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# Rethinking Mintzberg's Organizational Model in the Digital Age: Structural Transformations and Hybrid Configurations in SMEs

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## Abstract

Digital transformation is profoundly reshaping organizational structures, challenging the relevance of classical analytical models. This article offers a critical reassessment of Mintzberg's organizational model in light of digital dynamics, with a specific focus on small and medium-sized enterprises (SMEs). Through an integrative literature review, the study examines the limitations of structural components and coordination mechanisms in a context marked by disintermediation, virtualization, automation, and interconnectivity. The distinctive characteristics of SMEs—agility, informality, and centralized decision-making—amplify the differentiated impacts of digitalization on their organizational configurations. The article underscores the need for a hybridization of organizational models by incorporating sociotechnical logics inherent to digital environments. It proposes theoretical pathways to adapt Mintzberg's framework to the contemporary realities of SMEs, establishing the foundations of a renewed analytical model capable of capturing the ongoing structural recompositions within organizations in the digital age.

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## Introduction

Digital transformation has become a key driver in the reshaping of organizational structures. Fueled by the increasing integration of information and communication technologies (ICTs), this dynamic brings about profound changes in how organizations design their processes, coordinate activities, structure hierarchical relationships, and conceive their overall architecture (Bounfour, 2016; Bharadwaj et al., 2013). It encompasses not merely the digitization of tools, but a more fundamental reconfiguration of organizational logics, thereby challenging the foundational assumptions of traditional models of organizational analysis. The rapid proliferation of digital technologies—collaborative platforms, process automation, artificial intelligence, cloud computing—has generated new informational environments marked by immediacy, interconnectivity, and adaptability (Yoo et al., 2012). In this context, analytical frameworks developed in the late twentieth century may prove partially inadequate for capturing the dynamics introduced by digitalization.

Among the foundational models in organizational theory, the framework developed by Henry Mintzberg (1979; 1982) remains a central reference for understanding structural configurations. Based on the articulation of five core components (strategic apex, operating core, middle line, technostructure, and support staff) and the coordination mechanisms that link them, this model offers a contingency-based typology of organizational forms. However, the increasing prominence of ICTs challenges several of its core assumptions, including the strict separation of hierarchical levels, the spatial embeddedness of units, and the centrality of standardization mechanisms. Digital collaborative processes, synchronous remote coordination, and the flexibility of autonomous teams necessitate a reconsideration of classical coordination mechanisms such as direct supervision and mutual adjustment. While Mintzberg's framework retains analytical value for understanding organizational structuring, its conceptual updating appears necessary in light of the transformations driven by digital technologies. This article contributes to ongoing efforts to theorize how digital transformation reshapes organizational design logics, particularly in contexts of limited formalization and high adaptive pressure, such as SMEs.

The aim of this article is to offer a theoretical reassessment of Mintzberg's model in the context of digital transformation, with particular attention to small and medium-sized enterprises (SMEs). These organizations constitute a particularly fertile field of investigation. On the one hand, they face mounting pressures to adopt digital technologies, despite operating with constrained resources and frequently informal structures (Berisha & Shiroka Pula, 2015; OECD, 2017). On the other hand, they often experiment with hybrid organizational forms that diverge from classical ideal-types—complicating their theoretical apprehension while offering fertile ground for conceptual renewal. Recent literature presents SME digitalization both as a strategic opportunity and

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as a vector of internal structural reconfiguration (Li et al., 2018; European Commission, 2020), prompting a reexamination of the frameworks used to analyze their organizational dynamics.

Within this perspective, the objective of this article is to propose a conceptual reframing of Mintzberg's model to better account for the realities of SMEs engaged in digital transformation. Drawing on a critical literature review, the study explores how the structural components of the model may be reconfigured through digital tools, and how coordination mechanisms may be enriched or transformed in digitally mediated environments. The goal is to establish a theoretical foundation for future empirical research grounded in a logic of conceptual renewal.

The article proceeds as follows. The first section revisits the foundational elements of Mintzberg's organizational model, identifying both its contributions and its limitations in digital contexts. The second section analyzes the organizational specificities of SMEs and the structural effects of digitalization. The third section offers a reinterpretation of the model through an integrative literature review combining perspectives on digitalization, coordination, and SME dynamics. Finally, the last section proposes a reconfiguration of the Mintzbergian model adapted to digitalized SMEs and discusses its theoretical implications.

## **1. Foundations of Mintzberg's Organizational Model**

Henry Mintzberg's work occupies a central position within the field of organizational theory. Beginning in the 1970s, Mintzberg developed a systemic structural approach aimed at describing, understanding, and classifying organizational configurations based on their internal components and coordination mechanisms (Mintzberg, 1979). His key contribution lies in the analytical modeling of organizational structures through the identification of five fundamental components: the strategic apex, the operating core, the middle line, the technostructure, and the support staff. Each of these components fulfills a specific function within the organizational system, and their interaction determines the overall structural configuration of the organization.

The strategic apex encompasses the executives responsible for setting the organization's strategic direction and making high-level decisions. The operating core includes individuals directly involved in the production of goods or services. The middle line links these two levels, ensuring the transmission of information, supervisory control, and coordination of activities. The technostructure is composed of analysts who design systems to standardize processes, outputs, or competencies, while the support staff delivers internal services that are essential to the organization but not directly engaged in production (Mintzberg, 1982).

According to Mintzberg, the structuring of an organization is shaped not only by the configuration of these components but also by the coordination mechanisms that align individual and collective actions. He identifies five such mechanisms: mutual adjustment, direct supervision, standardization of work processes,

standardization of outputs, and standardization of skills. Each mechanism represents a dominant mode of coordination within a given type of organization. For instance, mutual adjustment is typical of small, informal structures, while bureaucratic organizations tend to rely on standardized procedures. These mechanisms are not mutually exclusive; rather, their combination determines the prevailing structural configuration (Desreumaux, 1996).

Building on this logic of interaction between structural components and coordination mechanisms, Mintzberg proposed a typology of structural configurations, or “organizational configurations.” These include, among others, the simple structure, the machine bureaucracy, the professional bureaucracy, the divisionalized form, and the adhocracy. Each configuration corresponds to a coherent organizational form suited to a specific environment, technology, size, or strategic orientation (Mintzberg, 1979; Donaldson, 2001). This approach aligns with the structural contingency perspective, which holds that the optimal organizational structure depends on contextual variables (Galbraith, 1973; Lawrence & Lorsch, 1967). Mintzberg's model therefore articulates an analytical understanding of internal components with an attentiveness to the contextual diversity in which organizations operate.

One of the strengths of this model lies in its ability to render complex organizational forms intelligible through a relatively stable analytical framework. Its pedagogical clarity and conceptual robustness have made it a widely used tool in management education and organizational diagnosis. Nevertheless, despite its theoretical richness, the model has been subject to criticism. Some scholars have argued that it presents an overly static view of organizational structures, insufficiently responsive to change, informality, or hybrid forms (Child, 2005; Hatchuel & Weil, 1992). Others have noted that digital technologies, networks, and process virtualization introduce profound shifts in traditional mechanisms of coordination and control (Zammuto et al., 2007), thereby necessitating a reconsideration of conceptual frameworks developed in an era when ICTs played only a marginal role in organizational functioning.

In this regard, it becomes pertinent to question the extent to which Mintzberg's model remains applicable in the face of contemporary digital transformations—particularly in organizational contexts that require agility, decentralized autonomy, informational fluidity, and flexible role structures, as is increasingly the case in many small and medium-sized enterprises today.

