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Teleworking during COVID-19 Pandemic Crisis: Influences of Female Leadership on Business Continuity and Employee Layoff in Eight Countries

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ABSTRACT

COVID-19 pandemic propelled teleworking for most firms to conduct work and sustain businesses. However, teleworking invades work-and-personal boundaries and hinders some employees from conducting complex tasks, potentially leading to layoffs. Did the teleworking trend during COVID-19 lead to unfair employee layoffs while companies sustained businesses using teleworking? Did the gender of a company leader predispose them to leverage telework differently because of the work-and-personal boundary predisposition? Motivated by these puzzles, we explore the impact of teleworking on business continuity and employee layoff, differentiated by leadership gender. The firm-level dataset used in this study comes from multiple surveys conducted by a reputable international financial institution with a worldwide presence. Ordinary least square estimation reveals that teleworking has positive impacts on business continuity but adverse effects on employment. We also found subtle moderating effects of female leadership in samples of eight countries with different income levels. Theoretically, this study contributes to our understanding of both technological and human factors during the COVID-19 pandemic crisis. It also provides practical implications on IT for development with consideration of income levels.

Keywords: Telework, female leadership, business continuity, employee layoff, COVID-19

INTRODUCTION

Teleworking refers to remote work supported by information and communication technologies (ICT) (Boell et al. 2013). Telework was proposed during the oil crisis in the 1970s to reduce oil consumption (Nilles et al. 1976). Teleworkers increased because of ICT from 6.6 million in 1992 to 42.2 million in 2002 in the United States, subsequently increasing 30 million in 2010 (Ozcelik 2010, Smith et al. 2018). Recently, COVID-19 propelled most organizations to telework because of the stay-at-home directives to curb the virus spread. Talityft estimates that more than 62% of employees in the US had to telework during COVID-19, compared to the earlier 7% of teleworkers who were largely managers.

Teleworking has its pros and cons. Prior studies note that employees are more engaged in their work through telework, as they are more productive and less likely to take time off the work even when they are sick (Wright 2015). Companies can retain crucial, if not all, employees because of teleworking, who may otherwise leave because of personal reasons, such as moving further from the office or are not able to manage commutes (Pinola 2015). Stress levels of employees may be lower as they do not have extensive work commutes. Moreover, telecommuting is cost-efficient for both employers and employees (Barrero et al. 2021), reducing building space and security for employers and saving fuel and other costs for employees.

Regarding the cons of teleworking, prior research has also suggested several challenges. Teleworking invades work-to-personal boundaries. Employees with children often face the challenge of balancing the complexity of parenting and professional roles, even making it confusing for children about the roles at home (Hogenboom 2020). Employees are left out of socializing activities amongst colleagues, which can build trust and support (Evans 2014). Networking and collaborations suffer when employees are not in one place. Employees become less creative as workplace conversations spark ideas and solutions to problems (Sawyer 2013).

From a company's perspective, telework involves several risks. Compensation risk may occur if workers choose to telework while being on vacation. Compensation and insurance issues may also arise if workers are compensated for work performed in an unsafe location. Furthermore, providing privacy and security protections at all places may not be feasible, although company-issued equipment that safeguards security may be an option.

Thus, even though propelled by a crisis, the adoption of telework may not lead to the best outcomes, as it is accompanied by multiple challenges and risks. While a crisis demands that a business somehow sustains its operations and activities and keeps critical employees performing at a high level, discussions on both advantages and disadvantages of teleworking are sparse in the existing research. Undoubtedly, business continuity is critical for all stakeholders of a company, including investors, employees, customers, and even the general public. Research notes that telework, with the operational mode changes from physical to digital, arguably helps productivity and flexibility (Boell et al. 2013). However, prior research also points that telework causes employee layoffs (Brussevich et al. 2020). Extant research leads the equivocal arguments to invoke the question that as organizations adopt teleworking for flexibility and autonomy, the common productivity problems of teleworking remain a concern (Holland et al. 2016). This study extends this debate and tries to fulfill the teleworking-and-impact gap in the existing research.

