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Gains and Pains of Teleworking: Importance of Female Leadership

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ABSTRACT

The COVID-19 crisis has led to an unprecedented surge in teleworking. Teleworking during the COVID-19 pandemic has brought both benefits and costs. Yet, its impact on business resilience remains underexplored. This study examines the impacts of teleworking on business resilience from two perspectives: business continuity and employee furlough. Furthermore, we highlight the role of female leadership in shaping these impacts. Using a matched dataset of more than 3,000 global firms, we tested four hypotheses and found empirical support. We found that female leadership enhances the positive effects of teleworking on business continuity while mitigating its negative effects on employment.

KEYWORDS

Telework; Female Leadership; Business Continuity; Employment

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1. Introduction

Teleworking refers to working remotely and usually is supported by information and communication technologies (Boell et al., 2013; Gohoungodji et al., 2023). The idea of teleworking actually was proposed during the oil crisis in the 1970s to reduce oil consumption (Pyöriä, 2011). The development of ICT enables teleworking in the past years, and the number of teleworkers increased by more than 200% from 1992 to 2002 in the United States, where this number reached about 30 million in 2010 (Smith et al., 2018). Some organizations adopted teleworking as it provides more flexibility and autonomy to their employees, while some organizations are concerned about the low productivity problems of teleworking (Holland et al., 2016).

Due to COVID-19, many organizations have asked their employees to work remotely in 2020. To maintain social distancing, the scale and impacts of mandatory teleworking are unprecedented. According to talentlyft¹, only 7% of US workers (most are managers) worked from home regularly before COVID-19, and due to COVID-19, 62% of employees in the US are working from home.

The large scale of teleworking brings both advantages and disadvantages. On the one hand, it enables companies to continue their business through online platforms. Business continuity is critical for many stakeholders, including investors, employees, customers, and even the general public. On the other hand, telework changes the working mode from physical to digital. While this process of digitalization can bring many benefits, such as increased productivity and flexibility (Boell et al., 2013), it also causes problems like employee furlough if not a layoff (Brussevich et al., 2020). These problems can become very significant during a crisis like the COVID-19 pandemic as companies may not have a well-prepared plan to adapt to the digital transformation and the pandemic. This creates a critical debate: while teleworking demonstrably enabled businesses to continue operating during the crisis, did it do so without the cost of increased employee vulnerability?

Despite the extensive discussion around the benefits and drawbacks of teleworking, especially in crisis contexts, a critical gap exists in understanding the role of leadership during the digital transition. Specifically, the literature has extensively explored female leadership, often highlighting its distinct advantages, such as compared to male leadership, female leadership can do better in leadership styles for effective performance (Eagly, 2007). In other words, female leadership has its own advantages, which is becoming more significant in the digital era and during a crisis. However, discussions around the impacts of female leadership in the context of the unprecedented level of teleworking and COVID-19 crisis in different countries are sparse. While we understand female leadership's general advantages, its specific impact on organizational outcomes during mandatory teleworking and a global pandemic remains under-examined across diverse national contexts. We argue that female leadership can significantly mitigate the negative consequences of crisis-driven teleworking while amplifying its benefits. Therefore, from the perspectives of female leadership advantage, female leadership and digitalization, and female leadership and crisis, this study aims to answer two main questions:

RQ1: What are the impacts of teleworking on business resilience?

RQ2: How does female leadership influence the impacts of teleworking?

To answer these questions, this study empirically tests four hypotheses using a matched dataset of firms from multiple countries. We hypothesize that while teleworking during the COVID-19 crisis was essential for business continuity, it also posed a risk of employee furlough. Crucially, we expect that the presence of female leadership will positively moderate these relationships, leading to enhanced business continuity and a reduction in employee furloughs. The paper is structured as follows: in the literature review section, we review the relevant research on teleworking and female leadership. In the theoretical framework section, we present the research framework and develop two sets of hypotheses. The next section is the methodology part of this study, followed by the analysis results. We conclude the paper by discussing the implications of this study.

2. Literature Review

2.1. Teleworking

Depending on the research scope and context, researchers have used different definitions of telework in prior literature (Ghabban et al., 2024). In some studies, teleworking is viewed as “a work arrangement in which employees perform their regular work at a site other than the ordinary workplace, supported by technological connections” (Fitzer, 1997). Some more detailed descriptions of telework include “flexible work arrangement that affords employees the ability to periodically, regularly, or exclusively perform work for their employers from home or another remote location that is equipped with the appropriate computer-based technology to transfer work to the central organization” (Caillier, 2013). Some researchers focused on the narrow definition of telework (i.e., telecommuting) and only considered it as work performed at home or a satellite office to reduce commuting (Shin et al., 2000), while some other researchers perceived telework as “any type of distributed work enabled by information technologies” (Fritz et al., 1997). While almost all the extant studies discussed voluntary telework in normal situations, in this study, we especially consider telework as (mandatory) remote working due to crises such as the COVID-19 pandemic.

Many of the prior studies on the impacts of teleworking are from teleworker’s perspective, including personality and job satisfaction (Smith et al., 2018), work-family conflict (Duxbury et al., 1992), and social isolation (Beer et al., 2016). However, relatively few studies on telework were from the organizational perspective, among which most of the studies discussed the adoption of telework (Illegems and Verbeke, 2004). The traditional motivation of telework may be cost-saving, organizational flexibility and learning, and the new motivation of telework can be the social-distancing requirement, adaptability and business resilience needs (Ruppel and Harrington, 1995; Dolce et al., 2020). As the strategic consideration of teleworking is changing, we need new theories to study teleworking during crises.

