The socio-organizational and human dynamics of resilience in a hospital: The case of the COVID-19 crisis

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Abstract

The aim of this paper is to analyze COVID-19 crisis management from the perspective of organizational resilience. An empirical study was conducted from April to June 2020 in one French hospital in Paris. The study focused on the organizational changes implied by the ‘all COVID-19 strategy’, the success factors facilitating the organizational resilience, and the difficulty factors. We show that organizational resilience in this case was based on a link between the anticipation and adaptation processes. This capacity for resilience can also be organized using an original structure that connects strategic decisions with the reality on the ground, takes account of the demands and constraints of operational actors, and offers them the necessary support. The description and analysis of real work carried out by operational actors illustrates the contribution made by expertize to organizational resilience, and the social dynamics of the adaptation process. Finally, the emotional aspects, rarely featured in the literature, are highlighted as an intrinsic element of a crisis. The results will provide evidence to help better understand crisis management and feedback to strengthen the management of future crises.

KEYWORDS
COVID-19, crisis management, organizational resilience

1 | ORGANIZATIONAL RESILIENCE AND CRISIS MANAGEMENT

Crisis-related literature repeatedly mentions a number of attributes: a severely disruptive situation (Crocq et al., 2009), that is threatening (Burnett, 1999; Kim & Lee, 2011), urgent (Borodicz & Van Hapeverk, 2002) and that overwhelms organizational, technical and human resources (Rogalski, 2004). Although the COVID-19 health crisis has its own specific features with numerous implications (Schulman, 2021), all these descriptions are true. The aim of this paper, which rests on a qualitative study performed in a hospital in 2020 during the first lockdown, is to show the human and social dimensions of anticipation and adaptation in the face of such a crisis and highlight their contribution to organizational resilience.

Organizations are often challenged with situations that require the implementation of different and complementary management methods. They must simultaneously anticipate and control the situations encountered, all the while remaining flexible and adaptable enough to manage unexpected events or crises that may arise. To achieve this, it is necessary to anticipate all possible situations, to prepare and implement the appropriate responses to these predictions, and to monitor compliance with the planned responses (Conant & Ashby, 1970; Weiner, 1961). This approach is reliable for dealing with ordinary situations, but insufficient in the face of unexpected events. To manage such events, the High-Reliability Organizations’ authors underline the importance of maintaining a global overview of the situation, developing the expertise and autonomy of operational stakeholders, ensuring permanent awareness of hazard occurrence.
and heightened vigilance, putting in place redundancies and margins, and adapting rules and procedures (La Porte, 2001; Roberts, 1993; Rochlin, 2001; Weick & Sutcliffe, 2001). Lastly, organizations must also be capable of improvisation, thanks to a sensemaking process that revolves around individual visions and knowledge (Weick, 1995), oversized resources to create margins (Woods, 2010), and social dynamics suited to the context (Christmann et al., 2014) or to job representation (Tillement et al., 2009).

Therefore, ‘anticipation’ and ‘adaptation’ processes are simultaneously required to manage the situations that arise. They may be adopted one after the other (Wildavsky, 1988), combined through operator expertise (Weick & Sutcliffe, 2001) or overlapped (Hollnagel et al., 2006, 2010). In our approach, anticipation and adaptation are the foundations of organizational resilience, which is a condition for crisis management capability. We defined it as the organization’s ability to anticipate disruptions so as to withstand them, adapt if necessary, and return to an acceptable state, regardless of whether these disruptions are minimal or highly serious (De la Garza et al., 2021). Anticipation involves the organizational, technical and regulatory procedures that have been planned in advance. Where these are insufficient, adaptation in situ takes the reins to adjust them as actors in the field are faced with unexpected situations. This can involve a range of responses, from amending an existing procedure to improvising an operating one that has never been tried before. This reliability paradox (Weick, 1995), this ability to make trade-offs between anticipation and adaptation processes, boosts organizational efficiency and helps regulate rigidity and flexibility, confidence and caution, compliance and discretion, expertise and unfamiliarity. In a similar vein to Weick (op.cit.), our approach (De la Garza et al., 2018; Le Bot, 2004; Le Bot & Pesme, 2010; Le Bot et al., 2018):

- recognizes the necessary coexistence of two seemingly opposed rationales—the technical rationale of anticipation, and humanity’s ‘flexible’ rationale of adaptability in interaction with its working environment;
- considers work teams and groups as the actors of resilience, rather than an individual-centric model.

Regarding the first point, our study took advantage of the crisis to analyze resilience. This opportunistic approach allows us to highlight how real work contributes to this link between anticipation and adaptation processes and the skills that underpin this adaptability. If these processes have been relatively well analyzed, it was mainly through organizational, cognitive or systematic engineering approaches. Few contributions analyze this link during real work activities or in situations that are very close to reality (Savioja et al., 2014; Villemaurin & Godon, 2017). Most of these approaches, however, address this question mainly from a sensemaking point of view (Weick & Sutcliffe, 2001). This is an essential perspective, but it does not highlight the role of human and social dimensions and the contribution of the real work of operational actors.

