Well-being for Innovative Behavior in Complex Organizations

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By

Caterina Galdiero and Maria Zifaro

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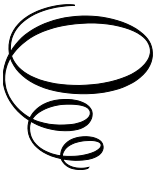

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INTRODUCTION

Complex organizations, with their complex structures and diverse teams, face unique challenges in maintaining employee morale and productivity. Organizations increasingly recognize the critical role of employee well-being in fostering innovation and promoting a "healthy" work environment. By cultivating a culture of well-being, these organizations can unlock the full potential of their workforce, foster a climate of creativity, and ultimately achieve sustainable growth.

The search for useful solutions to overcome the apparent contrasts between economic, social and environmental aspects has led to the emergence of organizations with greater complexity generated by the relationships between economic, social, environmental and technological dimensions, generating new models of doing business and new ways of managing human resources. Technological transformation and organizational complexity coexist with the need for organizations to innovate in order to survive. To ensure this, organizations can foster a healthy, stimulating and positive work environment that is low in stress and tends to be more creative and fit to meet the challenges of a changing marketplace. Organizational well-being is not just a goal in itself, but a strategic investment for organizations today that face the challenge of complexity and want to remain competitive over the long term. In this work, the authors use theoretical contributions to interpret the phenomena of organizational complexity, generated by a system of organizational interconnection that affects the dynamics within the organization and the relationships between the people who are part of it. These represent one of the main sources of organizational complexity within which it is necessary to cultivate and encourage innovative behaviors through well-being policies.

CHAPTER 1

CHARACTERISTICS OF COMPLEX ORGANIZATIONS: ADAPTATION AND INNOVATION IN THE ENVIRONMENT

Introduction to complexity

Complexity has encouraged the observation and in-depth study of different phenomena, according to broader perspectives, and has been a driving force for understanding the elements useful for investigating organizational phenomena and human resource management. A first factor that feeds complexity is represented by an increasingly frequent condition of a change in perspectives from which a complex scenario emerges, that affects both the company in its internal organizational dynamics, and the market and more generally the external environment, pushing companies to face the dynamics of the era of the organizational Hybrid characterized by constantly accelerating dynamics, consequently generating increasingly complex systems. In a turbulent market-environment there is a high risk that organizations will not be able to adapt to the continuous push for change. But the organization must train itself to be ready to absorb stress without suffering trauma in order to change products, processes, structures, strategies and culture, all of which require managers capable of "facilitating" through the enhancement of ideas and resources. A second factor that increases complexity in organizational contexts is represented by the role that the organization takes on, both subject and object, cause and effect of transformations not only within the confines of the company, but within and beyond increasingly wider, but above all uncertain and virtual boundaries. The elements have changed, but above all the interrelationships, with dynamics attributable to the world of probability rather than that of predictability, increasing uncertainty.

Among the most significant changes that can be induced in a context of digital transformation, we are witnessing a reduction in hierarchical levels,

different ways of managing information flows, processes rather than functions, empowerment models, learning organizations, policies geared towards flexibility and "total quality," cost configurations attentive to activity flows, and self-control systems. These changes can sometimes be a source of stress.

Organizations, however, are required to adopt operational methods that reflect and configure problem solving. Specific cultural perspectives and sets of values influence the way in which recent "challenges" are faced and it can be assumed that some perspectives that, for lack of a better term, we call "postmodern", are useful for the study of complex phenomena. If we consider an organization as a system of roles to produce a system of values, it is important that each person belonging to it knows the "values" and shares them. The ability to cope with risks and crises shifts from predictability to probability, confirming the centrality of organizational variables in the awareness that probability can be a generative element of stress. The factors that manifest complexity within organizations contribute to an understanding of complexity theory as regards the study of causes and factors that determine behavior patterns linked to interactions between people and the environment. In "simple" systems, for which a reductionist description of causality is valid, we try to analyze complex realities by dividing them into single components, even though understanding the nature of the parts taken in isolation would not allow us to clarify and understand how they function together. The transition from a science of the past linked to simplification to a science of the future that has complex systems as its object has numerous implications from theory to the more operational applications of organization. We can trace organizational complexity back to an organizational system made up of dynamic aspects consisting of interconnected elements. Organization is complex because it is not something that is given to us, but something that we create, model and weave continuously by connecting numerous elements.

For this reason, phenomena such as competitiveness and innovation within the context of generalized structural changes contribute to the growth of complexity and different organizational models. In fact, it is precisely in relation to the natural and growing complexity of problems that the need to configure and implement increasingly innovative solutions that take into account numerous variables is connected.

In this chapter, through theoretical contributions, we address an interpretation of the phenomena of organizational complexity, generated by a system of organizational interconnection that impacts on the dynamics within the

organization, as well as the complexity of the relationships between people in organizations, the complexity of work environments that are configured as hybrid, virtual and flexible work environments, the complexity generated by technology in a relationship between machine and man, represent the main source of organizational complexity in which to encourage innovative behavior through well-being policies. All these elements of complexity can compromise the survival of organizations and only innovative behavior can guarantee their survival. All this offers the authors food for thought, using well-being as a key to understanding how to deal with complexity and to find in this a source of motivation for innovative behavior.

