Given the rationale presented, it is reasonable to anticipate that the mandatory disclosure of sustainability reports will improve employee treatment. As a result, I propose the following hypothesis:

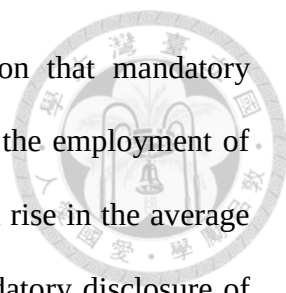
H1: The mandatory disclosure of sustainability reports improves the firm's employee treatment.



It is important to acknowledge that the reduction in information asymmetry can give rise to a phenomenon known as managerial myopia (Simpson and Tamayo, 2020). Managerial myopia occurs when managers prioritize short-term financial goals at the expense of long-term strategic decisions and investments. This behavior is manifested when managers concentrate on maximizing current earnings or meeting specific earnings targets, often neglecting long-term value creation and innovation. Employee treatment is typically regarded as a long-term process (Chang et al., 2015). Consequently, companies may allocate fewer resources toward employee treatment, potentially decreasing overall employee well-being.

4.2 Mandatory Disclosure of Sustainability Reports and Real Behaviors

In the first hypothesis, this study proposes that mandatory disclosure of sustainability reports can enhance employees' fair treatment. However, it is crucial to examine the actual behavioral changes that occur in companies following the implementation of mandatory disclosure. Three proxies are employed to represent the real behavior of employee treatment: disability employment, employee turnover rate, and average employee salary. I anticipate that a mandatory sustainability report will lead to an increase in the number of employees with disabilities, a reduction in the employee turnover rate, and an increase in the average employee salary. These expectations align with the rationale of Hypothesis 1. Similarly, companies that demonstrate a commitment to employee treatment tend to focus on long-term value by engaging in employee involvement, cultivating a better working environment, and increasing employee salaries to retain valuable employees.



Building upon the insights above, I maintain my assertion that mandatory reporting yields several favorable outcomes, namely an increase in the employment of individuals with disabilities, a decrease in employee turnover, and a rise in the average employee salary. This expectation is rooted in the notion that mandatory disclosure of sustainability reports diminishes information asymmetry (Simpson and Tamayo, 2020). Subsequently, companies strive to enhance employee treatment as a means to mitigate adverse behavior. Based on these considerations, I formulate my hypothesis as follows:

H1a: The mandatory disclosure of sustainability reports increases the number of employees with disabilities, decreases the employee turnover rate, and increases the average salary of employees.

4.3 Employee Treatment and Innovation

Given the inherent connection between employees and innovation, I further explore the relationship between employee treatment and innovation. The success and sustainability of organizations heavily rely on their employees, who play a pivotal role in maintaining a competitive advantage (Hall, 1993; Coff, 1997). As companies strive to improve employee retention and ensure fair treatment, it becomes evident that treating employees better leads to favorable outcomes for several reasons. Firstly, fair treatment enhances employee satisfaction levels (Stamolampros et al., 2019), thereby increasing the likelihood of employees' long-term commitment to the company and reducing employee turnover rate (Stamolampros et al., 2019). This can be attributed to employees who perceive fair treatment are more likely to reciprocate with heightened dedication and loyalty (Akerlof, 1982). Secondly, empirical evidence suggests a positive impact of

employee treatment on innovation. Mao et al. (2019) conduct a study demonstrating that positive employee treatment substantially and positively influences innovation within organizations. As innovation is widely acknowledged as a long-term process, increasing employee satisfaction and decreasing turnover rate is crucial (Chang et al., 2015).

In line with the research conducted by Brown and Martinsson (2019), mandatory disclosure can effectively reduce information asymmetry and enhance innovation. Building upon the hypothesized results in H1 and H1a, which propose that mandatory disclosure can enhance employee treatment, I argue that higher levels of employee treatment will positively influence innovation. Based on these insights, the following second hypothesis is proposed:

H2: Positive employee treatment positively impacts fostering innovation within firms.

5 Research Design

5.1 Variable Constructions

Measurement of Employee Treatment

I obtain the proxies of employee treatment from the Taiwan Economic Journal (TEJ) database. TEJ collects all public data to evaluate a company's sustainability performance. I utilize two proxies of the employee treatment indicator in my analysis: *EMP_HEALTH* and *EMP_STAT*. *EMP_HEALTH* represents the score assigned to employee health and safety, and *EMP_STAT* represents the score assigned to employee statistics. The range of both proxies is 0 to 100, and a higher score indicates better performance.

Furthermore, to gauge the real behavior of firms concerning employee treatment, I consider several additional proxies for the real behavior. These proxies include *DIS_NUM*, the rate of sufficient disabled persons hired, which equals the disabled persons hired divided by the disabled persons must be hired according to the regulation.; *EMP_TURN*, employee turnover rates; and *AVG_Salary*, the average salary of employees. Each of these variables provides insight into real behaviors of employee treatment and helps assess the firms' behavior in these areas.

Mandatory Sustainability Disclosure

In 2014, the Taiwanese government introduced Rules Governing the Preparation and Filing of Corporate Social Responsibility Reports by TWSE Listed Companies.¹ This regulation mandated certain firms in Taiwan to create sustainability (CSR/ESG) reports, which were required to adhere to the most recent guidelines published by the

¹ The English version of the rule is also available on the following website:
<http://twse-regulation.twse.com.tw/ENG/EN/law/DAT0201.aspx?FLCODE=FL075209>



Global Reporting Initiative (GRI). Table 1 presents the time and requirements for firms that must issue the sustainability report mandatorily.



[insert Table 1 here]

Measurement of Innovation

In most previous research investigating innovation efficiency, patents are commonly utilized as a metric to gauge innovation. Innovation is typically assessed based on two dimensions: input and output. Mao et al. (2019) define the number of patents as a quantifiable indicator of innovation input, while the total number of patent citations is regarded as a quantifiable indicator of innovation output.

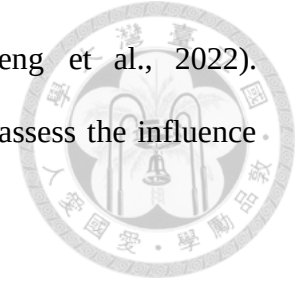
In line with previous studies (Mahmood and Zheng, 2009; Yang et al., 2009; Chang and Chen, 2013; Mahmood et al., 2013), I gather the patent and citation data from the Taiwan Intellectual Property Office (TIPO) database.