In connection with the second point, crisis management typically requires the participation of a higher number of stakeholders (Molenda et al., 2008) and an expansion of the fields and levels of intervention. As such, crisis organization is structured around a principle of distribution between various teams with complementary skills, which must be taken into account, consulted and integrated in the decision-making process. This assumes constant communication between different stakeholders (Crichton et al., 2005; Wybo & Kowalski, 1998). Effective crisis management, therefore, requires coordination and collaboration between these various levels and groups, to take decisions and complete the necessary actions. But what are the modalities and concrete forms of this linkage that is required for global resilience? On which actors and socio-organizational dynamics do these links depend? How can they be organized? Apart from a few references (Christmann et al., 2014; Tillement et al., 2009), the literature provides few answers to these questions.

Finally, the dynamic functioning of the socio-technical system in an operational situation is central and requires resilience, through a series of disruption and stabilization phases, where the system chooses the best-suited rules or operating procedures and applies them (Le Bot, 2004; Le Bot & Pesme, 2010). In the same way, our hypothesis is that the hospital faced phases of disruption in dealing with this new virus. Nevertheless, achieving stabilization has been difficult even though control of this was possible at some point.

To address these topics, an empirical study was carried out during France’s first lockdown. This allowed us to remotely monitor the management of the first wave in March 2020, almost in real-time. In the perspective set out below, our hypothesis was that the hospital is certainly able to handle this health crisis: first, through activating the emergency plans that have been anticipated, and second by adapting its resources to the healthcare requirements. Indeed, the hospital is a socio-technical system that often faces critical situations and has experience of different kinds of crisis (heatwave in 2003, terrorist attack in 2015, H1N1 in 2009). Thus, our study focuses on the organizational resilience capability of the hospital and will highlight the elements that support it in terms of expertise, knowledge, interactions and collective actions and management.

2 | METHODOLOGY

2.1 | Initial request and data collection

EDF’s research and development team has been conducting studies on organizational resilience for many years (De la Garza et al., 2018; Le Bot, 2004; Le Bot & Pesme, 2010; Le Bot et al., 2018; Lot & Guillaume, 2016). In April 2020, we proposed an opportunistic study to La Pitié Salpêtrière, a French hospital which was a reference facility for COVID-19. Our aim was to compare the sanitary crisis management in place at EDF with that of a hospital and to measure our methods and models against those of a different sector. This study was carried out with agreement and interest of the hospital’s crisis medical management team to provide them with feedback that would help them to better understand and improve the way they function. As it was not possible to grant access to the field due to the health context, this study was carried out remotely. This study
focuses on the time around the first wave (March 15 to May 11, 2020) and covers the initial critical period from the event triggering the health crisis (the first death of a patient from COVID-19) through to the months where the situation was under relative control.

The aim of the study was to characterize and analyze the decisions taken, local actions, difficulties, and adaptations, so as to have a record of what to replicate or improve where necessary, develop staff skills, and prepare to manage the next stages of the crisis. The challenge of data collection was to identify remotely the elements that contributed to effective organizational resilience, with a view to exploring the factors that facilitated or hampered it (organization, emergency plans, procedures, skills, knowledge, experience, expertise, etc.). To meet this challenge, our work identified the human, social, organizational, and managerial factors deployed to handle the crisis and the unexpected situations encountered by the hospital at different levels: the crisis unit and frontline healthcare staffs. The factors underlying the anticipation and adaptation processes have been divided into two levels analyzed from two complementary points of view, ergonomics and sociology: (i) an organizational and structural level, in terms of managing the crisis team, combining senior management, departmental management, administrative sections and their links to field work and (ii) an operational level, in terms of response implementation by healthcare staff working in the ICU and emergency departments, which were most heavily hit by the health crisis.

The hospital is considered here as a high-risk socio-technical system, where teams must continually manage critical situations, and where the slightest error could result in the worsening of a patient’s condition or even death. Organizational resilience plays out across different levels of action and in the interactions between them:

- Management by the crisis unit (approximately 30 participants), with investigation of team decision-making, preparation, communication and ownership of the decisions by departments. The aim of the crisis unit is to handle the crisis, anticipate and find solutions to unexpected situations regarding healthcare, human resources, equipment and so forth.
- The provision of care by staff, and in particular any restructuring, prioritization methods, withdrawals, and methods and actions for monitoring the effectiveness of choices made and collective operations.
- The contribution and operational methods of ‘support’ departments (laboratories, pharmacy and logistics).

Data were collected between April and June 2020 using qualitative methods developed in the fields of cognitive psychology, ergonomics and sociology. The corpus was built by triangulation (Eisenhardt, 1989) from three types of data.

Through 37 explicative interviews (Vermersch, 2014), we were able to gather detailed accounts from individuals, using a template to structure and systematize the information. These interviews were anonymous, conducted remotely due to the lockdown measures in place, lasted between 45 and 90 min, recorded with the interviewees’ consent, and transcribed in full. Interviewees from the crisis unit were experienced and included staff from the supporting departments. We established a list of personnel that we wanted to interview, including numbers and types of healthcare staff and administrative staff. Given the circumstances, it was impossible to have full control over the sample because the participants were volunteers, some of whom did not work at this hospital. Finally, the healthcare and medical staff had varied backgrounds and levels of experience, which allowed us to understand the forms of collective functioning between experienced and inexperienced staff members (Table 1).