The first research question of this study is: *What is the impact of teleworking on business continuity during the COVID-19 crisis?* We anchor to the Adaptive Structuration Theory (AST) (DeSanctis and Poole 1994) to posit that when interacting with technology, organizations will transform and create an integrated mechanism to derive value (Contreras et al. 2020). When the integration is appropriate, organizations can acquire the continuity impact. While this may lead to retaining a set of critical and valuable employees, plausibly, employees who are considered less useful for continuity of operations can be told to leave the organization. Thus we pose the second research question: *What is the impact of teleworking on employee layoffs during the COVID-19 crisis?*

Adaptive Structuration Theory (AST) further positions a responsibility of the technology-organizational integration on leadership (Pulley and Sessa 2001), as in mobilizing a considerable telework-force leadership plays a significant role in achieving efficiency (Wojcak et al. 2016). With consideration of teleworkers' competence/incompetence and social isolation/saturation, leaders can play different roles, including developing teleworkers' relationships and upgrading teleworkers' skills (Wojcak et al. 2016). Among the diverse factors of leadership, this study has a focus on female leadership (we admit that gender is not neatly divided along the binary lines of woman and man; this study follows the major prior work and explores the female vs. male leadership). Researchers found that compared to male leadership, female leadership can do better

in building connections and envisaging teleworker's situations (i.e., empathetic coordination) for effective performance (Eagly 2007). In other words, female leadership has its advantages, which are becoming more significant in the digital era and during a crisis. However, with the COVID-19 crisis-driven teleworking, the role of female leadership is not clear. Is there still female leadership advantage and how is the interaction between female leadership and teleworking are both critical questions for the success of teleworking during the COVID-19 pandemic. Therefore, we posit a third research question: *How does female leadership influence the impacts of teleworking on business continuity and employee layoffs during the COVID-19 crisis?*

To investigate the three research questions, we used a matched firm-level dataset from surveys conducted by a reputable international financial institution with a worldwide presence. Ordinary least square estimation reveals that teleworking has positive impacts on business continuity but adverse effects on employment. We also found subtle moderating effects of female leadership in samples of countries with different income levels. This study contributes to our understanding of both technological and human factors during the COVID-19 pandemic crisis. It also provides practical implications on IT for development with consideration of income levels.

The remaining 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 following section presents the methodology, followed by the analysis results. We conclude the paper by discussing the implications of this study.

LITERATURE REVIEW

Adaptive Structuration Theory: Implementation of Teleworking

Adaptive structuration theory is applicable for studies of organizational change caused by the implementation of technologies. It provides a framework to examine the variations in organizational change after the usage of technologies from two perspectives (DeSanctis and Poole 1994). The first one is about structures that are provided by technologies and the second one is about structures that emerge in the interaction of people and technologies (Torraco 2005). The term structures relate to the general rules and resources that facilitate human activity while the term structuration refers to “the act of bringing rules and resources from an advanced

technology” (Torraco 2005). In the context of this study, organizational change occurs because of the COVID-19 pandemic-driven teleworking. 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 performance (Bloom et al. 2013), 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 (e.g., Nicklin et al. 2016), 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). 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).

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).

Leadership Styles: Female vs. Male 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). 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). 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., 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).

THEORETICAL FRAMEWORK

Impact of Teleworking

In this study, we focus on the impacts of mandatory teleworking due to crises of 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 (Donnelly and Proctor-Thomson 2015). During the COVID-19 pandemic, teleworking also lead to 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 have started 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 put emphasis on factors that influence 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 telework in the context of this study. We focus on the consequences of telework 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, telework 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 the online business and achieve business continuity. When an organization applies or develops the suitability for telework, it can have better telework outcomes, 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 pandemics (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). In other words, as indicated in the AST, the implementation of teleworking brings in the positive organizational change of business continuity (Barrett 2018), which otherwise will be disrupted in the COVID-19 pandemic crisis. 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, and the discussions were around the freedom and control issues in the teleworking process (Gálvez et al. 2020, Shin et al. 2000). In the pre-COVID-19 era, teleworking-related research studied the motivation and job attitude changes, work-family conflicts due to teleworking, issues such as social isolation, barriers to career development, and changes in work habits (Baruch 2000, Duxbury et al. 1992, Beer et al. 2016). However, teleworking during COVID-19 is a 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. Some recent works emphasized the impacts of the extreme increase of mandatory working from home on employees' well-being (Molino et al. 2020). But one potential consequence of teleworking on employees' benefits that have not been discussed is the change of their employment status, that is, the change from employment to layoff. As suggested, the personality of employees and appropriate jobs for employees during teleworking should be considered (Tamrat et al. 1996). This study hypothesizes the association between teleworking and employee layoff 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 and internet connections are needed for teleworking. Not all employees have these devices, and for some companies, it's hard to provide such devices. For large-scale and sudden telework 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 of teleworking.

