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THE ROLE OF ORGANIZATIONAL RESILIENCE IN MANAGING RISKS AND UNCERTAINTIES

An analysis of the Italian public health sector's response to the Covid-19 threat

SUPERVISOR

PROF. LUCA GIUSTINIANO

CO-SUPERVISOR

PROF. GABRIELE GABRIELLI

CANDIDATE

ALESSIO DI POFI ID 714761

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CHAPTER 1 | INTRODUCTION

Undoubtedly, the modern world is characterized by a breathtakingly fast speed to change; as news report hourly, the globalized society hardly remains quiet and steady in a condition, it rather constantly evolves and reshapes itself, escaping the grasp of human control; crisis, scientific discoveries, conflicts, new opportunities, they all carry intrinsic shocks and challenges for social, political, and economic spheres.

Crisis, shocks.
The reader might be immediately thinking about the Covid-19 pandemic, which still shows no sign of ending, but unfortunately, this is not the only example of a crisis that could be easily recollected: just in the last 20 years, the globalized world experienced plenty significant socio-economical catastrophes, such as the sovereign debt crisis, around 2012, the subprime bubble burst, in 2008 and 2009, and the hardships that followed the Twin Towers terrorist attack in September 2001.

Maybe counterintuitively, it is crucial to notice how even opportunities, such as technological advancements, might create unsettling disturbance if not correctly handled, and this is becoming more and more relevant nowadays: autonomous

machine learning algorithms, Artificial Intelligence, 5G and 6G network technology supporting the Big data generation and the micritization of processors surely come to some readers' mind as the globalized world is experiencing what is considered as a new industrial revolution, but prospectively speaking, the humanity has a lot of crucial challenges to face, like the energy transition, environmental protection and the private space race (Dawson, 2017).

Regardless of whether it is caused by crisis or by opportunities, any kind of change inherently causes a shift in the *status quo*. If not well detected and managed, even a slight variation in the environment can cause losses of competitive advantage, of stability, of competitivity in the player that does not pay adequate attention to alterations; indeed, quite the opposite could be said to the organizations that proactively manage uncertainties, recover from them and reconfigure to the altered environment (Guertler & Spinler, 2015).

It is surely interesting to notice how, simultaneously, the concept of Resilience rose in popularity in the collective imaginary, as an antidote to the distresses of uncertain and troubled times; that might be intrinsic to longing for hope underlying Resilience's most wide meaning, and it is surely a comforting idea to resort to.

But how reliable, useful, and impactful is Resilience actually? Could it be scientifically used to help the whole society in anticipating, coping, and adapting to crises and threats?

Recently in the academic literature, various studies and interpretations of Organizational Resilience blossomed and generated valuable and interesting insights on the matter; while it is a rather enriching experience for both scholars and practitioners to explore and dwell such concepts, it can be disconcerting how the current research is almost only focused on privately-owned organizations and enterprises, leaving the public sector as an ample research gap.
This dissertation hopes to bridge it, answer those interrogatives and provide a set of tools, useful to manage uncertainty.

To pursue such a change of paradigm though, this research must focus on a different research object: to better proxy the public sector characteristics, as the reader will be able to learn in the following chapters, the research was conducted on the personnel of *Azienda Sanitaria Locale Frosinone*, a local Healthcare Public organization.
Not only this choice reflects the strategic decision to conduct an analysis on a specific and well-delimited organization, but this

specific public company has been specifically selected for its well-renowned growth and success during the last couple of years, especially in managing the pandemic risks and threats.

As this paper aims to inform the widest possible public, from expert scholars to people willing to approach this interesting matter for the first time, this analysis will follow a narrative approach, avoiding technicalities as much as possible, and presenting data in easy-to-understand tables and graphs.

To make this experience as pleasant as possible, hereafter the reader can find an explicative roadmap of how this dissertation is structured.
First, there will be presented a necessary overview of the different conceptions of the term resilience, transitioning from the most immediate definition to the ecological, psychological and engineering definitions, arriving at last to the managerial field.
Then, as the population of this study is the Italian public sector, focusing on the peculiar environment of a Healthcare organization, there will be illustrated the evolution and the peculiarities of this economic environment, and it will be explained in detail what an *Azienda Sanitaria Locale* (ASL) actually works.

After presenting to the reader the most interesting portion of peer-reviewed literature used to strengthen the validity and the reliability of this investigation, the research question and the underlying hypothesis will be made explicit.
At that point, the research strategy will be outlined, with an in-depth view of the rationale adopted to approach the organization resilience matter in order to produce new and quality primary data.
The gathered data, after being carefully analyzed and clearly presented, will be then discussed widely, highlighting key considerations and future developments.

CHAPTER 2 | AN OUTLOOK OF THE VARIOUS MEANINGS OF RESILIENCE

The second chapter of this dissertation will explore the various meanings of resilience, as the first core theme of this analysis.
The reader will be guided in this investigation, initially touching the etymological origin of the term, its evolution and popularity, to then explore those facets more interesting to this thesis' target and closer to the managerial and organizational fields.
Whenever possible, each shade of the term resilience will be first explained with a simple and brief definition, and then deepened with an appropriate overview of the academic literature, in order to provide a satisfying overview of this fascinating and polyhedric term, catchy and effective for any kind of reader.

2.1 | WHAT IS RESILIENCE? MOST IMMEDIATE DEFINITION

If one were to browse the term resilience, out of the blue, they would probably run across an explanation similar to this:
"Resilience is the quality of being able to return quickly to a previous good condition after problems".
Is this minimal definition satisfying? Probably not, it appears over-simplistic and way too generic.

Could this mean that Cambridge Dictionary, from which the latter definition is taken, did not do a good job in providing a well-rounded explanation?
That does not seem to be the case. As previously stated, the word resilience, the core of this dissertation, has a multifaceted nature, therefore it escapes to a simple definition.

2.1.1 | ETYMOLOGY AND PHILOSOPHICAL RELEVANCY OF THE TERM

At this point, careful readers, probably not satisfied by the general definition provided in the previous paragraph, could be asking themselves if there's a reason behind this polyhedrality of meanings and to which contexts does the term belong.

Etymology might present an interesting reflection to start with: like many scientific words, resilience has a Latin origin: the verb *resilire* is formed by adding the prefix re- to the verb *salire* 'to leap, to make leaps, to gush', with the immediate meaning of 'to jump back, to return quickly, suddenly, to rebound, to recoil', but also with the translational meaning of 'to retreat, to shrink, to contract' (Glare, 1980).
But, as the reader might already know, there is magic and wisdom in the Latin language; while one can be brought to think

that the term has a pragmatic origin, related to the English technical jargon of the first industrial revolution, the Romans used it referring to the art of climbing into an upturned boat, as a powerful metaphor for the ability to withstand difficult situations. This metaphor was, in fact, so powerful that resilience can be traced down the history of philosophy as well:
Plato, in Book IV of the Republic, spoke of fortitude, an irresistible and invincible force that makes every soul unbeatable in the face of adversity, a capacity for self-control and resistance in the face of pleasures and pains that man naturally possesses.
Furthermore, Seneca claimed that difficulties strengthen the mind, and today studies confirm what the Stoic philosophers Epictetus and Marcus Aurelius claimed in antiquity: inner strength has saving power.
As the ancient thinkers had already guessed, the reaction to difficulties, unforeseen events and problems depend on man's interpretation of events (Section 2.1.3).

Perpetuating these ideas of an innate human yearning to strive, it is appropriate to mention two of the most celebrated modern thinkers, certainly familiar to the reader's background.
Firstly, summoning one of the leading figures of literary romanticism, Giacomo Leopardi, in his composition '*La ginestra o il fiore del deserto*', drew attention to a plant that manages to

grow even in the most disadvantaged ecosystems. It grows on the slopes of volcanoes and despite the lava that burns and desertifies, it is reborn with its intensely scented yellow flowers.
The broom, as a metaphor, serves as a symbol of the human condition. And just as the plant bends to survive, so too man must be flexible in order to adapt to change.
Secondly, in more recent times, Nietzsche highlights the concept of resilience with the statement "Everything that does not make me die makes me stronger" which we find in his masterpiece “The Twilight of the Idols” (Nietzsche, 1968).

2.1.2 | EVOLUTION OF THE TERM RESILIENCE

As this analysis had the opportunity to report, resilience’s core meaning is a harbinger of a powerful idea in current times, characterized by velocity and uncertainty; unsurprisingly the term has earned conspicuous fame and relevancy, arousing more and

more interest.

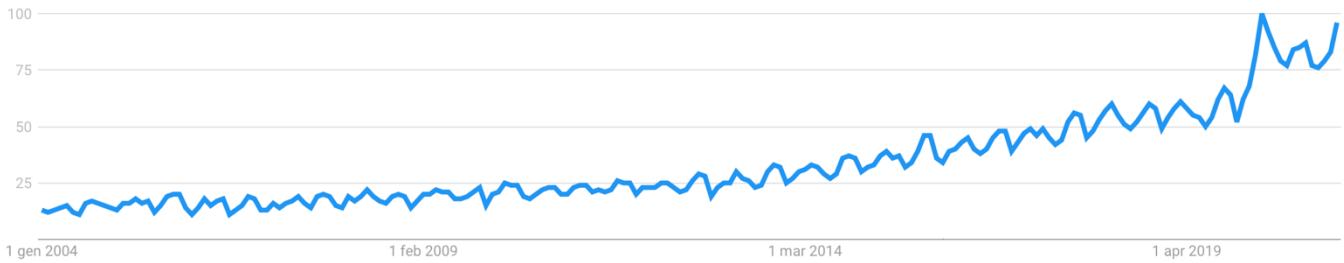


Figure 1:Frequency of searches for the word resilience, Screenshot taken from Google trends

This exhibit shows how 'resilience' as a topic has been increasingly searched from year to year, starting from 2004 and ending to the present.

It is possible to trace an explanation for this rising popularity: the fascinating concept underlying the term in analysis seems to be so powerful and consistently recurring, that many sciences and disciplines have adopted resilience as a part of their identity. Setting sails from the idea of resiliency as "is the ability of a system to adapt to change", hereunder, there will be provided with a handful of different meanings related to specific contexts, to give the reader an overlook of the impact of resilience in the modern society.

As the first example, in ecology and biology, resilience is defined as 'the capability of a material to repair itself after damage or of

a community (or ecological system) to restore its previous state after being subjected to a shock or a disruptive event that has removed it from that state' (Folke et al., 2004).

Analyzing the ecosystem example(s), as they can easily be translated to the organizational matter (Section 2.2), the disturbance may be anthropogenic (e.g. pollution, deforestation, climate change, invasion by one or more alien species) or natural (e.g. a weather event, a fire, a landslide) in origin.

The natural type of Mediterranean ecosystems (e.g. Mediterranean maquis), characterized by high variability of many environmental factors, have evolved a strong resilience to natural events such as fires, strong sea storms, and the collapse of rocky ridges and species typical of these environments are able to quickly recolonize areas destroyed or heavily degraded by these types of events.
On the other hand, many tropical environments (e.g. rainforests or coral reefs), whose environmental parameters have remained almost unchanged for millennia, do not have the capacity to regenerate following disturbances that are much less degrading than those described above (B. Walker et al., 2004).

To conclude, it is thought that in an ecosystem a higher variability of environmental factors corresponds to a higher resilience of the species belonging to it and that different types of ecosystems favor different types of resilience to strive as if the players in the system acted according to the Contingency theory (Chandler, 1962).

Furtherly iterating on the previously exposed concepts, in material science, resilience is measured as 'the ability of a material to resist dynamic forces, like impacts, (Campbell, 2008) until failure, by absorbing energy through elastic and plastic deformation'.
This definition of resilience coincides with what is called impact toughness or impact strength in English technical literature; it might help the reader to better grasp the idea that not only resilience is related to the ability to adapt to the various threats in the environment, but also a certain form of inherent tenacity to resist to the said obstacles.

Moreover, in computer science, the term fragility index or resilience index refers to 'the ability of a system to adapt to conditions of use and to resist wear and tear in order to guarantee the availability of the services provided' (Björck et al., 2015).

These objectives can be achieved through redundancy techniques. Take the case of a floppy disk, as a vintage but immediate example, which has reached the end of its useful life and therefore has a high risk of failure. Resilience can be achieved by duplicating the resource available for writing data. For example, data can be written to several disks in order to insure against the failure of a single disk.
So, it can be a redundancy mechanism for parts deemed critical. But it may also concern the distribution of an application over several computers in order to absorb processing loads.

The reference contexts are those relating to business continuity and disaster recovery (Section 2.2.1).

Finally, in psychology, resilience is defined as the ability to cope constructively with traumatic experiences, to rearrange one's life positively in the face of adversity, and to rebuild oneself by being receptive to the positive chances that life provides without alienating one's identity.

The psychological theory defines resilient people as 'who manage to cope effectively with adversities, amid unfavorable events, despite everything and sometimes against all odds, to

give new impetus to their lives and even to achieve important goals' (Ackerman, 2021).

Resilience can be thought of as a psychic function, which changes over time in relation to experience, time and, above all, to the underlying evolution in one's mental processes.

Therefore, we find resilient capacities of the following types:

- instinctive: characteristic of the first years of life, when mental processes are dominated by egocentrism and a sense of omnipotence.
- affective: reflecting emotional maturation, sense of values, sense of self and socialization.
- cognitive: when the subject can use symbolic-rational intellectual capacities.

Adequate resilience is the result of the integration of these libido-instinctive, affective, emotional and cognitive elements (Cenevaro, 2001).

The notion of resilience, increasingly applied to a whole community or civilization rather than to the individual, is gaining traction in the examination of social settings following catastrophic natural or man-made disasters such as terrorist

attacks, revolutions, or wars (Fishwick, 2005). There still are economic and social processes that, as a consequence of a disaster's trauma, stop to develop and, at times, even collapse, becoming extinct; in other situations, they endure and, moreover, exactly as a result of the trauma, find the strength and resources for a new period of growth and affirmation.