The TIPO database is recognized as a highly reliable source, covering all patent applications granted in Taiwan since 1950 (Mahmood et al., 2013; Chin et al., 2006). Following the approach (Mahmood et al., 2013), I input the names of each firm using traditional Chinese script into the database to identify patent applications. I record patent identification numbers, application and approval dates, as well as patent types. The sample period for my study is from 2013 to 2021².

To determine a firm's number of patent applications eventually granted in a specific year, I calculate based on the patent application year. This approach provides a

² Due to the constraint of data from sustainability disclosure, the sample starts with 2013.

more accurate representation of the timing of innovation (Deng et al., 2022). Additionally, I calculate the patent citation in subsequent years to assess the influence of a patent.



Initially, I determine the count of patent applications that a firm eventually obtains in a given year. To capture the timing of innovation more accurately, I rely on the patent application year instead of the grant year (Deng et al., 2022). Furthermore, I assess the impact of a patent by calculating the number of citations it receives in subsequent years.

I utilize the natural logarithm of patent counts (*Patents_NUM*) and the natural logarithm of patent citations (*Patents_CITA*) as proxies for firm innovation (Chin et al., 2006; Mahmood et al., 2013; Mao et al., 2019; Yang, 2022).

Control Variables

Considering previous research (Hoi et al., 2013; Chen et al., 2018; Downar et al., 2021; Kim et al., 2022), I consider key characteristics of firms that influence their behavior towards employee treatment to control for variations across firms. To account for the relationship between firm size and CSR performance, as Prior et al. (2008) demonstrated, I include *SIZE* as a control variable, measured by the natural logarithm of the firm's total assets. Alongside *SIZE*, the following control variables related to financial indicators are included: *Leverage* indicates the capital structure of a firm, measured by the total assets divided by total equities; *FA* represents the fixed assets scaled by total assets; $\Delta SALES$, measured by the change of net sales scaled by the net sales of the previous year; *ROA*, as measured by operating income divided by average total assets. Additionally, I include *NEG_EARN*, representing negative earnings, as a decline in profitability may impact spending on employee treatment. *CFO* denotes the

net of cash flow from operating activities divided by total assets. It is reasonable to assume that firms with higher cash flow may invest more in employee treatment and vice versa. Firm-related control variables are as follows: *AGE*, measured by the natural logarithm of one plus the number of years a firm has been in operation; *Independence* refers to the number of directors not involved in day-to-day operations. *RND* is measured as R&D expenditures scaled by total assets. *RND* may be associated with employee treatment because it is important for firms' profitability and its long-term nature (Chang et al., 2015).

5.2 Main Research Design

5.2.1 Difference in Difference

In line with the approach employed by Kim et al. (2022), I incorporate the Difference in Difference (DiD) analysis to explore the causal relationship between employee treatment and the mandatory disclosure of sustainability disclosure, as outlined in H1 and H1a. The DiD analysis involves categorizing the sample into treatment and control groups. The treatment group consists of firms affected by the regulation of mandatory sustainability reports. Conversely, the control group comprises firms unaffected by the regulation. By comparing the changes observed pre and post-adoption, the DiD analysis allows for the identification of causal effects. This analytical technique is commonly employed in studies focusing on examining mandatory rule adoptions, such as adopting International Financial Reporting Standards (IFRS) (Chen et al., 2014; Li et al., 2015; Lin et al., 2017). The DiD analysis is a suitable method for investigating the impact of mandatory sustainability disclosure on employee treatment.

5.2.2 Test for H1

To test H1, which is that the mandatory adoption of sustainability reports improves the firm's employee treatment, I follow the approach that Kim et al. (2022) developed. The regression model is as follows:

$$EMP_TREATMENT = \beta_0 + \beta_1 TREAT + \beta_2 TREAT \times POST + \sum_{j=1}^n \alpha_j CV_j + IndEF + YearFE + \varepsilon \quad (1)$$

where *EMP_TREATMENT* measures how a firm treats its employees, taking into account two factors *EMP_HEALTH* and *EMP_STAT*. *EMP_HEALTH* is the score of employee health and safety provided by TEJ. The score range is 0 to 100, and a higher score indicates better performance. *EMP_STAT* is the score of employee statistics provided by TEJ. The score range is 0 to 100, and a higher score indicates better performance. *TREAT* is a dummy variable that equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable equals one if the firm-year falls in the post-period for the regulation of mandatory sustainability disclosure and zero otherwise.. The full specification of equation (1) includes *TREAT*, *POST*, and *TREAT*×*POST*. When estimating equation (1), *POST* is omitted from the regression because it is redundant in *TREAT*×*POST* due to the staggered implementation of the regulation of mandatory sustainability disclosure.³

I anticipate that the coefficient β_2 will demonstrate a positive and statistically significant relationship. This expectation is rooted in the fact that β_2 captures the impact of sustainability report disclosure on employee treatment. A positive (negative)

³ *POST* equals one only for mandatory sustainability disclosure firms in the post-regulation period. Thus, *POST* and *TREAT*×*POST* are the same in practice.

coefficient on β_2 would indicate that the disclosure of sustainability reports leads to an increase (decrease) in employee treatment subsequent to the mandatory disclosure.



5.2.3 Test for H1a

To investigate H1a, I incorporate the same independent and control variables as used in H1. The regression model is presented below.

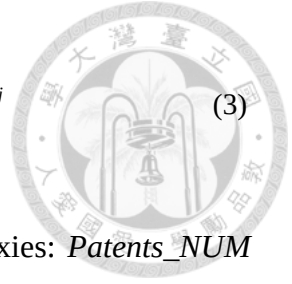
$$REAL_BEHAVE = \beta_0 + \beta_1 TREAT + \beta_2 TREAT \times POST + \sum_{j=1}^n \alpha_j CV_j + IndEF + YearFE + \varepsilon \quad (2)$$

REAL_BEHAVE represents the real behavior, which consists of three proxies: *DIS_NUM*, the rate of sufficient disabled persons hired (%), which equals the disabled persons hired divided by the disabled persons, must be hired according to the regulation; *EMP_TURN*, employee turnover rates; and *EMP_Salary*, the average salary of employees. Each variable provides insight into different aspects of employee treatment and helps assess the firms' behavior. The anticipation is that both the number of employees with disabilities and the average salary might rise, so I anticipate that the coefficient β_2 should be positive. In contrast, I anticipate that the coefficient β_2 has a negative impact on the turnover rate. This is because companies that demonstrate a commitment to employee treatment tend to focus on long-term value by engaging in employee involvement, cultivating a better working environment, and increasing employee salaries to retain valuable employees.