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. One gap in prior literature on teleworking is that the main focus was only on skilled male workers (Belzunegui-Eraso and Erro-Garcés 2020). Brussevich et al. (2020) evaluated teleworkability across 35 countries and estimated that about 15% of employees are at a high risk of layoff 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 some industry sectors, female workers could be at risk disproportionately.

Third, we also note that the influence of digital transformation on employment and the labor market is not clear (Eichhorst et al. 2017, Balsmeier and Woerter 2019). On the one hand, through digitalization, the operational processes can be automated and thus become more efficient. Previous studies have also shown the concern that digital transformation of

manufacturing may bring risks of job losses (Beier et al. 2017). 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 layoff after adopting large-scale teleworking. In others words, as suggested by AST, with improper technological appropriation, telework implementation can cause negative outcomes on human resources (Turner et al. 2019). Hence, we propose the following hypothesis:

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

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 COVID-19 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 COVID-19 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 sustained 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 decisive, independent, aggressive, forceful, and achievement-oriented. The latter one is helpful, kind, sympathetic, and traditionally feminine behaviors (Vroman and Danko 2020). Most female leaders are able to display the communal leadership style naturally and view this nature of female leadership as an advantage (Post et al. 2019). Another leadership style is 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, research has 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 satisfying teleworking experience and better teleworking performance, which is the business continuity in this study (Contreras et al. 2020).

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 in 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.

It is also likely that female leadership can reduce the influence of teleworking on employee layoffs. Research has shown that in the COVID-19 pandemic, countries that were led by female leaders did better in controlling 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 are more likely to 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 female leadership, that country generally puts more emphasis on social equality and has the attribute of caring for the general public and social sustainability in developing policies (Coscieme et al. 2020). We can apply similar logic in the context of a women-led organization. Female leaders are more likely to consider their employees' benefits over potential short-term economic loss. In addition, a company with female leadership is usually a company that cares about corporate social responsibility (CSR). With such a company culture, they may include the potential consequence of employee layoff 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 layoff 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 layoffs or unwillingness to participate in teleworking result from this lack of support from colleagues and supervisors (Bae, Lee, and Sohn 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. With support from female leaders, employees who have low teleworkability may solve their problems and reduce the chance of layoff in teleworking.

Third, the traditional male leadership is generally based on a masculine ego-ideal that values 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, Latu, and Belkin 2019). Women leaders in our society lean toward 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 layoff due to difficulties in teleworking. Women naturally respond to others' difficult conditions communally and pro-socially (Preston 2013). In the context of employee layoff 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 layoff.*

METHODOLOGY

Data and Variable

The dataset used in this study comes from multiple surveys conducted by a reputable international financial institution with a worldwide presence. The first one is a firm-level survey to see the impacts of the COVID-19 crisis in 2020. Then in 2021, the same institution did a follow-up COVID survey. Earlier, the organization also conducted several enterprise surveys that provided data about firms' characteristics. We matched these datasets to explore the impact of teleworking on firms' business continuity and employee layoff as well as the role of female leadership during the pandemic. The variables used in this study are listed in Table 1.

Table 1. Variable Table

<i>Dependent Variables (2021)</i>	
Business Continuity	The current share of online sales of a firm (%).
Employee Layoff	The ratio of number of workers who have been laid off due to the outbreak of COVID-19 to the number of full-time employees of operations (%).
<i>Independent Variables (2020)</i>	
Teleworking	The current share of workforce working remotely (%)
Female Leadership	Is the Top Manager Female? (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 foreign individuals, companies or organizations
IT	Establishment has its own website IT (1=yes, 0=no)
Sales type	Main product/service: percent of total annual sales (%)
Business type	The ratio of direct exports to sales (%)
RnD	During last fiscal year, establishment spent on R&D (excluding market research)? (1=yes, 0=no)
Cash flow	% of working capital borrowed from banks
Loan	In last fiscal year, did establishment apply for new loans/lines of credit? (1=yes, 0=no)
Labor cost	Ratio of total labor cost (including wages, salaries, bonuses) in last fiscal year to the establishment sales 3 years ago (%)

There are two dependent variables: business continuity and employee layoff. We use the current share of online sales to proxy business continuity. Employee layoff is measured by the ratio of

the number of workers who have been laid off due to the outbreak of COVID-19 to the number of full-time employees. 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 the top manager is female. We also consider several control variables that may influence the business continuity and employee layoff, including firm size, firm age, ownership type, IT, sales type, business type, research and development (RnD) expenditure, cash flow, loan, and labor cost.

