Economic Sciences, Management and Commercial Sciences Review - University of M'sila | Volume: 19 / N°: 01 / N.S : 37 (2026) p 491-507

Digital Leadership and Strategic Vigilance in Algerian Higher Education: Toward an Integrated Theoretical Framework

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Received: 14/05/2026 **Accepted: 20/06/2026** **Published:30/06/2026**

Abstract

Digital transformation has become a defining challenge for higher education institutions (HEIs) worldwide, yet its leadership dimensions remain undertheorized in non-Western contexts. This article advances a theoretical framework that integrates digital leadership and strategic vigilance as complementary institutional capabilities within the setting of Algerian public universities. Drawing on transformational leadership theory (Bass & Avolio, 1994), complexity leadership theory (Uhl-Bien & Arena, 2018), and the dynamic capabilities framework (Teece et al., 1997), the article argues that strategic vigilance—understood as an institution's structured capacity for environmental sensing and proactive adaptation—mediates the relationship between digital leadership and organizational effectiveness. The University of Djelfa, a regional public university in central Algeria, is used as an illustrative context to ground theoretical propositions in an emerging-economy reality shaped by centralized governance, resource constraints, and post-pandemic urgency. The framework contributes to theory by proposing a contextually sensitive model of leadership-driven institutional adaptation and offers four propositions for future empirical investigation. The article concludes with a comparative analysis of analogous transformation trajectories at the University of Jordan (MENA region) and the University of Edinburgh (global benchmark), revealing both convergent pressures and divergent institutional responses.

Keywords: digital leadership, strategic vigilance, organizational effectiveness, Algerian higher education, dynamic capabilities, transformational leadership, complexity leadership

Jel Classification Codes: **:** I20. I23. M10.

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1. INTRODUCTION

The digital transformation of universities is no longer a matter of institutional choice it has become an environmental imperative. Across the world, higher education institutions face simultaneous pressures to modernize their teaching and governance practices while preserving the academic and civic functions that define their social purpose (UNESCO, 2023). In high-income economies, this transition is largely a matter of acceleration: institutions already possess mature digital infrastructures and agile management cultures. In developing regions, however, the challenge is fundamentally different in kind. Institutions must navigate transformation under conditions of structural scarcity, centralized governance, and uneven digital literacy conditions that render models imported from the Global North analytically insufficient.

Algeria illustrates this predicament with particular clarity. Since the early 2000s, the Ministry of Higher Education and Scientific Research has pursued a succession of

modernization initiatives, culminating most recently in the "Digital University 2030" strategic framework. Yet national ambition has repeatedly outpaced institutional capacity. At the level of individual universities, digital initiatives often emerge as improvised responses to external mandates rather than expressions of coherent internal strategy. The COVID-19 pandemic, which forced the overnight adoption of remote teaching tools across the entire Algerian university system, amplified these tensions dramatically. It exposed the extent to which digital readiness was uneven, leadership capacity was fragmented, and organizational learning was reactive rather than anticipatory.

It is against this backdrop that the present article makes its theoretical contribution. We argue that two institutional capabilities are decisive for universities seeking to navigate digital transformation in constrained environments: digital leadership and strategic vigilance. Digital leadership refers to a leadership orientation that couples technological awareness with strategic vision, communicative agility, and the capacity to cultivate a culture of continuous learning (Westerman et al., 2014). Strategic vigilance, drawn from the dynamic capabilities literature (Teece et al., 1997), refers to an institution's structured ability to scan its environment, interpret emerging signals, and reposition its resources ahead of disruption (Daft, 2010). Alone, each of these capabilities is insufficient. Together, they constitute a mutually reinforcing architecture for institutional resilience.

This article proceeds as a theoretical contribution. It reviews the relevant literature, synthesizes three complementary theoretical traditions, advances an integrated conceptual framework, and proposes four theoretically grounded propositions for future empirical investigation. The University of Djelfa, a regional public university established in 1999 and currently serving over 30,000 students, is used throughout as an illustrative context—not as an empirical case subject to measurement, but as a grounding reference that gives the theoretical claims analytical specificity. The article closes with a comparative analysis involving two contrasting institutional experiences: the University of Jordan, representing the broader MENA higher education landscape, and the University of Edinburgh, representing a global benchmark for digital transformation in research-intensive universities.

The article is organized as follows. Section 2 reviews the theoretical foundations across three bodies of literature. Section 3 develops the conceptual framework and its underlying propositions. Section 4 discusses theoretical and practical implications. Section 5 presents the comparative analysis. Section 6 concludes.