5.2.4 Test for H2

To investigate the second hypothesis, I refer to the approach developed by Mao et al. (2019) as follows.

$$INNOVATION = \beta_0 + \beta_1 EMP_HEALTH + \beta_2 EMP_STAT + \sum_{j=1}^n \alpha_j CV_j + IndEF + YearFE + \varepsilon \quad (3)$$



where the dependent variable, INNOVATION, consists of two proxies: *Patents_NUM* and *Patents_CITA*. *Patents_NUM* is the natural log of one plus the number of patents a firm granted in year t+1; *Patents_CITA* is the natural log of one plus the citations of patents a firm granted in year t+1.

I expect the coefficients β_1 and β_2 to exhibit positive and statistically significant values, which suggests that firms will generate more patents and higher patent citations. Consequently, a higher employee treatment index is projected to be linked with enhanced effectiveness and efficiency in firms' patent generation.

6 Empirical Results

6.1 Data and Sample Collection

In order to examine the hypotheses outlined, a comprehensive data collection process is implemented, spanning from 2013 to 2021. With a specific focus on listed companies in Taiwan, the data gathering includes various ESG-related variables such as the employee treatment index, the number of employees with disabilities, the employee turnover rate, and the average salary of employees, all sourced from the TEJ database. I exclude the financial industry and any data with missing values. Additionally, to address H2, the patent and citation data are acquired from the esteemed Taiwan Intellectual Property Office (TIPO) database, encompassing patent and citation information.

6.2 Descriptive Statistics and Correlations

Table 2 displays the descriptive statistics for the variables utilized in the analysis, covering 4,291 observations from 2013 to 2021. *EMP_HEALTH* exhibits a mean value of 50.96 with a standard deviation of 25.36. *EMP_STAT* has a mean value of 49.99 with a standard deviation of 29.03. The variable *TREAT*×*POST* demonstrates a mean of 0.13 and a standard deviation of 0.33. Additionally, *EMP_TURN* has a mean value of 0.17, *DIS_NUM* has a mean of 0.65, and *EMP_Salary* has a mean of 0.33.

[Insert Table 2 here]

Table 3 displays the correlation among the variables utilized in the models. The correlation coefficients, calculated using the Spearman method, are presented in the lower corner of the table, while the coefficients calculated using the Pearson method are provided in the upper corner. Two-tailed p-values are indicated in parentheses.



[Insert Table 3 here]

6.3 Regression analysis for H1

Table 4 displays the regression outcomes for H1 based on equation (1). In columns (1) and (2) of table 4, the regression results indicate the impact of the mandatory disclosure of sustainability reports on employee treatment. Specifically, the coefficient of $TREAT \times POST$ shows a significantly positive effect on EMP_HEALTH in column (1) and EMP_STAT in column (2). The coefficient for EMP_HEALTH is 0.117, with a statistical significance level of 1%. Similarly, the coefficient for EMP_STAT is 0.217, with a statistical significance level of 0.1%. These findings imply that companies have notably enhanced employee treatment from the pre-rule to the post-rule period. Consequently, the results align with the predictions made in H1.

[Insert Table 4 here]

6.4 Regression analysis for H1a

Table 5 illustrates the regression outcomes for H1a using equation (2). In column (1) of table 5, the coefficient of $TREAT \times POST$ for DIS_NUM exhibits a significantly positive value of 0.063 at a statistical significance level of 5%. This indicates that the mandatory adoption of sustainability reports has a notable positive impact on the hiring of employees with disabilities. In other words, firms that adopt the mandatory report tend to increase their employment of individuals with disabilities.



Moving on to column (2) of table 5, the coefficient of $TREAT \times POST$ for EMP_TURN is significantly negative, with a value of -0.015 at a statistical significance level of 5%. This result indicates that the mandatory adoption of sustainability reports leads to a decrease in employee turnover rate. It suggests that firms improve employee treatment, resulting in employees being more inclined to stay with the company.

In column (3) of table 5, the coefficient of $TREAT \times POST$ for EMP_Salary , representing the average salary of employees, is significantly positive with a value of 0.09 at a statistical significance level of 0.1%. These findings are in line with the prediction made in H1a, which suggests that the mandatory adoption of sustainability reports increases the number of employees with disabilities, reduces employee turnover, and raises the average salary of employees.

[Insert Table 5 here]

Based on the regression results from H1 and H1a, it is evident that the mandatory adoption of sustainability reports positively influences employee treatment.

6.5 Regression analysis for H2

Table 6 explores the association between employee treatment and innovation. In column (1), the analysis reveals a significantly positive coefficient of 0.013 for $Patents_NUM$, with a statistical significance level of 0.1%. Similarly, in column (2), the coefficient for $Patents_NUM$ is 0.006, with a statistical significance level of 0.1%.

These regression findings from columns (1) and (2) support the notion of a positive and significant impact between employee treatment and innovation.

For column (3) and (4) of table 6, the results demonstrate that the coefficient of *Patents_CITA* is significantly positive, with values of 0.05 and 0.003, respectively. These coefficients are associated with statistical significance levels of 0.1% and 0.5%. These outcomes suggest that employee treatment has the potential to enhance the quality of patents, as reflected by the increase in patent citations. Therefore, the results align with the prediction made in H2, which suggests that positive employee treatment fosters innovation within firms.

[Insert Table 6 here]

7 Conclusion

In this study, I examine the impact of mandatory disclosure of sustainability reports on employee treatment and explore how firms change their behavior after the introduction of mandatory disclosure. My primary objective is to examine the actual behavioral changes following the mandatory adoption of sustainability reports. To measure the real effect of employee treatment following mandatory sustainability disclosure, I formulate two hypotheses based on data spanning from 2013 to 2021 in Taiwan, where mandatory disclosure of CSR has been required for specific listed companies since 2014. The assumption in H1 predicts that mandatory disclosure leads to improved employee treatment, which is assessed using an employee treatment indicator obtained from TEJ. To further investigate the actual effects of employee

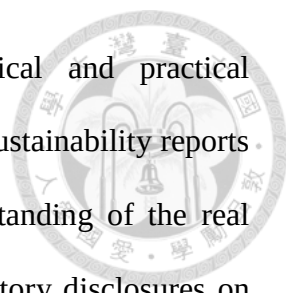
treatment, an additional hypothesis, H1a, examines the effects on the hiring of employees with disabilities, employee turnover rates, and average employee salaries.

