

The Role of Telework in Resilience During the COVID-19 Pandemic

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ABSTRACT

The aim of this article is to better understand the role of telework in resilience during the pandemic. The authors analyze the results from five online surveys from March 2020 to February 2021. The corpus results from the compilation of different sources: written reports on March 2020, a narrative survey on April 2020, a quantitative survey on May 2020, a second narrative survey on December 2020, and finally, three focus groups on February 2021. Thus, the transcription of 1,299 managers is studied following the textual data analysis methods. The findings indicate that the role of telework differs according to whether the resilience is individual or collective. It also changes over time and differs according to the process of resilience which the authors propose to divide into three phases: preventive resilience (before the disaster), reactive resilience (during the disaster), and curative resilience (after the disaster). The authors use the results of the resilience study to discuss implications for the development of telework as a digital tool and practice.

KEYWORDS

Commitment, Crisis, Curative Resilience, Linguistic Clutch, Lockdown, Manager, Mixed Method, Preventive Resilience, Reactive Resilience, Speech Act Theory, Textual Data Analysis, Working From Home

INTRODUCTION

At the time of writing this article (February 2022), the populations of Mauritius, Reunion Island, Madagascar, among other places, are sounding “red alert” due to a large and unexpected¹ cyclone in the Indian Ocean. The Tropical Cyclone Batsirai is intensifying as it moves north of Mauritius. Although people never become fully accustomed to cyclones, it seems that they have developed a certain form of resilience. In this study, I focus on human resilience during another event: the COVID-19 pandemic, specifically regarding telework.

A broad definition of *telework* has been formed: “Teleworking occurs when employees perform all or a substantial part of their work physically separated from the location of their employer, using IT for operation and communication” (Baruch, 2001). It includes work away from the traditional office, with the help of computers or other digital facilities to maintain a link to the office (Bélanger & Allport, 2008; Venkatesh & Speier, 2000). It excludes working from a remote business office,

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on a mobile phone from a professional vehicle, or on a laptop during a business trip. Currently, telework appears as a major research theme in the study of the future of work (Santana & Cobo, 2020). However, so many of the concepts in the telework sphere have been used that they have lost their specificity (Lindstrom et al., 1997). Among them are telecommuting, multiflex, mobile work, flexiplace (Pratt, 1984), work at home, satellite office, detached units, distance meetings, and virtual organization (Lindstrom et al., 1997). Other terms for this work arrangement include working-at-a-distance, flex work, virtual work, and remote work (O'Neill et al., 2014). Three types of telecommuting locations appear: satellite work centers, neighborhood work centers, and home-based work centers (Kurland & Egan, 1999). Regarding work places, other concepts include resort offices and mobile workplaces (Lindstrom et al., 1997). So, dimensions discriminating the telework situations can be forms of organization and workplaces (Lindstrom et al., 1997). The importance of IT infrastructure in enabling teleworking, online learning, e-government, e-commerce, and other online activities has also been widely recognized (Greenhill & Wilson, 2006; He et al., 2021; Robinson et al., 2020; Van Der Meulen et al., 2019).

Before the COVID-19 crisis, teleworking was an arrangement between employer and employee (Venkatesh & Speier, 2000). But working full time at home has been the mandatory mode during containment. So, major specific characteristics of teleworking during this period are: mandatory working from home; full-time working from home with no employee agreement; sudden, without preparation time (Carillo et al., 2020). Nevertheless, it has allowed those who could telework to continue their activities and contributed to a form of resilience. Thus, in the United States, 5% of all full workdays were supplied from home before the lockdown and increased to 50% during May to October 2020 (Barrero et al., 2021). In France, 3% of employees worked remotely in 2017 (DARES, 2019) and increased to 32% during the lockdown, out of which 75% of teleworkers discovered this practice for the first time (Pénard & Coulanges, 2020).

The need to understand the effects of telework is made even more salient by the fact that the sudden and mandatory work from home after shutdowns is paving the way to permanent working from home, or elsewhere out of a traditional office, arrangements. Besides, the many impacts of COVID-19, and particularly, the role of information systems and technologies in this crisis are of research interest (see, e.g., Dwivedi et al., 2020; He et al., 2021; Venkatesh, 2020). Understanding how telework contributes to resilience helps to highlight the keys for developing it when different types of tension entails when practices are difficult, unfeasible, or no longer make sense (Orlikowski & Scott, 2021).

Both of the following views are found in the literature on resilience: resilience as a property and resilience as a process (see, e.g., Barrett et al., 2021; Coutu, 2002). My intention in this article is to evaluate findings through these two different perspectives. This exploratory research proposes to also investigate managerial and dynamic aspects of resilience due to digital tools and practices such as telework. I study the various coping strategies through individual and collective behavior. Studying people at work, particularly at their home, can be done using much of the existing methods (Baruch, 2001). Nevertheless, an interesting way to observe teleworkers behavior is to examine how they report their experiences and actions. Some might seek internal resources while others would not hesitate to call on external resources to cope with adversity. The focus on behavioral aspects is justified by the intention to complement information system management's scarce knowledge on these topics.

Therefore, in this article, I aim to contribute to filling these gaps by asking the following research question:

What is the role of telework in building resilience during the COVID-19 pandemic? More specifically, how does telework affect the dynamics of individual and collective resilience during COVID-19?