Complexity in interorganizational relations

Organizational systems naturally pass from one equilibrium point to another through environmental adaptation and self-organization (Dooley et al., 1995; Lewin, 1992; Waldrop, 1992). The fundamental concepts of the mechanistic era have been seriously challenged by Einstein's theory of relativity and the discovery of quantum mechanics (Bohm, 1957; Gribbin, 1984). The principle that organizations are non-equilibrium systems because they must align with the environment is widely addressed by systems theory and Ashby's cybernetics (1958). Wiener (1948) led to seeing the organization as an “organism” (Morgan, 1986) where fluctuations coming from the outside (environment) force the system to adapt in order to maintain equilibrium, while the negative feedback mechanisms that manifest themselves with an attitude of rigidity in organizations dampen the effect of these fluctuations. Positive feedback mechanisms, which accentuate fluctuations, can be used to improve and accelerate the effects of positive fluctuations. The organization does not play a passive role of observation with respect to the environment (Weick, 1979), but organizations according to contingency theory must face and find a way to align with the environment in which they find themselves (Lawrence & Lorsch, 1967). By finding results of alignment, showing contingency effects, along the dimensions of: environment, strategy, structure, technology, employee commitment (for example, McKelvey & Aldrich, 1983; Miles & Snow, 1978; Pfeffer & Salancik, 1978; Morgan, 1986). Mintzberg (1979) and Miller and Friesen (1978) had already studied structural contingency (defining five structural forms along a spectrum from mechanistic to organic: mechanical bureaucracy, divisional form, professional form, simple form and adhocracy) and discovered that the adaptation between the structural form and the environment was fundamental for the success of organizational performance. But also the interconnections of the parts that

make up the organization generate many different types of hybrid structures that differ from the classic divisional, functional and matrix structures (Martinez & Burton Obel Hàkonsson, 2024). In fact, in the organic metaphor, organizations evolve according to the contingencies of the environment. For example, the outsourcing of activities to the growth and geographical distribution of work units or teams can increase organizational complexity, presenting the organization with a challenge of managerial complexity. For those organizational systems that intend to internationalize or increase their target market or start a strategy to improve efficiency by getting closer to the customer or supplier or raw material, the choice often becomes a response to the need to adapt to the environment and find a point of equilibrium. We are therefore witnessing an inability of traditional approaches to "manage" complex situations, linked to strong demands for change and adaptation at every organizational level (individual, group, organization). Therefore, organizations cannot be passive actors in these turbulent processes. The study of population ecology holds that organizational attributes are put to the test in a Darwinian landscape, in which companies with inferior structures and/or practices die in competition with limited resources (Hannan & Freeman, 1989). Selection is an intentional managerial choice of action, based on pre-established objectives, values, criteria, control points or competition. For example, several studies have shown that organization and corresponding technology co-evolve, influencing each other over time (Rosenkopf & Tushman, 1994; Van de Yen & Garud, 1994). Population ecologists have often modeled organizational change as the diffusion and adoption of both technical and managerial innovations.

For this reason the environment, organizational structures and work organization models are carefully observed, also in search of new configurations (Padroni 2007; Martinez & Burton Obel Hàkonsson 2024). The connections between the internal and external parts of the organizational system serve to respond with increasing care and attention to the demands for quality orientation, to satisfy the greater need for autonomy, responsibility, and therefore empowerment, to define a new role for the leader, to satisfy the demand for flexibility of the structures (Padroni, 2007), freedom combined with responsibility are capable of activating energies that go from individuals to families and return to business combinations. In this whirlwind of opposing forces and connections of relationships, new and different organizational models are represented in increasingly hybrid forms and managements (Gray, 2002), with managerial and cultural dynamics that push towards new models of doing business and new ways of managing human resources and knowledge. Therefore, the organization presents itself

more and more as a cognitive system, made up of people who relate to a market-environment trying to influence systems of values and cultures, marked by progressive heterogeneity (Nonaka, 1988). In fact, the logic of organizational complexity pushes towards the "valorization" of all human resources, both "internal" and "external", combining the intellectual value of people, technological potential and information, leading to the redesign of organizational structures and work organization models towards hybrid forms (Padroni, 2007; Goldstein 1990, 1994; Martinez & Burton Obel Hàkonsson, 2024). New organizational forms and models are oriented and polarized towards change, training, development, attention to values, organizational climate and culture, oriented towards collaboration and total quality that have modified communication, logic and management techniques in organizations (Padroni, 2007). The complex organizational system, therefore, consists of a large number of forces and actors that interact with each other in various ways to give life to fragmented structures and processes, not linked to predetermined models.

Managing the Human Resource Complexity

The Complex Adaptive Systems (CAS) theory allows us to analyze the organizational system from a more holistic point of view, including social systems, ecologies, economies, cultures, politics, technologies, etc. (Gell-Mann, 1994). Complexity, therefore, encompasses a range of approaches and structures that are complex in time and space, focusing on individual relationships as well as on organizational management and design. Social systems are characterized by non-linear flows of information and resources, as confirmed by CAS theory, which identifies truly complex behavior. According to this approach, the authors focus on the "soft" aspects of the organizational elements and dynamics that accompany the phenomenon of organizational complexity, specifically on the dynamics that accompany relationships between people. In general, people's behavior is difficult to predict and we only have general indications of what might happen in certain situations, emphasizing the probabilistic nature of behavior. Environmental turbulence, from crises in international equilibrium to emergencies that are increasingly less "exceptional", from climatic to social ones, can have effects on relational dynamics even within organizations. This is why complexity theory places great importance on relationships, on the way people interact, on a wide range of organizational and management issues, such as culture and creativity, the performance and cost-effectiveness of the system (Padroni, 2007). For example, if managers recognize the value of relationships in the workplace and understand that it

is important to promote new ways of managing human resources in a system of complex relationships, then they are in favor of promoting greater attention to people and taking their suggestions into account, favoring a culture of attention in which people are highly sensitive to the needs of organizations. If you become aware of the complexity of the environment in which you operate, you become aware that the difficulty associated with long-term planning rather than management failure is a predictable result of the environment (Kregel, 1988). Another example is when you are dealing with companies where employees show low motivation, a low level of belonging, poor ability to commit, prevailing focus on pay, planning investment to improve communications and relationships between people, promoting the well-being of employees in a positive organizational climate helps to increase performance levels, thus overcoming the challenges of complex organizations (Martinez, 2024). Therefore, in organizations it is necessary to build relationships based on trust, to encourage the birth and affirmation of values, to overcome all kinds of frontiers by learning to cross temporal, cultural and geographical boundaries in order to survive. Creativity, the ability to generate innovations both on a conceptual and relational level, appears as a starting point for very complex business processes, even in periods of difficulty and turbulence, offering a basis for study and discussion (Mullins, 1992). The dynamics of innovation adoption can be better described by assuming that resistance to adoption is caused by institutional factors (inter- and intra-organizational) rather than by an individual's risk aversion or propensity to imitate (Davies, 1979; Stoneman, 1983; Kodama, 1995). In this model, the adoption of innovation evolves together with the organizational environment necessary to nurture innovation.