2. Theoretical Foundations

2.1 Digital Leadership in Higher Education

The concept of digital leadership has developed unevenly in the scholarly literature, reflecting the relatively recent convergence of leadership studies and digital transformation research. At its most general, digital leadership designates a leadership orientation that integrates strategic vision, technological literacy, and organizational change management (Westerman et al., 2014). What distinguishes it from earlier conceptions of technology-oriented leadership is its insistence that digital competence is insufficient without a

corresponding capacity to communicate that vision, build collective commitment, and manage the human dimensions of change.

The theoretical ancestry of digital leadership is predominantly transformational. Bass and Avolio's (1994) foundational account of transformational leadership—with its four components of idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration—provides the conceptual scaffolding upon which most digital leadership frameworks are constructed. Transformational leaders, in this tradition, are distinguished by their ability to articulate visions that transcend immediate operational concerns and to inspire followers toward higher-order collective goals. In a digital context, this translates into the capacity to frame technological change not as a technical necessity but as an opportunity for institutional renewal, to challenge existing assumptions about teaching and governance, and to support individual members through the anxieties that accompany disruption.

Yet transformational leadership theory, however generative, carries limitations that become visible precisely in the kinds of environments this article addresses. It tends to locate agency in individual leaders rather than in organizational structures and interaction patterns. It assumes a relatively stable institutional environment in which vision can be articulated and pursued over meaningful time horizons. And it is insensitive to the ways in which bureaucratic constraints, resource scarcity, and political pressures shape what leaders can actually do. These limitations have prompted a complementary engagement with complexity leadership theory (Uhl-Bien & Arena, 2018).

Complexity leadership theory reconceptualizes leadership as an emergent, distributed process rather than the property of individual actors. Drawing on complexity science, it argues that in adaptive, networked organizations, effective leadership depends less on positional authority than on the cultivation of conditions that enable collective learning, creative adaptation, and the distributed exercise of initiative (Uhl-Bien & Arena, 2018). This perspective is particularly apposite for Algerian public universities, where the formal hierarchy of ministry, rectorate, faculty, and department coexists with informal networks of faculty initiative, student activism, and peer learning. In such environments, digital transformation cannot be mandated from above—it must be cultivated through enabling structures, relational trust, and the legitimation of bottom-up innovation.

The COVID-19 pandemic provided an involuntary stress test of digital leadership capacities across the global higher education landscape. Research consistently shows that institutions led by digitally aware, communicatively agile, and empathetically responsive leaders navigated the shift to remote instruction more effectively than those relying on command-and-control approaches (Olabiyi et al., 2025; Muslim, 2024). At the same time, the pandemic revealed the fragility of leadership capacity built on individual competence alone: when key individuals were unavailable, institutions often reverted to paralysis. This observation reinforces the complexity-theoretic argument that resilient digital leadership

must be distributed and embedded in organizational routines rather than concentrated in exceptional individuals.

In the Algerian context specifically, empirical investigations of digital leadership remain scarce. The available evidence suggests that leadership development programs in Algerian HEIs are underdeveloped relative to the sector's aspirations (Benhabib et al., 2020). Faculty and administrative leaders typically acquire digital competencies informally, through personal initiative rather than institutional investment. This creates a structural vulnerability: digital capacity is unevenly distributed and organizationally fragile, dependent on individuals who may leave, be reassigned, or simply burn out. A theoretically adequate account of digital leadership in this context must therefore address not only what leaders do, but the organizational conditions that make distributed, sustainable digital leadership possible.

2.2 Strategic Vigilance as a Dynamic Capability

Strategic vigilance is not a term that has achieved canonical status in the management literature, but the phenomenon it designates—the structured capacity of an organization to monitor its environment and position itself ahead of emerging disruptions—is central to the dynamic capabilities framework articulated by Teece et al. (1997) and elaborated in subsequent decades. In that framework, the sensing dimension of dynamic capabilities refers precisely to the processes through which organizations scan technological, competitive, and regulatory environments, interpret the signals they receive, and update their strategic orientations accordingly. Strategic vigilance, as used in this article, operationalizes this sensing dimension for the specific institutional context of higher education.