However, not all organizations around the world are ready to start teleworking, and beyond the technological factors, there are many other factors such as organizational characteristics that may influence the adoption of teleworking (Ansong and Boateng, 2018). It was noted that the developing countries were not prepared for teleworking in a study on which countries were ready for remote work (Carillo et al., 2020). According to a Delphi survey, there are significant differences between high-income countries and low-income countries on the potential for working from home (Berg et al., 2020).

Table 1. Advantages and Disadvantages of Teleworking.

Teleworking		
Advantages (Gains)	Disadvantages (Pains)	Reference
Increased employee performance, decreased organizational expenses, higher employee morale, and more employee autonomy	Increased feelings of isolation, employees feeling less connected to their organization, and feeling “out of the loop” in office politics and decisions	(Smith et al., 2018)
Financial advantage, Increased work- life balance, Spatial mobility, Increased work autonomy, Increased productivity, Increased job satisfaction, Increased work morale, Recruitment and retention, Improved agility	Work-life blurring, Career and workplace involvement, Trust, Technical support, Interruptions, Legal framework, Teamwork and collaboration, Expertise and training, Security	(Boell et al., 2013)

There have been extensive discussions on the advantages and disadvantages of teleworking. Mostly, the main advantages are improved productivity, reduced business overhead costs, enhanced organizational flexibility, reduced commuting time for employees, and effective employee recruitment and retention (Greer et al., 2023). The

major individual-level disadvantages are psychological feelings, and major firm-level disadvantages are collaboration and knowledge management (Boell et al., 2013; Smith et al., 2018). A summary of the gains and pains of teleworking discussed in prior literature are shown in Table 1. To measure the effectiveness of teleworking, we need to consider both individual welfare and organizational interests. Also, in times of crisis, the focus of the measurement should also be changed from traditional metrics such as employee satisfaction to some resilience-related factors. Prior study has suggested organizational communication and controls as well as organization's human relations as the primary dimensions when measuring the organizational effectiveness of teleworking (Shin et al., 2000).

The current literature on teleworking exhibits several critical shortcomings, particularly when viewed through the lens of recent global crises. While existing research offers varied definitions of telework and largely focuses on voluntary arrangements in normal situations, it fails to adequately address the unique dynamics and consequences of mandatory, crisis-driven remote work. Furthermore, the vast majority of studies adopt a teleworker-centric perspective, neglecting a comprehensive organizational-level analysis of the strategic implications for business continuity and employee well-being during crises. This gap is exacerbated by insufficient attention to global disparities in telework readiness and impact, especially between developed and developing nations. Finally, the existing framework for measuring telework effectiveness often falls short in crisis contexts, as it rarely incorporates resilience-related metrics or adequately balances individual and organizational outcomes. These combined limitations underscore a pressing need for new research to fully grasp the multifaceted role of teleworking in unprecedented times.

2.2. Female Leadership

Women leaders have some unique characteristics compared to men leaders. For example, women leaders are more likely to adopt a relational approach in their leadership and thus bring effective leadership behaviors to organizations (Carli and Eagly, 2016; Carrasco and Palma, 2024). Therefore, there is the argument of 'female leadership advantage' (Post et al., 2019). Indeed, with the changing workplace in 21st-century, female leadership is building connective leadership, which is considered as a new model for the modern business environment (Lipman-Blumen, 1992). The psychological roots of female leadership advantage are gender differences. Unlike males, who on average value separation as mature success, females mostly feel safety from connections in the social web (Lipman-Blumen, 1992; Li and Tong, 2023). Typical female leadership skills include relational skills, empathy, communication, and more (Lammers and Gast, 2017). Prior literature has compared the female vs. male leadership styles. For example, Eagly and Carli (2003) discussed the differences and similarities of these two leadership styles from task-oriented vs. interpersonally oriented, autocratic vs. democratic, transformational vs. transactional perspectives. And based on the comparisons, they found female leadership advantage. Eagly (2007) studies the effectiveness of female leadership by comparing the contemporary model of male and female leadership. The conclusion of the study is although female leadership has both advantages and disadvantages, with some recent changes (e.g., employment and education), women have achieved and will continue their success in leadership roles.

Generally speaking, compared to men, it's harder for women to become leaders, which is the so-called glass ceiling effect (Baxter and Wright, 2000). However, researchers indicated that women are more likely to become leaders in a crisis, and this phenomenon is referred to as the glass cliff (Bruckmuller and Branscombe, 2010). There are several reasons for such glass cliff positions, and one argument is that the attributes of male leaders do not fit the requirement of leadership during a crisis. Another more positive reason is trust. Since female leaders mostly adopt relational behaviors during a crisis, such as an organizational crisis, they can obtain more trust from employees and other stakeholders (Post et al., 2019). For the case of the COVID-19 crisis, researchers argue that due to the limited presence of female leadership at both firm-level and country-level, COVID-19 regulations are

likely to be less cautious since women would emphasize more on caution (Brooks and Saad, 2020). Indeed, studies show that during the COVID-19 pandemic, international female leaders are more resilient and are doing better in uncertain times (Cherneski, 2020; Coscieme et al., 2020). One theory is that female leaders mostly have communal leadership. They can reduce emotional labor and perform better during a crisis (Vroman and Danko, 2020).