### **1.1. The Five Basic Components of the Organization**

In the analytical framework proposed by Henry Mintzberg, organizational components are not conceived as static units, but rather as interdependent functional domains, each contributing to the overall structural dynamics of the organization. The model moves beyond a strictly hierarchical or vertical depiction of the firm;

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instead, it describes an articulated system of structural functions, each governed by its own logic of action, organizational positioning, and differentiated relationship to coordination mechanisms (Mintzberg, 1979). This approach adopts a systemic perspective, wherein the foundational components serve as the anchors for stability, regulation, and performance across the organizational system.

One of the major contributions of this conceptualization lies in the differentiation it introduces between entities often conflated in classical models—particularly between operational units, supervisory functions, and support activities. By disentangling these functional domains, Mintzberg enables a more nuanced analysis of organizational architecture, particularly in relation to coordination, control, and standardization imperatives. This distinction proves especially relevant when examining how each component responds to changes in technological or institutional contexts.

The nature of these components is intrinsically linked to modes of work organization. The technostructure, for example, is responsible for designing regulatory instruments, including process formalization systems, planning tools, and performance management methods. It plays a regulatory role but does not directly engage in operational execution or strategic decision-making. By contrast, the strategic apex concentrates the centralization of major decisions, the organization's overall orientation, and the management of its external interfaces. The middle line functions as a transmission and control axis, linking strategic and operational levels. It is not a neutral conduit; it reflects a vertical conception of authority and introduces a tiered structure of responsibilities.

A distinguishing feature of the model is its clear delineation of the operating core, which encompasses directly productive activities organized around routines, technical competencies, and tangible objectives. Unlike frameworks that center the organization around leadership or control functions, Mintzberg places productive activity at the core of structural analysis, highlighting the foundational role of the operational base. Finally, the support staff—often overlooked in classical structural approaches—is recognized as an essential yet peripheral component. It encompasses transversal services such as information systems, maintenance, human resources, and legal support, all of which are critical to the continuity of organizational functioning, despite not being directly involved in the creation of marketable output (Hatch, 2018).

These five components are not merely descriptive categories; they embody a logic of functional differentiation that enables the organization to manage increasing complexity. They interact according to specific logics, and their relative importance varies across technological, strategic, and sectoral contexts. For instance, a highly standardized organization operating in a stable environment will tend to privilege the technostructure,

whereas an innovative and flexible organization may place greater emphasis on the operating core and support units (Bolman & Deal, 2017).

The emergent structure resulting from this differentiation rests on a fragile equilibrium. Any significant alteration within one component is likely to trigger adjustments in the others. This structural interdependence reflects the inherent complexity of organizational systems and underscores the relevance of the Mintzbergian model for analyzing the effects of systemic transformations—such as the widespread adoption of digital technologies in contemporary organizations.

## 1.2. Coordination Mechanisms

In Mintzberg's analytical framework, organizational structure is not merely a juxtaposition of functional components; it is fundamentally grounded in the way individual activities are articulated to produce a coherent whole. This articulation is made possible through coordination mechanisms, understood as the modes by which tasks are synchronized and efforts combined within the organization (Mintzberg, 1979). The model identifies five fundamental mechanisms, each corresponding to a distinct logic of integration—rooted in norms, interpersonal relationships, or technical arrangements.

The originality of this conceptualization lies in its capacity to capture the diversity of internal regulatory modes without reducing coordination to mere hierarchical supervision. It highlights the plurality of ways in which organizations ensure the coherence of collective action, depending on their size, technology, strategic orientation, and environmental context (Galbraith, 1977; Van de Ven & Delbecq, 1974).

Mutual adjustment is based on informal communication between actors. It emerges in situations where tasks are weakly standardized, highly interdependent, and require continuous interpersonal adaptation. This mechanism is predominant in uncertain or creative environments, such as innovative organizations or start-ups (Hatchuel & Weil, 1992). Coordination is achieved through direct interaction, without reliance on formal hierarchy or rigid procedures. It is particularly suited to contexts characterized by high task interdependence and variability.

Direct supervision involves one individual assuming responsibility for coordinating the work of others through explicit instruction. This mechanism is commonly observed in simple organizational structures, where authority is centralized and decision-making channels are short. While it allows for rapid responsiveness, it becomes less effective as organizational complexity increases. One of its consequences is the concentration of decision-relevant information at the top of the hierarchy, potentially leading to managerial overload (Desreumaux, 1996).

Standardization of work processes refers to the imposition of pre-established rules, procedures, or methods. Typically designed by the technostructure, this mechanism aims to formalize and control organizational activities. It fosters stability through the repetition of predictable behaviors, especially in bureaucratic structures. While it promotes efficiency, it can also lead to rigidity in unstable or rapidly changing environments (Perrow, 1986).

Standardization of outputs consists of defining the expected results while granting actors autonomy over the means used to achieve them. This mechanism aligns with a management-by-objectives logic and is often accompanied by performance indicators or dashboards. It is commonly used in decentralized organizations or those emphasizing individual or collective performance (Simon, 1997).

Standardization of skills relies on prior training and professional education. Coordination is achieved through shared knowledge that is internalized upstream of organizational action. This mechanism is prevalent in professional organizations where actors possess recognized and relatively autonomous expertise, such as hospitals or universities (Mintzberg, 1982; Freidson, 2001).

These mechanisms are not mutually exclusive. They coexist within a single organization and are combined in varying ways according to a relatively stable internal logic. Their respective dominance serves as a diagnostic criterion for identifying organizational configurations. For example, mutual adjustment is central to adhocracies, whereas standardization of skills predominates in professional bureaucracies. This dynamic framework moves beyond linear or mechanistic models of coordination by accounting for the coexistence of multiple logics within real-world organizational settings (Bolman & Deal, 2017).

The relevance of this schema lies in its ability to articulate formal and informal, structural and cultural, centralized and decentralized dimensions of coordination. It provides a conceptual lens through which to analyze tensions, redundancies, and complementarities between coordination modes. However, this model—formulated in a historical context prior to the widespread adoption of digital technologies—remains largely grounded in face-to-face interactions, linear communication circuits, and a relatively stable conception of roles.

In a digitalized environment, the boundaries between these mechanisms become increasingly porous. Collaborative platforms, intelligent management systems, and automation tools may give rise to hybrid forms of coordination. This invites a reconsideration of how coordination mechanisms can be redefined, augmented, or substituted—particularly in agile or decentralized organizational settings, such as digital SMEs. A contemporary reassessment of the model thus requires rethinking the epistemological foundations of organizational coordination in light of technological mediation and the reconfiguration of work.

### 1.3. Typical Structural Configurations

Mintzberg's modeling of organizational configurations is based on a systemic articulation between structural components, coordination mechanisms, and contextual factors. It is not a merely descriptive taxonomy, but rather an analytical typology grounded in the internal coherence of organizational structures, as shaped by their dominant operational logic (Mintzberg, 1979). Each configuration results from a particular alignment between a predominant coordination mechanism, a central structural component, and a specific environmental context—such as stability, complexity, or required levels of innovation.

This approach is embedded in the tradition of structural contingency theory, according to which the optimal form of organization depends on exogenous variables such as technology, organizational size, or competitive environment (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). By identifying typical configurations, Mintzberg sought to move beyond abstract universal models, offering coherent archetypes observable in real organizational settings. These archetypes are not normative prescriptions but structuring ideal-types intended to guide both analysis and organizational design.