The answers will help us know how digital technologies and initiatives can be effectively sustainable in the sense that they are managed for resilience. To pursue these research objectives,

and following the insights of the speech act theory, I analyze the results from the compilation of data from five different sources from March 2020 to February 2021. This research is part of a larger research project mentioned below. As the crisis went through several periods of multiple lockdowns, including curfews, they generated changes in mentalities and opinions, and also in workers' practices (Moscarola et al., 2022) and in workers' speech act. Thus, in this extract, the transcription of 1,299 managers and specialists is studied following the textual data analysis (TDA) methods and the speech act theory (Austin, 1962).

The findings indicate that the role of telework differs according to whether the resilience is individual or collective. It also differs according to the process of resilience which I divide into three phases: preventive resilience (before the disaster), reactive resilience (during the disaster), and curative resilience (after the disaster). I start with these findings to explore implications in two areas. First, theoretically, I suggest the three concepts mentioned, which delineate resilience at the individual or collective level. Second, I suggest implications for the development of telework in order to build these resiliencies.

In the following sections I describe the empirical method of the study and findings in detail. I conclude with a discussion of how these results can help the development of new technologies and practices that support managers and specialists in the future.

RELATED WORK

Telework and Its Paradoxical Effects

In this research, I adopt a broad definition of teleworking to include any work away from the traditional office (Bélanger & Allport, 2008; Hopkins & McKay, 2019; Lee et al., 2007), often in an employee's home office (Venkatesh & Speier, 2000), using computers (Pratt, 1984) or ICTs to maintain a link to other employees of the organization, including but not limited to those working at a physical work location maintained by the employer (Bélanger & Allport, 2008; Greenhill & Wilson, 2006; van der Meulen et al., 2019). I consider various setups of telework from telehealth to online education.

Advantages and disadvantages of teleworking are numerous from individual and organizational levels, also are its inhibitors and motivators (Baruch, 2001; Gupta et al., 2022).

For the employer, teleworking programs help productivity, rentability, and flexibility. They help to meet employee demand, decrease office expenses, and access remote talents (Bose & Luo, 2011; Suomi & Pekkola, 1998; Tsiligirides, 1993; Venkatesh & Speier, 2000). They also decrease absenteeism and turnover, and decrease non-salary related expenses (Frolick et al., 1993). Most research highlights the lack of cooperation and team spirit disadvantages of teleworking (Taskin & Bridoux, 2010; Tsiligirides, 1993; Venkatesh & Speier, 2000). Other negative teleworking aspects include managerial, administrative, and legislative problems with teleworkers (Tsiligirides, 1993). Moreover, the reduced supervisor control leads to decreased timeliness of work completion and questions the risk of employees cyberslacking (O'Neill et al., 2014; Venkatesh & Speier, 2000).

For the employee, the flexibility offered by teleworking regarding the allocation of time and energy leads to better job satisfaction (Fonner & Roloff, 2010; Tsiligirides, 1993; Venkatesh & Speier, 2000). Better quality of life is afforded through flexibility in balancing family and work. The economic advantages of teleworking is realized in the fact that employees can live in more desirable or lower cost areas away from the firm while their commuting costs are reduced as well (Bose & Luo, 2011; Tsiligirides, 1993). Employees may show greater commitment to performance while teleworking (Van Der Meulen et al., 2019). For example, employees may work more efficiently because there is no need to physically engage with others as they would in a traditional office setting (Eckhardt et al., 2019). But, the lack of contact may lead to social problems from isolation (Golden et al., 2008; Tsiligirides, 1993; Venkatesh & Speier, 2000). Another disadvantage is stunted teleworker salary growth (Golden & Eddleston, 2020), as well as pervasive employer control (Sewell & Taskin, 2015).

For society as a whole, the main gain of teleworking is environmental. Indeed, it reduces pedestrian and vehicle congestion in major cities, energy consumption, air pollution, and thus, environmental damages (Bose & Luo, 2011; Tsiligirides, 1993; Venkatesh & Speier, 2000).

Since the COVID-19 crisis, many studies have focused on the consequences of employees working remotely (see, e.g., De Vincenzi et al., 2022); although, some have investigated if there are any positive effects of teleworking during the pandemic (Brem et al., 2020). For example, it has been examined if telework helped society slow down the spread of the COVID-19 (He et al., 2021). Another recent study about adjusting to epidemic-induced telework distinguishes it from conventional remote working (Carillo et al., 2020). From an individual level, academics investigated how telework employees react and regulate their work behaviors while at home (Chong et al., 2020).

Digital inequality is a core issue during this crisis. Researchers have studied reciprocal impacts of COVID-19 and digital inequalities: technical means, autonomy of use, social support networks and experience (Beaunoyer et al., 2020). Inequality appears also when teleworkers are providing their own digital tools to work at home (Robinson et al., 2020).

More generally, scholars ask what the potential future of knowledge work is, given its transformation into almost exclusively digital work during the COVID-19 crisis. (Wang et al., 2020). They suggest post COVID-19 futures range from cyborg (digital Taylorism paradigm) to *knowmad* (worker autonomy paradigm) (Wang et al., 2020). A knowmad, as defined here, has the flexibility and work attitude of the digital nomad, not necessarily the globe-trotting lifestyle. Another interesting study of how the use of IT changes over time, in reaction to a prolonged crisis that impedes normal operating procedures shows that five phases occur from organizational and individual levels: survival, socialization, normalization, strategy, and institutionalization (Carugati et al., 2020). Relative importance of tools and practice are evaluated through persevering and innovating (Carugati et al., 2020).