While the literature extensively details the “female leadership advantage” and the “glass cliff” phenomenon, highlighting women leaders’ relational approaches and their propensity for crisis leadership, a significant gap remains. Existing research predominantly focuses on voluntary telework in normal situations and provides only macro-level insights into female leadership during crises. It fails to specifically examine how female leadership impacts organizational outcomes, such as business continuity and employee well-being, within the unique context of mandatory, firm-level teleworking during a global crisis like COVID-19. This leaves a critical gap in understanding the nuanced interplay between leadership styles and remote work dynamics in unprecedented times.

3. Theoretical Framework

3.1. Business Resilience

Business resilience is one part of a broader concept of organizational resilience, which refers to “a fundamental quality in people, groups, organizations or systems to respond to a significant change that disrupts the expected pattern of events without engaging in an extended period of regressive behavior” (Amann and Jaussaud, 2012). It is also defined as “the ability to survive a crisis as well as thrive through effective planning and adaptive capability by developing innovative solutions” (Kamalahmadi and Parast, 2016). Business resilience has been of both academic and practical interest recently due to the growing climate change and economic turbulence with globalization (Espiner et al., 2017). By reviewing literature on business resilience during crisis, we found that most of the studies focused on small business, and the crisis discussed include power outage (Tibay et al., 2018), earthquakes (Dahles and Susilowati, 2015; Tibay et al., 2018), terrorist activities (Dahles and Susilowati, 2015), weather-related emergencies (Adekola and Clelland, 2020), hurricane (Torres et al., 2019), and economic shock (Soroka et al., 2020). The industry groups of businesses are also diverse, from hospitality or tourism businesses (Dahles and Susilowati, 2015; Tibay et al., 2018) to the manufacturing industry (Soroka et al., 2020). Prior studies investigated business resilience in both developing countries (Dahles and Susilowati, 2015) and developed countries (Adekola and Clelland, 2020; Torres et al., 2019).

Some researchers explored different business resilience indicators, including adaptive ability, ability to leverage information, reflective business model, and core competence of staff (Tibay et al., 2018). Some studies examined business resilience internally by considering both economic resilience and attitudinal resilience (Torres et al., 2019), while some other studies looked into the external relationship between business resilience and community resilience (Adekola and Clelland, 2020). Very few studies reviewed the impact of COVID-19 from the business resilience perspective. Also, there is a lack of study on business resilience from both organizational and individual perspectives.

In this study, to measure the consequences of teleworking during COVID-19, we focus on business resilience from both organizational and individual perspective. More specifically, we use online sales after closing the physical operations to measure the organizational interests and the worker furlough to measure employee welfare. Both factors are about firm-level resilience performance.

3.2. Impacts of Teleworking on Business Resilience

In this study, we focus on the impacts of mandatory teleworking due to natural disasters such as an earthquake

or other crises like the COVID-19 pandemic. Studies have shown that in disaster environments, the experience of teleworking at home brings both benefits and costs, including loss of professional interaction, reduced mutual learning and cooperation among employees, resulting in different duties (Donnelly and Proctor-Thomson, 2015). During the COVID-19 pandemic, teleworking also leads to both benefits like economic continuity and complaints (Dolce et al., 2020). At the organizational level, the operations got disrupted due to the social distancing policies. Many organizations start using telework to ensure business continuity during the lockdown. Teleworking, especially such a large scale of telework during the COVID-19 pandemic, is an organizational phenomenon. However, few studies have discussed the implications for organizations. Prior literature mostly puts emphasis on factors that influencing the adoption and diffusion of telework (Ruppel and Harrington, 1995) or the motivations for having a telework program (Frolick et al., 1993). This is no longer the case for teleworking in the context of this study. We focus on the consequences of teleworking and believe it can enhance the business continuity of organizations for several reasons.

First, teleworking, especially those of timely transformation from 'old normal' (work at the office) to 'new normal' (work at home) reflects a high level of digitalization and technology innovation of an organization. Compared to teleworking in other contexts, teleworking during a pandemic is to confine the population and to contain the virus, and more importantly, it is unprepared (Kniffin et al., 2020). Therefore, the adaptability of an organization becomes the key to business continuity. If an organization can start teleworking swiftly, such flexibility enables it to continue online business and achieve business continuity. Researchers discussed the relationship between organizational suitability and telework impacts (Higa et al., 2000). When an organization applies or develops the suitability for telework, it can have better telework outcome, which is the business continuity in this study. In other words, such adaptability enables companies to use teleworking effectively and protect their businesses from disruptions caused by pandemic (Cherneski, 2020).

Second, from the resource-based view (RBV), teleworking is one type of job resource, which becomes more critical for companies to maintain competitive advantages during a crisis (Illegems and Verbeke, 2004). The situation of mandatory working from home during the COVID-19 pandemic poses a huge challenge for companies to survive and thrive in this complex business environment. Although in the last two decades, with the transformation to the digitalized business environment, work can be done remotely, and organizations can have more flexible structures to provide better customer services as well as employee benefits (Pulley and Sessa, 2001; Felstead and Henseke, 2017). Large-scale teleworking is still unprecedented. The swift shift to teleworking allows companies to minimize the negative impacts of lockdowns on their business and move their operations online to continue the businesses.