In this increasingly strong interconnection and interaction with internal and external, individual and organizational value systems, it is particularly important to have a unifying power in generating synergies among people capable of integrating individual and assimilated goals with those expressed by the company. Reality proceeds and evolves through contaminations, intersections, and contradictions, rather than through sharp and distinct patterns. Culture within organizations is often shaped by the influences of the cultural and institutional context in which they operate, manifesting hybrid cultures and feeding the complexity of organizations. Cultures of diversity of gender, religion, age, social and cultural level, or cultures of nonprofit business or social orientation are all subcultures within the same organizational network that incorporate, through processes of institutionalization, the cultures of the external context, contributing to the formation of hybrid organizations in which prevailing subcultures are

sought to be shared by increasing management complexity (Martinez, 2024). Complexity also manifests itself in the difficulty of securing and satisfying the needs expressed by bearers of different cultures, even though these must come together in a corporate mission and vision. Organizational culture is a complex construct that does not originate only within the organization but evolves and develops on the basis of a plurality of factors that refer to the values expressed by management to those of the individuals who work within the organization, to the relational systems that have been consolidated within the organization but also to the historical moment in which the organization lives and to the political and institutional phenomena of the reference context. Added to all this are the different subcultures present within the same organization. In a multicultural society, organizations present mutually opposing cultures that end up fragmenting, impoverishing themselves in multiplying, or mutually enriching themselves by unifying around a central and complex organizational reality. Organizations become multicultural organizations consisting of complex social systems in which cultural diversity impacts interactions, innovation exchanges, and productive and creative processes that require the ability to manage this complexity by promoting inclusive policies, conflict management skills, and policies that foster knowledge exchange.

A more realistic and systemic "postmodern" vision, in light of the epistemological changes taking place in contemporary knowledge, will be marked by the acquisition and "management" of a "new sensibility" capable of dealing with the multiple forms of diversity (Padroni, 2007), which are not neutral with respect to culture and the acceptance of individual variations. Careful "diversity management" can be a source of enrichment, with positive effects on the system's performance, flexibility and competitiveness. The "postmodern" human being must govern diversity which, according to an evocative representation (diversity wheel), would take two different configurations: the "primary" one would group together aspects that the person finds difficult to modify, such as age, ethnicity, psycho-physical abilities; the "secondary" dimension would instead refer to a series of characteristics such as religion, professional experiences, residence that tend to change during life and in turn are influenced by other factors of both a subjective and objective type (Padroni, 2007). Strong emotional involvement would ensure employees both a higher degree of satisfaction and more pleasant working environments. For this reason, there is growing attention towards approaches capable of enhancing diversity management in a more realistic personnel management capable of enhancing aspects and interrelations of a subjective and objective nature aimed at ensuring the climate and cooperation within the organizational

structure. The environment conditions behavior, values and culture, therefore strategies, which are not neutral with respect to people's behavior, even in a framework of non-linear relationships, not forgetting how the same scenario can represent an opportunity or, on the contrary, a threat. In reality, diversity management is practiced for a variety of reasons ranging from market needs to the desire to attract or retain particular professional skills, to contain the costs of turnover and absenteeism, to create synergies following new collaborations, to increase the creativity and capacity for innovation of the system, which are increasingly important as tools for success. Attention to a diversified market, also from an ethnic point of view, can have as its competitive strength the ability to reflect the mosaic of society. The theory of complexity, with its highly interdisciplinary nature, has shown, in the context of the equilibrium conditions of an economic system, the importance of exploring the possibilities and limitations connected to diversity, including cultural diversity.

The complexity of the work environment in the hybrid era

New work models involve the integrated management of spatiotemporal, technological, and cultural changes in the organization (Kingma, 2019). New forms of work are moving toward hybrid models of work, often using the notion of work away from traditional organizational structures and permanent employment to include, for example, “crowd work” and online forms of work (Howcroft & Bergvall-Kåreborn, 2019) characterized by both temporal and spatial flexibility. Increasingly complex information systems and virtualized organizational formations (e.g., Internet platforms) contribute to the development of new ways of working, including work practices that include “telecommuting, nomadic work, hot-desking, working in co-working spaces, virtual or mobile work” (Aroles et al., 2021, p. 1). The widespread use of mobile and networked computing technologies such as the Internet, smartphones, and cloud computing, along with applications such as Zoom and Microsoft Teams, which allow people to meet in virtual spaces, open up new spaces in the way people work (Brakel-Ahmed et al., 2020). The work environment of employees has drastically shifted from offices to homes. Telecommuting is often a desired perk for employees, but employers see it as a temporary environment. The COVID-19 pandemic has changed the way the home office has gained importance and is likely to become an essential part of the work environment (ILO 2020a). A rapid transition from office to home office through location flexibility proved to be a necessary solution, turning telework into home office and becoming more flexible in terms of time and space. With telecommuting, employees

do their work from home, where they live with other family members and where their rights and well-being are difficult to secure (Wang et al., 2023). Work schedules often intersect with domestic responsibilities and social activities in the family environment (Xue & McMunn, 2021). Employees have limited opportunities to spend their leisure time away from the home-office. As a result, many employees worked more than the hours stipulated in their employment contract, negatively impacting employee well-being and productivity (Nemteanu & Dabija, 2023). This type of work negatively affects employees' stress and overall health (Como et al., 2021). Work from home or outside the office is likely to persist, and the home office will become an essential part of the work environment. With the almost obligatory shift to remote work, some employees may realize the benefits of remote work, thus causing a shift in mindset, while others may wish to return to their traditional work environment (Vayre et al, 2022; Haja, 2022). It is critical to understand the needs of employees in terms of time and place of work, because only workplaces designed for employees and that demonstrate organizational resilience can survive and remain competitive in the future, maintaining productivity, performance, and satisfaction at a high level (Asgari et al., 2022).