I conduct regression analyses for H1 and H1a applying the difference-in-differences (DiD) analysis to explore the causal relationship between employee treatment and the mandatory adoption of sustainability disclosure. The DiD analysis involves categorizing the sample into a treatment group and a control group. This categorization is based on whether companies disclosed sustainability reports prior to the mandatory adoption of disclosure.

The empirical research is consistent with my hypotheses, demonstrating that the mandatory disclosure of sustainability reports can enhance employee treatment, which aligns with the results obtained by Brown and Martinsson, 2019).

Furthermore, I explore the relationship between employee treatment and innovation. Using the number of patents generated by firms and the citations received from other firms as dependent variables, I investigate this hypothesis by using data of patent and citation from the Taiwan Intellectual Property Office (TIPO) from 2013 to 2021. The empirical results indicate that higher levels of employee treatment are associated with increased patents generated and improved patent quality. These results are consistent with a study conducted by Mao et al. (2015).

My research makes three contributions. First, I integrate the viewpoints of Simpson and Tamayo (2020), which question the positive or negative impacts of accounting disclosure on innovation by reducing information asymmetry. This integration provides a new perspective on the impact of mandatory disclosure of sustainability reports on employee treatment and innovation. The result indicates that companies enhance employee treatment following the mandatory disclosure of

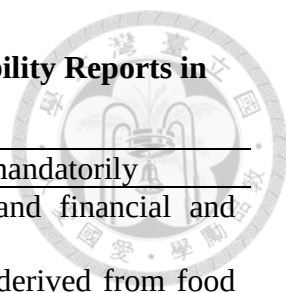


sustainability reports. This explanation has important theoretical and practical implications for understanding the role of mandatory disclosure of sustainability reports in shaping firm behavior. Second, my study enhances the understanding of the real effects of mandatory disclosure. I examine the influence of mandatory disclosures on employee treatment from different perspectives, such as the hiring of employees with disabilities, turnover rates, and the average salary of employees. This contributes to the broader literature on the mandatory disclosure of sustainability and its impact on real behavior. Lastly, the mandatory disclosure of sustainability reports may prompt companies to focus on long-term profits. This highlights the potential for sustainability reports to influence corporate behavior and strategic decision-making.

There are certain limitations to be acknowledged in this research. Firstly, it concentrates solely on employee treatment and may not be applicable to general issues. Secondly, it is crucial to acknowledge that the impact of mandatory disclosure on employee treatment can be affected by other factors beyond the research scope. Lastly, the behavior of companies may be influenced by economic and policy considerations.

Future studies can further address the effects on social aspects by exploring different variables and investigating additional topics related to social aspects among ESG considerations.

Table 1: Time and Requirement of the Regulations for Sustainability Reports in Taiwan



Fiscal Year	Firms need to issue the sustainability report mandatorily
2014	(1) The company falls into the food, chemical, and financial and insurance industries. (2) No less than 50% of the company's revenue is derived from food and beverage. (3) The company's common stock has achieved no less than NT\$10 billion.
2016	The company's capital stock has achieved no less than NT\$5 billion and no accumulated losses in the annual final accounts.
2018	The company's capital stock has achieved no less than NT\$5 billion and with accumulated losses in the annual final accounts.

Table 2: Descriptive Statistics (N=4,921)

	Mean	P25	P50	P75	SD
<i>EMP_HEALTH</i>	50.96	33.23	36.88	75.13	25.36
<i>EMP_STAT</i>	49.99	25.00	49.66	75.35	29.03
<i>TREAT</i>	0.39	0.00	0.00	1.00	0.49
<i>TREAT</i> × <i>POST</i>	0.28	0.00	0.00	1.00	0.45
<i>EMP_TURN</i>	0.17	0.07	0.13	0.22	0.14
<i>DIS_NUM</i>	0.65	0.33	0.67	1.00	0.34
<i>EMP_Salary</i>	0.33	0.00	0.00	0.00	0.79
<i>Patents_NUM</i>	0.22	0.00	0.00	0.00	0.84
<i>Patents_CITA</i>	14.95	13.91	14.80	15.78	1.54
<i>SIZE</i>	16.16	15.01	16.04	17.08	1.54
<i>LEVERAGE</i>	0.88	0.35	0.66	1.14	0.82
<i>FA</i>	0.26	0.12	0.23	0.37	0.17
<i>ΔSales</i>	0.10	-0.08	0.03	0.17	0.44
<i>ROA</i>	0.03	0.00	0.04	0.08	0.11
<i>Neg_Earn</i>	0.28	0.00	0.00	1.00	0.45
<i>CFO</i>	0.05	0.00	0.06	0.12	0.11
<i>AGE</i>	3.11	2.77	3.22	3.58	0.63
<i>Independence</i>	2.17	2.00	3.00	3.00	1.15
<i>RND</i>	11.01	9.94	10.96	12.02	1.70

Note:

This table presents descriptive statistics for the sample. *EMP_HEALTH* is the score of employee health and safety provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance. *EMP_STAT* is the score of employee statistics provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance. *TREAT* is a dummy variable equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable that equals one if the sample year corresponds to the implementation year of regulation of mandatory sustainability disclosure and any following year and zero otherwise. *EMP_TURN* is employee turnover. *DIS_NUM* is the rate of nonsufficient disabled persons hired (%). *EMP_Salary* is $\ln(1 + \text{average salaries of employees in original amount})$. *Patents_NUM* is the natural log of one plus the number of patents a firm granted in year $t+1$ provided by TIPO. *Patents_CITA* is the natural log of one plus the citations of patents a firm granted in year $t+1$ provided by TIPO. *LEVERAGE* is total liabilities divided by total equities. *FA* is the net property, plant, and equipment scaled by total assets. *ΔSales* is the change of net sales scaled by the net sales of the previous year. *ROA* is operating income divided by average total assets. *Neg_Earn* is an indicator variable that equals one if a firm's lagged earnings are negative, and zero otherwise. *CFO* is the net of cash flow from operating activities divided by total assets. *AGE* is the number of years that firms have been in operation. *Independence* is the number of independent directors. *RND* is the natural logarithm of a firm's investment in research and development.