So, telework is found both positively and negatively related to the employer, employee, and whole society (Huang & Wang, 2022). In fact, like other digital solutions and practices, telework has paradoxical effects, impacting, simultaneously, negatively and positively (Loup et al., 2020). Paradoxical effects, contradictory but interdependent elements that exist simultaneously and persist over time, are well known to information systems specialists when studying the place, success, adoption, or practice of a technology in organizations. Behind the concepts of ambidexterity (Gregory et al., 2015), mirror effect (De La Rupelle & Kalika, 2009), and the duality of technology (Orlikowski, 1992), paradoxical effects ultimately reveal how technologies interact with organizations and actors. When studying telework paradoxes during COVID-19 pandemic, previous research finds three classic paradoxes: 1) exploitation vs exploration, 2) virtual vs human, and 3) personal vs professional life. I add three more threads of tension, less common because they are potentially conjunctural: 4) crisis vs stability, 5) autonomy vs control, and 6) individual vs team (Fuhrer, 2021).

Finally, recent studies on telework during the pandemic investigate its negative, positive, and paradoxical effects. However, studies on the interplay between telework and resilience are scarce.

Resilience as Individual or Collective Property

Resilience can be described as the art of bouncing back. It is the capacity to cope with unanticipated dangers after they have become manifest (Wildavsky, 1988). At the individual level it is the idea of coping by adjusting. It is the capacity to react, to face, to cope with turbulences. Resilience is a person's ability to deal with disturbances while maintaining their core practices and goals (Walker & Salt, 2012). In a recent study, the authors imply that individual resilience is associated with challenge appraisals due to its significant relationships with experienced telework eustress (Van Slyke et al., 2022). According to Coutu (2002), there are three characteristics that hold true for resilient individuals and organizations: the acceptance of reality, the propensity to make meaning of an adverse situation, and the ability to make do with whatever is at hand.

Resilience at the organizational level is its ability to absorb and adapt in a changing environment, to enable it to deliver its objectives, and to survive and prosper (International Organization for

Standardization [ISO], 2017). It is the result of the interaction of attributes and activities, and contributions made from other technical and scientific areas of expertise (ISO, 2017). As Coutu (2002) highlights, “Resilience is neither ethically good nor bad. It is merely the skill and the capacity to be robust under conditions of enormous stress and change.” Broadly, it is the capacity for an enterprise to survive, adapt, and grow in the face of turbulent change (Pettit et al., 2010). Therefore, resilience is found in the literature as a multilevel property, and it is also found as a process.

A Process of Commitment

Whatever the level (individual or collective), I suggest that resilience differs over time and is dependent on context. Indeed, the context, the situation, and the events inscribe resilience over time. Thus, resilience is a dynamic capacity of organizational adaptability that grows and develops over time. It is not a static attribute that organizations do or do not possess (Gittell et al., 2006). This is why it seems more appropriate to address resilience as a pathway or process; it is an evolving and interactive process (Cyrulnik, 2021). In his article, Powley (2009) defines resilience as an adaptive process. He introduces the concept of *resilience activation*, referring to “the mechanisms by which resilience emerges or activates when organizations confront threats, challenges, or unexpected emergency situations.” Finally, this complex concept of resilience can be viewed as a capacity, normative condition, return to equilibrium, and transformation (Barrett et al., 2021; Linnenluecke, 2015). From this perspective, I find a similarity with the process of commitment.

The idea of commitment, close to engagement and implication, is of interest at several levels. At the individual level, someone who has been going through a process of resilience for several years finally shapes a personality that is conducive to commitment. At the collective level, commitment to the network that constitutes the community is also a factor in resilience (Sakurai et al., 2020). As the aim in this article is to focus on behavioral aspects of resilience. I will concentrate, therefore, on the concept of resilience as an individual and collective commitment. I consider behavior as anything a person does in response to internal or external events. Actions may be overt (i.e., motor or verbal) or covert (i.e., activities not viewable but involving voluntary muscles); behaviors are physical events that occur in the body and are controlled by the brain. Here, the commitment involves acting or reacting. Resilience through commitment engages one to find ways to move with energy through adversity. In the workplace, for instance, individual and collective resilience can manifest in many ways. Escaping from the role as a victim of circumstance by acting can be an option. Conversely, a lack of resilience can be expressed as a nonreaction, which can lead to a form of procrastination. So, investigating commitment will lead to better understanding individual and collective mechanisms of action.

Both views are found in the literature, and my intention in this paper is to evaluate the findings through the two different perspectives: resilience as a property and resilience as a dynamic commitment.

DATA AND METHODS

Data Collection

The data presented come from the COVID Data Lab (Moscarola et al., 2022), a collective research device on COVID-facing organizations. The data are extracted from global research that started at the beginning of the crisis. The aim was to understand how the pandemic was impacting companies and their actors in practice. The research project was launched in March 2020 by collecting managers’ experiences from the beginning of the first lockdown that month to February 2021 (Moscarola et al., 2022). In this paper, the corpus results from the compilation of five different sources (see Table 1).

Written reports were comprised of data from managers’ experiences during the March 2020 lockdown. An open-ended online questionnaire was sent to the Business Science Institute doctoral-managers network. Following this first study, researchers involved wanted a more in-depth survey from the point of view of managers and specialists about the impacts the crisis had on their companies and

Table 1. Overview of data collection

Date	Context	Audience	Participants	Type of Input
March 2020	Beginning of first lockdown	Business science institute doctoral managers	30	Open questionnaire
4-20 April 2020	First lockdown	Business Science Institute network of contacts	291	Narrative survey n°1; open questions simulating a face-to-face interview
18-30 May 2020	First lockdown	Business Science Institute network of contacts	426	Omnibus survey; closed questionnaire
15-27 December 2020	Second lockdown	Business Science Institute and IAE network of contacts and Sphinx network	530	Narrative survey n°2; personal accounts; picture wall
12 February 2021	Second lockdown	Volunteers recruited through narrative survey n°2	22	Participation in three focus group discussions

Note: Data was sourced from Moscarola et al. (2022).

management. As the involved researchers came from distinct disciplines, different research traditions were followed by managing both qualitative and quantitative approaches. Online narratives were collected in April 2020 in response to open-ended questions that simulated face-to-face interviews. An omnibus survey was conducted in May 2020, resulting in a closed online questionnaire covering the different functions of the company. Thus, questions about human resource management (HRM), marketing, remote work, supply chain information, decisions made, and structural organization were available.

