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Digital Divide, Working Time and Social Ties in the Algerian Organizational Environment: A Grounded Theory Approach

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Abstract:
This study investigates the multidimensional effects of information and communication technology (ICT) adoption on human resources within the Algerian organizational context. Drawing on Grounded Theory as its methodological framework—through a rigorous, three-stage process of open, axial, and selective coding—and informed by 30 semi-structured interviews conducted with managers from diverse public and private organizations, the research examines three interconnected dimensions: the intra-organizational digital divide, the recomposition of professional temporalities, and the transformation of social ties at work. The findings reveal the emergence of a second-degree digital divide, a growing permeability between professional and personal time, and an original triple relational configuration that enables the theorization of actor–organization adjustment modes under the influence of ICTs.

Keywords: *ICT; digital divide; working time; social ties; grounded theory; Algerian organization.*

Résumé

La présente étude analyse les effets de l'introduction des technologies de l'information et de la communication (TIC) sur les ressources humaines dans le milieu organisationnel algérien. En mobilisant la théorie enracinée (Grounded Theory) comme cadre méthodologique — à travers un processus rigoureux de codage ouvert, axial et sélectif — et à travers 30 entretiens semi-directifs conduits auprès de cadres issus de différentes organisations publiques et privées, trois dimensions principales ont été examinées : la fracture numérique intra-organisationnelle, la recomposition des temporalités professionnelles, et la transformation des liens sociaux au travail. Les résultats révèlent l'existence d'une fracture numérique de second degré, d'une porosité croissante des temps professionnels et personnels, ainsi qu'une triple configuration relationnelle originale permettant de théoriser les modes d'ajustement acteur-organisation sous l'effet des TIC.

Mots-clés : *TIC ; fracture numérique ; temps de travail ; liens sociaux ; théorie enracinée ; organisation algérienne.*

I. INTRODUCTION

The rapid dissemination of information and communication technologies (ICT) within organizations has profoundly transformed working methods, temporal structures, and forms of social interaction. While numerous studies have explored this impact in Western contexts (Orlikowski, 1992; DeSanctis & Poole, 1994; Barley, 1986), research focusing on developing countries—and more specifically on organizations in the Maghreb—remains marginal in the international scientific literature.

Algeria, which has been engaged since the early 2000s in a process of computerizing its administrations and businesses, constitutes a particularly revealing field of investigation. The coexistence of generations of workers with differentiated technological cultures, the fragility of digital infrastructures, and the cultural specificities surrounding relationships to time and hierarchy lend this context a notable analytical singularity.

This contribution aims to address three central research questions:

- How is the digital divide manifested and structured within Algerian organizations?
- To what extent do ICTs contribute to the recomposition of professional and personal temporalities?
- How does the use of ICTs affect the nature of social ties in the organizational environment?

1. Theoretical Framework

The theoretical framework of this research is structured around four interdependent axes: approaches to technological structuring in organizations, theories of the digital divide, frameworks for analyzing professional temporalities, and theories of social connection. Each of these axes is mobilized in a complementary manner to account for the complexity of the phenomenon under study.

1.1. ICTs in the Organizational Environment: Between Determinism and Social Construction

1.1.1. Technological Determinism and Its Limits

The debate over the impact of ICTs on organizations has historically been structured around two major opposing theoretical traditions. Technological determinism, rooted in positivist epistemology, holds that technology exerts intrinsic, predictable, and universal effects on organizational structures. From this standpoint, the organization functions as a dependent variable of technology, whose forms, processes, and relationships are determined by it. This perspective, dominant in the early decades of organizational computerization, generated considerable optimism about the prospects for radical rationalization of organizational processes.

In practice, however, this conception proved insufficient to account for the diversity of effects observed from the same technological tool across different contexts. Empirical studies consistently demonstrated that identical technologies produced markedly different outcomes depending on implementation conditions, thereby challenging the premise of universal determinism.

1.1.2. Social Constructivism: Technology as a Social Artifact

In response to the limitations of determinism, social constructivism (Bijker, Hughes & Pinch, 1987) foregrounded the sociotechnical dimension of technologies, arguing that any technology is the product of social negotiations, cultural arbitrations, and power dynamics. From this perspective, technology has no inherent effects: it is the social context of use that endows it with meaning and consequence. This approach has the considerable merit of restoring actors and their strategies to the center of the analysis of technological uses.