Third, one of the biggest concerns of doing business remotely is the interruption of communications. With the increased use of information and communication technologies (ICT), ICT-enabled teleworking can address this concern and connect employees and their communication well (Derks and Bakker, 2014). Internet and cloud services have facilitated teleworking. The COVID-19 pandemic has generated an abrupt and enormous change in how companies operate. To prevent infection of the virus, social (physical) distancing policies are adopted and implemented broadly (Prin and Bartels, 2020). Employees are not allowed to work in the same office, and the channel of communications also changed to ICTs, which is the foundation of teleworking. Therefore, with teleworking, internal communications can continue to contribute to business continuity. Prior study has shown that teleworking during the COVID-19 crisis can both protect employees' safety and ensure the continuity of business activities (Belzunegui-Eraso and Erro-Garcés, 2020). Based on these reasons, we hypothesize that:

Hypothesis H1: Teleworking has a positive association with business continuity.

On the other hand, before the COVID-19 health crisis, working from home was considered as a form of award for employees (Gálvez et al., 2020). Researchers focused on freedom and control issues in the teleworking process

and debated whether organizations should adopt teleworking (Shin et al., 2000). However, teleworking during COVID-19 is a totally different story. There are no adoption issues anymore, and the focus has also shifted from motivation to the outcome and job characteristics. Employees need to adjust their working style for teleworking. Many previous studies focused on teleworker-related issues. Teleworkers' motivation and job attitude changes were discussed by Baruch (2000). Many researchers investigated the work-family conflicts due to teleworking (Duxbury et al., 1992). Other issues such as social isolation, barriers to career development, and changes in work habits were examined by Beer et al. (2016). Some recent works emphasized the impacts of the extreme increase of mandatory working from home on employees' well-being (Molino et al., 2020). One potential consequence of teleworking on employees' benefits that has not been discussed is the change of their employment status, that is, the change from employment to employee furlough. This study hypothesizes the association between teleworking and employee furlough from changes in working conditions, teleworkability, and operation efficiency perspectives.

First, for changes in working conditions, it's about both physical and tangible factors. Physical devices such as computers, video cameras, and internet connections are needed for teleworking. Not all employees have these devices, and for some companies, it's very hard to provide such suppliers to all employees. In other words, for large-scale and sudden home-based work during the COVID-19 crisis, there is increasing difficulty in ensuring adequate resources to enable teleworking (Kniffin et al., 2020). The tangible factors are the environment of working from home, the personality and situation of employees, and home and family conditions (Belzunegui-Eraso and Erro-Garcés, 2020). Variation of these factors indicates that not all employees are likely to have the chance to telework.

The second perspective to consider is teleworkability of employees. With the brunt of social distancing policies, employees need to adapt to this new way of working remotely. But for teleworking, employees' abilities (i.e., teleworkability) are different, especially considering the gender differences. Prior literature on teleworking mostly focused on skilled male workers as the sample in their empirical studies (Belzunegui-Eraso and Erro-Garcés, 2020). Brussevich et al. (2020) evaluated teleworkability across 35 countries and estimated that about 15% of employees are at high risk of furlough due to low teleworkability. Also, workforces in different countries have different levels of teleworkability. In advanced and emerging countries, women teleworkers may get less affected by the pandemic, but in developing countries and in some industry sectors, female workers could be at risk disproportionately.

Third, there has been a long debate on the influence of digital transformation on employment and the labor market (Eichhorst et al., 2017; Balsmeier and Woerter, 2019). While digital transformation brings many benefits, such as business continuity during a crisis, this process also has some negative impacts on employment. Previous studies have shown the concern that digital transformation of manufacturing may bring risks of job losses (Beier et al., 2017). Through digitalization, the operational processes can be automated and thus become more efficient. Similarly, with ICT-enabled teleworking, it may need fewer employees to conduct some business activities. For companies that do not consider social sustainability and only focus on economic consideration, they may increase the employee furlough (if not layoffs) after adopting large-scale teleworking. Hence, we propose the following hypothesis:

Hypothesis H2: Teleworking has a positive association with employee furlough.

3.3. Influence of Female Leadership

As discussed in the literature review section, because of its unique attributes, female leadership can play a significant role during a crisis and in the digital transformation process. The role of female leadership in the context of teleworking during the pandemic, especially how it can influence the impacts of teleworking on business resilience, has not been investigated thoroughly. In this study, we argue that on the one hand, female leadership can enhance the positive influence of teleworking on business continuity, and on the other hand, female leadership can mitigate the negative impacts of teleworking on employment. There are several reasons to support our first

argument on the role of female leadership for better business continuity when using teleworking during the crisis.