A second qualitative online survey was launched during the second lockdown in December 2020 in order to capture the life stories of managers and specialists at work. All the researchers involved mobilized their own managers' networks to participate in the survey and to supplement the number of participants. This second survey began with a picture wall to encourage respondents to tell their own stories (Ganassali, 2016). A combination of twenty images was produced and participants were asked, "When you think back to the past ten months, what images come to your mind?" The respondents could select images that best correspond to how they felt (see Figure 10 in the Appendix). The participants were to estimate the impact of this crisis on their personal and business aspects. They were also asked to give us feedback on their experience of this crisis and their proposals for the future. For example, they were asked, "What was your worst experience at work in the last ten months?" The analysis of this survey revealed interesting themes to focus on and to deepen: the work logistics, the changes in the organization of work, and the relationship of the employee to the company. Consequently, it was proposed to the respondents to participate to three focus groups corresponding to the three themes. The focus groups took place via videoconference in February 2021.

The various online sources were finally gathered in a single database called Covid-Data, containing all the texts classified by origin, date, and identity (i.e., age, gender, country, function, company size).

Data Treatments

I used textual data analysis (TDA) and have followed the speech act theory (SAT) to conduct data treatments.

Techniques for the analysis of textual data, also known as text mining or text analytics, call on statistics, data analysis, language engineering, and semantics (Moscarola, 2022). I used textual data analysis methods which gather exploration capabilities including text mining, thematic exploration, targeted search, contextualization and triangulation (Bolden & Moscarola, 2000). These methods

facilitate analysis by providing tools such as lexical appropriation, factor analysis, thematic classification, and triangulation.

Concerning the lexical appropriation, statistical text examination includes counting words and studying the associations between them, by determining occurrences and co-occurrences. Concerning the factor analysis, it allows for systematical study of lexical associations and to determine affinities between terms that are frequently associated. Concerning the thematic classification and the research stream, the units of meaning (responses, sentences, sequences of words, etc.) can be partitioned if they resemble one another in terms of the words that compose them. The method used is the descending hierarchical classification based on several factor analyses. It allows to define homogeneous classes (Moscarola, 2022).

The speech act theory was also mobilized to deeply explore the experience of teleworkers during this crisis, focusing on behavioral aspects of individuals and collective resilience toward commitment. To do so, the literature in linguistic offers a complementary possibility to investigate teleworkers' narratives and discourses, based on the SAT (Austin, 1962). The SAT distinguishes what is said (an utterance) from the act of saying it (uttering) (Moscarola, 2022). The utterance refers to the content of the message: what is said or what is written, or the surface meaning. Uttering refers to how the utterance is expressed. It includes the manner and style of communication. By investigating utterance and uttering together, other senses than the surface meaning can emerge. According to SAT, narratives and discourses involve choosing the words the author uses, whether consciously or unconsciously. Thus, the words of a text can reveal two levels of meaning: a surface level with utterance and a deeper level with uttering. Therefore, when studying a text, at the first level, the focus is on what the author of the message says. At the second level, a focus on something else can emerge, which can be discovered by interpreting the speech acts. Following pragmatics and SAT, language is considered based on how it is used in context. Therefore, to find what is said beyond the apparent meaning of an utterance, the study of deictic terms, such as clutches, is of interest (Moscarola, 2022).

So, by modelling, targeted search allowed for identifying and weighing concepts. The contextualization aimed to detect and explain the influence of contexts. Thus, I mixed qualitative methods of content analysis with quantitative tools to bring out meaning for a better understanding. I used the Sphinx DataViv software for the treatments for its advanced data analysis and visualization functions.

RESULTS

The starting corpus, consisting of 12,114 sentences of 1,299 respondents, is analyzed here. Among the respondents, 62% are men and 38% are women; 12% of them are younger than 35 years old, 62% between 35 and 55 years old, 26% are more than 55 years old; 49% of them are from France, 41% from Europe, and 10% from Africa; 35% of them are managers, 16% are entrepreneurs, and 49% are specialists; 13% of them belong to firms of which size is less than 10 people, 27% between 10 and 99, 26% between 99 and 1,000, and 34% more than 1,000.

I exploited this data based on the procedure described in the previous section. A step-by-step exploratory strategy was driven to answer to the research questions. I tried first to study the overall place of telework during the period by studying lexical components of the corpus. Then, I tried to find homogeneous classes in the corpus and suggested theme interpretations. As the interpretation was in terms of individual and collective orientation, I investigated the contextual characteristics of each commitment. Finally, I studied these orientations in their dynamics.

I present in the next section these step-by-step results and analysis, first by discussing the lexical appropriation, followed by the research streams, and finally, singularity emerging from triangulation.²

Lexical Appropriation

The word cloud below shows the most common words (see Figure 1). It gives an idea of the overall content.