The crisis unit held daily meetings that we listened to remotely without participating in them. Thirty-five meetings were listened into by telephone with the participants’ consent. Notes were taken of the discussions and cross-checked with the minutes when they were circulated. The data collected from the follow-up of crisis unit meetings underwent repeated ‘floating reading’ (Bardin, 1977), which consisted of regularly reading and rereading the corpus to familiarize ourselves with the study aim and specify the analysis.

The corpus was then completed by an analysis of documents describing the health crisis management methods employed by healthcare establishments and internal hospital notes (protocols, flow charts, flow maps and crisis organization). This documentation allowed us to understand the crisis organization of the health system as a whole and at the hospital in particular, as well as the organization of the hospital’s departments before and during the crisis.

### Table 1: Study participants

| Staff category                                                                 | Number |
|--------------------------------------------------------------------------------|--------|
| Hospital crisis unit members                                                   | 10     |
| Healthcare and medical staff (department heads, doctors, interns, emergency doctors, nurses, assistant nurses) | 17     |
| Administrative staff (supervisors, logistics department, laboratory, prevention and quality departments) | 10     |

2.2 Data analysis

Our theoretical framework prompted us to take an interest in the management of uncertainty, decision-making, and collective action—all elements which support the adaptation and innovation processes. In advance of the interviews, we instantiated these concepts and notions to define the operational themes in relation to the work carried out. To achieve this, we listened to crisis unit meetings using the free-floating approach and read the minutes several times. This enabled us to become familiar with what was being anticipated and with some of the adaptations that had been implemented or were being developed. We then drew up an interview grid to clarify the specific themes for which these processes were implemented. The themes explored were as follows:

- Decisions by the crisis unit: arrangements for informing departments and implementation.
- Management of patient flow and number of beds.
- Development of new treatment, hygiene, sedation, and intubation protocols.
• Transformation of existing departments into critical care departments.
• Cooperation within and between departments.

In addition, inspired by Flanagan’s critical incident technique (Flanagan, 1954), the interviewees were asked to describe, on the one hand, three situations related to the health crisis that were particularly difficult to manage, or were perhaps even failures, and, on the other hand, three situations that were considered successes in terms of adaptation. It was then possible to explore the decision-making of different actors and groups, and their underlying mechanisms (organizational systems, knowledge and skills).

Finally, materials relating to the interviews and meetings have been organized thematically using grounded theory (Corbin & Strauss, 2014). Constant feedback between data and concepts was made possible through the use of an abductive approach (Van Maanen et al., 2007): the research began from the field to identify hypotheses and conclusions that would help answer the questions and hypotheses posed during the literature review. Themes were therefore analyzed in line with our theoretical framework and organizational resilience analysis. A summary of these findings has been discussed with the members of the crisis unit to confirm our interpretations.

Analysis of our data highlights 13 themes relating to health crisis management (Table 2). Some of these themes are common to the three categories of staff involved, but others are specific to only two categories. Most of the difficulties were raised by healthcare staff and crisis unit personnel.

In the next two sections, the results are presented at two levels: a descriptive nature level, and a conceptual rereading level (van Maanen, 1979).

### 3 | RESULTS

This section describes the development and implementation of the hospital’s response to the crisis. It shows how management of the crisis was based on a link between the anticipation and adaptation processes at various levels of the hospital. Organizational resilience is illustrated through measures planned, external to the hospital, the effective operation of the hospital’s crisis unit, and then the adaptation of operating procedures by medical staff on the ground. Some limits and difficulties encountered are finally presented.

#### 3.1 | Anticipated organizational measures at different levels

Our analysis shows that, in terms of crisis management, anticipation occurs at several levels and on different timeframes, as illustrated in Figure 1. The first level of anticipation occurs within government and the Ministry of Health and Solidarity. A second level of anticipation involves the hospital, which has broken down the national plans and directives into crisis units. Finally, when faced with the actual crisis and this genuine 'break', the relevant crisis units and emergency plans were initiated at all levels.

In terms of crisis management, the hospital was not starting from scratch; it already possessed emergency structures and plans at a variety of levels. From a structural point of view, the French Ministry of Health relies on Regional Health Agencies. Their purpose is to help organize the response to emergencies and health crises, by putting in place the necessary structures in cooperation with local authorities and the Ministry.