That said, radical constructivism tends to underestimate the constraints that the material characteristics of artifacts impose on possible uses. An email system, for instance, configures specific communication patterns that are not infinitely malleable: it imposes formats, rhythms, and traces that actors cannot always circumvent or reshape at will.

1.1.3. Structuration Approaches: Towards a Theory of Interaction

It is within this intermediate theoretical space that the most productive approaches for the present research are located. Giddens (1984), in his theory of structuration, proposes that social structures are simultaneously the medium and the outcome of human action: actors reproduce structures through their actions, while these same structures, in turn, delimit the possibilities for action. This structure/agency dialectic is foundational to understanding the relationship between actors and ICTs.

Barley (1986), in his now-classic study of the introduction of CT scanners in radiology departments, empirically demonstrated how the same technology could generate radically different structural reorganizations depending on the contexts of use and pre-existing power dynamics. This demonstration of the non-neutrality of context constitutes a foundational contribution to our research design.

Orlikowski (1992) subsequently formalized this reasoning through the concept of the "duality of technology," inspired by Giddens' duality of structure. She shows that technology is simultaneously a material artifact—endowed with physical and symbolic properties—and a social construct whose meaning is produced and reproduced through the practices of actors. Orlikowski (2000) later refined this framework with the concept of "technology-in-practice," emphasizing that the analytically relevant focus is less the technology itself than the recurrent practices actors develop around it.

The Adaptive Structuration Theory (AST) proposed by DeSanctis and Poole (1994) constitutes the third key contribution to this framework. AST posits that advanced technological systems (groupware, ERPs, collaborative platforms) embed a set of "potential structures"—rules and resources—that actors mobilize, interpret, and adapt in accordance with their professional needs and organizational culture. The theory distinguishes between faithful appropriation, which respects the spirit of the system, and unfaithful appropriation, which diverts it for alternative purposes. This distinction is particularly illuminating for understanding the misuses and non-uses observed in our fieldwork.

1.2. The Digital Divide: Genesis, Levels of Analysis, and Organizational Specifics

1.2.1. Genesis and Evolution of the Concept

The concept of the "digital divide" emerged in the United States in the early 1990s, gaining wide recognition through the NTIA (National Telecommunications and Information Administration, 1999) report titled "Falling Through the Net." In its initial formulation, it denoted disparities in access to computer equipment and the Internet between social groups differentiated by race, income, or geographic location. This conception—known as the "first-level" divide—shaped public policies oriented towards equipping and connecting excluded populations.

In France, the conceptual debate crystallized around the terminological choice between "fossé numérique" (emphasizing the traversable nature of the gap), "fracture numérique" (foregrounding the idea of structural rupture), and "clivage numérique" (Dupuy, 2007; Rallet & Rochelandet, 2004). This is not a merely semantic debate: it reflects differing theoretical assumptions regarding the irreversible or contingent nature of digital inequalities.

1.2.2. The Second-Level Digital Divide

Subsequent research progressively demonstrated that resolving the access problem did not automatically dissolve digital inequalities. Hargittai (2002) introduced the concept of the "second-level digital divide" to capture inequalities in skills, practices, and the effectiveness of use, irrespective of equipment access. Van Dijk (2006) elaborated a four-dimensional model of access: motivational access (the disposition to use), material access (ownership of equipment),

skills access (digital competencies), and usage access (the effectiveness and diversity of actual practices).

Lasfargue, cited in the thesis, highlights that even managers—a socio-professional category typically regarded as advantaged—can exhibit significant difficulties and reluctance in their use of ICTs. This observation is central to our research, which focuses on Algerian managers who display highly differentiated usage profiles despite comparable access to technological equipment.

1.2.3. The Digital Divide in the Organizational Environment

Andonova (2009) transposed this analytical framework to the organizational context by distinguishing between uses (effective and diversified utilization), misuses (incorrect, inefficient, or diverted utilization), and non-uses (avoidance, delegation, refusal). This tripartite typology is particularly heuristic for understanding the dynamics of technological appropriation observed in Algerian organizations, where actors with markedly differentiated stances towards ICTs coexist within the same institutional spaces.

The concept of "total mediation" (médiation totale), identified in our corpus, refers to the systematic recourse to a third party to perform technological tasks that the actor cannot or is unwilling to accomplish independently. This mechanism, which finds no equivalent in existing typologies, constitutes an original contribution to the understanding of intra-organizational digital divides.