As one can see, “telework” is a core word (593) in second position among the 10 most frequently cited words, just after the word “work.” So, it is a central concern during this crisis. Words such as “work,” “firm,” “activity,” and ‘lockdown’ are also common words. It seems that the main concern of the firm during the lockdown is to maintain activity via telework. This overall result is not surprising and is shared by previous research (Fuhrer, 2020). Indeed, without telework during this crisis, organizations would not have been able to operate and activity would have stopped. Since I never mentioned the word “telework” in the survey, the fact that it is one of the most frequently mentioned words remains an interesting result. But I need to go further by analyzing those who mention “telework” in the response. The reading of the orientation of the verbatim (see details in Figure 6 in the Appendix) reveals that the word “telework” was cited by individuals who are optimistic about the future (34%). They probably anticipate or already live the advantages of the situation. They are more numerous than those who are pessimistic (24%). Nevertheless, the number of those who have a divided opinion (12%) and those who have no opinion (30%) is significant. This means that uncertainty prevails, as the following testimony shows:

New Zealanders [are] better than Australians at executing business continuity plans and working from home, as they have had major earthquakes, there’s a real resilience that’s good short term, but really, working from home for lengths of time is yet to be tested as we are only 1 week done. (Participant: woman; more than 55 years old; Africa; April 2020; narrative survey 1)

Even if recent studies already compare pre-COVID and post-COVID working from home outcomes (see, e.g., Teodorovicz et al., 2021), I think it is still too early to conclude that COVID is behind us.

Research Streams

The top-down hierarchical clustering reveals four main clusters A, B, C, and D (see Figure 2).

In cluster A (22%), words such as “work,” “office,” and “colleague” are the most used. This cluster seems to be concerned by the work done at office and collective issue.

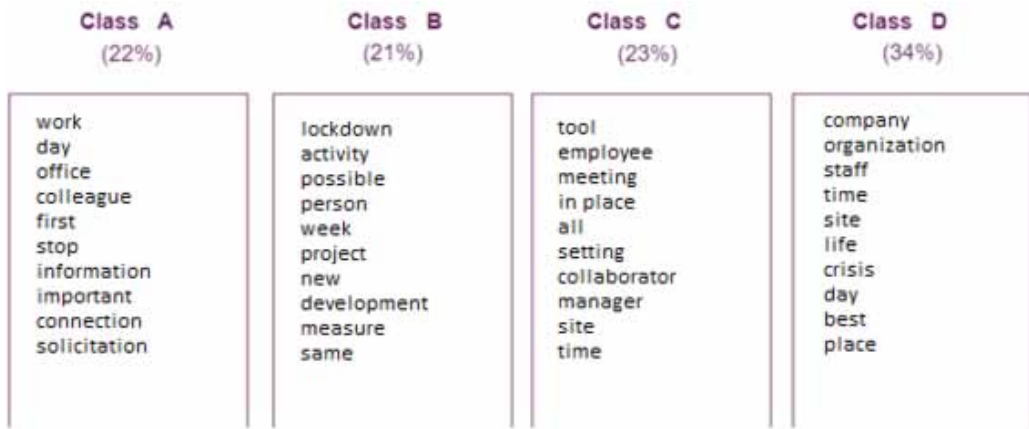
In cluster B (21%), “lockdown,” “activity,” “possible,” and “person” are the most used. This cluster seems to be concerned by the individual activities caused by the lockdown situation.

In cluster C (23%), “tool,” “employee,” “meeting,” “in place,” are the most used. This cluster seems to be concerned with the tools made available to the employee for meetings.

Figure 1. Telework as a core word



Figure 2. Themes of the selection revealed by the sentence typology



For the last cluster D (34%), words such as “company,” “organization,” “staff,” and “time” are the most used. This cluster seems to be concerned with the organization of the company’s staff, especially in time management.

It can be seen that clusters A and D are oriented toward the collective (i.e., the team, the company as a whole), while clusters B and C are oriented toward the individual (i.e., the employee, the person). So, it is interesting to investigate individual and collective orientations further.

Triangulation

The theoretical position is to focus on the concept of resilience as an individual and collective action, reaction, and commitment. To better understand the role of telework in individual and collective resilience, and following this theoretical position, I have identified individual commitment as distinct from collective commitment. In line with works on SAT, I propose to capture individual commitment by the “I” clutch, or indicator or index of enunciation, while collective commitment is captured by the “we” or “us” clutch.

It appears that gender, age and size of the company play a role in the type of resilience. As Figure 3 shows, individual resilience is distinct from collective resilience. On the right of the factor map, individual resilience is more likely to occur among women, among those under 35 years old, and among those working in large companies, more than 1,000 employees. This can be explained by the role of women in this crisis, particularly with regard to finding solutions to balance family and professional life. Following verbatim illustrates this difficult conciliation:

In addition to this work overload, I found myself being a teacher of 5th year of primary school and 8th graders, children who do not master computers well and who had to be helped constantly to hand in their e-homework on the Internet. (Participant: woman; 35-55 years old; specialist; France; December 2020; narrative survey 2)

Further gender studies will provide additional and interesting perspectives. In this case, it is the appreciation of the personal situation that contributes to individual resilience.