The concept of absorptive capacity, developed by Cohen and Levinthal (1990) and subsequently elaborated by Zahra and George (2002), provides an important complementary perspective. Absorptive capacity refers to an organization's ability to identify, assimilate, and exploit external knowledge. It is, in essence, the cognitive and organizational infrastructure that allows vigilant sensing to become productive learning rather than mere observation. In higher education institutions, absorptive capacity is influenced by the breadth of faculty expertise, the quality of information systems, the permeability of disciplinary boundaries, and the degree to which leadership actively promotes knowledge integration across organizational subunits.

The relationship between vigilance and absorptive capacity has important implications for the Algerian university context. Algerian public universities operate within a highly centralized governance structure in which strategic planning is largely conducted at the ministerial level and communicated downward through regulatory instruments. This means that individual universities have limited formal authority over their strategic orientations, but this does not imply that vigilance is irrelevant—it means that the relevant object of vigilance shifts. Rather than scanning for competitive threats or market opportunities in the manner of private-sector firms, Algerian universities must develop the capacity to interpret

ministerial signals, anticipate policy shifts before they become mandatory directives, and position their internal capacities to respond flexibly when mandates arrive. This form of regulatory vigilance, oriented toward the upstream governance environment rather than the lateral competitive landscape, is a distinctive feature of public higher education in centralized systems.

Daft's (2010) account of organizational information processing provides a useful framework for understanding how vigilance functions at the institutional level. In Daft's model, organizations vary in the richness and breadth of the information scanning systems they maintain, the interpretive frameworks through which they make sense of environmental signals, and the mechanisms through which interpretations are translated into strategic responses. High-vigilance organizations maintain diverse boundary-spanning roles, invest in structured horizon-scanning processes, and cultivate interpretive communities—groups of people who collectively make sense of ambiguous environmental information. Low-vigilance organizations rely on ad hoc information gathering, interpret signals through inherited frameworks that may no longer fit current conditions, and lack the organizational mechanisms to translate awareness into action.

At the University of Djelfa, as in many comparable institutions, vigilance is largely informal and episodic. Department heads monitor ministry circulars; faculty members informally share observations about pedagogical trends; administrative leaders occasionally benchmark against peer institutions. These are the raw materials of vigilance, but they do not yet constitute a structured dynamic capability. Building such a capability requires institutional investment: in information systems that aggregate and curate relevant signals, in boundary-spanning roles that connect the institution to its broader environment, in sensemaking processes that bring diverse perspectives to bear on strategic questions, and in leadership practices that communicate environmental intelligence throughout the organization and connect it to adaptive decision-making.

The growing body of research on organizational resilience in higher education converges on a similar conclusion: institutions that have built structured vigilance capabilities—sometimes described as environmental scanning systems, strategic intelligence functions, or foresight processes—consistently demonstrate greater adaptive capacity under conditions of turbulence (Lenart-Gansiniec, 2022). This finding holds across institutional types and national contexts, though the organizational forms through which vigilance is institutionalized vary considerably. In research-intensive universities in high-income countries, strategic intelligence is often embedded in dedicated planning and strategy units. In resource-constrained regional universities in developing contexts, comparable functions must be achieved through less resource-intensive mechanisms: faculty development programs, participatory planning processes, and leadership practices that systematically incorporate environmental scanning into governance routines.

2.3 Organizational Effectiveness in Higher Education: A Dynamic Perspective

The concept of organizational effectiveness has a contested history in higher education research, reflecting the difficulty of specifying what it means for a university to perform well given the multiplicity and occasional incommensurability of its purposes. The Competing Values Framework developed by Quinn and Rohrbaugh (1983) and subsequently applied to higher education by Cameron and colleagues represents the most influential attempt to systematize this complexity. The framework identifies four value orientations—human relations, internal process, open systems, and rational goal—that correspond to different conceptions of what organizational success means. Effective organizations, in this view, are not those that excel on any single dimension but those that achieve productive tensions across all four.

This multidimensional conception of effectiveness is analytically useful precisely because it resists the temptation to reduce institutional performance to a single metric. It acknowledges that universities must simultaneously maintain operational stability (internal process), invest in human development (human relations), drive innovation and growth (open systems), and deliver measurable educational and research outcomes (rational goal). The tensions among these orientations are not pathologies to be eliminated but productive creative tensions to be managed—and managing them well is, in itself, a form of organizational competence.