Furthermore, Marchandise draws a fundamental distinction between "those who possess digital skills and those who do not," underscoring that the digital divide is not reducible to questions of equipment ownership but encompasses deep inequalities in cultural and social capital (Bourdieu, 1980). In the Algerian organizational context, these inequalities are further amplified by generational specificities and the power dynamics that structure hierarchical relationships.

1.3. ICT, Working Time, and the Recomposition of Temporalities

1.3.1. The Evolution of Temporal Frameworks in Organizations

The question of working time is among the oldest and most contested in the sociology of work. From Weberian analyses of the bureaucratic rationalization of time to contemporary scholarship on temporal flexibility, working time has long constituted a battleground between economic, social, and identity-based logics.

The introduction of ICT into organizations has radically reconfigured these debates by giving rise to new forms of professional temporality. Thoemmes (2000) documented the transition from a Fordist temporal regime—characterized by clear demarcations between working time and non-working time—to a post-Fordist regime marked by flexibility, extended availability, and the interpenetration of spheres. This transition, which the author characterizes as the "end of working time" in its classic, bounded form, is accompanied by a growing complexification of individuals' temporal practices.

1.3.2. The Porosity of Time: A Gender and Status Phenomenon

The concept of "porosity of time" (Thoemmes, 2000) refers to the increasing permeability of the boundary between professional and personal time as a result of ICT adoption. This porosity is far from a neutral phenomenon: it is socially differentiated according to gender, hierarchical status, and the nature of professional activity.

Research by Boboc and Dhaleine reveals that men tend to extend their professional activity into the home (professional life encroaching on personal life), while women more frequently use ICT to manage domestic obligations from the workplace. This gendered differentiation in temporal practices adds a significant dimension to the porosity of time, one that extends well beyond the straightforward question of professional availability.

Monjaret further observes that, despite internal organizational regulations formally prohibiting personal communications in the workplace, managers frequently display tolerance towards such

practices—particularly in the case of women. This informal latitude reveals the complexity of temporal negotiations that unfold within organizations.

1.3.3. Work-Family Conflict and Balancing Strategies

Greenhaus and Beutell (1985) theorized "work-family conflict" as arising from three forms of incompatibility: time conflict (one sphere absorbs time that rightfully belongs to the other), strain conflict (stress generated in one sphere spills over into the other), and behavior conflict (behavioral norms expected in one sphere are incompatible with those of the other). ICTs amplify all three forms of conflict by eroding the spatiotemporal barriers that previously contained their expression. Génin (2007) demonstrated how executives—a socio-professional category particularly susceptible to temporal porosity—develop a range of balancing strategies: strict separation (ritualized disconnection practices), integration (acceptance of permanent availability), and selective segmentation (differentiated availability depending on interlocutors and circumstances). These strategies are shaped by organizational culture, hierarchical expectations, and family constraints.

Schor's work, cited in the thesis, highlights that actual working hours have increased substantially in developed countries since the 1980s, partly as a consequence of ICT adoption. This tendency—which the author terms the "Overworked American" effect—also manifests in non-Western contexts, albeit with characteristics specific to each cultural and institutional environment.

1.4. ICT and Social Ties: Between Dissolution and Recomposition

1.4.1. Social Ties: Evolution of a Concept

The notion of social ties is among the most foundational and debated concepts in sociological thought. In its broadest sense, it encompasses the forces, representations, and mechanisms that bind individuals to one another and integrate them into collectives. Although the concept is rarely given an explicit entry in classical sociological dictionaries, it has been implicitly constructed through the foundational theoretical contributions of the discipline. Durkheim conceived of social ties through the prism of solidarity—mechanical in traditional societies, organic in modern ones—as the very cement that binds the individual to the collective. Weber approached the question through social relations, defined as "behavior of individuals in reciprocal orientation." Simmel, by contrast, grasped the tie through the sense of belonging and the intersection of social circles: for him, the tie is constructed through a dialectic between similarity and difference, belonging and distinction.

It was from the 1970s onwards that the concept of social network (Granovetter, 1973; Elias, 1994) renewed the analysis of social ties by shifting the analytical focus from groups to relationships and the connections between individuals. Granovetter famously distinguished strong ties (dense, emotionally invested relationships within cohesive groups) from weak ties (sparse, emotionally distant relationships between individuals embedded in different social worlds), paradoxically demonstrating that the latter are more effective for the circulation of information and access to novel resources.