The simple structure corresponds to a configuration that is minimally formalized, weakly differentiated, and highly centralized. It relies primarily on direct supervision as the dominant coordination mechanism. The strategic apex exerts immediate control over the organization as a whole. This configuration is typically found in small enterprises, start-ups, or environments where rapid decision-making is critical (Mintzberg, 1982). Its flexibility is advantageous, though it remains vulnerable to managerial instability.

The machine bureaucracy is characterized by the standardization of work processes. It exhibits a high degree of formalization, a developed technostructure, and a clearly defined hierarchy. This configuration is typical of public administrations or industries operating in stable, routine environments (Perrow, 1970). It enables rigorous control, but generates organizational inertia that is often incompatible with uncertain or innovation-driven contexts.

The professional bureaucracy is grounded in the standardization of skills. It relies on a highly trained and autonomous workforce, with the operating core playing a central role. This model is prevalent in hospitals, universities, and professional service firms, where practitioners enjoy substantial autonomy, and coordination is achieved through professional norms rather than strict hierarchical control (Freidson, 2001; Scott, 2008).

The divisionalized form organizes the enterprise into quasi-autonomous units, each with its own objectives and resources. Coordination is achieved through the standardization of outputs, primarily via performance-based management. This configuration is common in large diversified corporations, where divisions operate as

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profit centers. It facilitates strategic responsiveness at the local level, but requires a strong capacity for oversight and control from the strategic apex (Chandler, 1962).

Finally, the adhocracy is characterized by low formalization, high horizontal specialization, and a reliance on mutual adjustment. It is suited to unstable, innovative, or complex environments that demand continuous flexibility. Teams are often multidisciplinary and project-based. This configuration is emblematic of technology firms, creative agencies, and research units (Mintzberg, 1979; Daft & Lewin, 1993).

Each of these configurations reflects a specific balance between stability and flexibility, centralization and autonomy, formalization and spontaneity. Their analytical relevance does not lie in their conceptual purity, but in their capacity to capture dominant patterns of structural arrangement. Contemporary organizational reality, however, frequently exhibits hybrid forms, blending multiple structural logics. This hybridization is further intensified by digitalization, which introduces cross-functional coordination modes, virtual teams, and collaborative platforms—elements that are difficult to reconcile with classical models.

Nevertheless, Mintzberg's typology remains a powerful heuristic framework. It enables the identification of an organization's dominant logic and the evaluation of its structural alignment with its environment and strategic orientation. It also provides a reference point for diagnosing structural tensions—such as those arising between centralization and autonomy, or between innovation and standardization. In the context of digital transformation, this typology offers a valuable foundation for rethinking contemporary structural shifts and adapting existing models to new organizational paradigms, particularly for SMEs that oscillate between agility and formalization.

#### **1.4. Limitations and Critiques of the Model in Evolving Contexts (Flexibility, Uncertain Environments)**

While Mintzberg's organizational model represents a foundational contribution to the understanding of structural forms, it exhibits several limitations when applied to organizational contexts marked by instability, increasing complexity, and a need for adaptability. Its conceptual framework relies on a relatively stable typology, predicated on the assumption that organizations tend toward structural coherence in response to their environments. Although this assumption was largely appropriate during the 1970s and 1980s, it appears increasingly inadequate in light of the rapid transformations brought about by globalization, economic uncertainty, and, most notably, digital transformation (Child, 2005; Volberda, 1996).

One of the primary critiques of the model lies in its strong structural bias, which leaves limited room for endogenous change dynamics or for the emergence of novel organizational forms. By seeking to stabilize analysis around archetypal configurations, Mintzberg tends to underestimate the transient, hybrid, and

experimental nature of actual organizational arrangements (Hatchuel & Weil, 1992). Many firms—particularly SMEs operating in volatile markets—adopt flexible, composite, and evolving structures that do not conform to any of the canonical configurations. These adaptive forms may oscillate between multiple coordination mechanisms depending on projects, partners, or competitive pressures, thereby challenging rigid classificatory logics.

Moreover, Mintzberg's framework assigns a central role to traditional coordination mechanisms—typically based on physical interactions, explicit hierarchies, and clear functional segmentation. This theoretical construct tends to overlook the growing importance of transversal, participatory, and digital logics, which are reshaping coordination processes in collaborative, distributed, and real-time work environments (Zammuto et al., 2007). Digital platforms, remote work tools, and open innovation models fundamentally disrupt classical categories of standardization and mutual adjustment. Consequently, it becomes difficult to position such practices within a typology developed on the basis of industrial-administrative organizational forms.

The model is also limited in its capacity to account for organizational change processes. By offering a static representation of structures, Mintzberg does not provide an operational framework for analyzing the dynamics of organizational evolution over time. It fails to conceptualize incremental transformation, structural disruption, or internal reconfigurations driven by technological, institutional, or strategic change (Greenwood & Hinings, 1996). In contrast, neo-institutional theories and processual approaches place greater emphasis on temporality, actor dynamics, and the tensions between continuity and change—dimensions largely absent from Mintzberg's schema.

Furthermore, in highly uncertain environments—characterized by technological turbulence, rapid skills obsolescence, and network-based organizational forms—the relevance of the model's foundational assumptions becomes increasingly questionable. The notion of an optimal configuration, structured around dominant coordination mechanisms and fixed components, resonates poorly with the realities of digital ecosystems, ambidextrous organizations, and post-bureaucratic structures (O'Reilly & Tushman, 2013). These organizational forms are distinguished by their ability to simultaneously exploit established knowledge and explore new solutions, necessitating a degree of structural plasticity that Mintzberg's model struggles to conceptualize.

Recent contributions in strategic management further emphasize that the organizational environment can no longer be viewed as a set of static exogenous variables, but rather as a dynamic field of interaction in which organizations co-construct their resources, routines, and adaptive capabilities (Teece et al., 1997; Eisenhardt & Martin, 2000). From this perspective, structure should not be conceived as a stable state, but as an evolving

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process, a dynamic construction serving competitive advantage. Mintzberg's model, centered on the description of finalized configurations, does not accommodate these logics of learning, experimentation, and continuous recomposition.

Therefore, while Mintzberg's framework retains pedagogical and analytical value in certain contexts, its theoretical scope remains limited when applied to organizations operating in open, fluid, interconnected, and digitally transformed environments. A contemporary reassessment of the model requires its enrichment through more dynamic, relational approaches that are attuned to the impact of digital technologies on the structuring and coordination of collective activity.

## **2. The Specificities of SMEs in the Face of Organizational Dynamics**

The analysis of organizational dynamics cannot overlook the heterogeneity of structures that compose the economic landscape. Among these, small and medium-sized enterprises (SMEs) represent a distinct category, both in terms of their economic weight and the specific features of their internal functioning. Their role in national and regional economies is widely acknowledged, particularly with regard to job creation, incremental innovation, production flexibility, and territorial embeddedness (OECD, 2017). Nevertheless, the theoretical treatment of SMEs within organizational approaches often remains peripheral, or is addressed through conceptual models originally designed for large corporations—thereby limiting the relevance of conventional frameworks for capturing their structural reality (Aldrich & Auster, 1986; Julien, 1997).