In the digital transformation context, organizational effectiveness acquires additional dimensions. DiMaggio and Powell's (1983) concept of institutional isomorphism is particularly relevant here. As Algerian universities respond to ministry directives, observe peer institutions, and absorb professional norms about what digitally advanced universities look like, they face powerful pressures toward conformity. Coercive isomorphism, exerted through regulatory mandates, compels adoption of specific digital tools and reporting practices. Mimetic isomorphism, operating through uncertainty and the desire to emulate successful peers, drives adoption of platforms and practices that appear legitimate even when their local fit is uncertain. Normative isomorphism, transmitted through professional networks and academic literature, shapes expectations about what constitutes good digital governance.

These isomorphic pressures are not necessarily negative—they can accelerate the diffusion of genuinely beneficial practices—but they become problematic when they drive surface-level compliance rather than deep organizational learning. A university that implements a learning management system because peers have done so, without investing in the training, support, and pedagogical redesign needed to use it effectively, exemplifies isomorphic adoption without organizational effectiveness. Strategic vigilance, in this context, performs a critical filtering function: it enables institutions to distinguish between external practices worth emulating and those worth adapting or resisting, and to make these distinctions on the basis of evidence about their own contexts rather than social pressure alone.

The post-COVID literature on higher education resilience has further enriched the conceptual landscape of organizational effectiveness by foregrounding adaptation and recovery as performance dimensions in their own right. Matsieli (2024) and Ndaba (2024) document how institutions that entered the pandemic with stronger environmental sensing capabilities, more distributed leadership structures, and more robust faculty development programs recovered more quickly and sustained higher levels of student engagement through the crisis period. These findings suggest that organizational effectiveness in turbulent environments should be understood not as a static property but as a dynamic capability—the capacity to sustain performance across varying conditions rather than to optimize performance under stable ones.

3. An Integrated Conceptual Framework

3.1 The Theoretical Architecture

The three bodies of literature reviewed above converge on a common insight: that digital transformation in higher education is a fundamentally relational and processual phenomenon, not a technical one. Technology adoption, however sophisticated, does not by itself produce organizational effectiveness. What produces effectiveness is the quality of the leadership, learning, and institutional intelligence that shape how technology is selected, implemented, and embedded in organizational practice. This insight motivates the integrated framework proposed here.

The framework rests on three theoretical pillars that correspond to three levels of analysis. At the level of individual leadership behavior, transformational leadership theory (Bass & Avolio, 1994) specifies the mechanisms through which leaders inspire collective vision, stimulate intellectual engagement, and build the individual competencies needed for digital adaptation. At the level of organizational process, complexity leadership theory (Uhl-Bien & Arena, 2018) specifies how these individual leadership behaviors must be distributed and embedded in enabling organizational structures to produce systemic rather than episodic change. At the level of institutional capability, the dynamic capabilities framework (Teece et al., 1997) specifies how the sensing, seizing, and transforming processes that enable adaptive performance are built, maintained, and deployed.

These three pillars are not additive—they are mutually constitutive. Transformational leadership behaviors create the cultural conditions under which distributed leadership can emerge. Distributed leadership structures create the organizational conditions under which dynamic capabilities can be built and exercised. Dynamic capabilities, in turn, create the environmental intelligence that enriches leadership decision-making and sustains the organizational learning cycles that keep all three elements alive. The framework thus describes a recursive, generative system rather than a linear causal chain.

3.2 The Mediating Role of Strategic Vigilance

The central theoretical claim of this article is that strategic vigilance occupies a mediating position between digital leadership and organizational effectiveness. This claim

requires unpacking. A mediation relationship in this context means that digital leadership produces its effects on organizational effectiveness not directly—or not primarily directly—but through the vigilance capabilities that digitally capable leadership enables and sustains.

The logic of this mediation proceeds as follows. Digital leaders who successfully articulate a compelling vision of institutional transformation, build faculty commitment through participatory engagement, and invest in the digital literacy of their teams create the conditions under which vigilance becomes organizationally possible. They do this by establishing information-rich environments in which environmental signals are systematically gathered and discussed; by legitimating the boundary-spanning roles through which individuals connect the institution to its external environment; by investing in the interpretive communities through which diverse perspectives on strategic challenges are synthesized into shared understanding; and by demonstrating, through their own communicative practice, that environmental intelligence is a valued organizational resource rather than a peripheral administrative concern.

In the absence of such leadership, vigilance tends to remain at the individual level—dependent on the initiative and curiosity of particular faculty members or administrators, but never aggregated into a shared organizational capability. Individual vigilance of this kind may occasionally produce valuable insights, but it is structurally unable to generate the sustained, distributed, and organizationally connected environmental scanning that enables proactive adaptation. The transformation from individual alertness to organizational vigilance is precisely what digitally capable leadership enables.