First, in the digital era, management teams are facing challenges of digital transformation and innovation in the transformation process. As a result, digital leadership (or e-leadership) is required for modern leaders. Although there is no unified definition of digital leadership and the innovation associated with it, researchers have discussed factors such as creativity, change readiness, flexibility, open organizational culture, transparent communication, and employee development are key dimensions of digital leadership (Kane et al., 2019). In the context of teleworking, management teams with effective e-leadership consider teleworking as an opportunity for their businesses (Contreras et al., 2020). In contrast, companies with traditional leadership can cause some problems in using teleworking. For example, they may not be able to adjust the organizational structure to fit the new working methods, or they are reluctant to develop new abilities to build a connective and trustworthy relationship with employees, which is one key female leadership advantage (Post et al., 2019). Innovation theories have shown that gender diversity in the management team is needed for impactful innovation in the process of digital transformation (Zhang et al., 2019). For example, for teleworking, leaders need to have innovative ideas to consolidate and build effective virtual teams to maintain organizational competitiveness. Along with cognitive diversity, gender diversity is considered a valuable asset for organizations to create business value and sustain success in the digitalization process. Studies have demonstrated the positive effects of gender diversity on the relationship between innovation and digital transformation success (Gfrerer et al., 2020). Prior literature also found that gender diversity does make a positive difference in board innovation (Benkraiem et al., 2020). In other words, in the process of using teleworking for business continuity, female presence in the management team can improve the effectiveness of digital leadership and innovation, leading to better performance of business continuity.

Second, female leadership is usually viewed as a communal leadership style. Prior literature discussed the two types of leadership styles: agentic and communal orientations. The former one is about decisive, independent, aggressive, forceful, and achievement oriented. The latter one is more about helpful, kind, sympathetic, and feminine behaviors (Vroman and Danko, 2020). Researchers indicated that most female leaders are able to display the communal leadership style naturally and viewed this nature of female leadership as an advantage (Post et al., 2019). Another term of leadership style is called connective leadership, which refers to the character of connecting individuals with both internal and external considerations (Lipman-Blumen, 1992). Internally, leaders with connective leadership characteristics care about their ego drives and tasks, and externally, they also care about the members of their group and community when they work together towards mutual goals. By using a broad spectrum of behavioral strategies, connective leadership connects with others and their goals. The core of connective leadership is 'connection', which is the foundation of teleworking during physical separation. This type of leadership recognizes the networks of relationships in our society. Many female leaders value the connection, caring, and responsibilities of their employees in their management.

Third, in the discussion around the glass ceiling vs. glass cliff, we found that women are more likely to become leaders during a crisis (Bruckmuller and Branscombe, 2010). In the COVID-19 pandemic crisis, management teams must adapt to remote working conditions in a relatively short time period to maintain sustainable business and effective leadership. Such abrupt changes require resilience and flexibility of leadership, which are some characteristics of female leadership (Eagly, 2007). During such a crisis, female leaders can do better to engage employees for a more satisfied teleworking experience and better teleworking performance, which is the business continuity in this study (Contreras et al., 2020).

To sum up, in the context of using teleworking during the COVID-19 crisis, female leaders can contribute more to the business outcome from teleworking. They play a significant role in innovating and excelling digital leadership, connecting with employees, and addressing challenges of changes in a crisis. In the digitalization of the work process (i.e., teleworking), female leaders will be able to work together with their employees to accomplish

organizational goals and retain a genuine concern for the benefits of their employees. As a result, female leadership can enhance teleworking enabled business continuity. The hypothesis is as follows:

Hypothesis H3: Female leadership may enhance the positive association between teleworking and business continuity.

In addition, we also believe that female leadership can reduce the influence of teleworking on employee furlough. Research has shown that in the COVID-19 pandemic, countries that were led by female leaders did better in control the crisis (Cherneski, 2020). The authors believe that there are two main reasons for this finding. The first reason is the long-term consideration of women-led governments, which have a focus on public health over short-term economic concerns. Female leaders will ask for collaboration from the citizens and implement more restrictive policies to confine the epidemic (Vroman and Danko, 2020). The second reason is that if a country has the female leadership, that country mostly put more emphasis on social equality and has the attribute of caring general public and social sustainability in develop policies (Coscieme et al., 2020). We can apply similar logic in the context of a women-led organization. On the one hand, female leaders will consider their employees' benefits more than potential short-term economic loss. On the other hand, a company with female leadership usually is a company that cares about corporate social responsibility (CSR). With such a company nature, they may include the potential consequence of employee furlough during a pandemic when they develop the corporate strategic plan. Prior research suggested that the commitment of senior leaders to CSR is essential for employee-centered CSR practices, on top of other organizational and contextual factors (Mayo et al., 2016). With the presence of women in the management team (e.g., the board), the senior leadership will have more motivation to consider reducing employee furlough as CSR practices for employees.

Second, in the context of teleworking, employees are physically away from their colleagues and thus have less chance to participate in peer learning or information sharing (Golden and Eddleston, 2020). Some employee furlough or unwillingness to participate in teleworking is because of this lack of support from colleagues and supervisors (Bae et al., 2019). By applying relational skills, female leaders are able to support and motivate employees and facilitate their work conditions. Prior literature has found that diversity management and supportive leadership can reduce the nonparticipation in telework programs. Mostly, this is the case when a female supervisor with supportive leadership helps the employees. With support from female leaders, employees who have low teleworkability may solve their problems and reduce the chance of furlough in teleworking.