SMEs operate at the intersection of specific economic, institutional, and social logics, which significantly influence their organizational design, strategic behavior, and adaptive capacity. These firms increasingly navigate environments marked by competitive intensification, technological acceleration, and rapidly evolving customer expectations. Within this context, the organizational forms they adopt cannot be understood as mere scaled-down versions of those of large firms. Rather, they reflect a distinct logic, often characterized by contingent arrangements, empirical learning processes, and informal coordination mechanisms (Welter, 2011).

For a long time, management literature underestimated these specificities, implicitly reproducing a modeling bias grounded in the structural norms of large, integrated corporations. This bias has led to the generalized application of principles such as process formalization, functional differentiation, and centralized strategic planning (Storey, 1994). Yet these elements are rarely present in SMEs, whose operational modes are more frequently driven by opportunistic logic, gradual adjustments, and a strong interweaving of personal, entrepreneurial, and organizational dimensions (Mintzberg & Waters, 1985; Verstraete & Fayolle, 2005).

The distinctiveness of SMEs in the context of organizational dynamics is also reflected in their relationship to structure and change. While large firms tend to organize their evolution around formalized strategic plans, SMEs

often follow non-linear trajectories shaped by available resources, exogenous events, or the intentions of their leaders. This relative plasticity does not imply disorganization; rather, it denotes an ongoing adaptive capacity rooted in proximity and responsiveness (Pettigrew, 1987; Chandler & Hanks, 1994). However, such flexibility also generates certain vulnerabilities—particularly in relation to skills management, the structuring of routines, and the institutionalization of organizational learning.

Organizational models derived from large enterprises—whether they correspond to professional bureaucracies, divisionalized structures, or adhocratic forms—struggle to adequately account for the internal logics operating within SMEs. These firms often rely on hybrid, evolving, and loosely formalized arrangements that cannot be reduced to ideal-typical configurations. This discrepancy underscores the need for theoretical renewal aimed at better capturing the specific internal dynamics of SMEs, by integrating their structural constraints, entrepreneurial orientation, and contextual embeddedness (Martela, 2019).

The challenge thus lies in moving beyond normative approaches based on standardized structural prescriptions, in favor of a more interpretive perspective that attends to the specificities of SMEs in their everyday operations. It becomes imperative to develop theoretical models that are more closely aligned with actual practices, grounded in fine-grained observation of the configurations, temporalities, and regulatory modes that characterize this essential segment of the economic fabric.

### **2.1. Definition and Organizational Characteristics of SMEs**

A nuanced conceptual approach is required to understand small and medium-sized enterprises (SMEs), one that considers both quantitative criteria and qualitative organizational realities. From a normative standpoint, the definition of SMEs varies across institutional contexts. The European Union, for instance, defines them based on thresholds for workforce size (fewer than 250 employees), annual turnover (less than €50 million), or total assets (less than €43 million) (European Commission, 2003). While widely adopted, this definition only partially captures the internal heterogeneity of the SME segment, which ranges from artisanal microenterprises to regionally integrated industrial firms.

Beyond size, SMEs are distinguished by specific organizational configurations shaped by logics of proximity, agility, and personalized work relationships. Internally, they are typically characterized by flat hierarchies, limited procedural formalization, and a strong overlap between strategic, operational, and relational functions (Mintzberg, 1983). This relational density facilitates rapid information flows and reduces coordination costs, but also limits the implementation of formal delegation mechanisms and integrated management systems.

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SMEs often rely on organizational forms that differ from classical bureaucratic logics. They tend to operate according to an organic configuration, wherein processes are shaped by individual competencies, interpersonal relationships, and accumulated experiential knowledge (Van de Ven, 1986). Work organization is marked by high functional versatility, minimal task segmentation, and a logic of learning by doing. While this structure enables responsiveness in volatile environments, it also generates vulnerabilities in knowledge capitalization, process formalization, and organizational resilience (Léger-Jarniou, 2008).

A central and distinctive feature of SME organizational structures is the role of the owner-manager. Unlike large firms, where responsibilities are specialized and distributed, SMEs are often structured around a highly personalized decision-making core. The entrepreneur typically assumes strategic, operational, and managerial functions in a model best described as one of decision centrality and functional omnipresence (Kor & Mesko, 2013). Although this governance mode can be effective in the short term, it creates organizational dependence on the founder, which may hinder delegation, constrain growth, and complicate succession or structural transformation (D'Amboise & Muldowney, 1988).

Moreover, information systems, management tools, and managerial practices are often rudimentary or absent. Management is based more on intuition, direct experience, and informal mechanisms than on standardized processes or codified performance indicators (Waśniewski, 2021). This informality does not necessarily imply disorganization; rather, it reflects an alternative organizational logic grounded in flexibility, personal commitment, and close interaction. Nonetheless, it may restrict access to financing, limit integration into complex value chains, and constrain the adoption of advanced managerial technologies (Papazoglou et al., 2000).

Finally, the institutional, regulatory, and sectoral environments in which SMEs operate exert a significant influence on the definition of their organizational characteristics. In contexts marked by strong regulation or macroeconomic instability, SMEs often adopt defensive or retrenchment strategies, which affect their internal structure and resource management (Julien, 1997). Similarly, access to skills, innovation, and markets is shaped by their position within inter-organizational networks, their relational capital, and their contextual adaptability (Welter & Smallbone, 2011).

Taken together, these elements invite us to consider SMEs not as scaled-down versions of large firms, but as entities with their own distinct organizational logics, structured around specific action principles. Their analysis therefore requires an adapted theoretical framework, one that integrates the structural, cognitive, and contextual dimensions shaping their operational dynamics.

## 2.2. Structural and Managerial Constraints Specific to SMEs

Small and medium-sized enterprises (SMEs) are not only distinguished by their size but also by a set of recurring structural and managerial constraints that shape their ability to grow, innovate, and ensure long-term sustainability. These constraints stem from organizational, cognitive, and relational determinants that influence both their internal structuring and their interactions with the external environment. An examination of these determinants reveals a series of specific vulnerabilities that are often marginalized in dominant organizational models, which are primarily constructed from the operational logics of large firms.

Structurally, SMEs are frequently characterized by low levels of task division, high centralization of decision-making, and limited formalization of internal processes. This minimalist architecture can be attributed to the need for flexible and reactive management in resource-constrained environments (Dimitratos et al., 2011). However, this apparent flexibility is accompanied by significant shortcomings in role definition, internal control procedures, and organizational knowledge documentation (Storey, 1994). The absence of codified routines hampers the transferability of competencies, complicates the onboarding of new personnel, and undermines the organization's capacity for long-term replication (Zahra, Neubaum & Huse, 1997).

Managerial practices in SMEs are generally centered around a personalized leadership model, with decision-making concentrated in the hands of the owner-manager. This governance mode fosters rapid decision-making and high commitment levels but also creates strong organizational dependency on a small number of individuals (Daily & Dollinger, 1992). The concentration of decision-making power leads to strategic lock-in, where major orientations depend heavily on the entrepreneur's intuitions, personal convictions, and risk tolerance (Kellermanns et al., 2008). In the absence of internal counterbalances, this configuration may hinder the development of collective learning processes or participatory strategic planning.

Another constraint lies in SMEs' limited absorptive capacity, defined as the ability to identify, assimilate, and apply new knowledge from the environment (Cohen & Levinthal, 1990). This limitation is largely due to a shortage of qualified human resources, restricted access to innovation networks, and physical or institutional distance from research and training centers (Lane, Koka & Pathak, 2006). Innovation is often incremental, emerging from experiential learning rather than from structured R&D initiatives. In addition, persistent financial constraints significantly hinder recruitment capacity, technological investment, and organizational structuring (Beck & Demirgüç-Kunt, 2006).