Organizational effectiveness, in turn, depends on vigilance in the following ways. Vigilant institutions make better-informed resource allocation decisions, because they have more accurate and more timely information about the environments in which those decisions will play out. They adapt their educational offerings more responsively, because they maintain ongoing intelligence about the evolving needs of students, employers, and communities. They manage the isomorphic pressures described in Section 2.3 more discriminatingly, because they can distinguish evidence-based best practice from social imitation. And they are more resilient in the face of disruption, because they have already anticipated many of the scenarios that disruption presents and have begun building the adaptive capacity needed to respond.

3.3 Contextual Moderation: The Algerian Institutional Environment

A theoretically adequate framework for digital leadership in Algerian higher education must account for the ways in which the distinctive features of the Algerian institutional environment condition the relationships it proposes. Three contextual features are particularly salient.

First, the high degree of centralization in Algerian university governance means that strategic decision-making authority is substantially concentrated at the ministerial level. Individual university leaders have limited formal autonomy over budget allocation,

curriculum design, staffing decisions, and strategic planning. This does not make digital leadership irrelevant, but it reconfigures its scope: the most consequential leadership behaviors in this context are those that enhance the institution's capacity to interpret and respond to ministerial directives intelligently, position the institution favorably in competitive processes for ministerial resources, and build the internal capabilities needed to implement national directives effectively. Leadership in this context is less entrepreneurial and more interpretive—a form of institutional intelligence work rather than strategic autonomy.

Second, the resource constraints characteristic of regional public universities in Algeria impose significant limits on the organizational investments required for sophisticated vigilance capabilities. Dedicated strategic planning units, advanced information management systems, and structured horizon-scanning processes are all resource-intensive. In their absence, vigilance must be achieved through lower-cost mechanisms: participatory governance processes that aggregate distributed faculty knowledge, informal boundary-spanning networks that connect the institution to relevant external communities, and leadership development investments that build the interpretive capacity of administrators and senior faculty. These mechanisms are less powerful than their resource-intensive equivalents, but they are not negligible—and theorizing them seriously requires sensitivity to context that generic models of dynamic capabilities typically lack.

Third, the legacy of the COVID-19 pandemic has created both an organizational memory of digital improvisation and a political window for institutional reform. The emergency digital deployments of 2020 and 2021 demonstrated, in visceral terms, the consequences of inadequate digital readiness. They also created a cadre of faculty members with direct experience of digital teaching who constitute a potential resource for more sustained transformation. And they created a discourse of reform—at both ministerial and institutional levels—that provides political legitimacy for investments in digital leadership development and vigilance infrastructure. This window is not permanently open, and the theory must acknowledge its temporally bounded character.

3.4 Theoretical Propositions

On the basis of the framework developed above, this article advances four theoretical propositions that specify the expected relationships among the core constructs. These propositions are intended as theoretically grounded claims that future empirical research can investigate and refine.

Proposition 1: Digital leadership, enacted through transformational and distributed leadership behaviors, exerts a positive direct effect on organizational effectiveness in higher education institutions operating in constrained institutional environments.

Proposition 2: Digital leadership exerts a positive direct effect on strategic vigilance by creating the communicative, informational, and cultural conditions under which structured environmental sensing becomes organizationally possible.

Proposition 3: Strategic vigilance, understood as an institutionalized dynamic capability for environmental sensing and adaptive positioning, exerts a positive direct effect on organizational effectiveness by enabling more informed resource allocation, more responsive educational adaptation, and more discriminating engagement with isomorphic pressures.

Proposition 4: Strategic vigilance mediates the relationship between digital leadership and organizational effectiveness, such that the effects of digital leadership on effectiveness are substantially—though not exclusively—transmitted through the vigilance capabilities that digitally capable leadership enables and sustains.

These propositions are not presented as exhaustive theoretical claims about digital transformation in higher education. They are deliberately focused on the specific mediating architecture that the article proposes, and they are bounded by the contextual conditions—centralized governance, resource constraints, post-pandemic institutional context—that the framework explicitly acknowledges. Which all four require to be emperically tested and would be constructive and illuminating research topics, furthermore_ actionable at any context!