1.4.2. The Two Major Discourses on ICT and Social Ties

The emergence of ICTs in contemporary societies has reactivated and complicated longstanding debates on social ties, giving rise to two sharply opposing positions that the thesis characterizes as the "pessimistic discourse" and the "optimistic discourse."

The pessimistic discourse (Breton, 2000; Wolton, 2000; Ramonet, 1999) denounces the dissolving effects of digital communications on social ties. According to Breton, the cult of the Internet engenders "lukewarm reaction relationships" that supplant authentic interactions, producing a paradoxical form of social isolation: the individual is technically connected to thousands of people yet emotionally estranged from their immediate environment. Wolton underscores the absence of any necessary correlation between technical efficiency and communication quality, arguing that the proliferation of communication channels does not inherently improve the quality of exchanges and may even superimpose a "technical bureaucracy upon human bureaucracy."

The optimistic discourse (Gates, 1995; Lévy, 1998; Sfez, 1999) views ICTs as a vector for the enrichment of social ties, enabling the maintenance and strengthening of long-distance relationships, the formation of new communities of belonging, and the promotion of civic participation. From this perspective, digital networks compensate for the weakening of proximity-based ties by enabling the construction of broader connections grounded in elective affinities rather than spatial contiguity. Jauréguiberry (2000) nuances both positions by demonstrating that ICTs engender a dual identity in their users: an "identity-me" (deployed in real-world interactions) and an "identity-self" (constructed in virtual spaces). This identity duality is particularly relevant for understanding the relational dynamics observed in Algerian organizations, where ICT use generates distinctive forms of presence-absence within work collectives.

1.4.3. Social Connection in Organizations Under the Influence of ICT

Specifically within the organizational context, Rosanvallon (2011) demonstrated that email paradoxically generates both a densification of formal exchanges and an impoverishment of informal interactions. This paradox lies at the heart of what we term "sociotechnical dissociation": the coexistence of virtual hyperconnectivity and an attenuation of direct relational ties.

The notion of "technicization of social action" (Jouët, 1993) refers to the process by which organizational interactions progressively migrate towards technical supports, profoundly altering the relational texture of organizations. This process is far from neutral: it advantages actors who master the codes of digital communication at the expense of others, thereby contributing to a reconfiguration of power relations within organizations.

Finally, the concepts of "technical performance rationality" and "passive identity" (Mallein & Toussaint, 1994) illuminate the psychosocial mechanisms through which certain actors refuse to integrate into the technological dynamic of their organization, preferring to maintain a professional identity anchored in traditional reference points. This form of identity resistance, far from being irrational, constitutes a self-preservation strategy in the face of transformations experienced as threatening.

Table 1: Summary of the main theoretical frameworks used

Dimension	Key Authors	Central Concepts	Contribution to Our Research
Technological structuring	Giddens (1984), Barley (1986), Orlikowski (1992), DeSanctis & Poole (1994)	Duality of technology, technology-in-practice, AST, appropriation	Understanding the differentiated logics of ICT appropriation
Digital fracture	NTIA (1999), Hargittai (2002), Van Dijk (2006), Lasfargue, Andonova (2009)	First/second degree divide, uses/misuses/non-uses, total mediation	Modeling usage levels and resistance in Algerian organizations
Temporalities	Thoemmes (2000), Greenhaus & Beutell (1985), Génin (2007), Boboc & Dhaleine (2007)	Porosity of time, work-family conflict, balancing strategies	Analyzing the interpenetration of professional and personal spheres
Social ties	Durkheim, Simmel, Granovetter (1973), Breton (2000), Wolton (2000), Jouët (1993)	Solidarity, strong/weak ties, dissolution/recomposition of ties	Theorizing relational configurations under the influence of ICT

II. METHODOLOGICAL FRAMEWORK: GROUNDED THEORY IN ACTION

The methodological approach adopted in this research is grounded in Grounded Theory. This choice is not arbitrary: it flows from a deliberate epistemological stance and from the alignment between the method and the objectives of the inquiry. This section presents the foundations of Grounded Theory, its concrete implementation in the Algerian field, and the analytical procedures through which the results were constructed.