SMEs also exhibit organizational vulnerability in their exposure to external risks. Their dependence on a limited number of clients, suppliers, or distribution channels makes them particularly susceptible to market volatility, supply chain disruptions, or the failure of key partners (Blundel et al., 2014). This structural

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dependence constrains their strategic room for maneuver, especially when operating in uncertain or weakly regulated institutional contexts. Furthermore, SMEs' limited bargaining power in factor markets or global value chains reinforces their subordinate positioning (Gereffi, Humphrey & Sturgeon, 2005).

From a managerial standpoint, SMEs often display underdeveloped management systems. Information systems, budgeting tools, and performance evaluation mechanisms are frequently rudimentary or absent, hindering evidence-based decision-making, outcome measurement, and optimal resource allocation (Hudson, Smart & Bourne, 2001). In many cases, management relies on tacit knowledge, informal practices, and short-term logic, which are poorly aligned with the demands of growth, standardization, or quality certification (Lepoutre & Heene, 2006).

Human resource management in SMEs also presents specific challenges. Employees are often required to be polyvalent, functional specialization is limited, and structured career paths are rare—factors that reduce the attractiveness of these organizations to qualified candidates (Heneman, Tansky & Camp, 2000). The owner-manager, often lacking formal training in human resource management, typically assumes direct responsibility for personnel, operating based on intuition or paternalistic logic, with limited scope for collective learning or professionalization of HR practices (Cardon & Stevens, 2004).

These constraints should not be viewed merely as deficits when compared to the standards of large enterprises. Rather, they reflect a specific organizational logic that requires analytical tools tailored to the complexities inherent in SME functioning. A rigorous understanding of these constraints is a prerequisite for designing support mechanisms, training programs, and transformation strategies that are effectively aligned with their actual needs.

### **2.3. Dominant Organizational Models in SMEs (Informality, Centralization, Responsiveness)**

The analysis of organizational models within small and medium-sized enterprises (SMEs) reveals configurations that differ significantly from those observed in large firms. These models do not represent fixed ideal types but rather contingent arrangements shaped by reduced scale, relational proximity, informal processes, and the constant need for adaptability. Three core dimensions—informality, centralization, and responsiveness—structure the dominant configurations observed in SMEs, each constituting an organizational response to specific structural constraints.

#### **2.3.1. Informality as a Dominant Mode of Regulation**

Informality constitutes a defining organizational feature in SMEs. It is expressed through the absence of written procedures, the scarcity of formal job descriptions, and the limited codification of work processes. This

informality should not be equated with disorganization; rather, it reflects a structuring logic based on interpersonal trust, shared experience, and operational flexibility (Ram & Holliday, 1993). It facilitates rapid decision-making, context-sensitive adaptation, and effective resource mobilization under uncertainty (De Clercq & Sapienza, 2006).

Nevertheless, informal regulation has structural limitations. It hampers the transfer of tacit knowledge, constrains operational scalability, and increases dependence on key individuals. In the absence of process documentation, SMEs may struggle to onboard new employees or to standardize practices, thereby impeding organizational learning and long-term growth (Prasanna et al., 2019).

### **2.3.2. Decision-Making Centralization as a Governance Principle**

The organizational model prevalent in SMEs typically relies on strong centralization of decision-making around the owner-manager. This centralization arises from both the reduced managerial hierarchy and the personalization of authority—two defining features of many SMEs (Mintzberg, 1983; Miller, 1983). The manager assumes strategic, operational, and relational responsibilities simultaneously, within a configuration where the separation of powers and functions is limited (Gray & Mabey, 2005).

While such concentration allows for high responsiveness, it also introduces organizational risks. In the absence of delegation, decision-making flows may be delayed when the manager is overburdened, and dependency on a single individual can jeopardize continuity in the event of absence or departure (Wang, Walker & Redmond, 2007). Moreover, centralization often hinders the development of collective regulation mechanisms or organizational intelligence processes, thereby limiting structural innovation and long-term strategic foresight (Kotey & Meredith, 1997).

### **2.3.3. Responsiveness as a Reaction to Environmental Volatility**

Responsiveness is a foundational element of SME organizational functioning. In an environment marked by economic uncertainty, market volatility, and increasing competitive pressures, SMEs often compensate for the lack of formalization with a heightened ability to adapt swiftly to external changes (Leitner & Guldenberg, 2010). This responsiveness is facilitated by short command chains, direct communication, and informally structured, often real-time, decision-making processes (Sarkar, Echambadi & Harrison, 2001).

However, such operational agility can have unintended consequences. An excessive focus on short-term adjustments may result in the neglect of structural development, weak strategic planning, and resistance to institutionalization processes essential for sustainability (Davila, Foster & Oyon, 2009). The absence of time for

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strategic reflection or the implementation of formalized steering routines may lead to long-term organizational fragility.

#### **2.3.4. Towards a Hybrid Logic of Organizational Configurations**

The coexistence of informality, centralization, and responsiveness does not give rise to a single model, but rather to a spectrum of hybrid configurations shaped by available resources, managerial experience, industry sector, and the enterprise's growth trajectory (Welter & Smallbone, 2011). Some SMEs adopt logics similar to adhocratic organizations, where employee autonomy is encouraged, while others maintain highly vertical structures, particularly in sectors characterized by low capital or technological intensity.

Recent literature advocates for a contextual reinterpretation of organizational forms in SMEs, acknowledging the plurality of internal balances between autonomy, control, improvisation, and formalization (Nolan & Garavan, 2012). This theoretical positioning encourages a departure from classical typologies derived from the study of large firms and calls for the integration of the structural and functional specificities of SMEs into contemporary models of organizational management.

### **3. ICT Integration and Digitalization Dynamics within Organizations**

The digital transformation of organizations represents one of the most significant developments in contemporary changes affecting management practices and organizational structuring. The gradual, and subsequently widespread, adoption of information and communication technologies (ICT) has deeply reshaped the modalities of coordination, production, information flow, and decision-making within productive entities (Zammuto et al., 2007; Orlikowski, 2007). Far from being limited to task automation or enhanced information circulation, the integration of ICT reconfigures organizational logics by introducing new forms of temporality, spatiality, and governance.

The effects of digitalization cannot be confined to technical change; rather, they constitute a systemic process in which digital tools interact with social structures, professional practices, and institutional regulations (Castells, 1996; Barley, 2015). This socio-technical dimension of transformation necessitates a critical re-examination of traditional organizational theories, particularly with respect to hierarchical structuring, power dynamics, mechanisms of control, and forms of autonomy. Organizational architecture tends to become more fluid, less hierarchical, and increasingly restructured around interdependent networks, platforms, and collaborative systems.

Recent scholarship in organizational management has progressively acknowledged these transformations, emphasizing that digital technologies should not be understood as neutral tools. Instead, they function as

artifacts embedded with structural logics capable of fundamentally reshaping routines, roles, and decision-making processes (Leonardi, 2011; Yoo, Henfridsson & Lyytinen, 2010). This transformative potential lies in the very nature of digital technologies, which do not merely support pre-existing processes but introduce novel logics of value creation, resource mobilization, and work organization.

Within this context, the integration of ICT raises significant theoretical challenges regarding the relevance and adaptability of established organizational models. Digitalization calls into question several foundational assumptions of classical organizational theory, particularly those related to centralized control, linear decision-making processes, and the stability of organizational structures (Bharadwaj et al., 2013). These changes demand a renewed conceptualization of coordination, supervision, standardization, and specialization, as defined in traditional analytical frameworks.