Table 3: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)EMP_HEALTH	1.00	0.21	0.29	0.28	-0.12	-0.20	0.13	0.14	0.35	0.02	0.13	-0.01	0.05	-0.06	0.06	0.09	0.19	0.31
(2)EMP_STAT		1.00	0.12	0.15	-0.54	-0.05	0.13	0.08	0.13	-0.14	-0.10	0.03	0.17	-0.10	0.09	0.01	0.13	0.20
(3)TREAT			1.00	0.78	-0.10	-0.17	0.01	0.05	0.58	0.18	0.08	-0.13	-0.20	0.03	-0.12	0.34	0.15	0.21
(4)TREAT ×POST				1.00	-0.12	-0.12	-0.06	-0.03	0.54	0.15	0.06	-0.13	-0.16	0.01	-0.11	0.34	0.30	0.22
(5)EMP_TURN					1.00	0.09	0.01	0.03	-0.10	0.13	-0.08	-0.06	-0.16	0.12	-0.12	-0.12	-0.08	-0.06
(6)DIS_NUM						1.00	-0.13	-0.15	-0.33	-0.02	-0.07	-0.04	-0.09	0.13	-0.14	-0.01	-0.04	-0.34
(7)Patents_NUM							1.00	0.74	0.10	0.00	-0.06	0.05	0.10	-0.05	0.09	-0.18	-0.12	0.31
(8)Patents_CITA								1.00	0.15	-0.01	-0.01	0.05	0.08	-0.02	0.09	-0.17	-0.10	0.31
(9)SIZE									1.00	0.33	0.02	-0.09	-0.12	-0.08	-0.06	0.32	0.24	0.61
(10)LEVERAGE										1.00	-0.09	0.00	-0.40	0.08	-0.34	0.14	0.09	0.13
(11)FA											1.00	-0.05	-0.10	0.11	0.16	0.13	0.03	-0.15
(12)ΔSales												1.00	0.39	-0.10	0.17	-0.12	0.02	0.01
(13)ROA													1.00	-0.46	0.63	-0.16	0.00	0.06
(14)Neg_Earn														1.00	-0.32	0.00	-0.06	-0.09
(15)CFO															1.00	-0.21	0.01	0.09
(16)AGE																1.00	-0.07	-0.12
(17)Independence																	1.00	0.21
(18)RND																		1.00

Note: This table presents correlations for the regression variables. *EMP_HEALTH* is the score of employee health and safety provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance. *EMP_STAT* is the score of employee statistics provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance. *TREAT* is a dummy variable equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable equals one if the sample year corresponds to the implementation year of regulation of mandatory sustainability disclosure and any following year and zero otherwise. *EMP_TURN* is employee turnover. *DIS_NUM* is the rate of nonsufficient disabled persons hired (%). *Patents_NUM* is the natural log of one plus the number of patents a firm granted in year t+1 provided by TIPO. *Patents_CITA* is the natural log of one plus the citations of patents a firm granted in year t+1 provided by TIPO. *SIZE* is the natural logarithm of the firm's total assets. *LEVERAGE* is total liabilities divided by total equities. *FA* is the net property, plant, and equipment scaled by total assets. *ΔSales* is the change of net sales scaled by the net sales of the previous year. *ROA* is operating income divided by average total assets. *Neg_Earn* is an indicator variable equals one if a firm's lagged earnings are negative, and zero otherwise. *CFO* is the net of cash flow from operating activities divided by total assets. *AGE* is the number of years that firms have been in operation. *Independence* is the number of independent directors. *RND* is the natural logarithm of a firm's investment in research and development.

Table 4: Mandatory Disclosure of Sustainability Reports and Employee Treatment

	(1) <i>EMP_HEALTH</i>	(2) <i>EMP_STAT</i>
<i>Intercept</i>	2.653 (10.79)***	2.961 (12.54)***
<i>TREAT</i>	0.049 (1.16)	-0.080 (-2.00)*
<i>TREAT</i> × <i>POST</i>	0.117 (2.63)**	0.217 (5.08)***
<i>SIZE</i>	0.052 (3.94)***	-0.031 (-2.42)*
<i>LEVERAGE</i>	-0.031 (-1.79)	-0.140 (-8.40)***
<i>FA</i>	0.248 (3.28)**	-0.628 (-8.66)***
<i>ΔSales</i>	0.011 (0.31)	0.133 (3.93)***
<i>ROA</i>	-0.060 (-0.29)	0.665 (3.32)***
<i>Neg_Earn</i>	-0.077 (-2.15)*	-0.052 (-1.53)
<i>CFO</i>	-0.028 (-0.16)	-0.071 (-0.42)
<i>AGE</i>	0.074 (3.19)**	0.173 (7.79)***
<i>Independence</i>	0.018 (1.39)	0.068 (5.53)***
<i>RND</i>	0.022 (2.19)*	0.123 (12.68)***
<i>Control for industry effects</i>	YES	YES
<i>Control for year effects</i>	YES	YES
<i>N</i>	4,921	4,921
<i>adj. R²</i>	0.060	0.142

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note 2: *TREAT* is a dummy variable that equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable that equals one if the sample year corresponds to the implementation year of regulation of mandatory sustainability disclosure and any following year and zero otherwise. *SIZE* is the natural logarithm of the firm's total assets. *LEVERAGE* is total assets divided by total equities. *FA* is the net property, plant, and equipment scaled by total assets. *ΔSales* is the change of net sales scaled by the net sales of the previous year. *ROA* is operating income divided by average total assets. *Neg_Earn* is an indicator variable that equals one if a firm's lagged earnings are negative, and zero otherwise. *CFO* is the net of cash flow from operating activities divided by total assets. *AGE* is the number of years that firms have been in operation. *Independence* is the number of independent directors. *RND* is the natural logarithm of a firm's investment in research and development.