Therefore, resilience is also a sociological as well as a psychological concept.
The 'resilient' person (or community) can be one who has had a sufficiently integrated psycho-affective and psycho-cognitive development, supported by experience, by sufficiently valid mental capacities, by the possibility of always judging not only the benefits but also the emotional-affective interferences that take place in relationships with others.
Nevertheless, it is interesting to notice how the notions just presented resemble in many parts the Path dependence theory, in which individuals and organizations behave and take decisions based on previous decisions or experiences made in the past (Praeger, 2008).

2.2 | AN EXCURSUS OF ORGANIZATIONAL RESILIENCE

Let us recollect what can be learned so far about resilience:
It is a capacity that belongs to ecological, biological, and social systems as well as to individuals, and which brings humans closer to the materials studied in engineering: both regain their shape in traumatic situations if they are subjected to deforming and extreme stress. In the case of the human being, it is a series of characteristics and factors that enable the person to react constructively to environmental shocks.
They are partly linked to the temperament one is born with, partly they are peculiarities that can be enhanced or diminished by the environment and can be developed through learning.
Can this human peculiarity be translated into organization and business systems?

With organizational contexts becoming more volatile, uncertain, and ambiguous, the idea of resilience has grown in importance in management studies and practice. Resilience refers to an organization's, a team's, or an individual's ability to absorb and learn from external shocks while also preparing for and responding to external challenges (Giustiniano et al., 2018).

2.2.1 | RESILIENCE IN BUSINESS CONTINUITY AND RESILIENCY PLANNING

Transitioning from a wider approach to the organizational matter, the first application of resilience is hereby presented.

The concept of Business Continuity may be referred to as "the capability of an organization to continue the delivery of products or services at pre-defined acceptable levels following a disruptive incident" (Sussex & Council, 2019), while Business Continuity and Resiliency Planning (Thompson, 2003) is the process of developing preventive and recovery strategies to cope with possible risks to an organization (Elliot, D.; Swartz, E.; Herbane, 1999). Characteristically, a Business Continuity and Resiliency plan contains all the most critical resources, services and activities required to ensure the continuity of the main organizational functions.

The objectives of the business continuity plan are multiple:

- At a strategic level, to ensure the proper management of critical events potentially threatening the very survival of the organization (e.g.: reputational crisis).
- At a tactical level, to coordinate the activities and efforts of the organization's different functions to ensure the

operational continuity of business processes following an interruption.

- At the operational level, to define the key steps to be taken by emergency response teams.

In other words, the business continuity plan is the main tool through which an organization prepares for future disruptions of any kind.

Implementing a Business Continuity Plan also allows an organization to:

- Preserve the growth, value, and reputation of the organization, thereby increasing stakeholder confidence.
- Build over time the ability to continue to operate in a coordinated manner following an incident.
- Demonstrate 'diligence' and sustainability in management.
- Improve competitive capacity.
- Increase the level of resilience of the organization.

Finally, the business continuity plan aims to minimize the time of interruption of business processes and to ensure the effectiveness and efficiency of recovery procedures until normality is restored.

2.2.2 | SUPPLY CHAIN RESILIENCE

A further definition of resilience is "the ability of a supply chain to adapt or evolve in the face of change." (Wieland & Durach, 2021).

Scholars and practitioners, recognizing the flaws in the traditional risk management approach (Norrman & Wieland, 2004) and abandoning the idea of a linear and internal supply chain, soon realized that the latter is often made by a myriad of companies, therefore detecting every possible danger in such an open system is extremely hard, if not vain (Wieland & Durach, 2021). As a result, from the beginning of the 3rd millennium, the idea of resilience rose in the academic environment, as a complementary way to match increasing complexity (B. H. Walker, 2020): resilience is capable of coping with a wide range of changes, it is less about identifying specific threats and more about the system's features (Sheffi, 2006).

To provide a better analysis of the matter, a brief analysis of the engineering point of view and the socio-ecological one are provided hereafter.

2.2.2.1 | ENGINEERING RESILIENCE IN SUPPLY CHAIN MANAGEMENT

It wasn't until recently that supply chain management was dominated by the notion of engineering resilience. In this case, we will assume that the supply chain is a closed, controllable framework, akin to any system built and planned by engineers (subway networks, electric infrastructures, deep learning algorithms) (Wieland, 2021). Managers face similar expectations as engineers, who must respond swiftly in case of a disruption to return the system to its *status quo anteam* as soon as feasible (Holling, 1996). When it comes to supply chain management, this notion is used to determine the supply chain's time-to-survive and recovery time, allowing for the identification of weak areas in the system (Simchi-Levi et al., 2018). Rebuilding the supply chain's design, typically by incorporating redundancies (e.g., multiple sources), increases resilience. According to this perception, a supply chain may be thought of as a rather inflexible structure. In the short run, the concept of supply chain persistence as a result of technical resilience makes sense. However, in the medium to long run, this approach has its drawbacks.

2.2.2.2 | SOCIO-ECOLOGICAL RESILIENCE IN SUPPLY CHAIN MANAGEMENT

As a result of the rise in human decision-makers and social interactions, socio-ecological resilience has also grown. (Folke, 2006). Since the supply chain can continually adapt to external environmental conditions and change itself into an entirely new and better system by utilizing the social actors and their skills, it is seen as a social system, comparable to a natural ecosystem. (Wieland, 2021). This led to an almost panarchical interpretation of the supply chain, merged into a system of systems, so that the interaction between the supply chain and systems operating at other levels (such as society, political economy, and our planet as a whole) could be analyzed. One way to think about this is Tesla's supply chain. It reflects the transition from internal combustion engines to electric motors, which is based on human actors' ability to predict long-term changes in the earth's future environment, combating climate change and implement those changes in business models. Most importantly, unlike engineering flexibility, as a fluid system that interacts with the rest of the world, the supply chain is not seen as something that needs to be fixed in a perennial state. Not only this would be improbable to achieve, but quite counterproductive as well: it is by following the

iterative paths of adaptation that the supply chain is able to morph into a more efficient and fitting version.

2.2.3 | ORGANIZATIONAL RESILIENCE ENGINEERING DEFINITION

An interdisciplinary topic of research, Resilience Engineering (RE), deals with security in complex systems. Complex systems are defined as socio-technical systems that have a large number of interdependent elements, the interaction of which with each other can lead to unforeseen and potentially damaging economic, human, and social outcomes (Bar-Yam, 1997). Examples of this type of system include many economic and political organizations, such as the financial system, the power grid and energy production system, and the military system and the health sector.
The main disciplines that contribute to this field of study are psychology, sociology, engineering, ergonomics, and safety science.

Resilience is defined by Resilience Engineering as the ability of a system to maintain and regain a state of dynamic equilibrium that allows it to function after an accident or under prolonged stress (Hollnagel et al., 2006). This first definition was then updated

and expanded to give greater emphasis to the aspect of risk anticipation and prevention, as a fundamental part of the resilience property of a system. According to this new definition, resilience could be identified as the inherent ability of a group to modify its operation before, during, and afterwards a change or disruption so that it can continue necessary activities under both anticipated and unanticipated scenarios (Hollnagel et al., 2011).

In the traditional view (belonging to Safety I's approach), safety is defined as a condition that minimizes the number of adverse outcomes. One assumption of this view of safety implies that, through examining its key components, it is possible to comprehend how a system works; the second assumption of this approach is that it is possible to distinguish the causes of an accident from the causes of "normal" performance. As a result, the objective of safety management systems is to decrease the number of accidents by minimizing their causes.
The new approach to safety that characterizes RE, called Safety II, accepts that it is not possible to completely understand the system. This method doesn't just centre around negative events, but also around the positive occurrences that happen in the workplace on a daily basis. Safety is hence defined not just as a mere lack of accidents, but rather as an output of successful day-to-day organizational procedures (Hollnagel, 2014).

Unlike many others, this method represents an entirely new way to think about safety. Comparatively to the traditional methods of risk analysis and risk management that employ cause-and-effect linear analysis, Resilience Engineering uses the Complexity Theory to modify analytical models so that they are flexible and robust. As stated by Perrow, accidents or errors are intrinsic and inherent in complex systems based on tight interconnections (Perrow, 1999), but malfunctions and accidents do not differ from the normal operation of the system, since the variability in the operation of its parts is ineradicable; what differs between an accident and normal operation is the interaction between the parts of a system: the same action, for example, may lead to an accident or not depending on the simultaneous presence of other concomitant factors. It is therefore useless to look for the unsafe action or the flaw in the system, as it risks obscuring the overall system of relationships between the elements.

The ultimate goal of RE's risk management, then, is not to minimize the sources of risk, but to improve performance under both predicted and unforeseen situations.

Ultimately, according to this strand of research, resilience is an emergent property of the system, as it results from the interaction between its parts.

A system is considered resilient if it has certain characteristics or capabilities:

- Anticipation: the ability to prevent hazards and modify its functioning to adapt to changes
- Monitoring: control and supervision of the performance of the system and its operational status looking for possible weak signals.
- Reaction: the ability to respond immediately to changes in order to adjust operations and avoid greater damage.
- Learning: the ability to learn from past events to increase the level of security. (Hollnagel, 2017)

CHAPTER 3 | A PECULIAR ORGANIZATION: THE CASE OF A PUBLIC LOCAL HEALTH COMPANY

The necessary premise of the dissertation is not just limited to a comprehensive overview of the term Resilience.
Since this research aims to inform and capture the interest of any kind of reader, its mission also requires a brief analysis of the environment in which the quantitative analysis is conducted:
an Italian Public Local Health company, to which from now on, it will be referred as *Azienda sanitaria locale*, (ASL).
Hereafter, chapter 3 will be devoted to a narrative of the latter organization peculiarities, its role in the Italian health sector and its evolution throughout the years.

3.1 | WHAT IS AN ASL?

An *Azienda sanitaria locale*, or ASL, provides health services in a specified region as part of the Italian public administration.
It is in charge of a certain portion of the population, in which it operates on behalf of the National Healthcare Service as envisaged by law.
As part of the national health service, the ASLs are companies with public legal personality, endowed with organizational,

managerial, technical, administrative, patrimonial, and accounting autonomy.
In fact, according to art. 3 of Legislative Decree no. 502 of 30 December 1992:

> "In order to pursue their institutional aims, the Local Health Units are set up as Companies with public legal personality and entrepreneurial autonomy" (from *d.lgs. 19 June 1999 n. 229*).

Organized in various organs and departments, it can host various types of employees, with healthcare, professional, technical role or administrative roles and provides all services established by the Italian NHS and its welfarist nature.

3.2 | THE NATIONAL HEALTHCARE SERVICE

Without dwelling too much on the legal matter, at least in this paragraph, it appears nonetheless crucial to describe how the National Healthcare Service is not made by a single, centralized administration, but a combination of organizations and organs which contribute to the achievement of the objectives of protecting the health of citizens.

It is composed of Central state bodies (like the *Ministero della Sanità*, the *Consiglio Superiore di Sanità*, the AIFA), Regional

bodies and Territorial bodies, like, for instance, the ASLs (Sapere, 2021).

Moreover, the Italian NHS implements Article 32 of the *Italian Constitution*, which states that every citizen has a "right to health". This is a typical example of welfare states: characterized by a public health care system of "universalistic" type (ANAP, 2021), it is able to grant health care to all citizens, financing its operation through the State itself via general taxation and by local health operators through *health tickets* and paid services.

It currently consists of several local and regional health services, the national coordinating organs, and the Ministry of Public Health. Their ultimate goal is to guarantee health care or to protect or safeguard citizens' health as defined by Italian law as a fundamental right of individuals and community interest, with respect for dignity and freedom of the human being.

World Health Organization data from 2000 showed Italy had the second-best health system in terms of spending efficiency and access to public care for its population, after France. In 2014, a Bloomberg rating placed Italy third in the world in terms of spending efficiency. (Il Sole 24 Ore, 2014).

Finally, what's relevant to highlight is that Regions have exclusive competence in regulating and organizing services and activities intended for the protection of health and the criteria for financing Local Health Authorities and Hospital Authorities, also in regard to management control and assessment of health care quality in accordance with broad principles defined by state legislation.
This new configuration is the product of a series of reforms and laws aimed at enchanting the NHS productivity and efficiency at any level.

3.3 | A NECESSARY EXCURSUS ON THE EVOLUTION OF ITALIAN PUBLIC ADMINISTRATION

As stated in the previous paragraph, the public administration has undergone several changes over the years to improve its productivity and efficiency.
As a starting point, Law 312/1980 sought to give a functional structure to public organizations, establishing specific qualifications for employees to be sorted, in ascending order, depending on parameters of quality of performance and responsibility; this was biunivocally linked to well-specified salary levels.

All this is then outlined in framework law no. 93 of 1983, which ensures equal treatment of employees, homogenization of legal positions, levelling of salaries and collective regulation of contractual agreements.
About ten years later, Delegated Law 421/1992, allowed the Italian Government to issue laws and/or decrees in order to contain, rationalize and control expenditure in the public sector, seeking to improve its efficiency and productivity and to reorganize it.
At the end of the 1990s, the regions and local authorities were given responsibility, conferring their functions and tasks to simplify and streamline administrative activities, and then, through legislative directive 165/2001, general principles for the organization of employees in public administrations were established.

Very important in the organization of the public sector is legislative decree 150/2009, known as the '*Brunetta Reform*', contained in Law No 15 of 2009. The reform aimed to recover productivity, combat illegality, ensure transparency and introduce a generalized system of evaluation in all public administrations. The latter initiates what is called the 'performance management cycle', which involves several steps, interesting to

deepen the reader's knowledge on how Italian Public Administration works.

The first step is the assignment of objectives and the subsequent allocation of resources. After that, the process is monitored and the company's performance evaluated, a reward system is established and, finally, reporting is produced for the conclusion of the cycle.

CHAPTER 4 | THEORETICAL REASONING AND RESEARCH HYPOTHESIS

Hoping that a satisfying starting point was provided with the ample depiction of the current state of the art ideas about Resilience, and the quick presentation of how the Italian National Healthcare system works, a careful and involved reader might have already sensed the lack of extensive interest in Organizational Resilience in the public sector, and they might be interested in finding out more.