Moreover, digitalization does not unfold uniformly across organizations; it produces differentiated reconfigurations depending on sectoral context, technological maturity, and initial structural configurations (Tilson, Lyytinen & Sørensen, 2010). It transcends a mere technological adoption process, instead encompassing deeper dynamics of managerial model redefinition, interpersonal interaction reshaping, and redistribution of power relations. Consequently, it entails not only an evolution of tools but also a transformation of the fundamental organizational logics.

The integration of ICT—conceived as an interweaving process of technical, cognitive, and institutional dimensions—raises essential questions regarding the capacity of organizations to rethink their internal structures, adapt coordination mechanisms, and construct forms of collective intelligence suited to digital environments. It offers a critical lens for analyzing contemporary transformations in work practices, emerging forms of organizational agility, and the tensions between standardization and personalization in management systems.

### **3.1. Definitions of ICT and Digital Technologies**

A rigorous understanding of the ongoing digital transformations within organizations requires a prior conceptual clarification of the terms *Information and Communication Technologies (ICT)* and *digital technologies*. Although these expressions are frequently used interchangeably, they differ in both their technological scope and the organizational dynamics they underpin.

ICT refers to the ensemble of tools, infrastructures, and systems that enable the acquisition, processing, storage, transmission, and retrieval of information in electronic form (ITU, 2012). This domain encompasses data processing technologies (computing), telecommunications systems (networks, telephony, satellites), and

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human–machine interface devices (computers, mobile terminals, software interfaces). The primary function of ICT is to facilitate the circulation and utilization of information, both within and beyond organizational boundaries (Benbasat & Zmud, 2003). Historically, ICT was introduced in organizations to support administrative rationalization, document management, and financial control before evolving toward more strategic applications.

Digital technologies, while constituting a subset of ICT, are distinguished by their ability to integrate multiple technological layers—data, algorithms, and interfaces—into interactive, adaptive, and scalable systems (Yoo, Boland, Lyytinen & Majchrzak, 2012). They encompass cloud computing, artificial intelligence, connected objects, digital platforms, online collaborative tools, and immersive technologies. What defines digital technologies is not solely their electronic basis, but rather their informational plasticity, their dynamic capacity to reconfigure organizational processes, and their role as enablers of organizational innovation (Tilson, Lyytinen & Sørensen, 2010).

The distinction between ICT and digital technologies is therefore not merely a matter of chronology or technological advancement. It involves distinct modes of organizing activities. Traditional ICT has primarily served to automate existing processes in pursuit of standardization and efficiency gains. In contrast, digital technologies contribute to the redefinition of organizational boundaries, the emergence of novel business models, and the transformation of roles within value chains (Bharadwaj et al., 2013).

Accordingly, the use of the term *digitalization* in contemporary management literature does not merely refer to technological deployment. Rather, it describes a structural transformation of organizational functioning, grounded in the pervasive integration of digital technologies across all operational dimensions (Verhoef et al., 2021). This transformation affects internal communication practices, collaborative work processes, data governance, and innovation capabilities.

Digital technologies are further characterized by their modularity, scalability, and interoperability. They enable the development of open platforms in which organizational functions are no longer confined to closed units but are instead distributed across interconnected ecosystems (Gawer & Cusumano, 2014). As a result, digitalization entails a reconfiguration of organizational modes, marked by disintermediation, task reallocation, and the streamlining of decision-making processes (Lyytinen, Yoo & Boland, 2016).

Therefore, contemporary organizational analysis must move beyond a purely technical understanding of ICT. It requires a systemic approach to digital technologies as drivers of deep sociotechnical transformations, reshaping organizational structures, practices, and competencies.

### **3.2. Effects of Digitalization on Organizational Structures: Disintermediation, Decentralization, and Virtualization**

Digitalization is progressively reshaping organizational architectures by profoundly altering interaction patterns, coordination mechanisms, and the distribution of functions. Three major effects merit particular attention in this transformation: disintermediation, decentralization, and virtualization. Each of these dynamics reflects a shift in traditional organizational boundaries, driven by the increasing integration of digital technologies into managerial and production systems.

Disintermediation refers to the gradual removal of intermediary levels or functions within interaction, decision-making, or distribution chains. Initially observed in economic spheres with the rise of digital platforms (Evans & Schmalensee, 2016), this phenomenon is now expanding to internal organizational configurations. The implementation of interconnected digital systems enables direct access to information, automation of administrative processes, and a redefinition of decision-making pathways. Supervisory, control, and reporting functions—historically managed by intermediate hierarchical layers—are increasingly being absorbed by integrated digital tools (Zuboff, 1988; Brynjolfsson & McAfee, 2014). This shift does not simply correspond to a flattening of hierarchies, but rather to a recomposition of roles, wherein value creation is redirected toward cognitively and strategically intensive activities.

Simultaneously, digitalization promotes functional decentralization by enhancing the autonomy of operational units and multiplying distributed decision points. Ubiquitous access to information, the fluidity of digital communication, and the rise of collaborative systems empower geographically dispersed teams to make context-specific decisions without consistently relying on centralized coordination bodies (Malone, 2004). This decentralization does not necessarily equate to a loss of control; rather, it is structured around frameworks of guided autonomy, where governance increasingly relies on real-time indicators, shared dashboards, and normative regulation instead of formal authority (Markus & Tanis, 2000). The redistribution of decision-making power to the organizational periphery is especially pronounced in unstable environments, where localized responsiveness becomes a key performance factor.

The third transformative effect is the virtualization of organizational structures, encompassing the dematerialization of workspaces, the flexibilization of productive temporalities, and the reconfiguration of social interactions within digital environments (Avolio, Kahai & Dodge, 2001). Through the use of collaborative platforms, cloud-based environments, and videoconferencing technologies, physical and temporal boundaries within organizations become increasingly blurred. Organizational activity can now occur asynchronously, remotely, and outside traditional production sites. Virtualization is not limited to task relocation; it entails a

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restructuring of social ties, professional socialization mechanisms, and managerial control modalities (Maznevski & Chudoba, 2000).

These three dynamics—disintermediation, decentralization, and virtualization—do not unfold uniformly across all organizations. Their extent and configuration depend on various factors such as sectoral characteristics, digital maturity levels, organizational culture, and the capacity of existing structures to undergo transformation (Bharadwaj et al., 2013). Rather than signaling the disappearance of hierarchical models, these dynamics suggest the emergence of hybrid organizational forms, combining strategic centralization with operational autonomy, physical spaces with digital interfaces, and formalized roles with flexible contributions.

In this regard, digitalization functions as a multidimensional driver of structural transformation. It challenges vertical integration logics, decision-making centrality, and the spatial localization of organizational functions. Consequently, it compels both scholars and practitioners in management to revisit the theoretical foundations of organization by incorporating informational, technological, and relational dimensions into the conceptualization of contemporary structures.

### **3.3. Specific Impacts on SMEs: Agility, Automation, Flexibility, and Innovation**

Small and medium-sized enterprises (SMEs) occupy a distinct position within digital transformation dynamics. Their relatively small size, less formalized organizational structures, and close proximity to the markets they serve simultaneously expose them to technological disruptions and offer them a potential for strategic adaptability. The introduction of digital technologies into such organizations generates differentiated effects on agility, automation, organizational flexibility, and innovation, thereby revealing the structural particularities of SMEs in the context of digital transformation.