Table 5: Mandatory Disclosure of Sustainability Reports and Real Behaviors

	(1) <i>DIS_NUM</i>	(2) <i>EMP_TURN</i>	(3) <i>EMP_Salary</i>
<i>Intercept</i>	1.948 (20.34) ^{***}	0.258 (11.13) ^{***}	5.472 (87.48) ^{***}
<i>TREAT</i>	-0.028 (-1.23)	0.003 (0.53)	-0.069 (-3.83) ^{***}
<i>TREAT</i> × <i>POST</i>	0.063 (2.57)*	-0.015 (-2.21)*	0.090 (4.68)^{***}
<i>SIZE</i>	0.427 (2.90) ^{**}	-0.007 (-3.69) ^{***}	0.055 (10.33) ^{***}
<i>LEVERAGE</i>	-0.082 (-13.33) ^{***}	0.017 (5.87) ^{***}	-0.028 (-3.46) ^{***}
<i>FA</i>	0.011 (1.07)	-0.066 (-5.52) ^{***}	-0.797 (-23.73) ^{***}
<i>ΔSales</i>	-0.173 (-3.78) ^{***}	-0.022 (-3.63) ^{***}	0.087 (5.29) ^{***}
<i>ROA</i>	-0.023 (-0.84)	-0.249 (-6.72) ^{***}	0.816 (8.42) ^{***}
<i>Neg_Earn</i>	-0.125 (-0.83)	0.019 (3.34) ^{***}	0.027 (1.65)
<i>CFO</i>	0.064 (2.82) ^{**}	0.108 (3.97) ^{***}	0.127 (1.60)
<i>Independence</i>	-0.309 (-2.70) ^{**}	-0.002 (-1.10)	0.029 (5.55) ^{***}
<i>RND</i>	0.006 (0.96)	0.002 (1.70)	0.052 (13.73) ^{***}
<i>Control for industry effects</i>	YES	YES	YES
<i>Control for year effects</i>	YES	YES	YES
<i>N</i>	4,921	4,921	4,921
<i>adj. R²</i>	0.133	0.141	0.305

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note 2: *TREAT* is a dummy variable that equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable that equals one if the sample year corresponds to the implementation year of regulation of mandatory sustainability disclosure and any following year and zero otherwise. *SIZE* is the natural logarithm of the firm's total assets. *LEVERAGE* is total assets divided by total equities. *FA* is the net property, plant, and equipment scaled by total assets. *ΔSales* is the change of net sales scaled by the net sales of the previous year. *ROA* is operating income divided by average total assets. *Neg_Earn* is an indicator variable equals one if a firm's lagged earnings are negative, and zero otherwise. *CFO* is the net of cash flow from operating activities divided by total assets. *Independence* is the number of independent directors. *RND* is the natural logarithm of a firm's investment in research and development.

Table 6: Employee Teatment and Innovation: Post Adoption Periods for the Mandatory Adopters

	(1) <i>Patents_NUM</i>	(2) <i>Patents_NUM</i>	(3) <i>Patents_CITA</i>	(4) <i>Patents_CITA</i>
Intercept	-6.667 (-14.91) ^{***}	-6.588 (-14.59) ^{***}	-2.576 (-9.78) ^{***}	-2.540 (-9.62) ^{***}
<i>EMP_HEALT</i>	0.013 (6.49) ^{***}		0.005 (3.94) ^{***}	
<i>EMP_STAT</i>		0.006 (4.13) ^{***}		0.003 (3.29) ^{**}
<i>SIZE</i>	0.485 (17.79) ^{***}	0.524 (19.84) ^{***}	0.205 (12.76) ^{***}	0.217 (14.04) ^{***}
<i>LEVERAGE</i>	-0.013 (-0.25)	0.002 (0.04)	0.030 (0.95)	0.040 (1.24)
<i>FA</i>	-0.650 (-2.60) ^{**}	-0.419 (-1.68)	-0.157 (-1.07)	-0.074 (-0.51)
<i>ΔSales</i>	-0.174 (-1.04)	-0.169 (-1.00)	-0.209 (-2.12) [*]	-0.208 (-2.11) [*]
<i>ROA</i>	-1.224 (-1.55)	-1.639 (-2.04) [*]	-0.896 (-1.92)	-1.084 (-2.31) [*]
<i>Neg_Earn</i>	-0.019 (-0.16)	0.012 (0.10)	-0.007 (-0.10)	0.008 (0.12)
<i>CFO</i>	1.840 (2.95) ^{**}	1.805 (2.87) ^{**}	0.783 (2.13) [*]	0.775 (2.11) [*]
<i>AGE</i>	-0.509 (-6.77) ^{***}	-0.541 (-7.04) ^{***}	-0.276 (-6.24) ^{***}	-0.293 (-6.53) ^{***}
<i>Independence</i>	0.175 (3.87) ^{***}	0.155 (3.41) ^{***}	0.024 (0.90)	0.017 (0.63)
<i>N</i>	1,355	1,355	1,355	1,355
adj. <i>R</i> ²	0.365	0.353	0.211	0.208

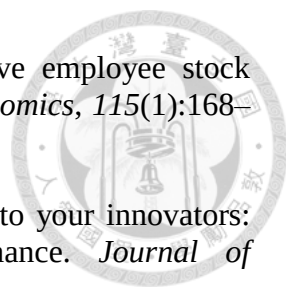
Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note 2: *TREAT* is a dummy variable equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise. *POST* is a dummy variable that equals one if the sample year corresponds to the implementation year of regulation of mandatory sustainability disclosure and any following year and zero otherwise. *SIZE* is the natural logarithm of the firm's total assets. *LEVERAGE* is total assets divided by total equities. *FA* is the net property, plant, and equipment scaled by total assets. *ΔSales* is the change of net sales scaled by the net sales of the previous year. *ROA* is operating income divided by average total assets. *Neg_Earn* is an indicator variable that equals one if a firm's lagged earnings are negative, and zero otherwise. *CFO* is the net of cash flow from operating activities divided by total assets. *Independence* is the number of independent directors. *RND* is the natural logarithm of a firm's investment in research and development.