| Staff themes                        | Hospital crisis team | Healthcare staff | Support staff |
|-------------------------------------|----------------------|------------------|--------------|
| Planned crisis organization         | X                    |                  | X            |
| Effective crisis organization and management | X                |                  |              |
| Collective mobilization             | X                    | X                | X            |
| Circulation of information and decisions | X                | X                | X            |
| Management of human resources, reallocation of job roles, temporary hires | X                | X                | X            |
| Hospital and department reconfiguration | X                |                  | X            |
| Operational adaptation processes for healthcare protocols, cleaning protocols, disinfection protocols, admissions, etc. | X                |                  | X            |
| Healthcare expertise, experience in crisis management at the hospital | X                | X                | X            |
| Equipment shortages at the start of the crisis | X                |                  | X            |
| Difficulties establishing adequate healthcare protocols due to lack of knowledge about the virus | X                |                  | X            |
| Fear linked to lack of knowledge about the virus, fear of transmitting the virus to family members | X                | X                | X            |
| Difficulties due to fatigue and duration of the crisis | X                |                  | X            |
| Difficulties managing patients, families, and deaths |                  | X                | X            |
ORSAN (France’s healthcare response organization for exceptional health situations), founded in 2014, predicts five situations that could affect the healthcare system and suggests specific methods for organizing healthcare in such events. Alongside it, the ‘White Plan’—an emergency plan to deal with a health crisis—organizes knowledge, interfaces and coordination between the hospital and other actors who may participate in crisis management (Foucher et al., 2018). In the case of a pandemic, this emergency plan recommends prioritizing healthcare operations, postponing any that are not considered as ‘urgent’ and transferring patients to other hospitals. This led the hospital to streamline and optimize its COVID patient flows and switch to an ‘all COVID’ mode during the first wave of the epidemic.

To implement this strategy and comply with these recommendations, a Hospital Crisis Unit (HCU) was activated in February 2020 to prepare and guide the hospital’s response. Its aim was to define, implement and reinforce the measures needed, and to adapt the hospital’s medical services to the requirements of the pandemic, as specified in the emergency plan called the ‘White Plan’. The hospital, therefore, activated its crisis unit, which took strategic decisions, broken down by working group, then by staff on the ground.

3.2 | An organizational structure that supports resilience

Although the management of a variety of critical events had been planned by the hospital, in particular through the establishment of the HCU, the organizational structure was able to adapt these emergency plans to ensure that the HCU’s decisions and forecasts were consistent with the frontline requirements of the various departments and the available resources. To achieve this, working groups (critical care, surgery, medicine, resilience, treatment of COVID patients leaving the ICU, etc.) were set up alongside the crisis unit to cobuild the response strategy and relay the information and decisions to the operatives. Figure 2 illustrates the relationship between these different structures.

Made up of a small number of stakeholders with clearly defined roles and responsibilities, the HCU serves a strategic purpose and has decision-making expertise, that directly aids the capacity of anticipation. To formulate a realistic response to the crisis, and to ensure access to reliable and accurate information, the HCU we studied equipped the crisis manager with the necessary administrative skills (hospital management, healthcare safety, human resources), and the necessary medical skills and experts (epidemiologists, pharmacists, virologists, infectologists, surgeons, critical care specialists, emergency doctors, etc.).

The daily meetings of the crisis unit followed the same agenda: (i) an update on the national epidemiological situation (number of daily infections, rate of positive polymerase chain reaction tests), expected trends and indicators relating to the situation at the hospital itself (number of admissions to critical care and number of admissions to hospital); (ii) scaling and adaptation of the hospital’s overall response (number of critical care beds required, location of these beds, allocation of skilled resources) and (iii) a specific update to present the views from the emergency department, critical care department, conventional wards, surgical departments, the pharmacy and human resources.

Then, decisions made must be suited to the size of the hospital as well as to the dynamics, magnitude and duration of the crisis. It leads the HCU to constantly adapt its strategy and decisions based on the situation being faced, and to scale resources accordingly. To help this capacity of adaptation, working groups were established around the
HCU and worked upstream on its decisions with representatives on the front lines:

“Very quickly, there was a need to reorganize some areas (surgery, medicine, intensive and critical care, geriatrics) and so we took on people who were experts in these fields. We set up working groups (surgery, critical care, medicine). This is vitally important, because these are the people who put forward suggestions and offer solutions. The HCU passed the ball to experts on the ground in the working groups, and then validated the feedback.” (crisis unit member 1)

Led by HCU members, these groups brought together representatives from various hospital departments related to the theme. They adapted the medical and treatment response plan, presented it to their respective departments, contributed their own personal expertise and raised suggestions with the crisis team. The HCU approved suggestions made by professionals on the front lines, ensuring decisions were reached quickly, without falling into long and meaningless discussions:

“It was necessary to be creative. For example, we commissioned several people to identify proposals for saving midazolam. They come up with proposals for us: this alternative can be used, or this one. This is what can be done. Then the protocol is validated. There is an institutional position. And then it is communicated back down to medics in the department (...)” (crisis unit member 2).

This dynamic can also flow the other way: the HCU can ask the group about a subject it is working on before sending back its proposals. The members of these groups communicate the decisions to frontline operatives, outlining them and implementing them, while ensuring consistency between strategic decisions and actual working conditions. Where necessary, they feedback any assessments, suggestions and difficulties voiced by those working on the front lines.