On the left of the map, results show that collective resilience appears to be most prevalent among men, among older people aged from 35 to 55, and in small- and medium-sized enterprises, from 10 to 99 or 99 to 1,000 employees. It seems that men are more likely to mobilize their network for action. Older men are favored because they presumably had more time to build their network. Moreover, it

Figure 3. Context of individual and collective commitment



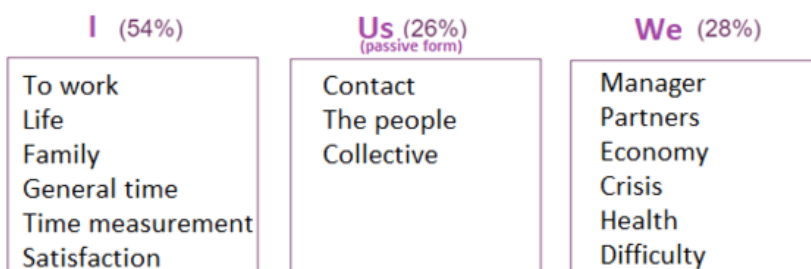
is easier to mobilize the network in small- and medium-sized companies than in large groups because of the number of people to contact. One can also count on the support of trusted people, those in one's close circle, for social support.

In this case, it is reacting by activating the network that contributes to collective resilience. Following testimony illustrates this:

I was used to working onsite and being confined was a new situation that stressed me and changed my habits: social distancing, micromanagement, following with great attention the media intoxication [...] updating my work, managing my budget, collaborating with close colleagues to assist ourselves or to complete the work of colleagues if needed. (Participant: man; more than 55 years old; Europe; December 2020; narrative survey 2)

I have seen above that the individual commitment captured by the “I” clutch is more likely to occur among women. Here, the results of the hierarchical classification (see Figure 4) show that, indeed, for the ‘I’ class (54%), the themes evoked are related to work, life and family. This confirms the previous results, highlighting the difficulty of reconciling work and family life in these times

Figure 4. Extract of the hierarchical classification



Only significantly over-represented items are displayed

of crisis. Time is a theme that also preoccupies respondents of this class. There is every reason to believe that this individual resilience also involves mastering time management. This is for example what a woman related:

The work-life balance was very disrupted, as there were no longer any boundaries, and I worked sometimes at night or early in the morning to be fully focused. (Participant: woman; 35-55 years old; entrepreneur; December 2020; narrative survey 2)

Results show that collective resilience (clutches “we” and “us” [passive form]) seems to look for contacts and partners and is more concerned with economic aspects. While individual resilience is more likely to be found in the family circle, collective resilience is more likely to be found in the business and economic sphere. The challenge here is to maintain activity, especially in times of lockdown, notably through teleworking. In addition, it is necessary to collectively organize the change impacting the company and the workers as implied by the following survey participant:

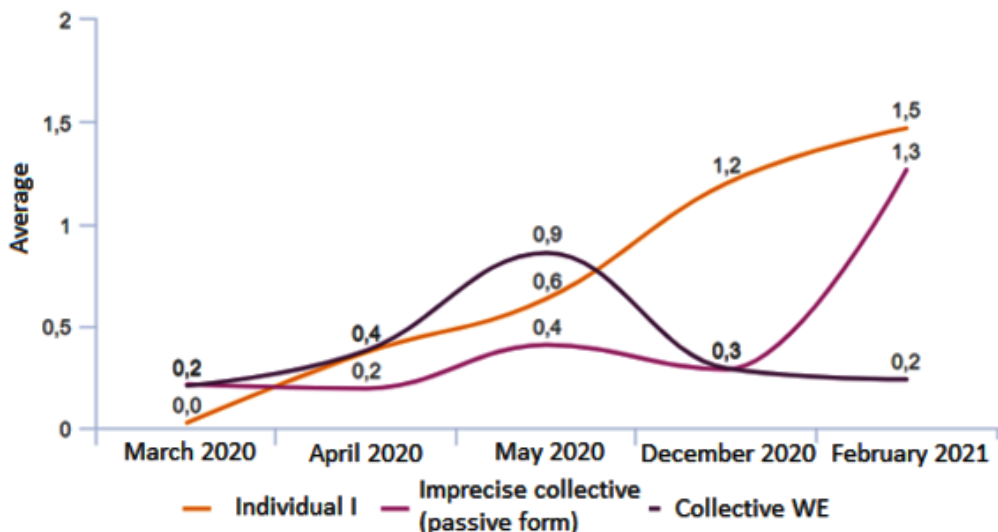
The link with colleagues was only by telephone and email. Work had to be rethought, as well as access to shared areas. This has meant more working hours to overcome technical problems and to provide the same quality and service. (Participant: man; 35-55 years old; Europe; December 2020; narrative survey 2)

Finally, regarding the dynamic aspects of resilience, the results show different curves of evolution according to the nature of the resilience: individual or collective (see Figure 5).

Regarding the evolution of the average intensity of the clutches in the sentences, an evolution between the different periods is visible. Personal resilience is constantly increasing throughout the observation period.

In March 2020, locked down management discovered telework (see details in Figure 7 in the Appendix). Individual measures and reactions are found to cope with teleworking situations. The reorganization of professional and personal activities is needed at home while uncertainty about the future remains. One explanation of this constant increase of individual implication may be the

Figure 5. Average clutch intensity over time



overall women's condition, which is difficult to change and may be getting worse as the COVID crisis continues. The reorganization of the activities also concerns collective engagement during this period because the priority was to maintain activity continuity.

In May 2020, the crisis accelerated the adoption of telework as practices and digital technologies. Previous results have shown that the experience of teleworking, as a reaction to lockdown, does contribute to accelerating its spread (Pallud et al., 2021). For example, perceptions and reactions to telework contribute to the future intention to continue with telework.

After one year, in December 2020, the change was felt (see details in Figure 8 in the Appendix). There was a lot of anxiety and uncertainty, and the explosion of telework was also becoming a problem. The organization of work was affected and fragmented work was denounced.