Agility, understood as the ability of an organization to respond swiftly and effectively to environmental changes, is one of the key differentiating factors for SMEs in digitized contexts (Overby, Bharadwaj & Sambamurthy, 2006). Digital technologies provide SMEs with tools for monitoring, analysis, and real-time responsiveness, which enhance their capacity to react to fluctuations in demand, supply chain disruptions, or regulatory changes. The streamlined decision-making structures commonly found in SMEs, often centered around the founder, facilitate the rapid integration of customer feedback, the redefinition of operational priorities, and the experimentation with digital solutions (Teece, Peteraf & Leih, 2016). This functional agility, enabled by accessible digital tools such as cloud-based ERP systems, CRM platforms, or predictive analytics applications, constitutes a strategic asset for SMEs, particularly in volatile competitive environments.

Automation is another domain of significant impact. While large corporations generally possess the financial and technical resources to industrialize processes at scale, SMEs can selectively leverage digital technologies to

automate high-coordination-cost or low-value-added functions (Davenport & Kirby, 2016). The adoption of tools such as e-invoicing systems, customer service chatbots, or AI-assisted inventory management solutions allows for a substantial reduction in repetitive tasks and a more efficient allocation of human resources toward cognitively demanding activities. This targeted automation, aligned with the budgetary and technical constraints of SMEs, contributes to operational efficiency while freeing up time for innovation and customer engagement.

Organizational flexibility, defined as the capacity to reconfigure structures, processes, and roles in response to contextual demands, is particularly amplified in SMEs through the use of digital technologies (Rindova & Kotha, 2001). Unlike heavily bureaucratic organizations, SMEs possess a high potential for structural plasticity. Digital tools facilitate the implementation of modular configurations, the temporary outsourcing of functions, and ad hoc collaboration with external partners (e.g., through freelancing platforms or industry-specific digital ecosystems). This digitally supported flexibility enables SMEs to transition rapidly from an internally focused production model to network-based, co-productive, or expanded distribution models, depending on market conditions and emerging opportunities.

Finally, the impact of digitalization on innovation in SMEs is especially significant. The literature demonstrates that digital technologies do more than reinforce existing processes; they also foster the emergence of new creative practices, products, and services (Li, 2020). Collaborative platforms, customer data analytics tools, digital prototyping environments, and open innovation communities enable SMEs to adopt participatory innovation processes, test hypotheses rapidly, and iterate their offerings based on market feedback. This capacity for digital innovation is particularly strategic for SMEs, which typically lack formalized R&D divisions and must innovate within resource-constrained environments.

However, these positive effects should be interpreted with caution, as the appropriation of digital technologies among SMEs remains uneven and contingent upon various factors: available skills, managerial vision, access to financing, local technological infrastructure, and institutional support mechanisms (OECD, 2021). Moreover, the intensification of digitalization may generate new vulnerabilities, particularly in terms of cybersecurity, technological dependence, and information overload, which must be considered within a careful and context-sensitive approach to SME digital transformation.

Thus, the integration of digital technologies within SMEs should not be viewed as a mere process of technical modernization. Rather, it entails profound transformations of their organizational capabilities by activating specific levers of agility, automation, flexibility, and innovation. These transformations require a nuanced understanding of the structural and cultural specificities of SMEs, along with a strategic support framework to avoid the pitfalls of partial, poorly managed, or operationally disconnected digitalization efforts.

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### 3.4. Contributions and Limitations of Existing Organizational Models in the Context of Digitalization

The rise of digital technologies has profoundly transformed organizational dynamics, challenging the relevance of theoretical frameworks developed within the industrial contexts of the twentieth century. Classical organizational models—whether based on mechanistic (Taylor, 1911), structural (Mintzberg, 1979), or systems-oriented approaches (Katz & Kahn, 1978)—have offered powerful analytical tools for understanding work division, coordination, hierarchy, and specialization. However, these models were conceived in relatively stable environments, characterized by instrumental rationality, task predictability, and low technological intensity.

From a diachronic perspective, these models have made major contributions to the understanding of organizational structures by codifying archetypes (functional, divisional, matrix, adhocracy, etc.) and specifying dominant coordination mechanisms (Mintzberg, 1979). They have also elucidated the relationships between structure and environment (Burns & Stalker, 1961), or between technology and organization (Woodward, 1965). Such contributions remain relevant for analyzing organizational configurations in low-digitization contexts or within organizations characterized by strong structural inertia.

However, the transformations induced by digitalization—marked by the emergence of platform logics, cognitive automation, the datafication of processes, and the virtualization of workspaces—reveal significant analytical and operational limitations in these classical frameworks. First, most traditional models assume relatively stable structures and formal hierarchies, whereas digitalization entails increasing organizational fluidity, characterized by modularity, cross-functionality, and algorithmic governance (Zuboff, 2019; Faraj, Pachidi & Sayegh, 2018). Traditional notions such as hierarchical line, support service, or value chain lose operational clarity in environments where organizational units are frequently reconfigured around projects, information flows, or automated decision systems.

Moreover, conventional models only partially account for the effects of digital artifacts on interaction and power dynamics. Digital tools, as non-human but structuring actors (Orlikowski, 2007), reshape informational asymmetries, decision-making capacities, and supervision modalities. The growing centrality of data in decision-making processes challenges the assumption that coordination is exclusively based on human or formal relationships. Classical theories fail to incorporate the performative effects of digital interfaces or the logic of algorithmic regulation characteristic of highly digitized environments (Möhlmann & Henfridsson, 2019).

Additionally, existing organizational models typically presume relatively fixed boundaries between the organization and its external environment. Yet, digitalization introduces increasing porosity between internal and external domains, particularly through the development of open innovation ecosystems, digital communities, and co-production relationships with users (Chesbrough, 2003; Nambisan et al., 2017). Structural

models based on silos are increasingly incompatible with environments marked by continuous interconnectivity, where knowledge, resources, and competencies circulate beyond traditional organizational limits.

Furthermore, conventional models often prove inadequate for grasping emerging organizational forms, such as platform-based firms, decentralized autonomous organizations (DAOs), or hybrid structures that rely simultaneously on human agents and artificial intelligence systems. These entities operate according to distributed, evolving, and often self-organized logics that exceed the traditional parameters of formalization, direct supervision, or functional division (Puranam, Alexy & Reitzig, 2014). The absence of vertical leadership and clear functional boundaries challenges the applicability of analytical grids derived from classical organizational paradigms.

In response to these limitations, contemporary literature has explored several avenues for theoretical renewal. Sociomaterial approaches (Leonardi, 2011; Orlikowski & Scott, 2008), network organization theories (Powell, 1990), and post-bureaucratic perspectives (Heckscher & Donnellon, 1994) offer more suitable tools for analyzing emerging digital configurations. These theoretical currents emphasize the dynamic interaction between material (technologies), cognitive (representations, knowledge), and social (relationships, norms) dimensions in organizational structuring. They also highlight the role of digital routines, technological scripts, and informational infrastructures in the reproduction or transformation of organizational practices.

Ultimately, existing organizational models retain heuristic value for analyzing structural features still present in contemporary organizations. Nevertheless, their explanatory power appears limited in a context of advanced digitalization, where plasticity, connectivity, and distributed intelligence redefine collective action logics. A renewal of theoretical frameworks seems necessary to fully integrate the complexity of sociotechnical interactions, the volatility of organizational configurations, and the central role of digital technologies in structuring work and decision-making processes.