Hence, as said, this dissertation aims specifically at bridging this research gap and revolves around this question:

Can Resilience be used as a tool to manage risks and uncertainties in the public sector?

While answering this question was far from easy, it seems both necessary and appropriate to present in detail the process used to arrive at the desired outcome.

4.1 | RESEARCH FRAMEWORK AND RATIONALE

One of the biggest challenges in conducting this research is linked to the lack of shared consensus regarding a solid and definitive approach to conceptualizing Organizational Resilience. The current research environment appears fragmented, with vast disharmony about what resilience really means and what characteristics does it possess.
There is, in fact, a treacherous underlying risk of this fragmentation: by choosing the wrong conceptualization as the analysis backbone, the whole research could be less consistent and valid, as a result.

Exploring the various perspectives of Organizational resilience, at this date one could find three main branches.

Firstly, a rather classic approach can be identified: resilience is the capability to resist adverse events and/or the capability to recover after disturbances (Horne, 1997); despite this strand being full of various contributions given in the last two decades, addressing concept as "strategic defense" (Mamouni Limnios et al., 2014), what does not convince is the excessive emphasis on coping mechanisms (Lengnick-Hall et al., 2011), as Resilience appears to be a result of multiple different factors.

Secondly, another cluster of scholars, going beyond the resistance and restoration aspects of resilience, agreed on exploring the possibility of resilience to strengthen an organization after a stress event: so, organizational resilience may be seen as an active and purposeful way of responding in the case of unforeseen circumstances (Hamel & Välikangas, 2003); from this angle, one could look at Resilience as "strategic offense" (Mamouni Limnios et al., 2014).

Finally, the third strand of researchers took a step further and incorporated the notion of anticipation in their evaluation (Rerup, 2001); formerly considered polar opposites, some agreed upon the idea that anticipation and resilience are linked and, therefore, encouraged organizations to achieve systemic Resilience through careful and planned preparation (Kendra & Wachtendorf, 2003); perpetuating and bolstering this idea, Scott Somers added the notion of "taking proactive steps" to make sure that a group or company can actually thrive amid adversities.

While it cannot be disputed that those three strands just presented to the reader all provide crucial and precious insights,

this research deviates from taking one of the three theories as correct.

Not fully satisfied by any of those contributions by themselves, the research will set its shores from another kind of conceptualization:

Resilience is a *meta-capability*

it escapes a single immediate definition, being comprised of plenty different capacities and skills; it can be deconstructed and analyzed via its individual parts.
Moving from the revolutionary conceptualization delivered by Stephanie Ducheck (Duchek et al., 2020), and inspired by the process-based academic literature, this study adopted a different approach; for the sake of clarity and exposition, this meta-capability will be destructured and explained considering its three stages: Anticipation, Coping and Adaptation.

From this perspective,

resilience is the ability to successfully respond to unfavorable events, acting before, during and after adversity.

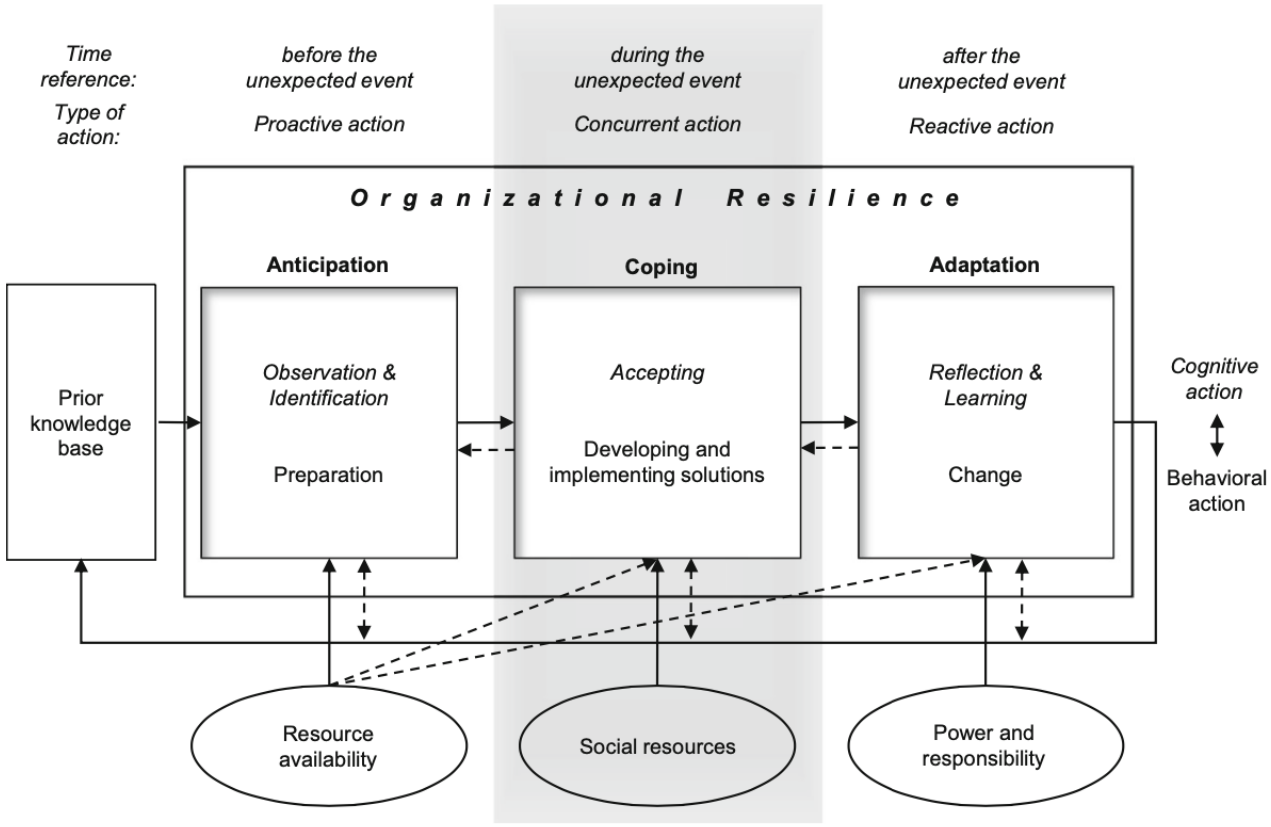


Figure 2: Illustration of Resilience as a Meta-Capability

As expectable, each stage contains specific singular capabilities that will be hereunder analyzed in pursuance of the logic of this research.

4.1.1 | ANTICIPATION

Proceeding in chronological order, the first dimension of analysis is *Anticipation*. It can be defined as the capacity to notice and respond to significant developments within the organization or in its surroundings (Ferreira et al., 2011).

But the reader must be warned, this does not imply that, by achieving resilience, an organization can prevent any crisis and disturbance, but it rather transmits the rejection of resorting to a last-minute intervention, following a "wait and see" strategy (Madni & Jackson, 2009).

4.1.1.1 | ANTICIPATION: OBSERVATION AND IDENTIFICATION

Therefore, to excel in the Anticipation dimension, *Observation and identification* are a crucial couple of capabilities.
Often considered together, they must be used in order to minimize the escalation of the upcoming threats' magnitude (Ortiz-de-Mandojana & Bansal, 2016); organizations must be able to detect early warning signs of a crisis and respond promptly.

4.1.1.2 | ANTICIPATION: PREPARATION

The second capability intrinsic to preparation resides in the *Preparation*, mutated from the High-Reliability Organization fields (Weick et al., 1999).
In times of disaster, preparation capabilities and the related process generate the crucial assets to then respond properly to the crisis, such as recovery plans, stronger relationships and

shared values useful to build a common view, ferrying beyond the hardships.

4.1.2 | COPING

As a *meta-capability*, Resilience does not only adhere to the anticipation phase just analyzed; being resilient and managing crisis are strongly connected to the general capacity to deal with the unexpected, therefore coping with unanticipated risks and situations, after they become manifest (Wildavsky, 2017) and can be distinguished in two core capabilities, hereafter discussed.

4.1.2.1 | COPING: ACCEPTATION

Although crucial events may be predicted in advance, it is commonly argued that, oftentimes, they come as a shock to organizations due to their denial. *Acceptation* sets up a "cognitive challenge" (Hamel & Välikangas, 2003), how is easily overcome by resilient individuals, who showcase a ready and lucid acceptance of reality.

4.1.2.2 | COPING: DEVELOPING AND IMPLEMENTING SOLUTION

Acceptation by itself does not offer the right approach to manage crisis; crisis procedures must be implemented, and *ad hoc* remedies must be developed when a disturbance occurs. After having *accepted* the incoming changes, it is necessary to quickly gather all the available information, being ready to generate plans and strategies to cope and hopefully overcome the distress in the best way possible (Weick et al., 2005).

A solution-finding skill, however, requires not just the ability to come up with new ideas, but also the collaboration with others. Both formal and informal coordination methods are crucial at times of acute hardship when choices must be taken quickly, and mistakes might have significant repercussions (Faraj & Sproull, 2000).

4.1.3 | ADAPTATION

Along with the capabilities to predict and adapt, trying to translate incoming changes into the organization's advantage, resilience encompasses the ability to *Adapt* to critical conditions.

The ultimate goal of adaptability as a process resides in directing the efforts to the improvement of the organization as a whole. What's even more interesting to highlight is that, as long as the organization lives and aims at thriving, it is pushed towards long-term learning (Madni & Jackson, 2009), almost as an iterative process aimed at propelling the organizational change.

4.1.3.1 | ADAPTATION: REFLECTION AND LEARNING

As described, the last stage of the resilience process resides in learning from errors, hardships, and troubling experiences. Cognitive and behavioral skills are therefore required to make the most out of failure experiences. Companies need to reflect on their current crisis scenario and incorporate their new information into their existing knowledge base. All of this pursues a specific objective: organizations and individuals must be able to act on this knowledge base enrichment and bring about pivotal improvements as a result of it (Edmondson, 1999).

4.1.3.2 | ADAPTATION: ORGANIZATIONAL CHANGE

Deviating from the point discussed above though, *Organizational Change* implies a systemic change. It is only via higher-level learning that we can achieve this type of overall change (Visser,

2007). There must be a change in the organization's worldview in order to encourage a shift in beliefs and cautious norms, and only the top management efforts are able to trigger such a change, in a top-down fashion (Huang et al., 2015).

4.1.4 | MAIN ANTECEDENTS AND DRIVERS OF ORGANIZATIONAL RESILIENCE

In all fairness, the proposed lookout of resilience as a meta-capability would not be complete and satisfactory without mentioning precursors and determining factors of particular importance, that play crucial roles in the framework underlying this analysis.

4.1.4.1 | KNOWLEDGE BASE

As the first driver, this analysis must focus on the role played by the knowledge base.
The organization's knowledge base plays an essential part in the resilience process, as the previously shared knowledge hinders or allows the anticipation processes (Gomes et al., 2014); additionally, it must be said that the knowledge base of one organization is directly influenced by all of the three phases of Resilience, as they include inherently some kind of learning:

learning in before of a crisis (anticipation), learning during a crisis (coping), or learning after a crisis (adaptation) (Smith & Elliott, 2007).

4.1.4.2 | RESOURCES AVAILABILITY

Another crucial antecedent, as an experienced reader could expect, resides in *resources availability*.
Many studies indicate the importance of having a diverse and easily accessible set of diverse resources as a basis for rapid and adequate responses in difficult situations (Vogus & Sutcliffe, 2007); interesting examples may be found in those apparently different concepts: time availability, liquidity, human resources, shared values.

4.1.4.3 | SOCIAL RESOURCES

Moreover, joining forces and standing together to face a common cause can be made substantially easier with the contribution of *social resources*.
Following the early warning of impending crises, as previously widely discussed, it is critical to respond in a resilient manner and establish suitable strategies to overcome those problems. Social

resources are frequently seen as a source of organizational resilience in such settings (Lengnick-Hall & Beck, 2016).
Specifically, deep social capital, if excellently channeled, could be able to foster resilience by virtuous processes, such as resource exchange, knowledge sharing and broad collaboration within the boundaries of organizations.

4.1.4.4 | RESPONSIBILITY AND POWER

Finally, what's left to discuss is necessary to dispel doubts and ambiguities in previous formulations: yes, if hardships are properly managed and the organization is able to thrive, organizations will surely generate new knowledge.
But knowledge does not apply and spread by itself.
Neither does it spread in highly hierarchical organizations (Denhardt & Denhardt, 2010).
Scholars and researchers are converging towards the idea of an authority form based on responsibility and experience, as a strong Resilience driver (Cheese, 2016). If all members of the organization believe that they can make a difference and that they are accountable for the organization's growth, they are more likely to be open to change. Then they are willing to

participate as a change sensor, pointing out undesirable habits and developing improvement measures.

4.2 | MAIN HYPOTHESIS

Developing what has been said above, and perpetuating an efficient exploration towards answering the research question, now it is time to enucleate the main hypothesis of this study:

> amid adverse circumstances, the ability to thrive is linked to a high degree of Organizational Resilience.

Thus defined, it will form the cornerstone of the analysis presented in the following chapters.

4.3 | RESEARCH VARIABLES

As a consequence of what has been just discussed, the following variables have been defined for each stage of the model based on the previously described theoretical reasoning and hypotheses and, as it will be explained later in more depth (Section 5.3.3), will be linked to Four-point Likert values:

- *observation_identification* will reflect to which extent employees actively anticipate adverse events by remaining alert and ready to intercept changes in the surrounding environment.
- *preparation* will reflect to which extent employees try to be ready for the occurrence of adverse events.
- *acceptation* will express to which extent employees are willing to deal with adverse events, recognizing the changes that occurred in the surrounding environment.
- *develop_solutions* will express to which extent employees are proactively ready to draft strategies and come up with helpful ideas, after adverse events occur.
- *reflection_and_learning* will express to which extent employees actively learn from errors and critical situations.
- *org_change* will reflect to which extent employees believe that any change within the organization represents an opportunity to improve, and not an additional threat.
- *knowledge_base* will reflect to which extent employees attribute value to a strong and shared set of information.
- *resource_availability* will express to which extent employees agree on the cruciality of having assets and data available, especially if this support organizational growth.