2.1. Epistemological Foundations: Why Grounded Theory?

2.1.1. Origins and Paradigmatic Positioning

Grounded Theory (GT) was developed by sociologist Barney Glaser and anthropologist Anselm Strauss in their landmark work "The Discovery of Grounded Theory" (1967). It emerged in response to two dominant tendencies in social science research: on one hand, the testing of hypotheses derived from large, pre-constructed theoretical systems; on the other, the production of rich ethnographic descriptions with no explicit theoretical ambition. Glaser and Strauss proposed a third pathway: the inductive construction of theory from empirical data, in an approach that is neither strictly deductive nor purely inductive, but "abductive"—proceeding through ongoing back-and-forth between data and emerging concepts.

This approach is rooted in the paradigm of symbolic interactionism, inherited from Mead and the Chicago School, which holds that actors behave on the basis of the meanings they attribute to situations, and that these meanings are produced and modified through social interaction. In our research, this paradigm translates into a primary focus on the representations that Algerian managers construct around ICTs, their strategies of use and avoidance, and the meanings they attach to the transformations of their professional environment.

2.1.2. Evolutions and Branches of Grounded Theory

Since 1967, GT has undergone significant internal developments. The Glaserian branch, faithful to the original inductive spirit, stresses the importance of not contaminating the analysis with prior theoretical readings. The Straussian branch (Strauss & Corbin, 1990) introduced a more systematic analytical protocol—incorporating open coding, axial coding, and selective coding—as well as a paradigmatic model that structures the relationships between categories. It is primarily this second branch that we mobilize in our research, while preserving the openness to the field that is central to the method's original spirit.

Charmaz (2006) subsequently proposed a constructivist GT, which acknowledges that categories are co-constructed by the researcher and participants rather than simply "discovered" in the data. This perspective is particularly well-suited to our Algerian fieldwork, where cultural and institutional access constraints played a significant role in shaping both the data collection and interpretation processes.

Epistemological Note: Contrary to a common misconception, Grounded Theory does not reject all prior theoretical knowledge. It simply invites the researcher to "bracket" their theoretical presuppositions in order to remain attentive to categories emerging from the field. This is what Glaser calls "theoretical sensitivity": the cultivated capacity to perceive nuances in the data and extract meaning from them.

2.1.3. Justification for Choosing GT for This Research

The choice of GT is supported by several converging arguments. First, the Algerian organizational context is poorly documented in the international literature: no pre-existing substantive theory accounts for the dynamics of ICT appropriation in this type of setting. GT is precisely designed for such exploratory situations, where the aim is to generate theory rather than test hypotheses imported from other contexts.

Second, the phenomena under study—the digital divide, temporal recomposition, and the transformation of social ties—are complex, dynamic, and contextually situated processes. Their adequate understanding requires an approach attuned to nuance, contradiction, and individual trajectories, which GT accommodates far more effectively than quantitative or hypothetico-deductive approaches.

Third, the research objective is to produce a middle-range theory (in Merton's sense) applicable to the Algerian organizational context and subsequently extensible to comparable contexts. This is precisely the theoretical ambition at which GT aims through the systematic construction of empirically grounded conceptual categories.

2.2. Research Design: Theoretical Sampling and Field Access

2.2.1. The Principle of Theoretical Sampling

GT does not rely on statistical sampling aimed at probabilistic representativeness. Instead, it employs "theoretical sampling," in which participant selection is guided not by pre-established statistical criteria but by the emerging analytical needs of the research. In practice, each completed interview informs the selection of the next: when an interview surfaces a category that remains insufficiently developed, the researcher selects a subsequent participant likely to enrich that category. This constant comparative method constitutes the animating principle of GT: each new datum is systematically compared with previously analyzed data, in order to test the robustness of the categories under construction, identify significant variations, and progressively sharpen conceptual boundaries. The process continues until theoretical saturation is achieved.

2.2.2. Field Access: Snowball Strategy

Access to the field was achieved through a snowball sampling technique, combined with a logic of maximum diversification to guard against sample homogenization. The researcher's network of contacts—encompassing both personal ties (strong ties: family members and direct colleagues) and professional connections (weak ties: indirect acquaintances)—served as the initial point of entry. Two types of intermediaries were identified:

- First-degree intermediaries (strong ties): individuals with a direct family or professional relationship with the researcher, each facilitating access to approximately seven or eight respondents.
- Second-degree intermediaries (weak ties): individuals encountered through first-degree intermediaries, whose more distant relationship with the researcher nonetheless opened access to respondents embedded in different organizations and sectors.