Because there is no international statistical definition for these terms, countries use slightly different and sometimes overlapping operational definitions (ILO 2020c). Therefore, the terms remote work, telework, home office, and work from home (WFH) are often used interchangeably. The term telework defines work from home or away from the workplace and is a subcategory of the broader concept of remote work. While remote workers may work at an alternative workplace outside their usual location, telecommuters may work from any alternative workplace and the use of personal electronic devices is an essential part of the performance of work (Olson & Primps, 1984; Pulido-Martos et al., 2021; O'Rourke, 2021). Work from home is known as home-based work, which includes temporary and alternative work arrangements (ILO 2020b). It represents the form in which an employee works from home using information and communication technology (ICT). Home office is a defined name for casual work from home or as flexible performance. In effect, hybrid work allows employees to work in the office some days a week and work from home on other days and offers flexibility in the work area in terms of space and time. In summary, hybrid work combines traditional “in-office” work with remote “out-of-office” work (Cook et al., 2020) or telecommuting. This blended strategy offers employees the flexibility to work from an office or any other remote location (home, cafeteria, coworking, etc.) outside the employer's location, with or without the use of ICT. According to Halford (2005),

hybrid work changes the nature of work, organization, and management across home space, organizational space, and cyberspace. The combination of working in the office and working from home can be beneficial for both employees and employers, but it can also lead to several problems arising from both work environments. Many authors have examined work from home, emphasizing its effects on employees, managers, organizations, or organizational culture. The traditional concept of working from home was seen as an advantage for employees who could irregularly perform their work outside the workplace. It also offers the opportunity to divide the workday according to individual obligations and the ability to perform work-related and non-work-related tasks. In addition, working from home benefits employees who need to travel to work and, therefore, saves time and reduces transportation costs, as well as employers who save on facility costs. Working from home offers greater flexibility of schedules and can only increase concentration and productivity when certain internal environmental conditions of a home office are met, such as visual privacy, general noise level (Yang et al., 2021; Gratton, 2021) freedom from distractions and the manifestation of good intrinsic work motivation, all of which contribute to a "healthy" environment. Overall, while it can lead to greater positivity, satisfaction with one's job, work engagement, and reduced chances of burnout (Charalampous et al., 2019), on the other hand, the unavailability of employees when needed, the inability to complete tasks on time, less flexibility in problem solving, and greater difficulty in monitoring employee availability and performance are some of the disadvantages of this hybrid work organization. It should not be underestimated that in the long run, however, the effects of reduced social interactions and excessive employee workload are visible (Ellison 1999; Cooper & Kurland 2002; Gareis, 2003; Haddon & Brynin, 2005; Gajendran & Harrison 2007; Sewell & Taskin, 2015; Messenger & Gschwind, 2016; Babapour et al., 2022; Srebalová, 2022). Moreover, as Smoder (2021) states, employees who work from home tend to work longer hours, which can worsen work-life balance. In addition, this leads to reduced recovery periods, which can have negative consequences on mental health, stress, sense of isolation, or depression (Tavares, 2017). It should not be overlooked that social interaction and collaboration can be positively related to employee creativity, performance, and productivity (Zwanka & Buff, 202; Cˇajková et al., 2023). The above factors can be considered the most significant advantages of traditional office work or office work, which, in many cases, is an argument in favor of maintaining these work settings. However, the situation may depend on the type of office, as often open offices, overcrowded and noisy spaces (Barath & Schmidt, 2022a) can be a

difficult environment for employees, causing stress or anxiety and leading to decreased productivity or performance (Needle & Mallia, 2021). Although hybrid work is relatively new in the world of work and its advantages and disadvantages are still being discovered, it has been shown to lead to positive outcomes for both employees and employers. Zwanka and Buff (2021) argue that this reorganization of work, combined with greater freedom and autonomy in choosing work time and space, can promote work-life balance, as it allows employees to balance multiple roles (family, personal, or career-related). In addition, it improves efficiency, which can be considered the main benefit, as it enables employers to increase the quality and design of workspace, minimize operational costs related to reduced office space, and improve employee safety. Thus, the results obtained from the survey of Karácsony's (2021) and Diab-Bahman and Al-Enzi's (2020) research, where according to Karácsony (2021), pandemic-induced telecommuting had a positive effect on the job satisfaction of the employees studied, and a significant portion of the employees surveyed would maintain telecommuting even in the post-pandemic era, while according to Diab-Bahman and Al-Enzi (2020) concluded that a more significant portion of employees' preferences suggest that the trend of working from home will continue. A portion of employees surveyed say they would be able to work efficiently if they had the option to adopt a hybrid work model, confirming global trends. This study indicates that employees value flexibility. However, only a minority of employees prefer to work from home full-time. These results imply that hybrid work is the most suitable solution to meet employees' preferences. The main purpose is to provide security, save on office costs, and meet employees' needs. On the other hand, some employees appreciate the opportunity to work from home, but they also need to be in personal contact with colleagues (to facilitate communication or collaboration).