Lastly, what is unique in the organization in this case is that the HCU members also kept one foot in their original departments, to whom they communicated and explained the strategic decisions taken. This positioning enabled them to remain connected to their business areas and understand frontline requirements:

“It was essentially the doctors in consultation with the nurses and the existing protocols who developed the MERS-CoV protocol. Each using their own special area of expertise. The doctors decided to use the drugs best suited to respiratory distress. And the nurses selected the dilutions that seemed the most logical, each using their own skills.” (doctor 4)

### 3.3 Adoptions to deal with the crisis requirements

This section presents the key innovations and improvisations implemented by the healthcare staff as an illustration of its ability to cope with the demands of the health crisis. In fact, in this section, we describe the adoption processes and how real work contributes to it. Figure 3 shows the reconfigurations and the compromises made by management and healthcare staff to cope with available resources when they face unexpected situations. Although it is not exhaustive, it shows the reconfigurations in relation to the 13 analysis themes used in the interviews, as described in Table 2.
First, improvised departmental restructuring made it possible to streamline and optimize patient flows as required by the emergency health plans. The hospital had to resize its ICU (late March–May 2020) and specify the number of beds needed for COVID patients, their location and distribution in the hospital, and the number of staff required:

"We redesigned the scope of intensive care, creating a unit where there wasn’t one before." (crisis unit member 3)

"Over time, all of the facilities that were providing intensive care for patients who did not have COVID (cardiac surgery, neurosurgery, digestive disorders) were turned into COVID units." (administrative staff 3)

"We figured that we had to get ready to scale up into intensive care units, and to make a plan for resizing, not just in the figurative sense, but also architecturally: knocking down or putting up walls, changing systems etc. in the buildings, and that’s what we did." (crisis unit member 1)

Collective mobilization aided the improvisation of these specific structures within extremely short time frames:

"I was still struck by how everyone at the hospital stepped up. Everyone pitched in to help with the crisis. Despite the fact that we had protocols that were amended on the ground, sometimes, three hours later, we had new protocols coming in. So, we were reading, updating our knowledge every time. But that was thanks to the managers, the doctors, the care assistants, the nurses. Everyone did their bit on the procedure. It was a team effort. So, the good thing there was that everyone was on the ground. Everyone was there to contribute." (administrative staff 3)

Second, the introduction of new protocols was crucial in fighting this new virus. Healthcare staff utilized a protocol that had been drawn up for MERS-CoV, and regularly adapted it to the specifics of COVID-19. Intubation techniques had to be rethought to take into account the contagiousness of the virus, and less intrusive techniques (Optiflow) were introduced through a trial-and-error approach, informed by new medical knowledge when it became available. Oxygenation techniques were also reviewed and adapted to the disease, by providing assisted ventilation via a mask instead of a cannula. Protocols for cleaning, disinfection and staff clothing were regularly reviewed to avoid contamination. The contagiousness of the virus, the lack of resources, the additional tasks required due to these protocols and their variability all complicated their implementation:

"We had to rethink all the drugs and all the techniques for intubating and treating these patients in relationship to the disease. We had to rethink how we do things and adapt the drugs to this respiratory disease." (nurse 2)

"(...) there’s a device called an Optiflow, where people are not intubated, it’s a way to avoid intubation. When it comes to oxygenation, you go through levels, different levels. First, there’s the nasal cannula. If that’s not enough, you use a small mask, and if that’s still not sufficient, there’s Optiflow." (doctor 5)

Third, the pooling of effort and unprecedented provision of material resources enabled this extraordinary organizational flexibility, despite the complexities and difficulties constantly faced by healthcare workers. Since the beginning of the crisis was
characterized by a lack of human and material resources (masks, scrubs, drugs and ventilators), the administration was able to react and provide staff with resources and support in a responsive and coordinated way. The support departments responded to the needs of those on the front lines by immediately hiring temporary workers, placing drug orders and sourcing material resources (beds and ventilators), with no regard for cost:

“They appealed for volunteers because there was a shortage of nurses in several Paris hospitals. So there were also students who had one day of training, and then they were mobilized and went into the departments to replace nurses…” (administrative staff 5)

“We’re in a crisis. My view is that, in a crisis, you don’t always do what you know how to do, and if you know how to do something, if you’re a doctor and they need a nurse, then you do the job of a nurse for a month. In any case, not everyone’s doing what they would normally be supposed to be doing.” (doctor 6)

These measures were complemented by full logistical deployment (installing partitions and modifying ventilation systems) or intervention from external companies during lockdown. The joint effort by administrative and medical staff to take strategic decisions and find ways to put them into practice greatly contributed toward the success of these adaptations.

Finally, staff also had to simplify the usual official channels and put new ones in place to facilitate the effective and timely circulation of information. Indeed, information communication and circulation strategies helped to notify staff about changes almost in real-time and in various domains (treatment, disinfection, dressing and undressing protocols, information to be shared relating to the strengthened rules around family visits). Numerous strategies were adopted, such as departmental notices and targeted emails to key staff members (e.g., the appointed COVID officer or head nurse). Others, such as group WhatsApp chats, were unplanned.