### **3.5. Toward a Hybridization of Organizational Models: Revisiting Mintzberg in the Digital Era**

The acceleration of digital transformation across organizations raises fundamental questions regarding the relevance of theoretical frameworks that have historically structured organizational analysis. Among these, Mintzberg's typology of organizational configurations (1979) has represented a major milestone in understanding structural forms and coordination mechanisms. However, the large-scale emergence of digital technologies, hyperconnectivity, and the proliferation of algorithmic systems challenge several foundational assumptions underpinning this model. The growing complexity of organizational environments calls for a critical reassessment of Mintzberg's framework in light of contemporary dynamics, favoring hybrid forms over rigid classification schemes.

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In his canonical typology, Mintzberg identifies five organizational configurations—simple structure, machine bureaucracy, professional bureaucracy, divisionalized form, and adhocracy—articulated around six structural components (operating core, strategic apex, middle line, technostructure, support staff, and ideology) and five basic coordination mechanisms (mutual adjustment, direct supervision, standardization of work processes, outputs, and skills). This model assumes a relatively stable structural framework, a clear division of labor, and a strong correspondence between organizational form and environmental context (Mintzberg, 1979; Mintzberg & McHugh, 1985).

In contrast, digital transformation introduces organizational dynamics that diverge significantly from this typological vision. Boundaries between organizational components become increasingly porous, coordination mechanisms hybridize, and structuring logics shift from teleological rationality to adaptive and evolving patterns (Davenport, Guha, Grewal & Bressgott, 2020). The adoption of digital technologies enables the decentralization of control, oversight, and coordination functions through technological systems, thereby challenging models based on hierarchical authority and role specialization (Faraj et al., 2018).

A central dimension that requires reconsideration is the articulation of Mintzberg's coordination mechanisms with those observables in digitalized organizations. For instance, direct supervision—traditionally associated with the simple structure or the strategic apex—is now often replaced or mediated by algorithmic management systems, collaborative platforms, or automated evaluation tools (Möhlmann & Henfridsson, 2019). Similarly, mutual adjustment—characteristic of flexible forms such as adhocracy—is increasingly enacted through synchronous and asynchronous digital tools, reshaping the temporalities and modalities of interpersonal collaboration (Mazmanian, Orlikowski & Yates, 2013).

Moreover, the rise of digital platforms and ecosystems shifts the organizational center of gravity toward configurations that Mintzberg only partially anticipated. Contemporary organizations are increasingly structured around modularity, structural plasticity, and inter-organizational connectivity, blurring distinctions between formal configurations. Platform-based firms orchestrate interactions among producers, consumers, and third-party developers within decentralized architectures, often lacking direct hierarchical control or clearly delineated functional divisions (Gawer & Cusumano, 2014; Parker, Van Alstyne & Choudary, 2016). These entities do not fit neatly within Mintzberg's bureaucratic or adhocratic categories but represent evolving, distributed, and hybrid forms.

Recent research on digital organizations highlights the emergence of structuring logics grounded in collective intelligence, distributed governance, and adaptive learning, which diverge from classical mechanisms of standardization or direct supervision (Majchrzak, Markus & Wareham, 2016). This evolution renders any

attempt at rigid or classificatory modeling increasingly obsolete. Instead, a comprehensive approach is required—one that conceives of organizations as fluid sociotechnical systems, whose forms emerge less from normative design principles than from the interactional dynamics among technologies, individuals, and institutions.

Revisiting Mintzberg in this context does not merely entail updating existing configurations; it necessitates an epistemological transformation of the model, shifting from a taxonomy of forms to a theory of hybrid arrangements. The notion of hybridization—borrowed from organizational theory (Battilana & Dorado, 2010; Besharov & Smith, 2014)—refers to the coexistence, within a single organizational system, of heterogeneous and sometimes contradictory structural logics. In digital organizations, this hybridization is reflected in the interweaving of market mechanisms, community norms, algorithmic control, and human judgment, configured according to context-specific challenges and constraints.

Accordingly, Mintzberg's framework could be reconfigured to incorporate the dynamic, unstable, and polycentric nature of contemporary organizations. Rather than fixing structures within typological configurations, the analysis must focus on the tensions, trade-offs, and organizational bricolage emerging from the interplay of coordination modes and technological substrata. This perspective aligns with post-bureaucratic management scholarship, which emphasizes the multiplicity of institutional logics coexisting within organizations (Greenwood et al., 2011) and the performativity of technologies in shaping organizational practices (Orlikowski & Scott, 2008).

Ultimately, a rigorous reassessment of Mintzberg's work in the context of digitalization does not invalidate its theoretical contribution. Instead, it aims to reinterpret his framework from a non-deterministic and evolutionary standpoint. The value of his model today lies less in its classificatory function than in its heuristic capacity to illuminate structural tensions between centralization and autonomy, formalization and improvisation, stability and innovation. Analyzing hybrid organizations requires moving beyond classical dichotomies and conceptualizing structure as a negotiated, contingent, and reconfigurable construct—one in which digital systems actively participate in the architecture of organizational life.

## Conclusion

This study has undertaken a re-examination of Mintzberg's organizational model in light of digital transformations, with a particular focus on the structural specificities of small and medium-sized enterprises (SMEs). The analysis has demonstrated that the growing prominence of digital technologies—far beyond their instrumental dimension—profoundly alters the foundational principles underpinning organizational structuring. Coordination mechanisms, functional components, and structural configurations, as identified in

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Mintzberg's framework, are being reconfigured under the influence of digital dynamics characterized by disintermediation, virtualization, automation, and the proliferation of intelligent systems.

In the case of SMEs, these transformations assume distinctive forms. Their relative structural plasticity, centralized governance, and direct exposure to environmental shifts render them both vulnerable to and responsive in the face of digital imperatives. The tension between internal constraints and external pressures produces hybrid organizational forms, often diverging from the ideal-types conceptualized in classical approaches. Structures appear less rigid, roles less hierarchical, and coordination mechanisms more distributed, increasingly relying on digital tools as vectors of regulation and interaction.

Within this context, a straightforward transposition of Mintzberg's model no longer suffices to account for the empirical realities observed in digitalized SMEs. While the analytical rigor of his framework remains relevant, it requires a conceptual reinterpretation to integrate emerging dimensions such as algorithmic governance, functional interconnectivity through platforms, and the self-organization of units via collaborative digital systems. The typological approach based on stabilized configurations must be complemented by a dynamic perspective capable of capturing ongoing reconfigurations and hybrid forms intrinsic to digital environments.

This hybridization does not weaken the model but rather constitutes a condition for its continued theoretical relevance in the digital age. It invites us to conceptualize organizations not as static entities but as evolving systems, shaped by tensions between the formal and the informal, centralization and autonomy, structure and flow. Reframed in this manner, Mintzberg's model can serve as a foundation for developing a renewed analytical framework, attuned to the particularities of SMEs and to the organizational implications of digitalization.

Ultimately, adapting Mintzberg's model to contemporary digital realities is not a matter of superficial modernization. It entails a theoretical reconfiguration that bridges classical contributions with emerging sociotechnical logics, within an integrative perspective. This undertaking is a necessary step toward rethinking the foundations of organizational analysis and offers fertile ground for future research—both conceptual and empirical—in an economy where agility, connectivity, and distributed intelligence are redefining the conditions for organizational structuring and performance.

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