Third, the traditional male leadership is generally based on a masculine ego-ideal that values the controlling, competitive, aggressive, and combative practices (Lipman-Blumen, 1992). In contrast, common female leadership has more people-centered leadership skills and emphasizes more on factors such as empathy and communication (Post et al., 2019). Naturally, women leaders in our society lean to more patient and nurturing behaviors (Vroman and Danko, 2020). Understanding, emotion demonstration, and advocated empathy are key elements of female leadership. Researchers indicated that the tangible emotional expression of leaders is desired by followers (Gardner et al., 2009). Mostly, women will express their understanding and empathy when they see others are in distress, for example, in the condition of furlough due to difficulties in teleworking. Women naturally respond to others' difficult conditions communally and pro-socially (Preston, 2013). In the context of employee furlough due to teleworking, female leaders become more attuned to their followers/employees compared to male leaders (Tomova et al., 2014). Female leaders consider more about the social influence and responsibilities in decision making, and they are helpful for employees who are experiencing employment difficulties in getting them through (Gedro et al., 2020). Based on the above discussion, we hypothesize that:

Hypothesis H4: Female leadership may reduce the positive association between teleworking and employee furlough.

4. Methodology

4.1. Data and Variable

World Bank Group (WBG) has conducted an annual firm-level survey globally in 2019. In 2020, with the COVID-19 outbreak, WBG also conducted a follow-up survey with firms to see the impacts of the COVID-19 crisis. We match these two datasets and obtain a sample of more than 3,000 firms to explore the impact of teleworking on firms' business resilience and the role of female leadership during the pandemic. These firms are from 15 countries that belong to low, middle, and high-income groups.

The variables used in this study are listed in Table 2. There are two dependent variables: business continuity and employee furlough. We use the current share of online sales to proxy business continuity. Employee furlough is measured by the number of workers who have been furloughed since the outbreak of COVID-19. Two independent variables are teleworking and female leadership. Teleworking is measured by the current share of the workforce working remotely. We coded the dummy variable female leadership as 1 if there are females amongst the owners of the firm. We have included several control variables to account for other factors that might influence business continuity and employee furlough. Firm-specific characteristics like size, age, ownership type, R&D expenditure, cash flow, and outstanding loans can all impact a firm's resources, adaptability, and financial resilience during a crisis. Additionally, operational and environmental factors such as existing IT infrastructure, industry type, sales type, and the overall business model significantly determine a firm's capacity for effective teleworking and its susceptibility to disruption. By controlling for these variables, we can isolate the specific effects of teleworking and female leadership on our outcomes.

Table 2. Variable Table.

<i>Dependent Variables</i>	
Business Continuity	The current share of online sales of a firm (%).
Employee Furlough	Number of workers who have been furloughed since the outbreak of COVID-19.
<i>Independent Variables</i>	
Teleworking	The current share of workforce working remotely (%)
Female Leadership	Amongst the owners of the firm, are there any females (1=yes, 0=no)
<i>Control Variables</i>	
Size	Total number of full-time employees, adjusted for temporary workers
Age	From year establishment began operations to year 2020
Ownership type	% owned by Government/State
IT	establishment has its own website
Industry type	establishment's main product/service last fiscal year
Sales type	main product/service: percent of total annual sales
Business type	% of sales: direct exports
RnD	during last fiscal year, establishment spent on r&d (excl market research)?
Cash flow	% of working capital borrowed from banks
Loan	in last fiscal year, did establishment apply for new loans/lines of credit?

4.2. Estimation Model

To test our hypotheses, we used ordinary least squares (OLS) regression model to estimate the coefficients. The model specification is:

$$Y_i = X_i\beta + \varepsilon_i \quad (1)$$

Where Y represents dependent variable (i.e., business continuity and employee furlough in this study), X represents a vector of factors, such as the teleworking, female leadership, and control variables; β is a vector of parameters to be estimated, and ε is the error term associated with each observation i .

5. Results

Table 3 presents the descriptive statistics and correlations of the variables. We find that the average share of online sales is about 9%, which indicates a quite low level of business continuity. The average number of workers who have been furloughed since the outbreak of COVID-19 is about 16. The average ratio of teleworking is around 7%, and about 32% of the firms have female leadership. The correlations in bold indicate the significance of correlations at 0.1 level.

Table 3. Descriptive Statistics and Correlations.

	VARIABLE	MEAN	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Continuity	9.03	18.74	1.00												
2	Furlough	15.82	57.51	0.003	1.00											
3	Telework	6.92	17.59	0.41	0.03	1.00										
4	Female	0.32	0.47	-0.004	-0.02	-0.01	1.00									
5	Size	96.36	383.66	0.02	0.26	0.02	-0.01	1.00								
6	Age	20.78	16.06	-0.04	0.003	0.004	0.04	-0.02	1.00							
7	Ownership	1.00	8.92	-0.04	-0.01	-0.02	0.07	0.11	-0.01	1.00						
8	IT	0.63	0.48	0.05	0.07	0.05	0.04	0.09	-0.04	0.02	1.00					
9	Industry type	2.22	1.66	0.02	-0.05	0.04	-0.02	-0.08	0.07	-0.01	-0.05	1.00				
10	Sales type	88.54	17.60	-0.02	0.01	-0.02	0.03	-0.01	0.03	-0.03	-0.03	0.01	1.00			
11	Business type	10.35	24.53	-0.03	0.12	0.01	-0.02	0.16	-0.02	0.02	0.11	-0.15	0.01	1.00		
12	RnD	0.12	0.32	0.01	0.05	0.05	0.04	0.11	0.01	0.02	0.17	-0.04	-0.04	0.14	1.00	
13	Cash flow	11.05	19.58	-0.02	-0.02	0.003	-0.01	0.04	0.03	-0.002	0.05	-0.01	-0.02	0.03	0.07	1.00
14	Loan	0.19	0.39	-0.04	-0.01	-0.001	0.02	0.06	0.04	0.07	0.07	0.01	-0.01	0.10	0.15	0.35