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Appendix 1: Variable Definitions

Variables	Definitions
Dependent Variable	
<i>EMP_HEALTH</i>	The score of employee health and safety provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance.
<i>EMP_STAT</i>	The score of employee statistic provided by TEJ. The range of the score is 0 to 100, and a higher score indicates better performance.
<i>EMP_TURN</i>	Employee turnover rate.
<i>DIS_NUM</i>	The rate of sufficient disabled persons hired (%), which equals the disabled persons hired divided by the disabled persons, must be hired according to the regulation.
<i>EMP_Salary</i>	$\ln(1 + \text{average salaries of employees in original amount})$
<i>Patents_NUM</i>	The natural log of one plus the number of patents a firm granted in year t+1 provided by TIPO.
<i>Patents_CITA</i>	The natural log of one plus the citations of patents a firm granted in year t+1 provided by TIPO.
Main Independent Variable	
<i>TREAT</i>	A dummy variable equals one if a firm is affected by the regulation of mandatory sustainability disclosure and zero otherwise.
<i>POST</i>	A dummy variable equals one if the firm-year falls in the post-period for the regulation of mandatory sustainability disclosure and zero otherwise.
Financial Indicator Control	
<i>SIZE</i>	The natural logarithm of the firm's total assets.
<i>LEVERAGE</i>	Total liabilities divided by total equities.
<i>FA</i>	The net property, plant, and equipment scaled by total assets
$\Delta Sales$	The change of net sales scaled by the net sales of the previous year.
<i>ROA</i>	Operating income divided by average total assets.
<i>Neg_Earn</i>	An indicator variable equals one if a firm's lagged earnings are negative, and zero otherwise.
<i>CFO</i>	The net of cash flow from operating activities divided by total assets.
Firm-related Control	
<i>AGE</i>	The number of years that firm has been in operation.
<i>Independence</i>	The number of independent directors.
<i>RND</i>	The natural logarithm of a firm's investment in research and development.

Appendix 2: GRI Standard - Social Topic

No.	Standard	Topic
1	401	Employment
	401-1	New employee hires and employee turnover
	401-2	Benefits provided to full-time employees that are not provided to temporary or parttime employees
	401-3	Parental leave
2	402	Labor/Management Relations
	402-1	Minimum notice periods regarding operational changes
3	403	Occupational Health and Safety
	403-1	Occupational health and safety management system
	403-2	Hazard identification, risk assessment, and incident investigation
	403-3	Occupational health services
	403-4	Worker participation, consultation, and communication on occupational health and safety
	403-5	Worker training on occupational health and safety
	403-6	Promotion of worker health
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships
	403-8	Workers covered by an occupational health and safety management system
	403-9	Work-related injuries
	403-10	Work-related ill health
4	404	Training and Education
	404-1	Average hours of training per year per employee
	404-2	Programs for upgrading employee skills and transition assistance programs
	404-3	Percentage of employees receiving regular performance and career development reviews
5	405	Diversity and Equal Opportunity
	405-1	Diversity of governance bodies and employees
	405-2	Ratio of basic salary and remuneration of women to men
6	406	Non-discrimination
	406-1	Incidents of discrimination and corrective actions taken
7	407	Freedom of Association and Collective Bargaining 2016
	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk
8	408	Child Labor
	408-1	Operations and suppliers at significant risk for incidents of child labor
9	409	Forced or Compulsory Labor
	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor
10	410	Security Practices
	410-1	Security personnel trained in human rights policies or procedures
11	411	Rights of Indigenous Peoples
	411-1	Incidents of violations involving rights of indigenous peoples
12	413	Local Communities
	413-1	Operations with local community engagement, impact assessments, and development programs
	413-2	Operations with significant actual and potential negative impacts on local communities





No.	Standard	Topic
13	414	Supplier Social Assessment
	414-1	New suppliers that were screened using social criteria
	414-2	Negative social impacts in the supply chain and actions taken
14	415	Public Policy
	415-1	Political contributions
15	416	Customer Health and Safety
		Assessment of the health and safety impacts of product and service categories
	416-1	Incidents of non-compliance concerning the health and safety impacts of products and services
	416-2	
16	417	Marketing and Labeling
	417-1	Requirements for product and service information and labeling
		Incidents of non-compliance concerning product and service information and labeling
	417-2	
	417-3	Incidents of non-compliance concerning marketing communications
17	418	Customer Privacy
		Substantiated complaints concerning breaches of customer privacy and losses of customer data
	418-1	

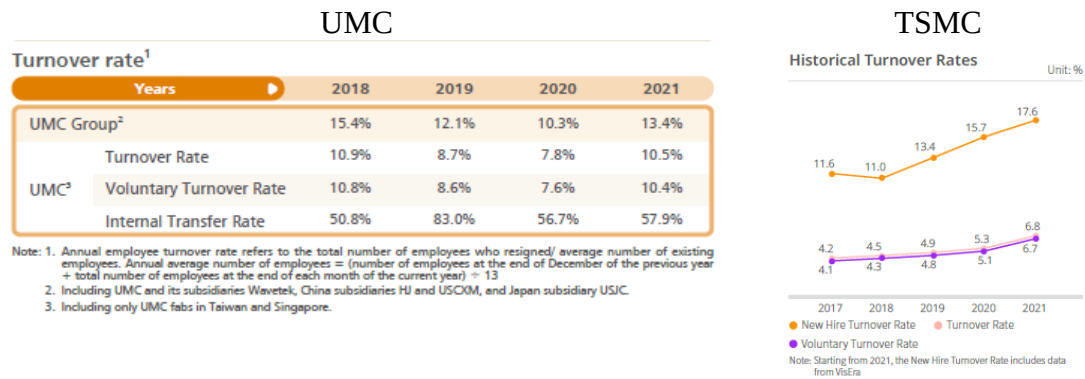
Appendix 3: Practical Examples of GRI Social disclosure

In Appendix 3, I present practical examples of the adoption of GRI (Global Reporting Initiative) by Taiwan Semiconductor Manufacturing (TSMC⁴: 2330) and United Microelectronics Corporation (UMC⁵: 2303). These examples are derived from the companies' ESG reports for the year 2021.

GRI 401 New employee hires and employee turnover

In GRI 401 explain the new employee hires and employee turnover rate. In UMC and TSMC ESG report, there are historical trends of turnover rate. In TSMC report, there is a future strategy for employee turnover rate.