This two-degree intermediation structure empirically illustrates Granovetter's (1973) principle of the "strength of weak ties": it was precisely the second-degree intermediaries, less directly connected to the researcher, who enabled access to the most socially and organizationally distant respondents, thereby enriching the diversity of the sample.

2.2.3. Sample Composition and Diversification

The final sample comprises 29 executives and managers drawn from various sectors of activity. Table 2 presents its detailed composition.

Table 2: Sample composition by sector

Business Sector	Structure Type	Profiles	Interviews	Location
Light Industries & Agri-food	Public / Private	Senior executives, HRD	3	Workplace
Insurance / Banking & Marketing	Public	Deputy directors, executives	6	Workplace + Public space
Energy Production	Public	Technical executives, managers	6	Workplace
Scientific Research	Public	Deputy directors	2	Workplace

Business Sector	Structure Type	Profiles	Interviews	Location
Telecommunication	Public	Managers, executives	4	Workplace
Air Navigation	Public	Regional directors, executives	8	Workplace + Public space

Source: research field.

2.2.4. Theoretical Saturation: A Criterion for Stopping Data Collection

Theoretical saturation (Glaser & Strauss, 1967) refers to the point at which collecting additional data no longer yields elements capable of developing or modifying the conceptual categories under construction. This stopping criterion—fundamentally different from a predetermined sample-size criterion—confers a specific form of rigor upon the approach: it proceeds not by statistical saturation but by conceptual saturation.

In our research, saturation was reached progressively and differentially across categories. The three principal categories (usage fracture, temporal porosity, and reconfiguration of ties) emerged from the very first interviews. Sub-categories stabilized gradually from approximately the twentieth interview onward. The final ten interviews confirmed existing categories without generating new ones, thereby validating saturation. This progressive saturation trajectory attests to the robustness of the categories constructed.

2.3. Data Collection

2.3.1. The Semi-Structured Interview: Justification and Protocol

The semi-structured interview was selected as the primary data-collection instrument on account of its distinctive dual virtue: it enables access to subjective representations, declared practices, and actors' strategies (Blanchet & Gotman, 2007), while simultaneously maintaining the thematic orientation necessary for comparability across the data corpus. Combessie (2010) describes it as aiming at "the production of a discourse on a theme by an informant, under the more or less directive guidance of an interviewer"—a formulation that accurately captures the balance between discursive freedom and thematic framing that characterizes our protocol.

The interview guide was organized around three thematic axes corresponding to the three dimensions of the research. Each axis comprised open-ended main questions, designed not to predetermine the discourse, and follow-up probes intended to deepen engagement with underdeveloped themes. Questions were deliberately formulated to encourage respondents to recount concrete situations rather than express abstract opinions—an important methodological safeguard for anchoring the analysis in actual practices rather than idealized self-representations.

2.3.2. Conditions of Administration: Negotiating Free Speech

The 30 interviews were conducted between 2014 and 2017, with an average duration of 75 minutes. The conditions of administration proved decisive for the quality of the data collected. Following the recommendations of Van Campenhoudt and Quivy (2011) on the importance of ensuring an environment conducive to freedom of expression, several protective measures were put in place.

Interviews were not systematically conducted at the workplace, so as to minimize biases associated with hierarchical surveillance and the fear of retaliation. Neutral settings—cafés, public spaces, respondents' homes—were often preferred. This precaution was especially significant in organizations with strong cultures of hierarchical control, where discourses produced "in situ" tend to be more conformist and less revealing of actual practices.

All interviews were audio-recorded with the explicit consent of respondents, following explanation of the strictly academic purposes of the research and guarantees of individual and organizational anonymity. Some respondents were additionally given assurances that the recordings would be deleted upon completion of the project. The recordings were subsequently transcribed in full, producing a textual corpus of approximately 900 pages.

2.3.3. Non-Participant Direct Observation as a Complementary Technique

Non-participant direct observation (Ghiglione & Matalon, 1998) was employed in a complementary manner during visits to certain organizations. It enabled the capture of behaviors and practices that remained unverbalized in the interviews, including avoidance postures towards technological equipment, dynamics of direct versus mediated interaction, and spatial configurations revealing actors' relationships with technology (arrangements of computer workstations, screen consultation habits, and the like).