3.4 The limits of organizational resilience

Nevertheless, workers encountered many difficulties, primarily emotional issues and fatigue, factors that are rarely considered or studied in the field of organizational resilience. And yet, every crisis comprises a very strong emotional component that affects the efficacy of the response (Jin et al., 2012; Sinaceur et al., 2005) and these aspects emerged spontaneously during interviews. In our case, several factors increased the emotional impact of this current crisis: hospital colleagues who contracted the disease, a fear of contaminating one’s own family, managing the family members of patients, and a high number of deaths. The accumulated fatigue between March and May 2020, compounded by intense workloads and working hours, further added to this emotional impact resulting from lack of knowledge about the virus and fear of getting sick:

“The worries covered just about everything: would we have a lot of COVID cases? How dangerous was it? How did the virus spread? How could we slow it down? What treatments could we use?” (doctor 8)

“It was the fear of getting sick and then the pressure that we felt, seeing people die and wondering what was going to happen. One of my colleagues was badly affected, he was in hospital for more than 21 days. Recently, he said to me: ‘You know, when I was in bed and putting the TV on, I would see the number of deaths, 300 deaths, 400 deaths, and I said to myself, maybe tomorrow or the next day, it’ll be my turn.’ That’s what I mean by emotion.” (nurse 2)

Emotional factors can have cognitive impacts. When the covid-19 pandemic began in March 2020, seeing their colleagues fall ill, sometimes seriously, made some staff very afraid of contracting this unknown disease or of infecting their family when they went home. Managing victims’ families, who at the start of the crisis were unable to see their relatives, alive or dead, was complicated. A structure was thus put in place to greet and communicate with family members, even though no members of staff had been prepared for this situation. Even with the restructuring, emergency staff were still unable to admit all patients as they would have wanted to do, which sometimes put them in a dilemma. Most staff had never faced this situation before.

COVID-specific factors led to increased workload, adding to the emotional pressure. COVID-19 requires constant monitoring and intricate care, as well as sustained physical effort, such as moving the patient into a prone position twice a day to prevent bedsores, which takes four to five members of staff. This disease requires long hospital stays (with several weeks in the ICU), which demoralizes healthcare staff who do not always see the benefits of their actions. On top of this are all of the new cleaning and disinfection procedures that must be followed. Healthcare staff experienced huge fatigue and workload:

“There’s a lot more technical procedures. We generally have heavy patients in intensive care. We’re used to that but usually, out of the 15 beds in critical care we have a total of 2 or 3 who are very, very seriously ill, and now, 10 of the 15 are in a very serious condition at the same time... It’s harder to see them, we have to manage things by ourselves more, that kind of thing. Lots more drugs to prepare.” (nurse 4)

Factors linked to the uncertainty of the ‘post-COVID’ world and to the waves that followed in 2020 and 2021, exacerbate these...
difficulties. The hospital is currently experiencing a difficult situation and the impacts of the health crisis will take a long time to disappear.

4 | DISCUSSION

Despite this burden on staff, the hospital demonstrated an organizational flexibility inherent to its organizational resilience. We will discuss here the key elements that shaped this.

4.1 | Anticipation is necessary and useful, even up against an unexpected reality

Anticipating the management of a pandemic relies on several systems and strategies (from the World Health Organization, the French Ministry of Health and the French Regional Health Agencies), which were implemented in all hospitals’ HCUs. This anticipation enabled the rapid implementation of crisis organization and effective coordination between different departments and facilitated patient admissions and transfers. However, these anticipated responses were only suitable for one phase of the health crisis. Extending them for a longer duration requires the implementation of separate and complementary organizational responses. The decision to go ‘all COVID’ at the expense of all other activities during the first wave of COVID-19 was not sustainable for the long term, as shown by the decline in collective deployment, the voices of doctors and surgeons defending their business areas during subsequent waves, and the accumulated fatigue of healthcare staff.

The anticipated measures did not account for the pandemic’s duration, limiting their effectiveness with every new peak experienced in France. Although its meetings are now less frequent, the HCU was still active in June 2021 to help the hospital to adapt. Furthermore, absorbing the consequences of the health crisis and the choices made will take a long time, bringing human and material costs.

4.2 | Translating crisis experience into crisis expertize

Anticipation relies on the knowledge of crises acquired by the hospital system and its staff. On one hand, this is based on the knowledge of all hospitals, each with its own size, geographical location and focus. On the other hand, the hospital has faced several crises in the past (SARS-CoV in 2003, the heatwave in August 2003, H1N1 in 2009, MERS-CoV in 2013 and the terror attacks of November 2015) and the specific expertize acquired by its staff from those situations was mobilized this time around. Therefore, in addition to the plans and systems guiding the preparation and management of health or similar crises, the nature and history of the hospital’s own activity has already given it a culture of risk management.

Moreover, the hospital manages ‘crises’ or critical situations continuously and on a daily basis, particularly in its emergency rooms and intensive care units. This daily activity fosters expertize, the ability to take a step back, collaboration with peers to discuss specific problems, problem-solving and decision-making in uncertain situations, sometimes in very quick time frames and when patients are in acute need. Healthcare staff are therefore experts in managing unexpected situations. They also have technical knowledge and specific tools to manage patients in crisis situations.

Alongside their technical and medical expertize, the data collected shows that social skills also contribute toward crisis management. The efficacy of the HCU meetings is due to the crisis medical director’s social skills: the balance between listening, firmness, and tact (Kornberger et al., 2019) during discussions and decision-making helped to build and maintain a collective dynamic. In a similar vein, the relevance of the suggestions raised by the working groups depends on the ability of the group leaders to get everyone working together, exchanging information, negotiating their cooperation and monitoring each other (Lazega, 2001). This aspect, which is not seen during short-term crises, is a special feature of this long crisis during which different staff have been able to find the space and time to negotiate their cooperation.