Turnover rate:



TSMC Future Strategy:

Talent Attraction and Retention	
Strategies & 2030 Goals ¹	2021 Achievements
Fulfill the "Commitment" Core Values Offer employees quality jobs and strengthen employee commitment.	For more details, please refer to "Strengthen Employee Commitment" in this section.
Conduct an Employee Core Value Survey every two years to reinforce core values. - Ensure that over 95% of employees are fully committed to their work. - Ensure that over 95% of employees are willing to continue working for TSMC in the next five years.	- Ensure that over 95% of employees are fully committed to their work. - Ensure that over 95% of employees are willing to continue working for TSMC in the next five years.
Conduct an Employee Core Value Survey every two years to reinforce core values. Rank in the 75th percentile for Sustainably Engaged; rank is determined by comparing results from the Engagement Survey against the WTW Global High Performance Norm (H2).	Ranked in the 75 th percentile for Diversity and Inclusion; rank is determined by comparing results from the Engagement Survey against the WTW Global High Performance Norm (H2).
Maintain position above 75 th percentile among industry peers in total compensation.	Maintained position above 75 th percentile among industry peers in total compensation.
Maintain total turnover rate between 5%-10%.	Total turnover rate: 6.8% Target: 5%-10%.
Less than 10% new hire (< 1 year) turnover rate.	New hire turnover rate (< 1 year): 17.6% ⁴ Target: < 15%.
Note 1: In response to materiality analysis results and development strategies in 2021, we have made adjustments to parts of the content for this strategy and sustainable target. Note 2: The Employee Engagement Survey is issued once every two years and will be issued next in 2023. For results from the 2021 Employee Engagement Survey, please refer to the section on "Strengthen Employee Commitment" in "Talent Attraction and Retention". Note 3: The following targets have been moved to "Talent Development" due to adjustments in development strategies: "70% over 50% of vacancies through internal transfers" and "70% over 75% of manager positions through internal promotions". Note 4: For more details, please refer to "Maintain Healthy Turnover Rate".	↑ Exceeded ✓ Achieved — Missed Target

⁴ TSMC 2021 ESG report: https://esg.tsmc.com/download/file/2021_sustainabilityReport/english/e-all.pdf

⁵ UMS 2021 ESG report: https://www.ums.com/upload/media/07_Sustainability/72_Reports_and_Results/1_Corporate_Sustainability_Reports/CSR_Reports/CS_Report_English_pdf/2021_CSR_report_eng/2021_CSR_report_en_all.pdf



GRI 405 Diversity and Equal Opportunity

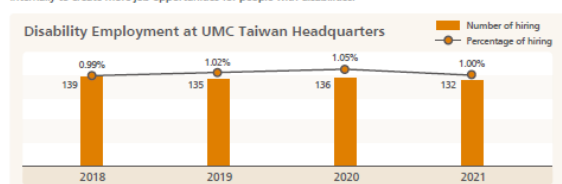
GRI 405 addresses the topic of diversity and equal opportunity, encompassing various aspects such as the employment of individuals with disabilities, as well as the employment of women and ethnic minorities.

Employment of People with Disabilities:

UMC

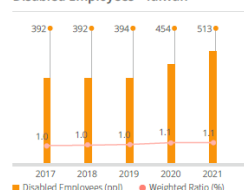
Employment of People with Disabilities

UMC supports the employment of people with disabilities, and has established channels for hiring people with disabilities. Through the Student Ambassador Project, people with disabilities such as physical handicap, visual impairment, hearing impairment, functional loss in vital organs and chromosomal abnormalities are hired. By the end of 2021, UMC headquarters in Taiwan employed a total of 132 employees with disabilities, which counts 1% of total employment and meets the employment ratio required by local laws and regulations, demonstrating UMC's care for disadvantaged groups. In the future, UMC will continue to actively carry out job evaluations internally to create more job opportunities for people with disabilities.



TSMC

Disabled Employees - Taiwan



Disabled Employees - VisEra



GRI 403 Occupational Health and Safety

UMC

Health Promotion Activities in 2021

Season	Theme	Event Spine	Key Achievements
Q1	Vaccination together	In response to the rolling adjustment of the epidemic, we regularly promote health education information on the Company's home page and bulletin boards to enhance new knowledge of epidemic prevention and correct hygiene concepts.	A total of 35 pieces of information on epidemic prevention were disseminated in 2021.
Q2	Doing health check together	To implement the concept of early detection and early treatment, we regularly conduct various health examinations. For example, on Mother's Day, the Company cooperates with medical institutions to conduct breast ultrasound examinations, and gives priority to annual health checkups at the Fab to enhance employees' awareness of preventive medicine.	A total of 161 employees attended the event, which was subsequently cancelled due to the seriousness of the epidemic in the domestic area. After the epidemic has stabilized, the program was adjusted to allow employees to arrange their own annual health check-ups at medical institutions until June 30, 2022, with NT\$1,500 granted for official leave and supplementary health check-ups to allow flexibility in scheduling and check-ups items.
Q3	Move together to lose weight	In response to the COVID-19 epidemic, UMC adjusted our activity plan and held the "Punch Card for Health Protection - Nine Grids" activity to promote a series of health education and epidemic prevention to strengthen the concept of individual health management and epidemic prevention among employees.	A total of 1,066 participants. [First box] Health Declaration 353 people attended [Second box] Health column 831 people participated [Third box] Keep a good mood 196 people participated [Fourth box] healthy weight loss ~ weight from time to time 114 people participated [Fifth box] Quick monitor of health condition ~ Download the National Health Insurance Administration APP 47 people participated [Sixth box] War against the epidemic ~ Home diary 152 people participated [Seventh box] Anti-stress expert 298 people participated [Eighth box] The battle against the epidemic ~ health guru 689 people participated [Ninth box] Outdoor prevention secrets 28 people attended
Q4	Listen to the consultation together	We promote and assist in various issues through onsite consultation services. We conducted health seminars to enhance the concept of prevention and health care for our colleagues, taking into account the problems of dysautonomia and daily pain that are common among modern people.	From October to December, 2,426 person-times consulted with physicians. The total number of participants in the health seminars was 305, with a total satisfaction score of 95. Such seminars were widely praised by colleagues.

Health Promotion Results Description

- Total number of people served by health promotion activities: 17,768
- Overall satisfaction level of health promotion activities: 95 points

Health promotion seal with health autonomy certification

Fab	UT	Fab 8D	Fab 8E	Fab 8F	Fab 12A_P5	Fab 8AB	Fab 8S	Fab 12A_P1
Expiration Date	2021-2023		2020-2022					2021-2024