Table 4 reports the estimation results of the OLS analysis. Model 1 is used to test the direct effect of teleworking on business continuity (H1). As hypothesized, the result shows a significant and positive relationship between teleworking and business continuity ($\beta=0.413$, $p<0.01$). Therefore, hypothesis H1 is supported. The moderating effect of female leadership on this direct relationship is tested in model 2, which is our third hypothesis H3. The results in column 2 suggest a significant and positive moderating effect of female leadership on the positive relationship ($\beta=0.082$, $p<0.5$) between teleworking and business continuity, indicating that female leadership can further enhance business continuity. As a result, hypothesis H3 is supported.

Column 3 presents the results for the direct relationship between teleworking and employee furlough. We find a positive and significant coefficient of this direct relationship ($\beta=0.108$, $p<0.1$), implying that with teleworking, there will be more employee furlough. This finding corresponds to H2 and thus supports H2. The last model is used to examine the influence of female leadership on the positive relationship between teleworking and employee furlough. Model 4 shows a negative and significant coefficient ($\beta=0.133$, $p<0.1$) for the interaction of female leadership and teleworking on employee furlough. This indicates that female leadership can mitigate the negative impacts of teleworking on employment and thus support hypothesis H4.

To sum up, the results indicate that expanding a firm's remote workforce by one percent significantly enhances business continuity, increasing the share of online sales by 0.413 percentage points. This benefit is even greater under female leadership, which adds an additional 0.082 percentage points. Conversely, the same one percent increase in remote work is associated with an increase of 0.108 furloughed employees, though this increase is mitigated by 0.133 workers when female leadership is in place. These results carry crucial policy implications for

navigating future crises and fostering a resilient economy. Firstly, given teleworking's positive effect on business continuity, policymakers should invest in digital infrastructure and promote best practices to facilitate widespread, effective remote work capabilities for all firms. Secondly, recognizing that teleworking can correlate with increased furloughs, targeted employment support programs and flexible social safety nets are vital to protect workers during forced remote transitions. Lastly, the significant mitigating role of female leadership on furloughs, coupled with its enhancement of business continuity, strongly advocates for policies that actively promote gender diversity in leadership roles across all sectors, leveraging their unique leadership styles to build more resilient and employee-supportive organizations.

Table 4. OLS Estimation Results.

VARIABLES	(1) Continuity	(2) Continuity	(3) Furlough	(4) Furlough
	H1	H3	H2	H4
Telework	0.413*** (0.031)	0.383*** (0.019)	0.108* (0.060)	0.159* (0.087)
Female		-0.279 (0.664)		0.318 (1.962)
Female×Telework		0.082** (0.033)		-0.133* (0.078)
Size	-0.00004 (0.0003)	0.00002 (0.001)	0.073*** (0.019)	0.073*** (0.019)
Age	-0.040*** (0.015)	-0.041** (0.018)	0.026 (0.058)	0.026 (0.058)
Ownership	-0.055*** (0.011)	-0.062** (0.024)	-0.410*** (0.080)	-0.412*** (0.084)
IT	1.140* (0.604)	1.204** (0.608)	4.612*** (1.769)	4.222** (1.708)
Retail	-1.112 (0.710)	-1.200 (0.798)	2.296 (2.654)	1.337 (2.466)
Wholesale	2.802** (1.291)	2.988*** (1.068)	-2.218 (2.607)	-2.033 (2.604)
Construction	-3.119*** (1.041)	-3.002*** (1.106)	5.607 (4.637)	5.587 (4.692)
Hotel or Restaurant	-2.212* (1.160)	-2.212* (1.206)	1.213 (2.114)	1.205 (2.115)
Service	1.396 (1.354)	1.222 (1.088)	-0.381 (2.483)	-0.325 (2.477)
Sales type	-0.020 (0.016)	-0.020 (0.016)	0.069* (0.037)	0.074** (0.037)
Business type	-0.040*** (0.013)	-0.036*** (0.013)	0.205*** (0.067)	0.213*** (0.069)
RnD	-0.397 (0.894)	-0.520 (0.907)	5.824 (4.072)	5.975 (4.102)
Cash flow	-0.017 (0.017)	-0.016 (0.015)	-0.117*** (0.030)	-0.110*** (0.030)
Loan	-0.565 (0.773)	-0.567 (0.781)	-2.554 (2.380)	-2.434 (2.390)
Constant	9.000*** (1.566)	9.094*** (1.552)	-2.192 (4.033)	-2.657 (4.067)
# of Firms	3,668	3,646	3,009	2,992
R-squared	0.183	0.181	0.125	0.132

Notes: Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6. Discussion

The COVID-19 pandemic has significantly changed the way people work. This study aims to investigate the consequences of teleworking during the COVID-19 crisis on business resilience, which has two facets: business continuity and employee furlough. More importantly, we examine the role of female leadership in this process. With a matched dataset that covers firms from multiple countries, we empirically test the effects of teleworking on business continuity and employee furlough. We find that on the one hand, teleworking during the COVID-19 crisis can ensure business continuity, but on the other hand, it can also cause employee furlough. In addition, our empirical analysis results also demonstrate the importance of female leadership. With female leadership, firms can do better in business continuity and can reduce the number of employee furlough. This study offers both theoretical and practical implications.