- *social_resources* will express to which extent employees gauge Social and interpersonal relationships based on positive values.
- *responsible_power* will reflect to which extent employees consider a form of authority based on experience and clear responsibilities to be linked to resilience.

Additionally, control variables have been established:

- *age* and *gender* will express the only personal data gathered in the survey.
- *role* will contain information about the interviewee's function within the organization: *healthcare, professional, technician* or *administrative*.
- *familiarity* will then highlight if the interviewee had familiarity with the concept of Resilience, before taking the questionnaire.

CHAPTER 5 | RESEARCH DESIGN & METHODS

To pursue these research goals, new and crucial data had to be gathered in the most careful and appropriate way.
This surely was the most challenging part of the dissertation, and it deserves a chapter to be presented and displayed in detail.

5.1| DATA GENERATION

To conduct successful research, it's necessary to gather quality data, analyze them and reach interesting and new findings, without forgetting to check if the data is consistent with the analysis framework and purpose.
But how can one obtain the data needed for their research?

When it comes to social and economic sciences, statistics can be based on two different categories of data, namely *primary data* and *secondary data* (Rabianski, 2003).

To better grasp the concept, one can say that Primary data is characterized by its *novelty:* it is collected directly from the data source without going through any existing sources.
They can be collected via *Primary research* (Driscoll & Brizee, 2017), giving the researchers to draft their research method, such

as surveys and experiments, who have almost complete control over the process, shaping the data collection to flexibly to fit the specific analysis.
Data collected in these ways tend to be more accurate, less subjected to biases and therefore they showcase a higher degree of authenticity.
As the reader might have imagined, primary data is not often gathered, since the implementation of this kind of collection is costly, difficult, strongly related to the environment's complexity, and extremely time-consuming.

Instead, one can refer to secondary data as the sets of information previously collected. Once primary data, trivially enough they become secondary when used by a third party (Johnson & Stake, 1996).

Examples of this kind of data contain government statistics, journals, datasets, case studies and yes, also all the articles and papers quoted and referenced in this research.
While being extremely easy to access, presenting little to no cost to researchers, its crucial to underline how the latter type of data is not tailored to the research using them, they might carry personal and procedural biases of the data source: a researcher aiming to use a source may need to further verify the data

collected by secondary sources, and contrarily to common belief, this decision is also time consuming, since one has to deal with irrelevant or non-appropriate data before finally finding something actually useful.

Please notice how, due to the intrinsic nature of this research, both types of data will be used: secondary data will be adopted and discussed in-depth to explain how the statistic sample, *ASL Frosinone* organization, survived and thrived during the pandemic (Section 7.1.2); primary data will be used to study whether said organization's personnel shows any relevant degree of resiliency (Section 7.1.3).

5.2 | SAMPLING DECISIONS

Having to conduct primary research, as previously stated, a set of decisions have been taken to formulate a ruleset aimed at maximizing the quality of this research and minimizing errors and biases.

Ideally, the best way to conduct this research would require perfect information from each element within the widest conceptualization of the target population, for example, all the workers employed in the Italian Public sector.

Realistically speaking though, this is practically impossible, as a result of the high costs and the bureaucratical barriers.
The said complexities can be therefore bridged by an appropriate sampling process, defining the sample as set of statistical units extracted from a wider population; using the sample, the properties of the entire population can be analyzed within certain error limits (Sauter, 2002).

That is why statistical sampling comes in handy: it serves as a very practical method to generalize an entire population, without losing important features and attributes.

5.3 | SURVEY DESIGN INSIGHTS

After presenting to the reader the framework and the theoretical background used as a foundation for the creation of the primary data needed for this dissertation, this section will spend a brief presentation of motivations that shaped the investigation process and generated the questionnaire as its output.

5.3.1 | TARGET POPULATION

As a consequence of the rationales explained in the previous paragraphs, the population of this study might even comprise all the employees of the Italian public sector.

This specific choice is aimed at bridging the existing research gaps regarding the resilience matter: the academic environment appears to be focused on the private sector, with a predominant emphasis on the Anglo-Saxon firms and enterprises; when it comes to studying public matters, resilience studies are more about environmental sustainability and civil engineering and outstandingly less about the organizations that belong the public sector.

5.3.2 | SAMPLING STRATEGY

Following on the Jessen's (Jain & Jessen, 1979) and Dillman's (Salant, P; Dillman, 1996) frameworks on how to efficiently conduct a survey analysis, the sampling frame had to be firstly defined: as previously stated and highlighted, this analysis will focus on the *ASL Frosinone* company staff a statistic sample.

This decision follows an evident rationale and a non-trivial one: on

the obvious side the latter organization's employees confidently share similarities with the population; on the less intuitive side, by the way, the sampling decision fell on the protagonists of a specific and demarcated organization, rather than picking various random employees belonging to various public companies.
The latter decision opens up many more various matters to be later analyzed: will the actors in one targeted organization share similar traits? Or will the survey highlight a fragmented set of ideas? How strong and cohesive are the ASL's values concerning Organizational Resilience?

This study aims to answer those questions as well.

5.3.3 | IN-DEPTH SURVEY STRUCTURE AND RATIONALES

At this point, the survey structure is nothing more than a consequence of the research strategy previously discussed, combined with the theoretical reasoning presented in chapter 4.

For the questionnaire distribution, the Qualtrics XM service has been chosen.
Many factors influenced this decision, like its reliability, its academic recognition, the fully customizable and pleasant user

experience it provides, but most of all to perpetuate on the idea of social distancing and caution mandatory and appropriate in these difficult times characterized by the hardship of Covid-19 pandemic.

The reader can find below the details of the questions included in the questionnaire.
An introductory write-up welcomes the interviewee, presenting the researcher and the analysis purposes in a narrative fashion. The respondents are here formally acknowledged and thanked for their contribution to the research, informed that the survey will take between five and eight minutes to complete, and guaranteed that the collection of data is compliant with the GDPR (see section 5.4).

Then, Section I is presented: this part is aimed at collecting personal and master data about the interviewees:

Q1 | To start with, please indicate your age.
Q2 | Please indicate your gender below.
Q3 | Please indicate below your role within the ASL.
Q4 | Do you already know what is meant by "Organizational Resilience"?

Section II, instead, is devoted to testing variables derived from theoretical reasoning. The interviewee is instructed to answer the following question by indicating how much they agree with the following statements, in a 4 options Likert scale namely *I Disagree Strongly, I Disagree Slightly, I Agree Slightly, I Agree Strongly*.

Likert scale questionnaires usage has been an undoubtedly effective practice in the social sciences, allowing researchers to transpose behavioral and qualitative indicators into quantitative data, therefore objective and easier to handle (DeVellis, 2016).

The strategic choice to only let the interviewee pick from 4 options is aimed at reducing ambiguity and stagnant results caused by neutral entries, forcing the subject to take a polarized position (Joshi et al., 2015).
For the same rationale, *Undecided, Somewhat Agree, Neither agree nor disagree* and other conceptual declinations of an abstention or a midpoint of the Likert scale was avoided.

Q5 | I carefully observe the changes in my environment, inside and outside my working environment.
Q6 | I try to actively prepare myself for unexpected risks and future crises.

Q7 | Once I recognize the risk or the crisis, I easily accept living in a modified environment.
Q8 | I am personally committed to developing and implementing solutions to mitigate the risk or resolve the crisis.
Q9 | After overcoming a critical problem or making a mistake, I reflect on the experience and try to draw lessons and suggestions for improvement.
Q10 | I believe that change in the organization I am a part of is not a problem but is crucial to cope with future risks and crises.
Q11 | Common knowledge shared by members of an organization is an important basis for crisis prediction and management.
Q12 | The availability of resources and information, especially those aimed at organizational growth, improves organizational resilience.
Q13 | Social and interpersonal relationships (based on positive values) positively influence organizational resilience.
Q14 | A form of authority based on experience and shared responsibility positively influences organizational resilience.

5.4 | GDPR COMPLIANCE

As presented to the interviewees in the introductory writeup, it feels relevant to state how the survey was conducted ensuring full compliance with the Italian Personal Data Protection Code, art. 13 of Legislative Decree 196/2003 and art. 13 of the EU Regulation n. 56 2016/679.
Data gathering was completely anonymous, IP address tracking was forcefully disabled, and no sort of cookies have been seeded in the interviewee's device.
Moreover, the data collected this way has only been used for academic purposes and will never be transferred or sold to third parties.

5.5 | DATA COLLECTION

After designing the questionnaire, porting it on Qualtrics.com and scripting in all the features to make it both easily completed and pleasantly usable, it was distributed among the personnel of the *ASL Frosinone*.
Data have been collected during August and September 2021.
After being the analysis was presented and enthusiastically endorsed by the head management, the ASL's staff of each order and rank has been reached via e-mail on their

organization, via a push notification on the organization's mobile app and a pinned post on the first page of the organization's *Intranet*.

The questionnaire received 473 entries.

CHAPTER 6 | SHOWCASE OF THE DESCRIPTIVE STATISTICS

Placed halfway, between the previous chapters regarding the rationales of this exploration, and the following, which focuses on the findings of the whole process, this section serves as a useful interlude to introduce the data gradually and pleasantly.

6.1 | DATA ANALYSIS

The large amount of data collected was analyzed with the support of two useful software tools to enable efficient and consistent processing: firstly, SPSS Statistics v.27, formerly *Statistical Package for Social Science*, currently owned by IBM, has been developed over the years to be useful in any field, not only the social sciences, but also medical/ epidemiological, economic, demographic, agricultural, marketing and has become a staple tool in academic researches; secondly, the notable and widely used Microsoft Excel has been used to create tables and graphs using styles, font and techniques close to common usage to ensure a pleasant consultation.

6.2 | OUTLIERS DETECTION AND MANAGEMENT

As previously explained, the questionnaire had been designed in such a way as to make it easy, simple, and quick for any interviewee to answer, as well as proposing a close ended-multiple choice answer, to better control the outcomes.
This reasoning was valid and applicable for questions Q2 to Q14 (refer to 5.3.3), but not for Q1, as the *Age* field was designed to only allow two-digit numbers.
Nonetheless, inspecting the set of primary data available after gathering the survey data from Qualtrics.com, some entries among the *Age* variable seemed a little odd, especially around the minimum and the maximum of the distribution.
Since analytical research cannot be moved by subjective suspicions, an appropriate analysis was set up to spot any objective outliers.

Amid the 473 *Age* entries, an initial visual representation confirmed earlier suspicions:

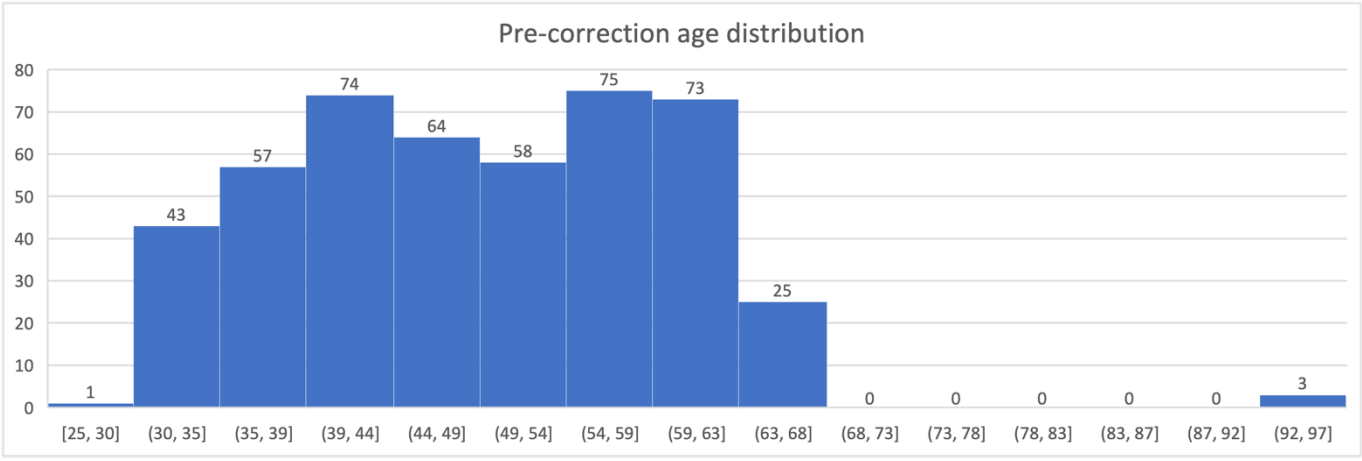


Figure 3: Pre-correction age distribution

As it can be easily visualized, three values fall in the range [92, 97], well away from the rest of the entries. Similar reasoning can be applied to the only entry in the range [25, 30].
This required a more thorough inspection.

Hence, with the aid of a Boxplot graph, the reader can clearly see how this research decided to state which values were to be considered as outliers.

The term outlier refers to an abnormal value in a sample of observations that is clearly too far apart from other accessible data.