In February 2021, results show that resilience was not only a matter of technology but also a matter of relationships (see details in Figure 9 in the Appendix). At this time of crisis, the importance of human relations, beyond the technological solutions to telework, was becoming clear. The material conditions for a *phygital* solution (i.e., a combination of physical presence and digital connection) was needed. But one must also be able to give meaning to all this, by overcoming the paradoxical situations (Dudézert et al., 2021; Fuhrer, 2021).

The collective through the "we" clutch follows a rather Gaussian curve, peaking in May 2020, before returning to its initial state in February 2021. This peak is near the end of the first lockdown. This period perhaps marks the beginning of a retreat of the collective to the detriment of the individual or even individualistic vision. Further research is needed to verify this possibility.

Therefore, the results on the dynamic suggest several phases of resilience over time. A phase where there is a direct reaction to this new crisis (between March and May 2020), followed by a phase where the crisis was established and the question of exit from the crisis was delayed (after May 2020). I can then suggest the idea of pre-crisis resilience, resilience during the crisis, and post-crisis resilience. I consequently suggest three distinct resiliencies: preventive, reactive, and curative resilience. Following are verbatims that can illustrate the three resiliencies:

- Preventive resilience:

Implementation of teleworking by O365 - we successfully delivered our services to our customers; Very good, because we had anticipated as early as the week before the lockdown was announced; We are a digital company, teleworking has allowed us to continue to serve our customers in a different but still efficient way. (Participant: man; Under 35 years old; France; April 2020; narrative survey 1)

- Reactive resilience:

Positive reaction - everyone is working as hard as they can, with the comfort of knowing that our agency has been teleworking since 16 March; - some staff have a laptop - a VPN connection allows them to work almost as if they were at the workplace. (Participant: woman; 35-55 years old; France; April 2020; narrative survey 1)

- Curative resilience:

Genuine training of employees in the use of videoconferencing and teleworking tools (not "do it yourself"), so that the logistical aspects do not spoil the first 10 minutes of collective virtual meetings (mix of situations: individual face-to-face or in a collective room and teleworking. (Participant: woman; 35-55 years old; specialist; December 2020; narrative survey 2)

Although I consider that this crisis is not over, some trends are emerging, and the results reveal that the role of telework in resilience during this crisis depends both on the level of resilience and on the phase in the resilience process over time.

DISCUSSION

As a result of these findings, telework has affected individual resilience and collective resilience in different ways during this crisis. It has developed individual resilience among young women working in large companies. It has developed collective resilience in older men working in smaller organizations. Moreover, these individual and collective resiliencies are circumstance-dependent and change over time.

These results are not consistent with those of Miron et al. (2021). Indeed, they suggest that there is a positive relationship among professional development and competences, job satisfaction, work-life balance, organizational climate, and well-being, and a negative relationship among the emotional dimension, commitment, autonomy, and well-being in the case of the telework. The results suggest a more nuanced approach. I note the possibility through telework of acting individually and collectively depending on the context and the time of the pandemic. The analysis of the individual and collective resilience through commitment has shown the importance of the context. Specifically, the gender, age, and size of the company played a role in the type of resilience. Moreover, the dynamic aspect of resilience analysis has highlighted distinct commitment over time.

On another matter, I have highlighted overall results on telework positive consideration and optimism. So, telework, as a positive coping strategy, is related to optimism. Therefore, the results support trait optimism as a factor contributing to resilience literature (see e.g., Souri & Hasanirad, 2011).

I also used the gender argument in the analysis of results. Elements suggest that women have a particular place in this crisis, although further research is needed in this area. Other authors have proposed more advanced results at this level. For example, Okafor-Yarwood et al. (2022) has highlighted the gendered digital divide challenge in the Gulf of Guinea during the COVID-19 crisis. Their results have shown that digital access was highly gendered due to systemic socioeconomic advantages that gave men higher access to education and income than women.

Finally, I introduced the concepts of preventive resilience, reactive resilience, and curative resilience. These resiliencies correspond respectively to resilience before, during, and after disaster. Of these three resiliencies, preventive resilience is probably the most counterintuitive. The preventive resilience is the process by which the individual or organization prepares for a probable disaster. It supposes providing conditions so when the disaster happens, one can bounce back more easily. The preventive resilience is indeed a difficult concept to grasp because it implies being prepared for the unpredictable. The transition from one resilience to another is not linear but rather forms a cycle, or a loop, the curative resilience preparing the new normal for the preventive one.

This interpretation is aligned with lessons from Sakurai et al. (2020) about resilience against crisis where, in a recent work, outline general resilience thinking, adaptability, preparedness, available and reliable information, engagement with the community, and ethical guidelines. Moreover, our results extend existing work (see Larivière, 2020) by showing bridges between resiliencies. I emphasize that the sum of individual resilience impacts collective resilience and that reactive resilience is impacted by preventive resilience and impacts curative resilience.

The main implication for theory is that the author draw inspiration from this data to discuss two crossed areas where telework can play a role in supporting managers, specialists, and organizations in maintaining or improving their resilience. The first area is resilience as transformation: preventive, reactive, and curative. The second is resilience as property: individual or network (collective).

An interesting contribution is also on a methodological level, particularly in the collection of data. Using a collaborative platform created by researchers of different disciplines has allowed for

the collection of data that is rich in quantity, but above all, allows for a transdisciplinary analysis. In this way future scholars can extract an interesting range of data and approaches and apply them in their own discipline.