This technique rests on the recognition that actors' discourse is not always consistent with their actual practices (Van Campenhoudt & Quivy, 2011). Observation thus partially controls for social desirability biases inherent in any interview situation and provides access to behavioral data that enriches and nuances the discursive data collected.

2.4. Data Analysis: The Three-Step Coding Process

Data analysis followed the three-step protocol of Straussian Grounded Theory (Strauss & Corbin, 1990): open coding, axial coding, and selective coding. These three stages are not strictly sequential; they overlap and inform one another within an iterative process of back-and-forth between data and emerging conceptual categories.

2.4.1. Open Coding: Fragmenting to Name

Open coding is the first analytical operation. It consists of reading interview transcripts line by line, segmenting the text into units of meaning (incidents, events, expressed ideas), and assigning a descriptive code to each segment. Deceptively simple in appearance, this operation is in practice the most creatively demanding analytical moment: it is where the researcher translates raw data into concepts, and where respondents' words are transformed into analytical categories.

In our research, this initial analytical pass yielded a rich repertoire of primary codes. Among the most significant:

- Codes related to the digital divide: "fear of the technological unknown," "delegated use," "total mediation," "identity resistance," "circumvention logic," "passive identity," "hierarchical pressure to adopt"
- Codes related to temporalities: "night-time email consultation," "conditioned reflex of connection," "professional encroachment on private life," "residual mental load," "voluntary disconnection strategy," "temporal porosity"
- Codes related to social ties: "progressive disengagement," "dissonant relationship," "strategic isolation," "perceived institutional ingratitude," "obligatory relationship," "impoverishment of informal exchanges"

A number of codes emerged directly from respondents' own expressions—what Strauss and Corbin (1990) call "in vivo codes": "temporal porosity," "obligatory relationship," and "institutional ingratitude" are near-verbatim formulations from respondents that were retained as analytical codes by virtue of their conceptual density.

2.4.2. Axial Coding: Connecting to Structure

Axial coding constitutes the second analytical step. It involves grouping open codes into progressively more abstract categories, then relating these categories according to the "paradigm model" proposed by Strauss and Corbin (1990). This model articulates five analytical components: causal conditions (what generates the phenomenon), the central phenomenon (the process under study), contextual conditions (the conditions of occurrence), action/interaction strategies (actors' responses), and consequences (the observed effects).

Table 3: Paradigmatic model of axial coding — the three dimensions

Dimension	Causal Conditions	Central Phenomenon	Actor Strategies	Consequences
Digital Divide	Age, initial training, organizational culture, identity anxiety	Internal digital stratification	Adoption, constraint, resistance, delegation (total mediation)	Differentiated productivity, organizational tensions, hierarchical divides
Temporalities	Intensification of mobile device use, culture of availability	Constrained porous temporality	Permanent availability, ritual disconnection, selective segmentation	Work-family conflict, burnout, residual mental load
Social Ties	Virtualization of interactions, sense of non-recognition	Sociotechnical dissociation	Hyperconnectivity, strategic isolation, dissonant withdrawal	Impoverishment of informal ties, deficit of organizational cohesion

2.4.3. Selective Coding: Integrating to Theorize

Selective coding constitutes the third and final step of the analytical process. It involves identifying the core category—the central phenomenon around which all other categories are organized—and integrating all categories into a coherent theoretical narrative.

In our research, the core category was designated the "organizational sociotechnical dialectic." It refers to the process by which the introduction of ICTs in Algerian organizations does not produce mechanical and uniform effects, but instead becomes embedded in pre-existing dynamics of power, culture, and representation, which it amplifies, disrupts, or recomposes depending on individual and organizational configurations. This core category integrates three principal sub-categories:

- "Internal digital stratification": the process of differentiating actors according to their levels of ICT mastery and appropriation, which generates a parallel hierarchy alongside the formal organizational structure.
- "Constrained porous temporality": the process whereby professional digital demands invade personal time, experienced as an unwanted imposition rather than a freely chosen flexibility.
- "Sociotechnical dissociation": the paradoxical coexistence of virtual hyperconnectivity and the attenuation of direct ties, generating unprecedented relational configurations within organizations.