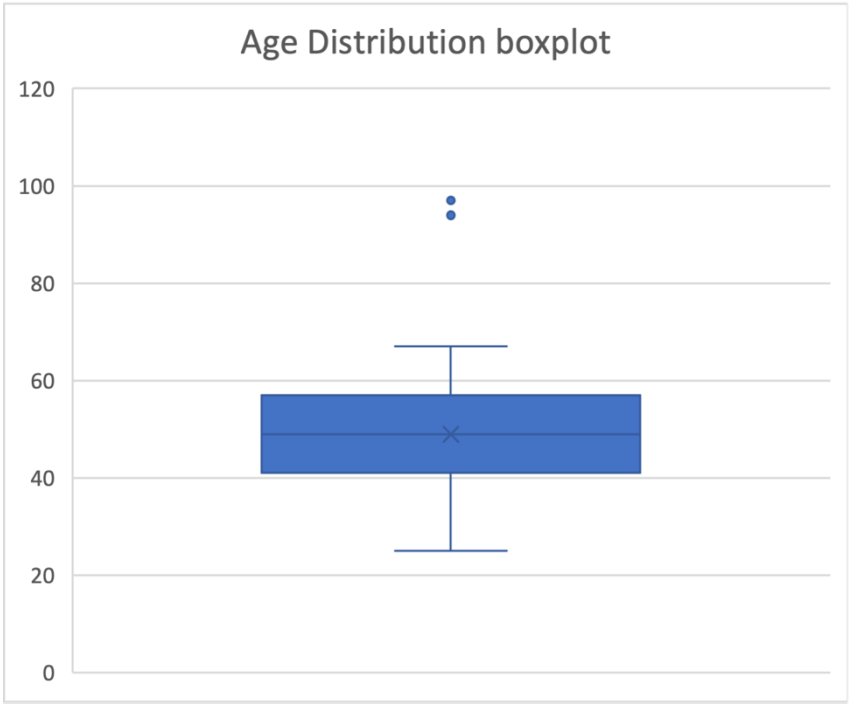


Figure 4: Boxplot of the biased Age distribution

This study proceeded in such a way, considering as outliers any result that was outside of the range of an interquartile distribution, [Q1-k(Q3-Q1), Q3+k(Q3-Q1)] where Q1 and Q3 indicate respectively first and third quartiles of data distribution, while k value is 1, in accordance with statistical practice.

Therefore, those three data items previously identified in the upper limit of the distribution are to be considered outliers, while the one entry found in the lower limit would not represent an outlier.

What is even more interesting to consider, lies in the fact that abandoning the formality of statistical definitions, and descending into the underlying characteristics of the population and of the sample in question, we prove that it is not possible to consider a datum as correct if that appears to identify an employee of the *ASL Frosinone* organization as being over seventy years old because they would most likely have already retired. it is instead possible to consider a 25-year-old as a possible employee of the aforementioned organization.

Finally, the three sets of entries that presented 94, 95, and 97 as *age* values were removed from the analysis, causing the modified dataset to be composed of 470 entries.

6.3 | GENERAL STATISTICS RAPRESENTATION

Once the previous problems have been correctly handled, the master data of the statistical sample in question can be presented clearly and immediately.
For this purpose, the reader can find below a series of graphs and explanations related to the first set of investigations and findings on raw data.

All of the following analyses will be conducted on the adjusted 470 entry dataset, outliers-related data excluded.

6.3.1 | ADJUSTED AGE DISTRIBUTION

Precisely because the abnormal data were found in the *age* value, it seems appropriate to now present again the distribution of data extracted from the adjusted dataset.

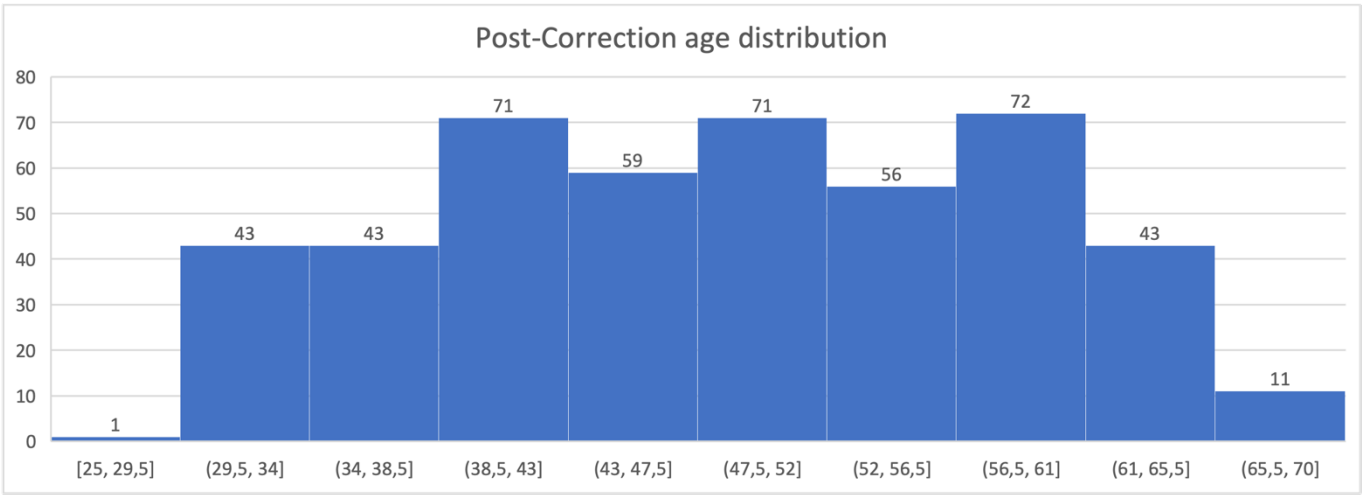


Figure 5: post-Correction age distribution

While the graph presents how the interviewees spread among age groups, the average age is 48,65 years, with a standard deviation of 9,99 years.

6.3.2 | GENDER DISTRIBUTION

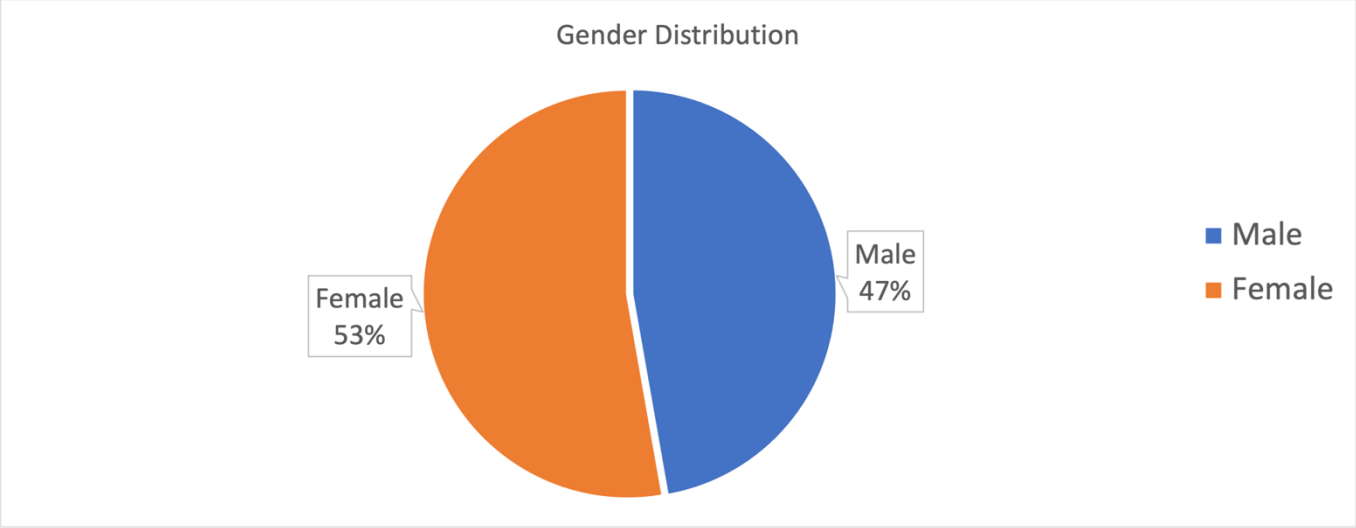


Figure 6: Gender Distribution

The sample size contains 222 males and 248 females; please note how, although answer number 3 "*Other / Prefer not to disclose*" was proposed in Question Q2, nobody in the sample decided to pick it.

6.3.3 | ROLE DISTRIBUTION

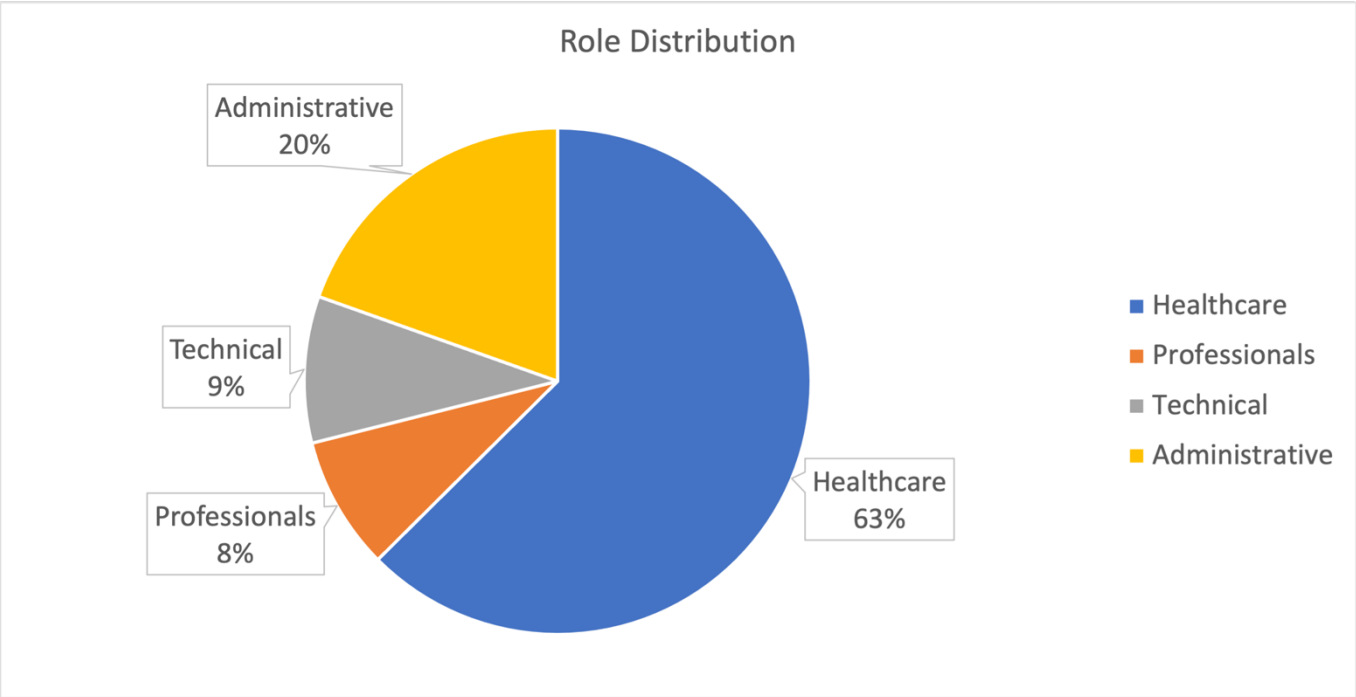


Figure 7: Role Distribution

The statistic sample appears coherent with one's expectations about the composition of a public healthcare organization. Among the 470 interviewees, 294 appeared to belong to the healthcare role, 40 to the professional, 44 to the technical and 92 to the administrative.

In the following, as they may not be familiar with them, the reader can find out in detail how the roles are divided according to the current law (dpr 20/12/1979 N761, 1979):

- In the health care role there are registered doctors, pharmacists, veterinarians, biologists, chemists, physicists, psychologists, as well as operators in possession of the

specific professional qualification for the exercise of teaching, organizational, nursing, technical-health, supervision and inspection and rehabilitation functions.

- The professional role includes lawyers and solicitors, engineers, architects, and geologists.
- The technical field is divided into separate tables according to whether a university degree or a higher professional and technical qualification or a medium professional and technical qualification or a lower professional and technical qualification is required for classification.
- Operators carrying out administrative tasks are entered in the administrative role for their respective profiles. The table of graduate administrative staff is divided into two brackets comprising administrative directors and administrative assistants respectively.

6.3.4 | FAMILIARITY DISTRIBUTION

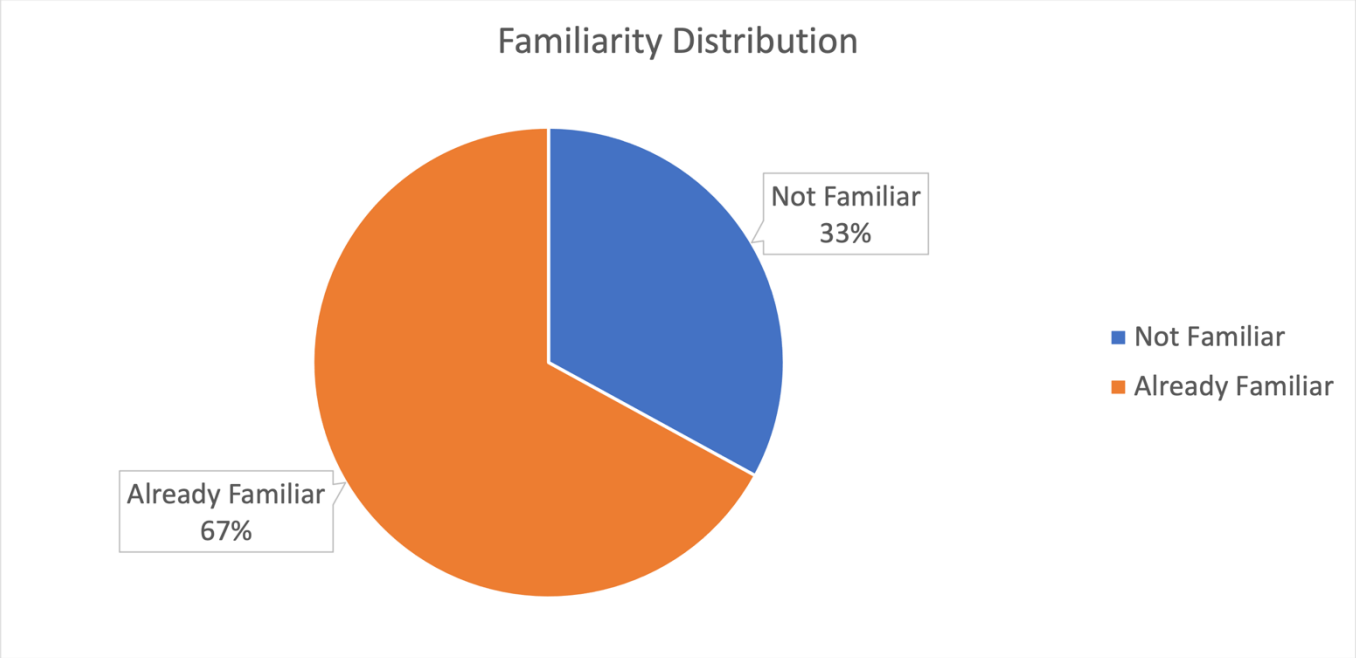


Figure 8: Familiarity distribution

Lastly, for what concerns Question Q4, the interviewees were asked whether they already knew what the term Organizational Resilience referred to, before being given a definition in the following section, before Q5.