4. Theoretical and Practical Implications

4.1 Contributions to Theory

This article makes several contributions to the theoretical literature on digital leadership and organizational learning in higher education. First, it extends the dynamic capabilities framework—primarily developed in the context of private-sector firms competing in commercial markets—to the institutional environment of public higher education in developing economies. In doing so, it shows that the sensing dimension of dynamic capabilities takes distinctive forms in centralized, resource-constrained institutional environments, where the relevant object of strategic scanning is not the competitive landscape but the regulatory and policy environment in which the institution is embedded.

Second, the article bridges transformational and complexity leadership theories in a way that is sensitive to the specific conditions of non-Western public higher education. Most applications of these theories to digital transformation in higher education have been conducted in high-income, relatively decentralized institutional contexts. The framework developed here shows how these theories need to be contextually recalibrated—shifting emphasis from entrepreneurial vision to interpretive intelligence, from strategic autonomy to adaptive positioning, and from individual leadership competence to distributed organizational capability—to remain analytically useful in settings like Algerian public universities.

Third, the article contributes to the small but growing literature on organizational resilience in MENA higher education (Ouali & Ouali, 2024). By theorizing the mechanisms through which digital leadership enables vigilance, and through which vigilance enables

effectiveness, it provides a more granular account of the pathways to resilience than earlier work in this tradition has offered. This granularity is important because it suggests specific intervention points—in leadership development, in information systems, in governance processes—that can be targeted by policy and institutional reform.

4.2 Implications for Practice

The framework has several implications for university leaders and policymakers. For university leaders, it suggests that investment in digital leadership capacity should be understood not primarily as investment in individual technical competence—though that is necessary—but as investment in the organizational conditions that enable distributed, sustained, and collectively intelligent digital governance. This means investing in participatory planning processes, in faculty development programs that build both digital skills and strategic awareness, in boundary-spanning roles that connect the institution to relevant external communities, and in leadership development that cultivates the communicative and interpretive capacities that complex, adaptive leadership requires.

For policymakers at the ministerial level, the framework suggests that the current approach to digital transformation in Algerian higher education—which relies heavily on top-down mandates communicated through regulatory instruments—needs to be complemented by investments in institutional capacity that enable more responsive, locally intelligent adaptation. Specifically, this means investing in leadership development programs that go beyond technical training to address the strategic, communicative, and organizational dimensions of digital leadership; providing institutions with more flexibility to develop locally adapted vigilance mechanisms rather than imposing uniform compliance frameworks; and creating knowledge-sharing platforms that allow institutions to learn from each other's adaptive experiences rather than reinventing solutions independently.

5. Comparative Analysis: Two Contrasting Institutional Experiences

To situate the theoretical framework in broader perspective, this section compares digital transformation trajectories at two institutions that represent contrasting points on the global landscape of university digitalization: the University of Jordan, selected as a benchmark from the MENA region, and the University of Edinburgh, selected as a global reference point for research-intensive digital transformation. The comparison is not intended to suggest that Algerian universities should replicate either experience; it is intended to illuminate, through contrast and analogy, the specific challenges and opportunities that the framework's propositions address.

5.1 University of Jordan: Digital Leadership Under Centralized Governance in the MENA Region

The University of Jordan, founded in 1962 and currently enrolling approximately 40,000 students, is one of the oldest and most prestigious public universities in the Arab world. Its digital transformation trajectory offers instructive parallels with the Algerian experience, as well as important contrasts.

Like Algerian universities, the University of Jordan operates within a centralized national governance structure in which the Ministry of Higher Education and Scientific Research exercises substantial authority over university affairs. Jordan's higher education system has been subject to a sequence of reform initiatives, most recently the National Digital Transformation Strategy (2021–2025), which mandates specific digitalization targets for all public universities. The University of Jordan's response to these mandates has been shaped by its relatively strong institutional capacity, its established relationships with international development partners, and its leadership tradition of proactive engagement with global educational trends (Khader, 2020).

The COVID-19 pandemic accelerated the University of Jordan's digital transition significantly. The institution had already invested in a learning management system and in faculty development programs for online pedagogy before the pandemic; when emergency remote teaching was mandated in March 2020, it was therefore better positioned than many peer institutions to maintain educational continuity. Post-pandemic analysis of the Jordanian experience highlights the importance of what might be described as anticipatory leadership: university leaders who had taken seriously the signals of impending disruption—from global health surveillance reports, from the experiences of universities in China and Italy, from the academic literature on pandemic preparedness—and had begun building adaptive capacity before the crisis arrived (Al-Fraihat et al., 2020).