Complexity in the service of technology

The understanding of complexity owes a prominent place to reflections that go beyond the mechanistic view of evolution related to the development of new models of work organization, but also to how information and communication tools are intertwined with the world of human relations, emblematic of psychosocial reality, not only in conveying information but also in the way the very relationships between individuals change (Morin, 2001). All this represents an important driver of organizational complexity, if we think about the issue of knowledge, as in Drucker's (1993) view, especially the innovative and definitively traceable to the area of human

capital (Scott, 2000), appears to be a key to success, so important as to configure a true "Knowledge Society." The impact of digital technologies on knowledge management also brings about new changes in the management of human relations in organizations and organizational design. The study of the impact of digital technologies on organizational arrangements has a long tradition. According to some scholars, it began as early as 1958, following an important article in the Harvard Business Review (Leavitt & Whisler, 1958) in which they tried to predict how what was then called *Information & Communication Technology* (ICT) would change management practices in the 1980s. The debate has since developed in part due to the fertile contributions of Herbert Simon who, in his 1960 volume "The New Science of Management Decision," collected his early thoughts "*on the use of computers and their implications for business management*." The topic of digital technologies, however, is obviously highly topical: scholars and managers are constantly wondering about *smart* and *virtual organizations*, smart working, *connected workers*, Big Data, artificial intelligence and robots. Undoubtedly, digital technologies greatly amplify the *information processing* capacity of companies (Martinez et al., 2004), however, it would be a mistake to simplistically imagine that technologies can deterministically define organizational arrangements: instead, attention must be paid to the interaction (*Human Computer Interaction Theory*) that is created between the digital technologies adopted and the people working in the company by increasing organizational complexity. All of this feeds organizational and managerial complexity because while it is true that through digital technologies human behavior can be conditioned and modified, it is also true that it is people who decide how to use the technologies, reinforcing, modifying, or nullifying their potential functionality.

First, digital technologies should be considered the result of people's actions, since they are obviously artifacts, that is, material products of programmers, engineers, technicians, managers, developers, hackers, and as such reflect the assumptions and goals of their designers and creators (Esposito Elena...). However, in the same way, digital technologies are artifacts used by people, who appropriate and adapt them to their own needs, requirements, and tasks. Only through this activation do technologies take on meaning, value and role in organizations, just as is the case with language: it does not exist, it has no meaning, if it is not used by at least two people. This is the logic behind the system of relationships between technology and people within organizations through the so-called domestication *of* digital technologies, which shows further elements of complexity in organizational design (Hynes & Richardson, 2009).

Second, digital technologies are used as information and knowledge management systems. Therefore, the availability and quality of information (e.g., Big Data) that such technologies can provide greatly influence how people activate the context in which they act, make decisions, and learn. It is important to clarify that digital technologies per se, as artifacts, are not social structures, nor do they embody social structures: only when data, processing principles and rules are used by people, then they activate and condition people's behavior (think social media). Therefore, the influence of digital technologies is not direct if, as mentioned, people appropriate the technologies and decide to use them in ways and criteria or for purposes other than those intended by the designers or engineers who made them. People may make mistakes in using digital technologies, they may sabotage them, they may learn to use them slowly and with delays, they may resist them, or they may ignore them and not use them at all. It can be concluded, therefore, that complexity lies in the way digital technologies are used, and not in the technologies themselves, which redefine an organizational arrangement (Martinez et al., 2024; Esposito, 2022).

Third, it should be specified that when digital technologies, such as information and knowledge management systems, are introduced, they must be accepted, imposed, or adapted within a pre-existing and specific organizational set-up composed of a combination of all the elements indicated in the multi-contingent design model. Complexity thus lies in the preexisting combination of elements of an arrangement that influences how people represent themselves, decide on and learn to use the technologies with which they interact and are thus affected by them.

Fourth, when people use digital technologies they enact behaviors that can either reinforce organizational arrangements or challenge and change them. The successful incorporation of new digital technologies is mediated by the climate, leadership, and pre-existing work microstructure of the organization in which these technologies are adopted. In essence, companies choose how to use digitization to implement their strategies, but also to change the structures and organization of work. The complexity lies in the fact that this choice is evidently conditioned precisely by these macro and microstructures, the climate and leadership that represent the collective social context that has been defined over time in a specific company. This approach, in essence, is based on the recognition of the existence of an *information-human interaction* between digital technologies and people (Martinez & Pezzillo, 2013; Martinez et al., 2024) and on the acceptance of the idea that digital technology itself, on the one hand, changes in the use that people make of it and, on the other hand, conditions people's behavior.

Digital technologies create new possibilities, but those possibilities are mediated by the perceptions, decisions, and knowledge that individually and collectively characterize the users of those technologies. Thus, in each individual company, the interaction between the elements of the setup and digital technologies develops differently and it is utopian to imagine that it will be substantiated in a serene interaction without tension or conflict. It is therefore very difficult to predict what results or effects will derive from the digitization of a private or public organization, since the digital impact is mediated by the more or less conscious choices and behaviors of the people who make them up and the procedures, rules and routines that have conditioned them up to that point. The result is this new hybrid organizational arrangements, also experimental, like those seen in the previous paragraph, sometimes superimposed on them, sometimes still variants of them.

The intersection of human and machine is a complex issue

The complexity of the intersection between technology and human resources, which began decades ago, highlights how new technologies, particularly artificial intelligence, big data, and analytics, are changing the role of the HR function, as well as human resource management practices and techniques (e.g., recruiting, learning, or career management on the one hand, empowerment, motivation, and leadership on the other) (Marler, 2009; Haines & Lafleur, 2008; Strohmeier et al., 2018). Current and recent developments in human resource digitization are transforming and influencing organizational performance (Marler & Fisher, 2013), and organizations around the world are exploiting the potential of digital transformation of work (smart working, flexible working, telecommuting capabilities) by increasing management complexity (Georgiadou & Antonacopoulou, 2021; Marsh et al., 2022). To design the future of work, companies and their leaders need to rethink the organization of work based on four main elements: the activities and processes carried out to achieve the organization's outcomes; the skills and talents best suited to the new working conditions; managing the impact on people's stress and well-being; and the characteristics of the workplace, defined as “a mixture of physical, cultural, and digital elements in the work environment that leads to fundamentally new and complex configurations of human and technological relationships at work that reshape the very nature of work practices (Marsh et al., 2022). Socio-technical theories are an important theoretical framework for the pursuit of organizational excellence in an increasingly digitized organizational context. However, the so-called “future of work” (OECD 2018; WEF 2019) will be characterized by work practices that are even