2.4.4. Memo-Writing: The Analytical Memory of the Research

Memo-writing accompanied the entire coding process. Memos—theoretical notes produced throughout the analysis—constitute what Strauss and Corbin (1990) describe as the "analytical memory" of the research. They document the researcher's intuitions, the evolution of categories, key analytical decisions, and connections between emerging concepts. In our research, memos played a particularly significant role in identifying relationships among the three principal categories, enabling the gradual construction of the integrated model of the "organizational sociotechnical dialectic."

The constant comparative method served as the organizing principle of the entire analytical process. Each new data segment was systematically compared with previously analyzed material, in order to test the coherence of the categories under construction, identify variations and negative cases, and progressively refine conceptual definitions. This procedure constitutes the central methodological guarantee of rigor within the Grounded Theory approach.

2.5. Rigor and Validity Criteria

2.5.1. Data Triangulation

Triangulation (Denzin, 1978) was ensured through the cross-referencing of three distinct types of sources: semi-structured interviews (discursive data), direct observations (behavioral data), and organizational documents consulted during field visits. Cross-referencing the accounts of respondents with different profiles (across sectors, hierarchical levels, and generational cohorts) further contributed to verifying the internal consistency of the constructed categories.

2.5.2. Communicative Validation (Member Checking)

A return to the field was made with a selection of key respondents, to whom provisional analytical interpretations were submitted for feedback and validation. This procedure, known as "member checking" (Lincoln & Guba, 1985), enables verification that the categories produced accurately reflect the meanings that actors themselves attribute to their practices. Several reformulations were made in light of this feedback, thereby strengthening the communicative validity of the approach.

2.5.3. Researcher Reflexivity

In keeping with the requirements of constructivist GT (Charmaz, 2006), sustained attention was paid to researcher reflexivity throughout the inquiry. Coming from the same cultural and professional context as the respondents, the researcher was required to continuously "bracket" their presuppositions in order to remain genuinely attentive to categories emerging from the field. Memos played an essential role in this reflexive process, enabling the tracing and objectification of the researcher's influence on the interpretive process.

Table 4: Summary of the methodological approach

Step	Procedure	Tools	Rigor Criteria
Design	GT selection, guide construction, field access	Interview guide (3 axes), intermediation network	Method/objectives alignment, sample diversification
Collection	Semi-structured interviews + non-participant observation	Audio recording, observation grid, field notes	Theoretical saturation, maximum diversification
Transcription	Full transcription of 30 interviews	Text corpus ~900 pages	Fidelity to verbatim, pseudonymization
Open coding	Segmentation and naming of meaning units	NVivo, in vivo and constructed codes	Constant comparison, theoretical sensitivity
Axial coding	Construction of the paradigmatic model	Paradigmatic model (Strauss & Corbin)	Internal consistency of categories
Selective coding	Identification of the core category	Memo-writing, theoretical narrative	Integration, theoretical density
Validation	Triangulation, member checking, reflexivity	Field feedback, reflexive memos	Communicative and constructivist validity

III. CONCLUSION

This study has investigated the multidimensional effects of ICT introduction on human resources within the Algerian organizational environment, mobilizing Grounded Theory as its overarching methodological framework. Drawing on 30 semi-structured interviews and a

rigorous three-stage coding process, three interconnected theoretical dimensions have been constructed and articulated.

First, the findings confirm the existence of a second-degree digital divide within Algerian organizations, manifesting as a process of internal digital stratification that generates a parallel hierarchy alongside the formal organizational structure. The concept of total mediation—the systematic delegation of technological tasks to a third party as a coping strategy—emerges as an original theoretical contribution with no equivalent in existing typologies of ICT appropriation. Second, ICT adoption produces a form of constrained porous temporality in which the boundary between professional and personal time is structurally eroded rather than voluntarily negotiated, a dynamic intensified by a pervasive organizational culture of hierarchical availability. Third, a process of sociotechnical dissociation is identified, characterized by the paradoxical coexistence of virtual hyperconnectivity and a tangible impoverishment of direct relational ties, giving rise to a triple relational configuration specific to the Algerian organizational context.

These three dimensions are unified by the core category of the organizational sociotechnical dialectic, which posits that ICTs do not produce mechanical or uniform effects but rather activate and recompose pre-existing organizational dynamics shaped by power relations, cultural representations, and identity strategies. This integrative category constitutes the primary theoretical contribution of the study, offering a middle-range theory applicable to comparable organizational contexts across the Global South and contributing to a much-needed decentering of organizational ICT research beyond Western epistemic frameworks.

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