Implications for design and practices, based on the interpretation of these findings suggest that technical and digital solutions should be designed and implemented considering these specific phases of resilience. For example, in the preventive resilience phase, prepare a phygital mode adapted to both the technological and human levels; plan the tasks, activities, and people who will be face-to-face or remote; plan the tasks and activities that will be in normal, degraded, or latent mode; plan manual, semi-automatic, or automatic backup procedures when a crisis approaches; and design modes of supervision and feedback of tasks or activities performed. For example, in the reactive resilience phase, trigger the anticipated plan, the planned phygital mode and adjust if necessary; deploy the control system in crisis mode while ensuring legal compliance. For instance, in the curative resilience phase, learn from successes and mistakes; assess impacts (damage and gains); repair damage (curative maintenance); restore procedure (from backup); switch from degraded or latent mode to new normal mode; communicate on negative impacts; promote gains; update data on pre- and post-crisis deviations on tasks and activities performed. This list is not exhaustive. As IT function supporting a traditional organization is usually unprepared for emergencies and disasters, the design of a digital resilience can then draw on these suggestions. Digital resilience is understood as “the phenomena of designing, deploying, and using information systems to quickly recover from or adjust to major disruptions from major exogenous shocks” (see the 2020 Call for Papers MISQ Special Issue on Digital Resilience). Computer scientists use a close concept in their technical vocabulary when describing some operating systems: so-called crash tolerance (*tolérance aux pannes*).

CONCLUSION

In this work I explored the role of telework in resilience during the pandemic. To do so, I analyzed the results from five online surveys from March 2020 to February 2021. The transcription of 1,299 managers and specialists was studied following the textual data analysis methods. A step-by-step exploratory strategy was driven to answer to the research questions. First, I tried to study the overall place of telework during the period by investigating lexical components of the corpus. Second, I attempted to find homogeneous classes characterized by words that are overrepresented and suggested their interpretations. Third, as my interpretation was in terms of individual and collective orientation, I investigated in depth resilience by the contextual characteristics of these individual and collective commitments. Fourth, I studied these orientations in their dynamics.

The main findings indicate that the role of telework differs according to whether the resilience is individual or collective. It also changes over time and differs according to the process of resilience which I divide into three phases: preventive resilience (before the disaster), reactive resilience (during the disaster), and curative resilience (after the disaster).

The main implication for theory is that the author draw inspiration from this data to discuss two crossed areas: resilience as property and resilience as process. Another contribution is methodological, as I used combined innovative data collection from the COVID-data-lab gathering researchers from multiple disciplines (Moscarola et al., 2022), aiming the reflection for the action (Holmes et al., 2020). Another innovative methodology is the use of mixed method, following TDA and SAT approaches. Implications for design and practices suggest considering these specific phases of resilience when designing and implementing digital solutions, specifically for sustainable telework.

The results also point to some limits and main areas of future work. First, while I collected knowledge data from a large sample of managers and specialists, there are other data sources that would be interesting that I could not address here. For example, the data presented does not tell about employees or people from other continents. Second, I address different phases of resilience, but people are not the same for the different data sources and therefore for the different phases. In

fact, some respondents were able to participate in more than one survey, and thus, be part of several data sources. But this was not the case for all of them. Therefore, a longitudinal study is necessary to go further. Third, I explored the role of telework in resilience and found different impacts changing over time and over circumstances. It would be interesting to federate these effects in a complementary causal model to assess validity, and to explore the changing over time. Fourth, future research could deepen and assess the impact of telework considering the crossing of the dimensions of resilience in the whole management process: finalization, organization, animation, and control.

CONFLICT OF INTEREST

The author of this publication declares there are no competing interests.

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ENDNOTES

- ¹ Usually, February is too late for cyclones in this region. The local population, especially the older population, is afraid of cyclones that occur during this time because they are known to be more devastating.
- ² Most of the results in the French version have been translated to English. When some translations were not possible, a manual translation was specified in brackets.

APPENDIX

Supporting Figures

Figure 6. Respondents who mentioned home office or telework



Figure 7. March 2020: Locked down management discovers telework

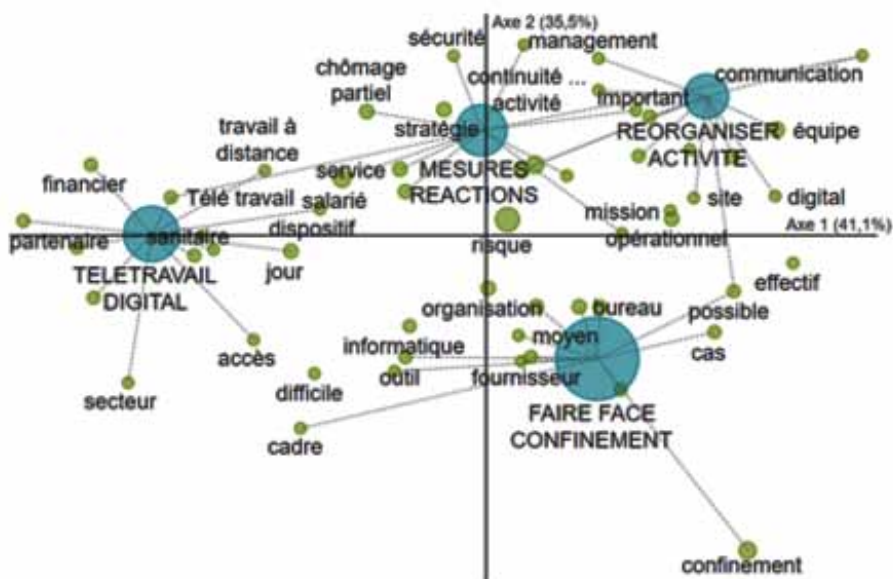


Figure 8. December 2020: Uncertainty, worry, and questioning



Figure 9. Resilience: A matter of technology and relationships