more dependent on digital technologies. Therefore, the use of flexible work models requires flexible technological solutions. However, these changes must be designed with the complexities of the relationship between people and technology in mind. The study of the human-machine relationship has shifted from the assumption that technology can replace human activities to sociotechnical approaches in which technology supports human activities as technical partners and collaborative agents, not simply as tools (Bednar & Welch, 2020). This perspective is based on sociotechnical theory (Sarker et al., 2019), which considers an organization composed of technical and social (people-related) systems, highlighting the social and organizational implications of the adoption and use of digital technology. Another contemporary socio-technical theme to explore is agile and hybrid work that necessarily requires the use of technology to perform work activities. Bednar and Welch go so far as to address the human-machine relationship in a collaborative agent logic (Bednar & Welch 2020; Ravarini et al,. 2020). In any case, the phenomenon of digitization in the world of work seems to have reached a point of no return. The socio-technical lens can be used in the industrial context, where the adoption of a multitude of digital technologies-in the form of robots and cobots-can alter the traditional and manual socio-technical interaction between technologies and workers (Margherita & Braccini, 2021). At a time in history when the crisis of socio-economic systems has forced the organization to take full advantage of the potential of the digital transformation of work, digitization is spreading across all sectors, integrating face-to-face relational dynamics with virtual ones, within which the ability to understand the other's state of mind and, more generally, the ability to relate becomes even more important. The ability to relate has become a key element in building lasting relationships based on trust, which are necessary for successful professional performance. Within this new organizational model, interpersonal relationships have been profoundly transformed, generating what we might call the reorganization of managerial and emotional dynamics. The relationship is no longer face-to-face but becomes human-computer or meta-human; these are not mere transpositions of concepts and modes of action that we are used to seeing, but they become essentially other ways of interacting, between people or between groups. Various sciences are analyzing some of these aspects; recently a new area of interdisciplinary research (neuroscience, economics, sociology and psychology) has developed. As digitization makes its way into work dynamics, several studies point out that emotional intelligence (EI) is an indispensable skill for teams and managers who must manage and coordinate a work group (Goleman, 1995; 2019). It also turns out to be an important predictor of performance, as the presence of high EI correlates

with better workplace behavior, particularly in work teams, which contributes to better outcomes and performance. A 2018 study confirms that social and interpersonal skills, in addition to being irreplaceable, prove to be the most important skills to cultivate in business and their demand will increase by 30 percent by 2030 (McKinsey, 2018). The manager's challenge is to be able to figure out how to develop and implement those soft skills and social skills that are also indispensable in digital environments. Emotional intelligence, i.e., the ability to perceive and express emotions, to know how to use, understand, and manage them, in oneself and in others, is an indispensable skill that challenges managers' management skills by increasing managerial complexity (Goleman, 2019).

In essence, the socio-technical approach offers a useful conceptual framework that provides a solid foundation for analyzing the impact of technologies on the social sphere. According to this approach, organizations can be viewed as socio-technical "open systems," that is, structures that can be analyzed according to two interdependent and complementary dimensions: the technical and the social (Dossena & Mochi, 2020). Specifically, the socio-technical approach is based on the idea that change requires human-centered design, as work systems involve the participation of one or more people interacting with each other and/or with machines (Bednar & Welch, 2020). Consequently, this approach suggests integrating variables traditionally studied in separate disciplines within a unified representation, following an interdisciplinary perspective. In particular, the technical dimension is associated with business processes, which consist of different activities, and technology, which is seen as the main driver for implementing these processes and transforming inputs into valuable outputs for the organization and its stakeholders. More recent developments in the socio-technical approach also focus on the internal functioning of the organization in relation to the environmental context of individual processes, roles, organizational units, networks and ecosystems (Mohr & Van Amelsvoort, 2016). This perspective integrates reflections on organizational complexity and the need to consider a management strategy to respond to that complexity.

CHAPTER 2

INNOVATION AND COMPLEXITY IN DIGITAL ORGANIZATIONAL

Introduction: between innovation and complexity

The ability of organizations to innovate is a fundamental requirement for organizational renewal and survival (March, 1991). Innovation appears to be a very complex process, that is, a dynamic, non-linear, evolutionary process in which an invention becomes an innovation (Link and Siegel, 2007) and in which both internal and external sources of knowledge can be used, intensifying the complexity-innovation binomial (Chesbrough, 2003). These new approaches make the linear model of innovation obsolete. In fact, over the last decade, the term "open innovation" has emerged as a new paradigm to extend innovation thinking and to highlight the social, institutional, cultural and spatial contexts and the relational, interactive and adaptive nature of the innovation process (e.g. Dahlander & Gann, 2010; Durst & Ståhle, 2013; Pellissier, 2011).

Trott and Hartmann (2009) suggest that a model for open innovation should consider both feed-forward and feedback mechanisms, thus highlighting the idea that innovation is intrinsically a cyclical process and that ideas do not have a fixed point of origin, i.e. they can emerge from any point in the cycle. Jarvenpaa and Wernick (2011) explain that open innovation networks are highly complex and involve multiple paradoxes and inter-organizational relationships. Innovation scholars have increasingly turned their attention to the potential of 'complexity theory' as a way of capturing the complex influence of context, interaction and adaptation in an innovation process (e.g. Carlisle & Mcmillan, 2006; Chae, 2012; Fleming & Sorenson, 2001; Lichtenstein, 2000; Poutanen & Ståhle, 2014; Ståhle, 2008; Tapsell and Woods, 2010; Viale & Pozzali, 2010). The promises of complexity theory (CT) go beyond the internal-external dichotomies of knowledge pools and linear process models. It focuses on the dynamics of complex systems and on interactions at the micro level that lead to a new (qualitative) order and new properties at the macro level. CT is therefore at the center of what

innovation scholars are interested in studying: what are the dynamics for the emergence of a new order. Therefore, the innovation paradigm can benefit greatly from adopting the complexity lens.