Estimation Model

To test our hypotheses, we used ordinary least squares (OLS) regression model with heteroskedasticity-consistent robust standard errors to estimate the coefficients. The model specification is:

$$Y_i = X_i\beta + \varepsilon_i$$

Where Y represents dependent variable (i.e., business continuity and employee layoff 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 .

RESULTS

Table 2 presents the descriptive statistics and correlations of the variables. We find that the average share of online sales is about 7%, which indicates a quite low level of business continuity. The average ratio of employee layoff due to COVID-19 is about 5%. The average ratio of teleworking is around 5%, and only about 2% of the firms have female leadership. The correlations in bold indicate the significance of correlations at 0.05 level.

Table 2. Descriptive Statistics and Correlations

	VARIABLE	MEAN	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Continuity	6.93	14.80	1.00												
2	Layoff	4.77	16.43	0.04	1.00											
3	Telework	4.87	14.53	0.19	0.03	1.00										
4	Female	1.82	0.38	-0.03	-0.08	-0.04	1.00									
5	Size	62.45	130.01	0.06	-0.02	0.07	0.03	1.00								
6	Age	21.92	16.54	-0.03	0.10	0.16	-0.13	-0.01	1.00							
7	Ownership	5.40	20.31	0.04	-0.01	0.06	0.04	0.21	-0.03	1.00						

8	IT	0.62	0.49	0.01	-0.04	0.04	0.04	0.14	-0.03	0.08	1.00					
9	Sales type	88.60	18.25	-0.07	0.02	0.001	-0.01	-0.03	0.04	-0.03	-0.02	1.00				
10	Business type	8.80	22.41	-0.01	-0.05	0.02	0.06	0.26	-0.08	0.25	0.14	-0.03	1.00			
11	RnD	1.88	0.33	0.03	-0.01	-0.06	-0.02	-0.12	-0.02	-0.09	-0.20	0.05	-0.12	1.00		
12	Cash flow	11.89	20.16	0.01	0.04	0.03	-0.02	0.07	0.08	-0.02	0.03	-0.04	0.03	-0.06	1.00	
13	Loan	1.83	0.38	0.03	-0.04	-0.08	0.02	-0.07	-0.08	0.04	-0.07	0.03	-0.09	0.09	-0.33	1.00
14	Labor cost	47.24	57.35	0.06	0.01	-0.03	-0.03	-0.05	-0.01	-0.05	-0.04	0.05	-0.02	0.09	-0.02	0.08

Table 3. OLS Estimation Results

VARIABLES	(1)	(2)	(3)	(4)
	Business Continuity	Business Continuity	Employee Layoff	Employee Layoff
	H1	H3	H2	H4
Telework	0.314*** (0.024)	0.196*** (0.050)	0.048* (0.029)	0.028 (0.115)
Female		-0.824 (0.540)		-1.938 (1.414)
Female×Telework		0.066** (0.027)		0.010 (0.064)
Size	-0.00004 (0.0003)	0.00002 (0.001)	0.002 (0.004)	0.002 (0.004)
Age	-0.037*** (0.010)	-0.039*** (0.012)	0.079*** (0.028)	0.075*** (0.028)
Ownership	0.006 (0.010)	0.006 (0.009)	0.013 (0.023)	0.012 (0.023)
IT	0.681* (0.401)	0.690* (0.407)	-1.615 (1.008)	-1.562 (1.009)
Sales type	-0.048*** (0.011)	-0.049*** (0.011)	0.031 (0.026)	0.033 (0.026)
Business type	-0.023** (0.009)	-0.024*** (0.008)	-0.043** (0.022)	-0.042* (0.022)
RnD	1.073* (0.552)	1.080* (0.567)	-0.863 (1.344)	-0.848 (1.345)
Cash flow	0.001 (0.011)	0.001 (0.010)	0.052** (0.023)	0.053** (0.023)
Loan	1.251** (0.520)	1.283** (0.513)	-1.421 (1.236)	-1.218 (1.244)
Labor cost	0.046 (0.100)	0.048 (0.139)	0.143 (0.812)	0.173 (0.812)
Constant	5.437*** (1.754)	6.907*** (1.975)	4.671 (4.275)	7.735 (4.835)
# of Firms	6,667	6,667	1,243	1,243
R-squared	0.108	0.109	0.027	0.029

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 3 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 ($\beta=0.314$, $p<0.01$). 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 ($\beta=0.066$, $p<0.05$) 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 layoff. We find a positive and significant coefficient of this direct relationship ($\beta=0.048$, $p<0.1$), implying that with teleworking, there will be more employees layoff. This finding supports H2. The last model is used to examine the influence of female leadership on the positive relationship between teleworking and employee layoff, H4. This did not produce a significant result when evaluated for the overall sample.