This anticipatory orientation corresponds closely to what the present framework describes as strategic vigilance. The University of Jordan's relative preparedness was not accidental; it reflected an institutional culture, cultivated through deliberate leadership investment, in which environmental monitoring and proactive adaptation were taken seriously as organizational responsibilities. At the same time, the Jordanian experience also reveals the limits of vigilance under centralized governance: the university's ability to act on its environmental intelligence was constrained by ministerial approval processes, by budget allocation rules that limited institutional flexibility, and by the difficulty of moving quickly within a complex, politically accountable governance structure. These constraints are structurally similar to those faced by Algerian universities, making the Jordanian experience analytically relevant without implying simple transferability.

A key contrast between the Jordanian and Algerian experiences lies in the degree of institutional investment in leadership development. The University of Jordan has maintained a dedicated Center for University Teaching and Learning since 2008, which has built a sustained program of faculty development encompassing both pedagogical innovation and digital literacy (Sharadgah & Sa'di, 2020). This institutional investment has created a distributed leadership capacity—a cadre of digitally capable faculty across departments—that complements and extends the formal leadership of rectorate and deanship. In Algerian universities, comparable investments remain exceptional, and digital leadership capacity tends to be concentrated in individual champions rather than distributed across the

institution. The framework developed in this article suggests that building this distributed capacity should be a priority for Algerian higher education policy.

5.2 University of Edinburgh: Strategic Vigilance at Scale in a Research-Intensive Institution

The University of Edinburgh, founded in 1583 and consistently ranked among the world's top twenty-five universities, represents a very different institutional context: a research-intensive, financially autonomous, internationally competitive institution operating in a high-income economy with a mature digital infrastructure. The comparison with Algerian regional universities is therefore not one of near-peers but of distant reference points—a deliberate methodological choice, on the grounds that understanding what a fully developed, resource-rich version of the capabilities described in the framework looks like clarifies what the framework is pointing toward, even if the pathway to that destination is long and contextually specific.

Edinburgh's digital transformation strategy has been characterized by a distinctive integration of strategic intelligence and institutional learning. The university's Information Services division, which encompasses both IT services and library and learning resources, has since 2015 maintained a structured environmental scanning process that monitors emerging developments in educational technology, artificial intelligence, open educational resources, and digital pedagogy on a rolling basis. The outputs of this scanning process inform the university's annual technology investment decisions, its faculty development programming, and its governance conversations about the institutional implications of digital change (University of Edinburgh, 2023).

This structured vigilance function represents an institutionalized version of exactly the dynamic capability described in this article. It is not dependent on the initiative of particular individuals; it is embedded in organizational roles, reporting structures, and planning cycles. It connects environmental intelligence systematically to strategic decision-making. And it operates continuously—monitoring weak signals of emerging disruption before they become crises—rather than episodically in response to acute pressures.

Edinburgh's experience during the COVID-19 pandemic further illustrates the organizational value of this institutionalized vigilance. The university's pandemic response planning had begun in January 2020, several weeks before the UK government issued formal guidance about educational disruption. This early start—made possible by the institution's active participation in global higher education intelligence networks and its structured monitoring of international developments—allowed Edinburgh to prepare remote teaching infrastructure, update assessment policies, and communicate with students and staff about contingency arrangements significantly ahead of most peer institutions (Watermeyer et al., 2021).

The contrast with both the University of Djelfa and the University of Jordan in this respect is stark. Both of the latter institutions responded to the pandemic reactively—

implementing emergency measures under crisis conditions rather than executing contingency plans developed through anticipatory intelligence. The difference is partly one of resources: Edinburgh's investment in structured vigilance reflects a financial capacity that neither Jordanian nor Algerian public universities currently possess. But it is also a difference of institutional culture and leadership orientation: Edinburgh's leadership has, over many years, cultivated an organizational norm in which horizon-scanning and anticipatory planning are treated as core governance responsibilities rather than peripheral luxuries. This cultural dimension of vigilance is analytically separable from its resource requirements, and it suggests that progress toward more vigilant institutional cultures is possible even before the resource constraints of developing-country universities have been fully addressed.