Theoretically, this study contributes to the literature on female leadership by highlighting its role in the digital transformation process and in pandemic crisis. Based on discussions around attributes of female leadership in prior literature, we combine the female leadership, teleworking, and COVID-19 crisis in one research framework. Earlier research has studied teleworking during COVID-19 (Dolce et al., 2020), female leadership in COVID-19 (Cherneski, 2020), or the role of the female supervisor in telework program (Bae et al., 2019). But to the best of our knowledge, we are one of the first studies that consider all of these three elements. The empirical analysis results support the importance of female leadership and the female leadership advantage arguments (e.g., Eagly, 2007).

Also, this study advances our understanding of the bright side and dark side of teleworking, which is the digitalization of the work process. Teleworking due to social distancing policy is unique, and the scale is unprecedented. Most studies on teleworking are in the traditional prior-COVID 19 contexts with a focus on the work-family balance, employee stress, and exhaustion when adopting telework (Duxbury et al., 1992). The theories used in these studies may not be applicable to the COVID-19 crisis. For example, before, work from home was considered as CSR practices for employees (Mayo et al., 2016), but now during the COVID-19 crisis, it causes negative effects on social practices oriented toward internal stakeholders. Although there are some recent studies on teleworking during the COVID-19 pandemic, they either focused on teleworker's individual feelings (Dolce et al., 2020) or lack of empirical investigation (Contreras et al., 2020). As we may need to spend more time to control the COVID-19 pandemic and continue the teleworking, we need a deeper and more comprehensive understanding of teleworking's impacts. By focusing on both organizational performance and employee welfare, this study offers insights into future research on the impacts of teleworking, or more generally, of the digitalization process.

Third, this study sheds light on the research of business resilience in a crisis. With climate change and many other sustainability issues, companies may face more challenges of crises in the future (Espinero et al., 2017). Prior literature has discussed business resilience mostly from the organizational perspective, with considerations of economic outcome (Torres et al., 2019). The theoretical framework of this study considers both business continuity and employment continuity (furlough) as two sides of business resilience. We also include the role of female leadership in this framework. For future studies on business resilience, more inclusive and diverse viewpoints can be investigated.

This study also provides suggestions for practitioners, especially for those in the social politics area. First, the results of this study indicate that teleworking during the COVID-19 pandemic can be beneficial for business continuity, but it also increases employee furlough. The impacts of teleworking are mixing, thus need comprehensive strategies and responses. Management teams are facing challenges caused by abrupt and disruptive changes in the working process. The changes from managing several employees working away from the office temporarily to managing most of the employees working from home continuously, leaders need flexibility and the ability to adjust their leadership.

Second, we highlight the role of female leadership in teleworking during the COVID-19 crisis. This paper aims

to analyze in detail the moderating role of female presence in top management on the relationship between teleworking and positive and negative outcomes during the covid-19 pandemic. By doing so, the paper takes into account the positive impact of teleworking on business continuity as well as the negative impact of teleworking on employee furlough. We suggest that female leadership can enhance positive impacts while mitigating the negative impacts. It thus supports the importance of diversity and inclusion in management. The study of the diversity of top management in the context of teleworking during the covid-19 pandemic allows us to understand the role of female leadership and the importance of diversity, especially in case of technology usage in a crisis. Organizations should continue the diversity and inclusion principles in hiring and promoting employees. We need more female leadership in our society, not only in the crises, but also in normal conditions for long-term sustainability.

Last but not least, from the sustainability perspective, organizations should pay more attention to corporate social responsibilities. They should try to balance their pursuit of economic performance and social responsibly. Despite the takeaways around CSR from teleworking in the COVID-19 crisis will be different from normal conditions, some lessons like caring and connecting with employees can be applied broadly as CSR practices. The findings from this study provide a unique perspective to understand the importance and dynamics of social responsibilities that are less observable in normal contexts (Kniffin et al., 2020).

7. Conclusion

Although the vaccines are available now, it is not yet sure how long we have to follow the social distancing policy. Many countries are still requiring teleworking as a preventive method to contain the COVID-19 pandemic (Bouziri et al., 2020). When we can control COVID-19, and for the future after the pandemic is overcome, many companies will continue the teleworking policy. Even finally we can get back to the 'normal' life, we will be in the new normal after the pandemic. For example, some companies (e.g., Microsoft) have announced that they will allow their employees to work from home forever. This new global work norm has deeply changed the working process, the relationship between leaders and employees, and the requirements for leadership (Cherneski, 2020).

Therefore, the purpose of the research was to investigate the role of female leadership during the COVID-19 mandatory work-from-home situation in order to find potential opportunities and risks, and formulate recommendations for practice. In particular, the findings and related recommendations could be useful in case of both a future societal crisis and the implementation of remote working practices under more traditional conditions.

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Conflict of interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

Author contributions

Conceptualization: Xue Ning; Investigation: Xue Ning, Yixiu Yu; Methodology: Xue Ning; Writing – original draft: Xue Ning; Writing – review & editing: Yixiu Yu.

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