Interestingly enough among 470 entries, 315 declared that they were already familiar with the notion, while 155 stated that they did not explore the topic quite yet.

CHAPTER 7 | FINDINGS AND DISCUSSION

After defining the theoretical reasoning and introducing various descriptive features of the statistical sample under analysis, the following chapter is mainly devoted to testing the main hypothesis underlying this research.

This aim will be pursued by presenting all the key steps in data analysis, aided by graphs and tables to ensure an immediate and pleasant consultation, all wrapped up in a narrative fashion to display the crucial findings.

Considering the novelty and the peculiarity of conducting one of the first research of organizational resilience in the public sector, after a complete discussion of the findings, a chapter will be devoted to those limitations encountered in the investigation process, and another one will be centred on the further developments in the field of Organizational resilience, moving from this contribution to the academic environment.

7.1 | HYPOTHESIS TESTING

Before proceeding with the exhibition of all the processes and the elaborations that led to the final findings, it seems appropriate to recall the main hypothesis:

> amid adverse circumstances, the ability to thrive is linked to a high degree of Organizational Resilience.

Below, the main hypothesis will be broken down and discussed in its three main components, for the sake of clarity.

7.1.1 | AMID ADVERSE CIRCUMSTANCES

As this thesis is being written, the world is still fighting one of the biggest crises of the modern age: the Covid-19 pandemic.
This fierce opponent needs no introduction nor explaination, as its presence has disrupted everyone's life over the past two years.
Sorely enough, it is appropriate to underline how this crisis directly threatens the life of all the healthcare sector workers: according to Amnesty International (Amnesty International, 2020), more than seven thousand health workers died soon after contracting the Covid-19 disease, while working at the forefront in order to keep

the whole society safe; and all of this is only before September 2020.
Rather than the death threat itself, the pitfall of the pandemic lies in its high rate of spread and its incubation period of 4 to 12 days (Moroni, 2020), during which it is difficult if not impossible to detect the presence of the virus efficiently and immediately unless swabs are used.
Despite the fact that the medical and scientific worlds have joined forces to create more than 76 specific vaccines for this disease, the crisis is far from averted, as it still generates various issues that the whole globalized world has to manage.

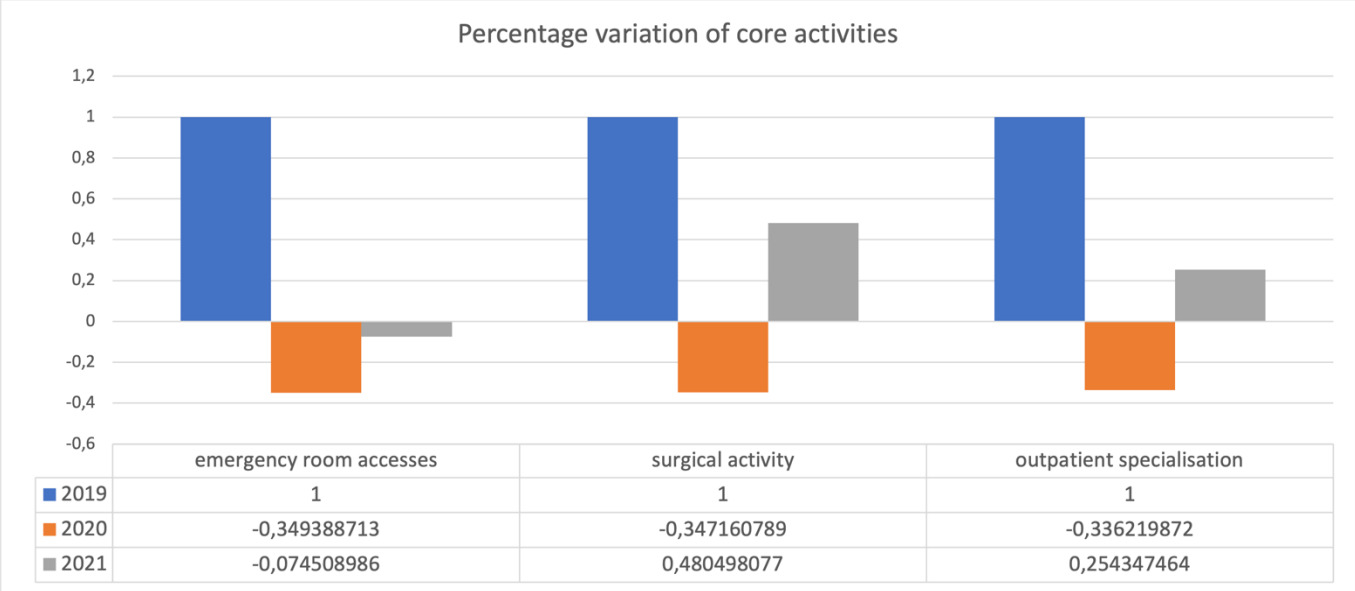
7.1.2 | THE ABILITY TO THRIVE

In this tragic, grievous setting the public healthcare organization *ASL Frosinone* has been chosen as the subject of this analysis as it represents one of the most virtuous examples of correct and efficient crisis management.
Often referred to by the news coverage as a "*Cinderella story*"(Porcu, 2021), *ASL Frosinone* was already the subject of a re-organization campaign promoted by the Latium region but managed to use the difficulties of the pandemic proactively to speed that process up; now, at the time this dissertation is being written, the said organization is among the top healthcare

organizations in the whole nation for the percentage of vaccinations.

The organization is surely thriving, and what is even more commendable is that it is thriving and growing in the midst of crises and difficulties where other organizations are struggling to survive.

It is appropriate to accompany this narrative with some significant secondary data available on the company intranet and kindly granted by the administrative staff to make this research more complete.



	emergency room accesses	surgical activity	outpatient specialisation
2019	1	1	1
2020	-0,349388713	-0,347160789	-0,336219872
2021	-0,074508986	0,480498077	0,254347464

Figure 9: Percentage variation of core activities

The graph above represents the percentage change of the three core activities in the first half of the years 2019, 2020, and 2021.

As can be seen, with 2019 as the pre-pandemic starting point, all three core activities experienced a significant and proportional contraction following the first covid wave, due to the reallocation of hospitals to crisis management facilities.
What is even more interesting to discuss is the variation between 2020 and 2021: It can be seen that for all three core activities, compared to the contraction in volumes in 2020, there was a strong recovery in 2021, especially for surgical activities.

This growth trend surely reflects the improvement efforts made by the entire organization, their will to thrive and ultimately, their resilience.
What is not apparent from the graphs, but is crucial to account for, is the myriad of covid-related activities that could not be included within the above chart, simply because they were not present in 2019 and therefore not comparable: as the pandemic still rages on, healthcare providers need to put in place fundamental and valuable activities such as Drive-Thru swabs and the vaccination campaign.
Despite not having accessible data at the present date, these kinds of considerations might help the reader to better grasp the magnitude of activities and efforts that the Healthcare system is putting in place.

7.1.3 | IS LINKED TO A HIGH DEGREE OF ORGANIZATIONAL RESILIENCE

After identifying the adverse circumstances that the healthcare sector had to manage amid the Covid-19 pandemic, and how well the organization in analysis managed the various hardships, it is now time to evaluate whether the personnel that belongs to *ASL Frosinone* show high rates of organizational resilience or not.

7.1.3.1 | SCORE ATTRIBUTION

To do that, it is necessary to convert the Liker values to questions Q5 to Q14 into numerical values ready to be handled.
As already specified (5.3.3), interviewees could only pick an answer among the following: *I Disagree Strongly, I Disagree Slightly, I Agree Slightly, I Agree Strongly*, who have been associated to numbers 1 to 4.

	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
A1	3	4	2	4	4	4	4	4	4	2
A2	4	4	4	4	4	4	4	4	4	4
A3	4	4	3	4	4	4	4	4	3	3
A4	3	3	3	3	4	2	3	3	3	3
A5	4	3	3	4	4	4	4	4	3	3
A6	3	4	3	4	4	3	3	4	4	3
A7	4	3	2	4	4	3	3	4	4	4
A8	3	3	2	3	4	3	3	3	3	3

A9	4	3	4	4	3	3	4	4	4	4
A10	3	3	2	4	4	3	4	4	4	3
A11	3	3	3	3	3	3	3	3	3	3
A12	3	3	3	4	4	1	3	3	3	3
A13	3	4	4	3	4	2	4	3	3	4
A14	1	1	1	1	1	4	4	4	1	1
A15	4	4	4	4	4	4	4	4	4	4

Figure 10:A random extraction of 15 anonymous answers.

Above, the reader can immediately view 15 sets of responses extracted from the dataset, A1-A15 identifying 15 anonymous interviewees.

In order to better handle the said data, the numeric values 1-4 were replaced to a decimal number in the range 0-1 to approximately indicate the percentage of the agreement to the statement proposed in each question:

- *I Disagree Strongly*, formerly identified with number 1, was replaced with 0, signaling a 0% agreement to the proposed statement.
- *I Disagree Slightly,* formerly identified with number 2 was replaced with 0.4, signaling a 40% agreement to the proposed statement.
- *I Agree Slightly,* formerly identified with number 1 was replaced with 0.6, signaling a 60% agreement to the proposed statement.

- *I Agree Strongly,* formerly identified with number 1 was replaced with 1, signaling a 100% agreement to the proposed statement.

	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
A1	0.6	1	0.4	1	1	1	1	1	1	0.4
A2	1	1	1	1	1	1	1	1	1	1
A3	1	1	0.6	1	1	1	1	1	0.6	0.6
A4	0.6	0.6	0.6	0.6	1	0.4	0.6	0.6	0.6	0.6
A5	1	0.6	0.6	1	1	1	1	1	0.6	0.6
A6	0.6	1	0.6	1	1	0.6	0.6	1	1	0.6
A7	1	0.6	0.4	1	1	0.6	0.6	1	1	1
A8	0.6	0.6	0.4	0.6	1	0.6	0.6	0.6	0.6	0.6
A9	1	0.6	1	1	0.6	0.6	1	1	1	1
A10	0.6	0.6	0.4	1	1	0.6	1	1	1	0.6
A11	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
A12	0.6	0.6	0.6	1	1	0	0.6	0.6	0.6	0.6
A13	0.6	1	1	0.6	1	0.4	1	0.6	0.6	1
A14	0	0	0	0	0	1	1	1	0	0
A15	1	1	1	1	1	1	1	1	1	1

Figure 11: Same entries of the previous table, post-value conversion

Above, the reader can catch a glimpse of how the same table proposed in figure 9 changed after the beforementioned value conversion.

7.1.3.2 | DATA AGGREGATION: DEGREE OF RESILIENCE AND HYPOTHESIS CONFIRMATION

Now that variables have been adjusted and made ready to process, the time has come to take some steps further towards answering the previously defined research question.

To do so, according to the underlying framework, this analysis can investigate the *resilience_degree* value as a combination of its components (see 4.1).

Therefore, the 470 values related to the questions Q5 to Q14 has been aggregate to the lower-level independent variables defined in Section 4.3, using a simple but effective method: the arithmetic mean.

	indipendent variable	value
Q5	observation_identification	0,737872
Q6	preparation	0,750638
Q7	acceptation	0,675745
Q8	develop_solutions	0,800851
Q9	reflection_and_learning	0,88766

Q10	org_change	0,729787
Q11	knowledge_base	0,832766
Q12	resource_availability	0,857872
Q13	social_resources	0,814894
Q14	responsible_power	0,740426

Figure 12: post-aggregation indipendent variables and values

Above, the reader can visualize each variable and its value, remembering that as the singular entries, it ranges from 0 to 1 and can be expressed and read in percentages.

Finally, the *resilience_degree* can be simply inferred aggregating the independent variables just analyzed.
Apparently, *resilience_degree* rate has an unprecedented value of 0,7828, or 78,28%, with a standard deviation of 0,0663 signaling an outstanding level of organizational resilience in the ASL Frosinone organization.

To recap, since intercorrelation analysis and control hypothesis testing was not feasible, the research question was destructured in its three core parts and each of them resulted true.

> Therefore, the hypothesis can be accepted in accordance with the set of primary data collection and the contingencies documented and analyzed with secondary data.

7.1.3.3 | DATA AGGREGATION: IMPACT OF PHASES AND DRIVERS ON RESILIENCE

Furtherly, as we defined resilience as a meta-capability, made up of different components, it is surely interesting to investigate which of its traits appears to contribute the most towards the result just displayed.