A second instructive contrast concerns the relationship between digital leadership and faculty agency at Edinburgh. Unlike the top-down digital mandates characteristic of centralized higher education systems, Edinburgh's digital transformation has been characterized by extensive faculty involvement in strategy development, technology selection, and pedagogical redesign. The institution's Digital Learning Applications and Media (DLAM) unit, established in 2016, functions as a faculty-facing service that provides both technical support and pedagogical consultation, and its priorities are shaped through ongoing dialogue with academic communities rather than unilaterally determined by central administration (University of Edinburgh, 2023). This model of distributed, consultative digital leadership corresponds closely to the complexity leadership perspective developed in Section 2 of this article, and it suggests that the complexity-theoretic dimensions of the framework may be more central to effective digital transformation than the transformational leadership tradition, with its emphasis on top-down vision articulation, alone would imply.

5.3 Synthesis: Convergent Pressures, Divergent Institutional Responses

The comparison of these three institutional contexts—the University of Djelfa, the University of Jordan, and the University of Edinburgh—reveals a pattern of convergent environmental pressures and divergent institutional responses that is theoretically illuminating.

All three institutions face the same fundamental challenge: digital transformation is an environmental imperative that no university can ignore, but the pace and form of transformation are shaped by institutional capacities that vary enormously across contexts. All three experienced the COVID-19 pandemic as a defining disruption that accelerated digital adoption and exposed leadership vulnerabilities. All three operate under governance structures that constrain institutional autonomy, though the degree of constraint varies from the tight centralization of the Algerian system to the relative institutional autonomy of Edinburgh.

The divergences, however, are equally instructive. Edinburgh's institutionalized vigilance function represents a mature, resource-intensive version of the capability that the framework describes, and its effectiveness in generating anticipatory adaptive responses is

well documented. Jordan's experience suggests that meaningful progress toward more vigilant institutional cultures is possible within constrained governance environments, provided that sustained investment in leadership development and institutional capacity is made over time. Algeria's experience—specifically at Djelfa—suggests that the starting point is further from Edinburgh's mature model than Jordan's, but that the post-pandemic moment has created a political and organizational window for accelerated development.

The comparison also highlights a consistent finding across all three contexts: that the cultural and relational dimensions of digital leadership—the extent to which leaders build trust, distribute authority, and cultivate a shared sense of institutional purpose around digital transformation—are at least as important as the technical or strategic dimensions. This finding reinforces the complexity-theoretic strand of the framework and suggests that leadership development investments in Algerian higher education should prioritize communicative, relational, and participatory competencies alongside digital technical skills.

6. CONCLUSION

This article has advanced a theoretical framework that integrates digital leadership and strategic vigilance as mutually reinforcing institutional capabilities in the context of Algerian public higher education. Drawing on transformational leadership theory, complexity leadership theory, and the dynamic capabilities framework, it has argued that strategic vigilance mediates the relationship between digital leadership and organizational effectiveness—that is, that the primary pathway through which digitally capable leadership produces institutional performance runs through the vigilance capabilities that such leadership enables and sustains.

The University of Djelfa has been used throughout as an illustrative context that gives theoretical claims analytic specificity without constituting an empirical test. The comparative analysis in Section 5 has situated the framework in broader perspective, showing that the capabilities it describes take different organizational forms in different institutional contexts, but that the fundamental logic of the relationships it proposes—leadership enabling vigilance, vigilance enabling effectiveness—is consistent across the Jordanian and Edinburgh cases.

The framework makes several contributions to theory. It extends the dynamic capabilities perspective to the distinctive governance environment of public higher education in centralized systems. It bridges transformational and complexity leadership theories in a way that is sensitive to the specific constraints of non-Western institutional contexts. And it provides a theoretically grounded account of the mechanisms through which digital leadership produces organizational effectiveness—an account more specific than the generalized claims of the existing literature and more actionable for both researchers and practitioners.

Important limitations must be acknowledged. The framework is developed through theoretical argumentation and illustrative reference rather than systematic empirical

investigation. The four propositions it advances require rigorous empirical testing across diverse institutional contexts before they can be treated as established findings. The contextual moderation claims developed in Section 3.3 are theoretically motivated but empirically underspecified: future research will need to develop more precise accounts of how centralization, resource constraints, and post-pandemic institutional memory condition the proposed relationships. These limitations define the research agenda that the article is designed to motivate.

The urgency of this agenda is real. Algerian universities are navigating a period of rapid and consequential digital transformation with limited theoretical guidance adapted to their context. The framework offered here is an attempt to provide such guidance—not by transplanting models developed elsewhere, but by building from the theoretical resources that the global literature offers toward a contextually grounded account of how universities in emerging economies can develop the leadership and institutional intelligence they need to transform digital pressure into institutional renewal.

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