Specifically, when we talk about organizational complexity, we refer to the aspects of environmental and organizational complexity management that have favored the emergence of new working models in the era of digital transformation, which have highlighted further aspects to consider. Technostress, for example, is a phenomenon closely linked to the digitization of work, which manifests itself in the context of smart working (SW) and the use of digital platforms with possible impacts on innovation processes. In an increasingly digitized work environment, in which traditional space and time lose relevance, the consequences on the psychophysical well-being of workers are evident. In work environments where technologies are used to manage and monitor processes, the perception of autonomy of workers changes, contributing to the appearance of forms of technostress.

Although the new forms and organization of work offer many advantages in terms of flexibility, reduced travel time and work-life balance, they could also amplify the stress factors associated with the intensive use of technology. According to Tapsell and Woods, (2010), Viale and Pozzali, (2010), the intensive use of digital technologies to facilitate work interactions is often associated with technostress, which can bring out negative aspects such as, for example, burnout, emotional exhaustion and reduced job satisfaction, as well as a decrease in work performance with possible repercussions on innovation. But this does not always happen, some authors have found that in some highly digitized environments and in certain situations with appropriate and well-managed use of technology, there is greater involvement in the work. This suggests that technostress can be influenced by the way remote work is managed and the context in which it operates. Workers who are able to use technology effectively feel more engaged, autonomous and satisfied with their work. The relationship between SW and technostress is complex and influenced by multiple factors. For example, technological overload, the lack of boundaries between work and private life and the possession of digital skills by workers. This shows that the digital transformation impacts and involves every aspect of company life, not being limited to the mere use of the tool, but rather taking the form of a change in mentality and processes. Naturally, this transformation must be accompanied by an awareness of designing a work environment that adapts to the digital transformation is a prerequisite for building a favorable work environment capable of fostering and

welcoming innovation processes. All this is the starting point for a healthy work environment that contributes to individual and organizational well-being.

The ability to innovate and digitize is largely determined by a clear digital strategy supported by top management that promotes a culture capable of change and reinvention. The difference with past industrial revolutions is that in the digital transformation risk and uncertainty are the cultural norm. Organizations that are more mature from a digital point of view are more comfortable accepting risk than those that are less digital. The consequence is an imbalance between the speed of change in the external environment and the pace of change implemented in organizations. For this reason it is important to have a well-defined and shared strategy that becomes a "roadmap" in which to set the individual steps and a timeline to achieve the objectives in which digital transformation plays a primary role.

How to interpret innovation in organizations

The increasing transformation of organizations in labor relations, technological innovation processes, generated by global change processes and changes in their environment, has a strong return on organizational complexity also understood as managerial complexity and especially in human resource management policies and practices. In most research on innovation diffusion, the variable that determines innovation is related to the characteristics of individuals who adopt innovation. Therefore, innovative human resource management is a reference point from which to ensure innovative processes and behaviors in a context of complexity within and outside the organization. On the topic of innovation and human resources, we can identify three different approaches in which innovation is an input or output of the HRM process or an innovation intrinsic to HRM.

Innovating human resource management

Innovation as an input is intended to express the idea that we want to innovate HRM by referring to HR policies and practices that are considered innovative. However, there is a subtle difference within this approach that needs to be considered. In one part of the literature, innovative HRM reflects policies and practices that are truly new and novel (Crossan & Apaydin, 2010). In another part of the literature, innovative HRM is a label for change or innovation in existing policies and practices, which is a form of incremental innovation (Crossan & Apaydin, 2010). We identify radical

innovation in HRM as those practices and policies that are truly new. In most cases, research in this field deals with innovative HRM by defining innovative HR policies and practices and then attempting to measure the degree to which organizations apply these policies and practices. The common characteristics of such innovative HRM policies and practices found in the literature are those that relate predominantly to: equal treatment; diversity management; inclusive policies; well-being management; human capital investment; sustainable employability; reward systems; and decentralization and autonomy (Agarwala, 2003; Appelbaum, et al. 2006). The main theoretical idea in this part of the literature is that HR policies and practices contribute to organizational performance, in that they increase employee performance, satisfaction, and commitment, if these policies and practices form packages or systems. This means that the various HR policies and practices that organizations can apply-for example, to attract new people, train employees, facilitate career paths, and so on-must be offered as a coherent set of tools. It follows that focusing on a single tool is less effective than having a combination of tools that aim at the same goal and are aligned internally with other dimensions and externally must fit the organization's environment (Huselid, 1995; MacDuffie & Kochan 1995). The presence of consistent systems of HR policies and practices has these motivational effects on individuals, as organizations more clearly signal their expectations and goals to employees so that they are able, willing, and aware to do their jobs (Koster, 2011). As a result, the level of human capital in these organizations is developed and optimized, in designing systems that are consistent with the organization's overall strategy and parts of the organization. It is clear that innovative human resource management is an integral part of this overall strategy. As noted above, what we have called the radical innovation sub-theme (in the sense of whether or not organizations have these HR policies and practices) is a common approach in the literature on innovative HR management. In a sense, it is also a static way of looking at innovative HR management, that is, looking at whether organizations apply certain practices that can be labeled as innovative. Unlike the radical innovation of human resource management policies and practices, the incremental innovation approach refers to changes, renewals and improvements of practices that already exist in the organization. Therefore, the focus is more on incremental innovation. In this sense, it can be closely related to classic HRM issues. HRM in these organizations is defined as innovative if there have been changes and improvements in these functions and accompanying HR policies and practices.