Just displaying the same data showcased in figure 11, sorting it in descending order, you can see which of the independent variables contributes most to the increase in the resilience rate:

	independent variable	value
Q9	reflection_and_learning	0,88765957
Q12	resource_availability	0,85787234
Q11	knowledge_base	0,83276596
Q13	social_resources	0,81489362
Q8	develop_solutions	0,80085106
Q6	preparation	0,7506383
Q14	responsible_power	0,74042553
Q5	observation_identification	0,73787234
Q10	org_change	0,72978723
Q7	acceptation	0,67574468

Figure 13: Aggregation and sorting of the indipendent values related to Q5-Q14

Hence, not fully satisfied, and realizing what it is possible to do with a precious dataset full of novel and interesting data, another observation is proposed below:

	aggregated variable	value
knowledge_base + resource_availability + responsible_power	drivers	0,81148936
reflection_and_learning + org_change	adaptation	0,8087234
observation_identification + preparation	anticipation	0,74425532
acceptation + develop_solutions	coping	0,73829787

Figure 14: Higher level of aggregation and sorting, relating to phases and drivers of resilience

According to the theoretical framework, the various independent variables have been aggregated based on the category they belong to (Section 4.1), and then sorted in descending order: it can easily be noticed how, the variables belonging to the "drivers" category, after being aggregated, presents the highest value and appear to be the absolute main contributor to the rising of the resilience rate, while the "adaptation phase", following the preceding aggregation with a slight deviation 0,03, appears to be the most relevant of the three stages of Resilience as a meta-capability.

7.2 | LIMITATIONS

Despite the robust framework, the correct identification of a congruent statistical sample and a primary dataset with a large number of entries, despite also the diligence with which this research was conducted, it is appropriate to point out that the analysis is far from free of limitations.

For example, the main limitation lies in the very nature of the public sector and the organization under consideration; this study, unlike many others in the field of organizational resilience, does not deal with and correlate a multiplicity of private companies, and this creates two types of problems.
The first, as mentioned, is directly generated by the fact that the company in question belongs to the public sector. It is not for profit but aims to maximize the health of society as its output. This means that its financial statements do not include items such as turnover, profit and revenue, which are items used to study the performance and growth of companies belonging to the private sector.
Both the novelty and the underlying trailblazing of this research give way to inherent weaknesses of this kind.
For the purposes of our research, the ability to survive can only be studied and considered as a Boolean indicator reflecting the reality of the current events.

The second issue, partly related to the definition of the statistical sample, partly related to bureaucratic barriers, partly related to time constraints, may be due to the fact that only one local health facility was considered without the possibility of benchmarking or comparing with other organizations in the same sector.

This notwithstanding, the research tried its best to solve these limitations or to *play around* them: in order to reinforce the analysis, the actual ability to thrive found in the organization in question, only expressible in a Boolean manner, was matched and explained with the assistance of secondary data belonging to *ASL Frosinone* (Section 7.1.2).

7.3 | FURTHER DEVELOPMENTS

Just as the ultimate intention behind this thesis is to fill a gap in research regarding organizational resilience in the public sector, the analysis just proposed could become a valuable starting point for a myriad of future insights and research.

For example, one route that could be followed from this dissertation would be to address the second problem set out in the previous chapter regarding the inherent limitations.
In fact, the exploration of organizational resilience in the public sector could be extended by performing the same test done on the health company in question has a large part of the Italian health companies, in order to highlight with greater consistency the strengths and the outstanding elements that contribute to the presence of resilience in an organization.

Or, *mutatis mutandis*, this could be transposed and proposed to other areas of the public sector, perhaps with the help of the state itself and the census and statistical bodies it uses.

Perpetuating on the idea of analyzing sentiment and trends of all the workers operating within a specific sector, helped by interviews and questionnaires, it could be interesting to study the relationship between Resilience and improvisation, and the paradox inherent to their interplay (Lombardi et al., 2021), since both of these two capabilities are considered relevant and useful in managing uncertainties.

Sometimes, the process turns out to be as relevant as the conclusions: as all the various steps of this research have been presented and commented, the primary data set generated for the purpose of this analysis should not be forgotten.

Yes, it was crucial to arrive at a consistent answer for our research question, and the dataset served its purpose, but it would be a waste to limit ourselves to such an analysis.
Instead, such dataset can be structured, sliced, and interrogated with the right tools and asking the right questions: for instance, when it comes to an organization's personnel and their

propensity to resilience, it could be both helpful and interesting to study within specific groups, distinguished by different characteristics, their propensity for resilience and how they perceive, believe, and operate amid difficulties.

As said, the dataset collected was way too interesting and valuable not to be analyzed further, so an example of those analyses will be showcased in the following section.

Nonetheless, this kind of analysis would be helpful to complete and deepen the various different fields of analysis and social sciences like psychology, organizational sciences, management engineering, policymaking, problem-solving, and many more, propelling the development of behavioral, relational, and cognitive studies aimed at improving the work practices within organizations and the life management for the whole society.

7.4 | FURTHER CONSIDERATIONS AND DATA SHOWCASE

As mentioned in the previous paragraph, this last analytical section contains interesting insights based on the primary data set collected and can be used as a reference for both evaluative analyses and interventions to enhance resilience within the

analysis organization, as well as examples and starting points for further research.

As it is not possible to display here the myriad of different analyses that can be carried out on the aforementioned dataset, this section will contain two simple examples: a "*horizontal comparison*" and an "*in-depth*" one, which will be appropriately explained.

7.4.1 | HORIZONTAL COMPARISON: ROLE

Let this research explore a possible question that readers might be asking themselves: does one role show a higher degree of Resilience compared to another?

For the sake of the argument, the *healthcare* role and the *administrative* role will be analyzed, being the two most populous *role* fractions.

Following all the processes carried out and explained in section 7.1.3, one might simply slice the database, find all the entries linked to the *healthcare* role, aggregate the values into variables and find what can be called *healthcare_resilience_rate*; the same can be said to obtain *administrative_resilience_rate*.

From these calculations, *healthcare_resilience_rate* has a value of 0,7741, with a standard deviation of 0,1292, while *administrative_resilience_rate* has a value of 0,8141, with a standard deviation of 0,1054; apparently, the administrative role presents a higher degree of resilience.

Is this satisfying enough? Probably not, since more analysis and presentation of data can be carried out, and they will be presented and compared below.

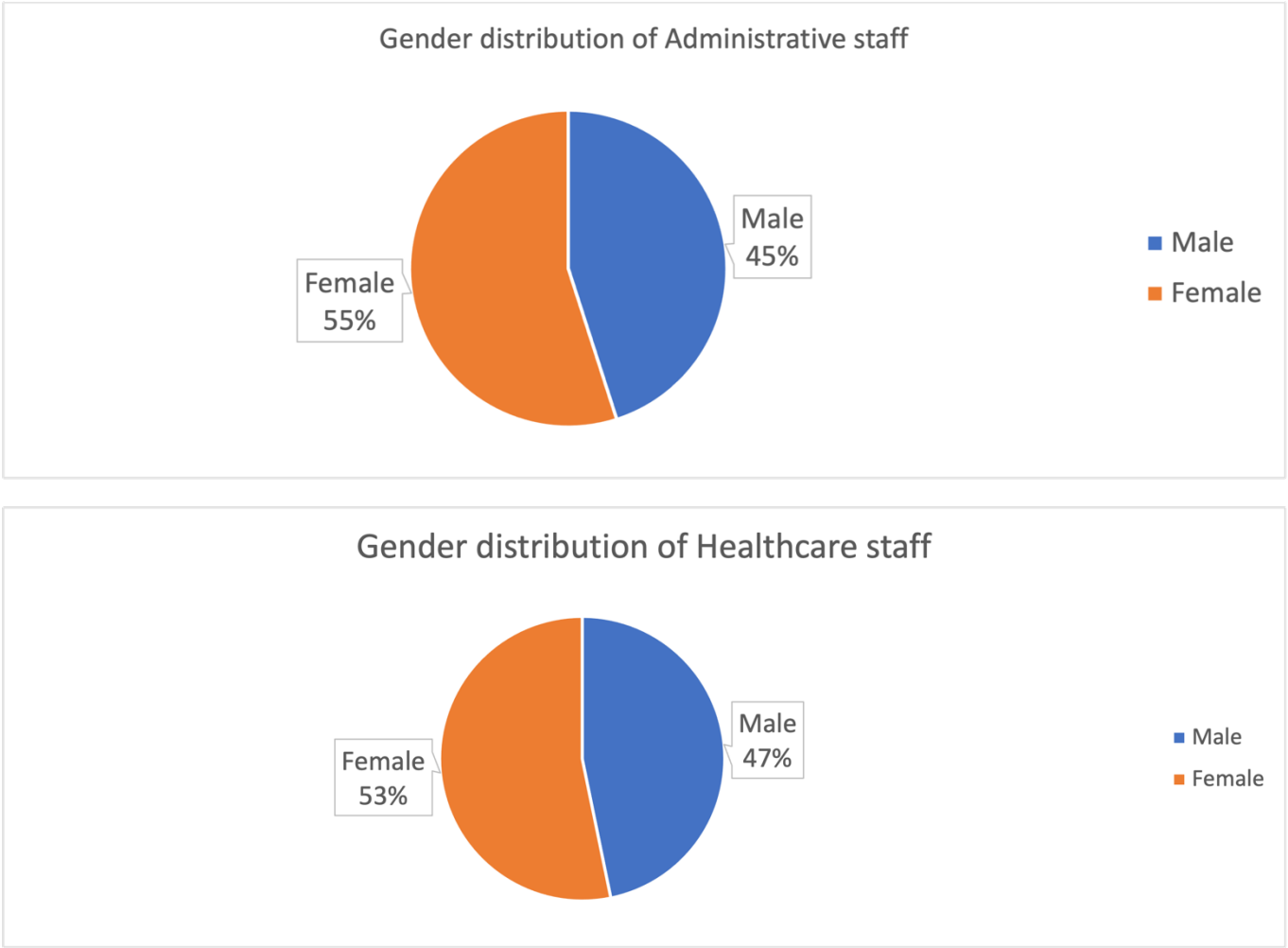


Figure 15: Gender distribution comparison - Administrative vs Healthcare

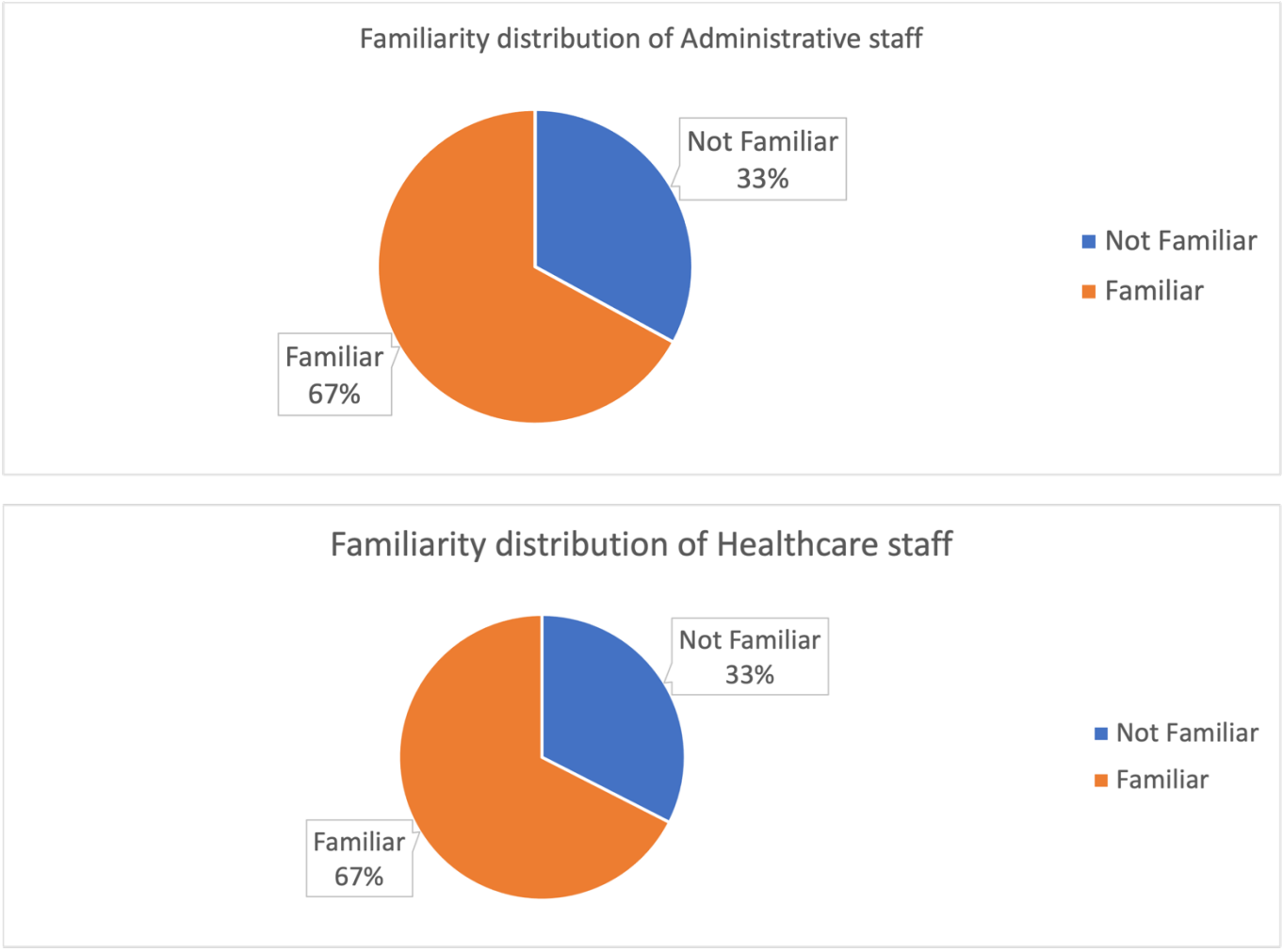
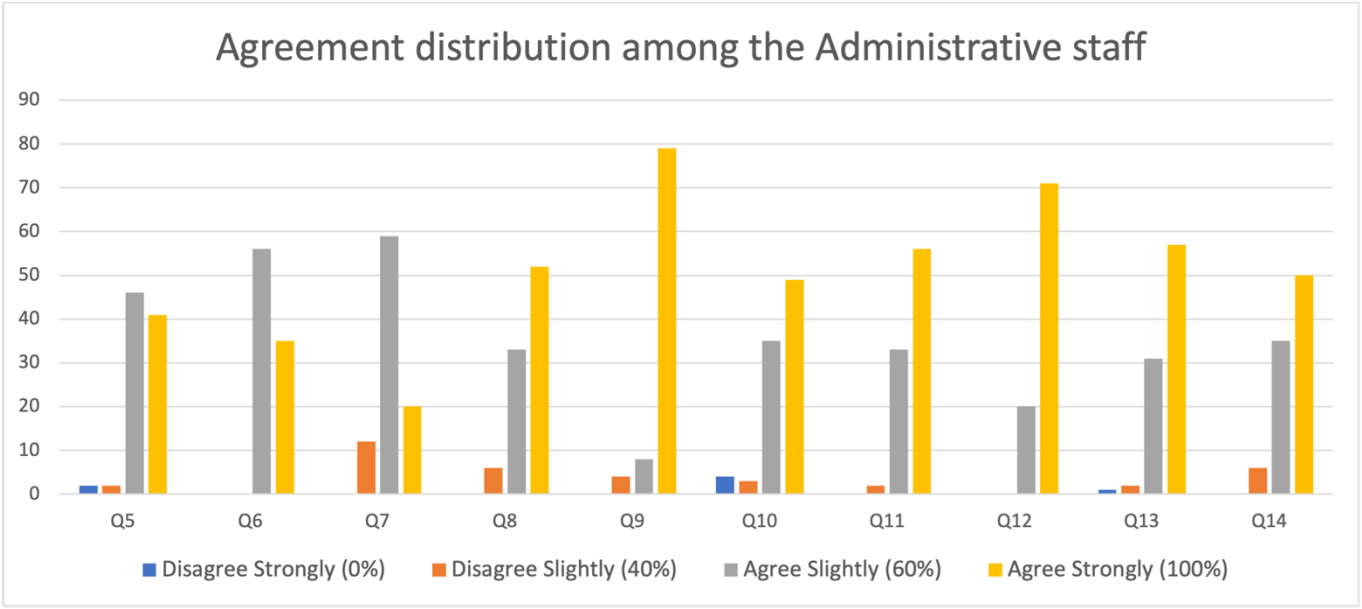