4.3 | An organizational structure that supports real work and adaptability

The organizational structure put in place for the hospital during the first wave prioritized the needs of staff and patients. The HCU’s choices combined government recommendations with frontline needs, attesting to the hospital’s organizational resilience. The thematic working groups facilitated joint working, discussion of innovative practices, and the circulation and implementation of decisions. This HCU is similar to a ‘project plateau’ used in industry, which helps foster proximity between its members, develop a shared objective and facilitate interactions. Coordinating these various specialties also includes a political element, as different disciplines and departments are occasionally pushed into incompatible situations of interest. In the acute phase of the crisis, COVID patients were prioritized. Depending on the circumstances, other patients were transferred to other hospitals or their care was postponed. Follow-up of daily HCU meetings by phone showed that decisions regarding recommendations from the front line were taken in a collegial manner (Waters, 1989). The crisis manager helped to mobilize and coordinate the skills distributed across the hospital. The ability to do this is often considered a leadership skill (James et al., 2011), although it is also a political skill that enables an ‘inquiry’ type decision-making process (Garvin & Roberto, 2001). It involves participants in problem-solving through an exploration process, encourages constructive criticism, discusses arguments in greater depth, and takes the time to formulate and elaborate different alternatives. The legitimacy of the crisis medical manager is essential here for leading the team, and stems from his/her formal role, granted by the rules, and his/her
professional competence. However, it chiefly depends on the manager’s personal reputation acquired from past or present projects\(^1\), which plays a decisive role in winning the trust and engagement of the rest of the project team.

These interaction spaces functioned as ‘trading zones’ (Galison, 1997) where know-how and knowledge were exchanged between different business areas and where groups’ cognitive challenges were coordinated (Carlile, 2004; Kellogg et al., 2006). However, above all, these groups operated as ‘discussion spaces’ (Detchessahar & Journé, 2018) that provided participants the opportunity to voice the difficulties and contradictions of their work and thus forge compromises, usually temporary, that would go on to act as the point of support for collective action. Some of the fruits of these discussions were ‘institutionalized’ by the HCU. Above all, by allowing and organizing reflection on the work, collective and organizational points of consensus on the rules were developed by those working on the front lines. To properly express opinions and form agreements, these spaces were centred on real-life work and frontline workers, at a frequency dictated by the pace of operations.

By ensuring a balance between the centralization of strategic decisions and the decentralization of operational decisions (Roberts, 1993), connecting different levels of the organization (each with their own level of responsibility) and focusing chiefly on supporting frontline operations, this structure ultimately supported the hospital’s capacity to adapt. Reflecting on the work and developing collective and organizational points of consensus on the rules can contribute to the management of crisis situations.

### 4.4 The socio-organizational and human dynamics of innovation

These spaces where participants can speak enhanced the HCU with a source of local innovation and adaptation, the general processes and dynamics of which are described here. They followed four main steps:

- An idea is voiced by the HCU or frontline team;
- It is deliberated by an expert group involving doctors and nurses to improve the initial proposal, make sense of it and adapt it to local circumstances, thereby rendering it more effective;
- It feeds back into the decisions made by HCU thanks to the connection between the various discussion spaces;
- The HCU institutionalizes the effective practices and disseminates them.

This creative collective process (Alter, 2000) results in protocols that are suited to the local context, which required frequent repetition to adjust to changes in the disease and our knowledge of it. Rapid changes to these protocols, their variability and their occasional overlaps led to ambiguity (March et al., 1976) that was resolved through sensemaking processes (Weick, 1995), using explanations from management or presentations from an expert to legitimize and explain the variations. Frontline workers sometimes turned to a trusted expert with whom a relationship had been established before the crisis. These ambiguous situations therefore required discussions to find a solution to critical situations, as well as strategic skills to make the message heard and apply the decisions, and social skills for shared sensemaking of the situation (Lot, 2008).

These successes, as in any crisis situation, come with costs and consequences (inability to treat certain patients, worsening of chronic patients) that must be managed by healthcare staff who are exhausted due to their considerable efforts and postponed rest. Therefore, as effective as it may be, this strategy is not sustainable in the long term.

### 5 CONCLUSION: ORGANIZATIONAL RESILIENCE, A DYNAMIC PROCESS ENABLING HUMAN RELIABILITY

Exploring organizational resilience from the implementation of the emergency plans in a real crisis was an opportunity to learn lessons to enhance it, as explained by Crichton et al. (2009). So, four areas of improvement for organizational resilience will be discussed.

The first involves lessons learned, a particular feature of this crisis, insofar as stakeholders have been constantly learning, and continue to learn throughout the pandemic. These lessons have been learned between different hospitals and colleagues, sometimes through a trial-and-error approach, in the spaces and times available, and lead to improved treatment, cleaning and disinfection protocols. In addition, the repeated and improving structural transformations (temporary care units, resource pooling, introduction of mixed units to treat COVID patients alongside others, etc.) as the crisis evolved reflects the permanent capacity for organizational learning. Some of these transformations could be incorporated into the anticipated organization for future crises, as well as into the daily organization. For example, it would be useful to experiment further with structured discussion spaces that bring together different skills and knowledge, to accelerate decision-making and organize day-to-day working. This case has shown us that a long crisis allows real-time learning, which is rather atypical. Conversely, the more common way of thinking is to use the lessons learned from crises to improve prevention, that is, anticipation. However, despite the existence of knowledge following the Spanish flu (Spinney, 2017), we have seen that no government plans were suited to anticipating this current health crisis. Thus, to cope with the variability of crises, these results suggest learning from past experience and better integrating it into anticipatory measures at different levels of crisis organization.