HRM is a response to innovation

Viewing innovation as an output means that organizations adapt their HR policies and practices in response to the external environment to generate innovation. Innovations (e.g., the introduction of new technologies) are part of and influence the organizational environment. In the relationship between technological innovation and HRM, in one case, external innovations and HRM are two separate variables and this link is relatively weak; in the other case, however, this link is strong because it concerns innovations directly applied to organizations' HRM policies and practices. In the first case of this approach to innovative HRM, there are many studies that focus on external trends and their impact on HR policies and practices. For example, there is a discussion of how globalization and technological changes affect organizations and work content (Colakoglu, et al., 2006). An even broader discussion can be found in Ulrich and Dulebohn (2015). They argue that the future of human resource management depends on several general trends, namely (a) social trends: health care, lifestyle, family structures; (b) technological trends: digitization; (c) economic trends: inflation, recession, labor markets; (d) political trends: stability, elections; (e) environmental trends: sustainability; and (f) demographic changes: age, education, diversity, income. Each of these trends can be considered a trigger for innovation. However, technological changes more explicitly reflect the link between innovation and HRM. For example, the impact of robots on the world of work fits neatly into this work. Many authors argue that jobs will be replaced by machines (Autor et al., 2003; Frey & Osborne, 2013); others predict that new jobs will emerge due to the introduction of robots (Brynjolfsson & McAfee, 2014). Both are probably true at the same time: some jobs disappear and others emerge. This, in turn, will have consequences for human resources, e.g., in the outflow of people, internal employability, recruitment, training, stress management (technostress), and well-being, with an important influence on the quality of the new way of working with consequences for human resources. The second case directly links innovation to human resource management, focusing on how organizations use new technologies to configure their HRM function, becoming E-HRM by organizations. E-HRM refers to the use of information technology to enable organizations to manage their human resources, for example by using Web technology (Ruël, et al., 2004; Marler & Fisher, 2013). However, it is not possible to determine a priori whether this is a radical or incremental innovation. On the one hand, it is possible that HR policies and practices remain the same and only the means by which they are organized and who provides them change. In this case, one can speak of incremental innovation. If, on the other hand, the scope of E-HRM and the number of features to

which it gives access increase considerably, for example, if they are linked to digital platforms that also serve as external labor marketplaces, this is a much more radical innovation.

HRM is linked to the innovativeness of organizations.

In this case, innovative HRM reverses the link between innovation and HRM in the sense that HRM is seen as a support or precondition for the innovativeness of organizations. Organizational innovativeness refers to various improvements that organizations can make, such as introducing new products and services, applying new marketing methods, or changing production and organizational processes (Crossan & Apaydin, 2010, Pouwels & Koster, 2017). Two groups of themes can be distinguished within this approach. Studies that fall into the first group are those in which researchers have a predefined idea of what constitutes HR policies and practices that contribute to innovativeness in organizations. For example, Pouwels and Koster (2017) find that organizations that use performance-related training and compensation score higher in product and service, market, and process innovation. The second group, on the other hand, is to predefine innovative HRM; HR policies and practices that contribute to organizations' innovativeness are labeled as innovative as a result of an evaluation of data showing innovative HRM. This means that in the first sub-theme there is a clear distinction between HR policies and practices on the one hand and organizational innovativeness on the other. In the second sub-theme this is less true, as outcomes (innovations) are used to label HR policies and practices (Oladapo & On yeaso, 2013).

The important aspect of both subthemes is that they focus on the question to what extent and how HRM contributes to the innovativeness of organizations, whereas in the other two approaches HRM is seen as a response to (external) developments. By focusing on this aspect of HRM, these studies provide evidence of the added value of HRM.

The relationship between digital transformation and digital stress

Digitization has fostered changes within organizations. Globally, the digitization of organizations has grown exponentially and seen new forms of work emerge in a very few years. Alongside this digital revolution, some critical issues have emerged: among them is digital stress. One generative factor of stress is the lack of digital skills. This occurs when one is unable

to use technological means with serenity. This creates a great deal of discomfort that does not allow one to work at their best and with serenity. Another factor that creates stress is inadequate technological equipment: working with unsuitable and malfunctioning hardware devices and outdated software affects one's work well-being. The feeling is that of not being able to handle the situation, suffering an IT load that is called information overload. Another behavior that can generate digital stress is multitasking, that is, performing multiple tasks at once. When there are many stresses and demands in a company that in practice cannot be managed and controlled, after a more or less long time a sense of abandonment and helplessness develops that generates discomfort and frustration in the worker. The tension can reach levels that compromise his well-being.

In assessing these dynamics that vary over time for occasional or persistent situations, it is necessary not to underestimate that today, more than in the past, stress levels are sustained by intangible, emotional and relational stressors. Examples include managing relationships, conflicts, living with the fear of a corporate crisis or other intangible risks, occasional, unforeseen and destabilizing issues, and lack of time to manage work and one's life due to excessive workload. Knowing how to perceive the first signs of failure, of nervous tension, is essential in order not to trigger psychosomatic reactions that over time become unmanageable. This also applies to the work environment, as there are real business pathologies that seriously threaten the resilience of companies.

Taking a closer look at the consequences of occupational stress, one can highlight organizational symptoms and consequent individual symptoms.

Organizational symptoms pertain to the company, and examples are corporate pathologies, sick organizations unable to sustain linear and functional planning, companies that rush to exercise destabilizing and highly stressful policies, heedless of the most basic rules of human resource management. In these contexts, a general state of malaise occurs, and employees experience the management of ordinary work activities with particular tension. The stress level becomes unsustainable and there is a feeling of being in a continuous state of emergency, accompanied by experiences of frustration and disappointment. All this becomes destabilizing. Lack of future prospects and improved working conditions, periods of stress, uncertainty and excessive tension, when no alternatives or better future prospects are seen, the stress level becomes unsustainable. The main symptoms of a general malaise in the company are: high level of conflict; absenteeism; excessive attendance; reduction in qualitative and quantitative