Figure 16: Familiarity with the concept of resilience distribution comparison - Administrative vs Healthcare



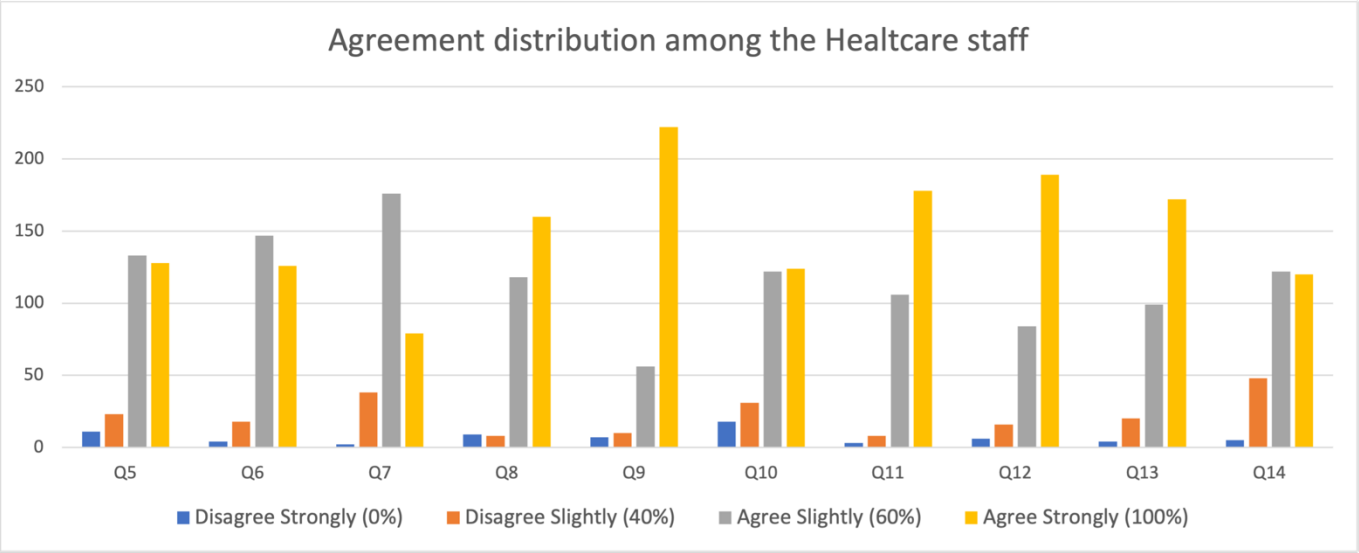


Figure 17: Agreement to Q5-Q14 distribution comparison - Administrative vs Healthcare

7.4.2 | IN-DEPTH COMPARISON: UNBUNDLING THE HEALTHCARE ROLE

This other example will explore how a dataset can be analyzed, from the general to the particular, where needed.

To demonstrate this, a set of graphs will be presented: starting from the whole dataset, each time taking the most populous portion of a variable will be considered: firstly, the analysis will focus on the entries from the healthcare role; from this sliced database, will only be taken the females healthcare workers; ultimately, it will be considered only the females healthcare workers who were familiar with the concept of resilience.
For any slice of the dataset, will be presented how the distribution of agreement changes.

Please notice that the choice of slicing is completely arbitrary and taken as a pragmatic example, but *de facto* the said dataset could be segmented with any criteria, following a specific request of the researchers.

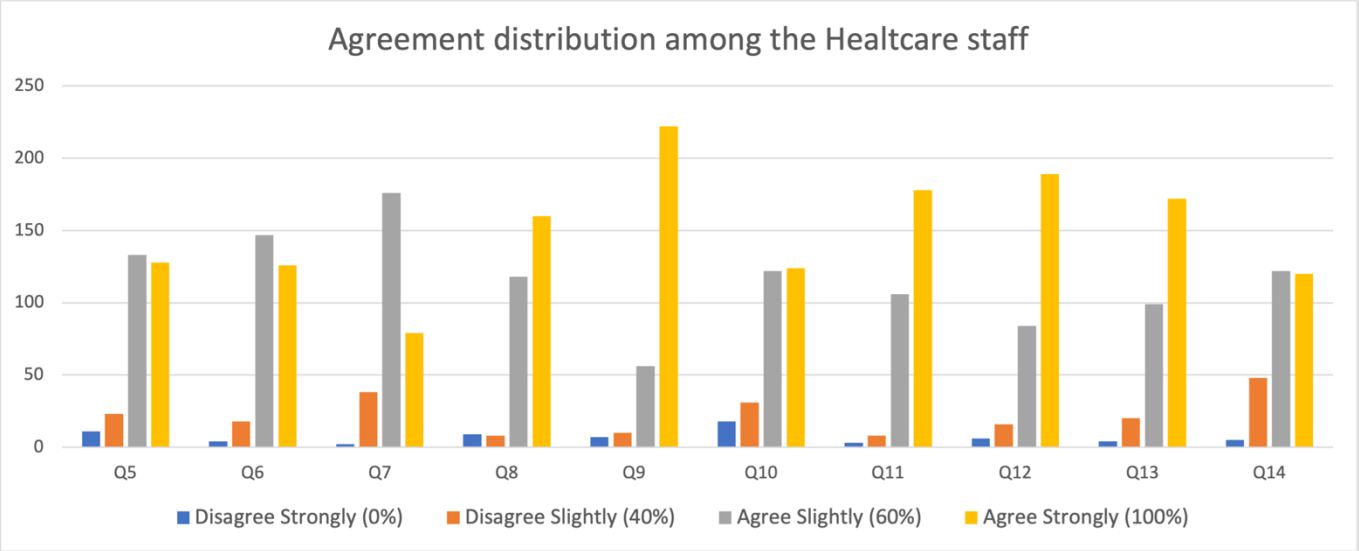


Figure 18: Agreement distribution among the healthcare workers

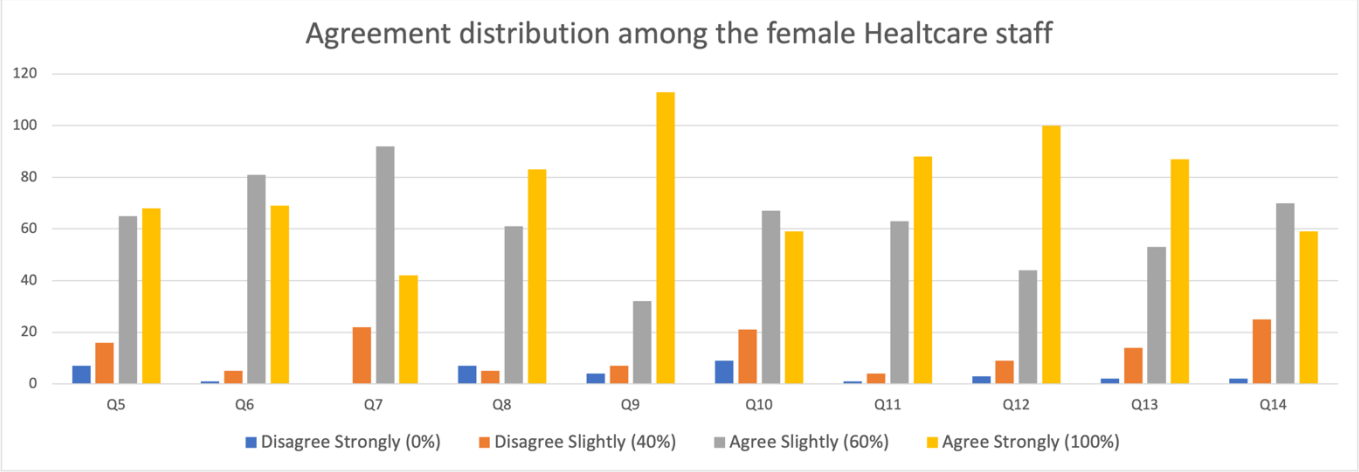


Figure 19: Agreement distribution among the female healthcare workers

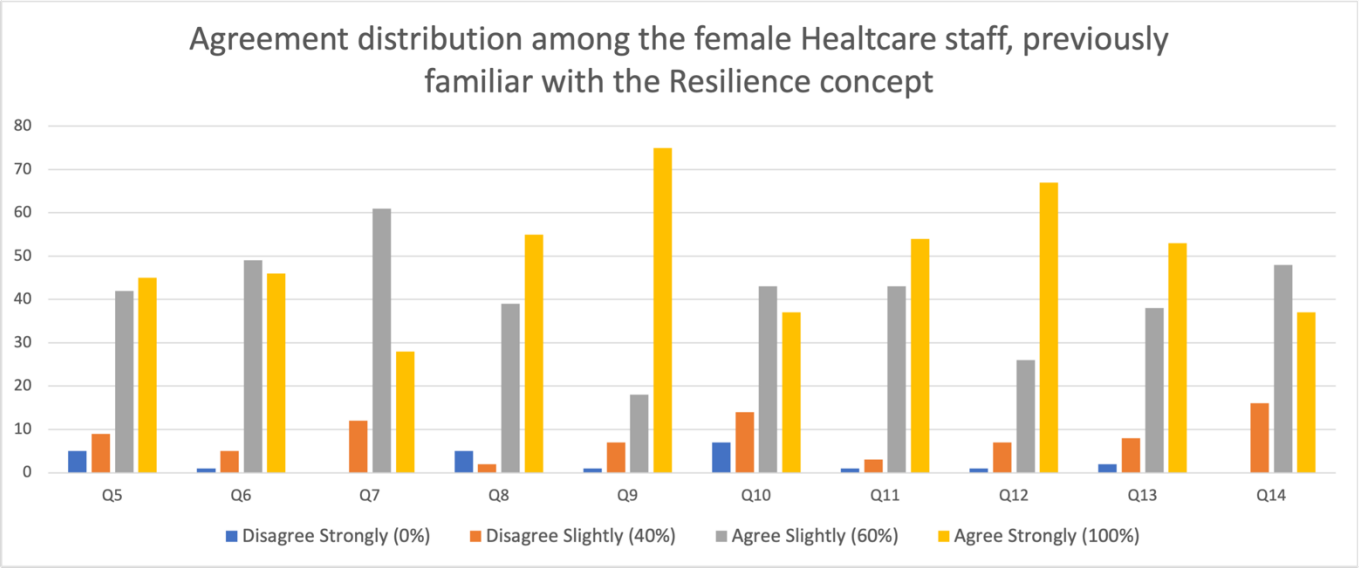


Figure 20: Agreement distribution among the female healthcare workers, previously familiar with the Resilience concept

CHAPTER 8 | CONCLUSIONS

The ultimate aim of this thesis was to explore the role of organizational resilience, during adverse and crisis situations. More than just that, this dissertation hopes to help to bridge the current research gap in the academic environment, especially regarding how Organizational Resilience affects the public sector.

An extensive literature review contributed to the identification of a useful set of theories to build up a solid and consistent framework to approach the Resilience matter, defining the latter concept as a *meta-capability*, composed of three stages and powered by four organizational drivers; once Organizational Resilience was defined in such a way, a research model had been designed to address the following hypothesis: amid adverse circumstances, the ability to thrive is linked to a high degree of Organizational Resilience.

An Italian public healthcare organization had been identified as the subject for testing the research question, being a virtuous example of how crisis and hardship should be managed

In accordance with the framework and the intended purposes, a questionnaire was distributed to a large section of the staff and received a significant number of entries.

In spite of the physiological limitations of the research conducted, the study highlighted the importance of resilience within risk and uncertainty management processes in the public sector and indicated which and how many of the intrinsic characteristics of resilience proved to be most successful.

Finally, this thesis highlighted various potential future paths to improve and iterate the underlying analysis, hoping to have provided some useful data, insights, and considerations to the academic environment.
Resilience has proved to be a crucial aspect and an important capability, especially in the organizational field: reached such important findings, this research aims at promoting and advocates for the idea that the new generations of employees, managers, politicians and policymakers should deepen their understanding of resilience, in order to pursue a better and more prepared society, able to promptly manage any emerging risks and difficulties.

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