The second area of improvement concerns the anticipation of crisis organization and the consideration of a long-term crisis. This may require different strategies to enable hospitals to manage pandemic patient flows while still treating other patients. The decision to switch to ‘all pandemic’ mode (‘all COVID’ here) weakens the health system’s organizational resilience over time. Similar thought must be given to human resources. Regardless of the
problem of understaffing since the start of the crisis, crisis management requires several highly specialized and trained reinforcements for a prolonged period. Now, staff are tired and there are few options for reinforcement. If the anticipated HCU s had been able to adapt their strategies as the pandemic evolved, they could have envisaged creating an one-call team to enable a greater rotation of HCU staff, the majority of whom have not changed post since February 2020. Even though the HCU s workload moves up and down in line with the peaks of the crisis, its members are also showing signs of fatigue. That is because the length of the crisis was not considered when this team was conceived (e.g., there are no break rooms), nor was the ability of staff to maintain this level of activity in-post for an extended period.

Tools are the third possible area for improvement. Our study has shown the importance of communication tools for near-real-time dissemination of information. To support communication on crises, the introduction of a real-time crisis exchange platform for staff, depending on their individual business areas and needs, is required. A prototype, considering the requirements of the actual work and missions of the stakeholders, could be designed and tested.

The final area for improvement relates to crisis management preparedness. Organizations are dynamic and learn from micro-incidents’ every day outside of crisis situations, which is makes them adaptable (Weick & Sutcliffe, 2001). However, the knowledge and skills needed for adaptation are only developed in special circumstances. In other words, in terms of crisis management, these will only be developed in simulations, crisis drills or real-life events (De la Garza et al., 2018). It is therefore useful to think about training methods inspired by real-life situations when constructing simulation scenarios (Klein et al., 2013).

Thus, one of the most important contributions of our empirical-based research is that it shows how work is imagined, decided, and then carried out when facing unexpected situations in a crisis context. Additionally, if crises have been approached by using the Resilience Activation Model (Powley, 2009), our results show that ‘resilience’ does not activate by itself in a professional context. Resilience needs the support of a specific organizational structures that connect various experts scattered in the organization and gathered on occasional basis in working groups. To emphasize, it is this combined expertise that contributes to creative solutions (Villemain & Lémonie, 2021) necessary for the organization’s adaptability. Indeed, our results highlight how professionals are able to adapt the available resources to the requirements of dynamic situations. This is achieved through the day-to-day practice of routine activities, in particular those conducted in emergency and critical situations. These situations are the basis of learning and experience and it is during these situations that professionals develop their crisis skills. In other words, organizational resilience is a permanent characteristic of a socio-technical system. But studying organizational resilience from this perspective is not widespread. For example, based on a review of the literature, conclusions reached by Ranasinghe et al. (2020) establish indicators of resilience engineering and safety management to describe the resilience levels of a high-risk system. However, their conclusions do not supply information on how to identify resilience engineering and safety management in a real-time situation or, specifically, in a crisis situation. For this reason, from a theoretical point of view, resilience engineering as defined by Provan et al. (2020) is closer to our approach by combining the two visions of safety management, that of the centralized control and that of the guide offering resources to cope with unexpected situations. That is, it provides resources to deal with unexpected situations by describing the characteristics of a safety-managed mode of guided adaptability. Some points have been confirmed by the results of our empirical-based research. Anticipating a crisis is necessary, but organizations should also have flexible capacities to cope with emergencies because collective mobilization ensures reliable coordination and decision-making during the crisis situation.

Equally important, our research focuses on a qualitative micro approach, while studies of organizational resilience usually consider macro approaches or are conducted in contexts other than high-risk systems. Also, empirical-survey research or quantitative studies are generally preferred (Varajao et al., 2021) to the empirical-based research we have conducted.

Finally, analyzing real work situations, how it is performed and what happens in a crisis context enables the reliable functioning of a socio-technical system in an emergency situation, as well as providing for a well-adapted emergency preparedness. Moreover, designing organizational resilience thus assumes that unexpected situations can occur, rather than considering that it is necessary to anticipate all possible scenarios.

AUTHOR CONTRIBUTIONS
Both authors contributed equally to the preparation and writing of the manuscript.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT
The data supporting the findings are available from the corresponding author, upon reasonable request.

ENDNOTE
1 The crisis manager had been on the front line for the hospital’s handling of the terrorist attacks in November 2015.

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**How to cite this article:** Lot, N., & De La Garza, C. (2022). The socio-organizational and human dynamics of resilience in a hospital: The case of the COVID-19 crisis. *Journal of Contingencies and Crisis Management*, 30, 244–256. [https://doi.org/10.1111/jccm.12419](https://doi.org/10.1111/jccm.12419)