Table 4. Additional Analysis in Three Groups

VARIABLES	(1)	(2)	(3)
	Layoff	Layoff	Layoff
	High Income	Upper Middle Income	Lower Middle Income
Telework	1.771*	-16.307	0.052
	(1.022)	(24.598)	(0.185)
Female	11.787	174.717	4.169
	(9.110)	(152.636)	(4.478)
Female×Telework	-0.929*	7.605	0.006
	(0.529)	(11.749)	(0.106)
Size	-0.001	-0.178	0.017
	(0.009)	(0.174)	(0.019)
Age	1.057	-0.561	-0.021
	(1.066)	(2.066)	(0.113)
Ownership	-0.007	1.076	-0.177*
	(0.028)	(0.786)	(0.106)
IT	4.738	-185.917	-1.505
	(4.227)	(155.584)	(5.475)
Sales type	-0.449	2.954	-0.202
	(0.400)	(2.679)	(0.273)
Business type	-0.009	0.758	-0.159**
	(0.024)	(0.540)	(0.065)
RnD	6.766	-16.882	-0.231
	(5.676)	(52.374)	(4.211)

Cash flow	-0.102 (0.115)	8.695 (7.854)	-0.096 (0.096)
Loan	2.733 (2.394)	136.416 (161.685)	-2.772 (3.275)
Labor cost	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Constant	-16.408 (14.036)	-742.614 (703.565)	30.897 (24.129)
# of Firms	493	414	506
R-squared	0.044	0.021	0.010

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

To understand the nuanced influences of female leadership, we divided the overall sample into three groups based on the income level of firms' home country. There are eight countries and according to the World Bank, these countries belong to high income (Greece, Italy, Slovenia), upper-middle (Georgia, Jordan, Moldova), and lower-middle income (Mongolia, Morocco) level groups. We tested the H4 for these three groups of countries. The results are reported in Table 4. It shows that only in the high-income group sample, we can find significant and negative moderating effects of female leadership, thus supporting H4. This result indicates that for firms in high-income countries, female leadership can mitigate the negative effect of teleworking on employee layoff.

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 continuity and employee layoff. 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 layoff. We find that although teleworking during the COVID-19 crisis can ensure business continuity, it can also cause employee layoffs. In addition, our empirical analyses also demonstrate the importance of female leadership. With female leadership, firms can improve business continuity and can reduce the number of employee layoffs, although the latter is only seen in high income countries. This study offers both theoretical and practical implications.

Anchoring to the adaptive structuration theory, this study advances our understanding of organizational change variations due to teleworking. More specifically, we study both the positive and negative changes caused by teleworking, which is one type of 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, and the theories used in these studies may not be applicable to the COVID-19 crisis. For example, in the pre-COVID-19 era, work from home was considered a CSR practice 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 only focused on teleworkers' individual feelings (Dolce et al. 2020) or lack empirical investigation (Contreras et al. 2020). As we may need to spend more time to control the COVID-19 pandemic and continue the telework, 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 for future research on the impacts of teleworking, or more generally, of the digitalization process.

This research also contributes to the study of leadership by highlighting the impact of female leadership when implementing teleworking during the pandemic. Based on findings related to the attributes of female leadership in prior literature, we evaluate 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 programs (Bae et al. 2019). But, we are one of the first studies that consider all of these three elements. The empirical analyses supports the importance of female leadership and the existence of a female leadership advantage (e.g., Eagly 2007).

This study also provides suggestions for practitioners, especially for those operating in the social political 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 layoff. The impacts of teleworking are mixed, 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 leadership on the relationship

between teleworking and its positive (business continuity) and negative (employee layoff) outcomes during the covid-19 pandemic. We suggest that female leadership can enhance positive impacts while mitigating the negative impacts. One thing to note is that the mitigating effects were only seen in high-income countries. Thus, practitioners in developing countries should pay more attention to promoting such mitigating effects of female leadership. The implication is consistent regarding 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 the 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 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).

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