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Compressed Adaptation: The Pacing of Dynamic Capability Development in the Era of Generative AI – A Case of Shell Kenya

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Abstract - International business scholars examine how firms adapt to rapid global shifts. This paper explores the temporal dynamics of dynamic capability development in a legacy multinational enterprise (MNE) subsidiary in an emerging market responding to Generative AI—a disruption marked by unprecedented pace. Through an in-depth longitudinal case study of Shell Kenya (2022-2024), we examine how a historically stable, asset-intensive firm compresses its adaptation cycle to integrate a high-velocity, knowledge-based technology. We identify a process of "compressed adaptation," in which the canonical stages of sensing, seizing, and transforming (Teece, 2007) are not sequential but highly iterative, concurrent, and mutually constitutive. Sensing evolves from periodic scanning to continuous, AI-augmented environmental monitoring. Seizing is parallelized through multiple, fast-moving "sprint teams" that prototype use cases in real time. Crucially, transforming—the reconfiguration of routines, structures, and skills—begins in medias res, before seizing is complete, to build the organizational capacity to absorb and scale AI initiatives. This compressed process challenges traditional, linear models of strategic renewal and highlights the acute temporal pressures on emerging-market subsidiaries of Western MNEs. We contribute to IB theory by (1) providing a temporal process model of dynamic capability development for high-velocity technologies, (2) explicating the microfoundations of pacing—the strategic orchestration of speed and sequence—in a legacy MNE context, and (3) theorizing the unique liability of legacy faced by established firms in emerging markets when confronting paradigm-shifting digital disruptions. The study reveals that competitive survival for such firms depends less on possession of cutting-edge AI assets and more on the ability to radically accelerate and re-sequence their internal learning and reconfiguration cycles to match the pace of the global technological frontier.

Keywords: Dynamic Capabilities, Generative AI, Pacing, Adaptation, Emerging Markets, Kenya, MNE Subsidiary, Temporal Strategy, Digital Transformation, Organizational Learning

I. INTRODUCTION

The spread of generative artificial intelligence (GenAI) marks a rapid and wide-ranging disruption for multinational enterprises (MNEs) (Haefner et al., 2023; Mollick, 2024). For legacy companies in asset-heavy industries, especially their subsidiaries in emerging markets, this disruption is even more challenging. They must contend not only with the technology's transformative potential but also from a position often rooted in outdated routines, legacy systems, and institutional constraints that differ from those in their home country (Regnér & Edman, 2014; Wu & Pangarkar, 2022). This creates an important puzzle for international business (IB) theory: how do established MNE subsidiaries in emerging markets regulate the pace of their adaptation—the timing and order of developing new capabilities—when faced with a technology that advances more quickly than their usual strategic routines?

The dynamic capabilities (DC) framework is the main perspective for understanding how firms adapt (Teece, 2007; Teece et al., 1997). It suggests a step-by-step process: firms first identify opportunities, then act on them by investing, and finally reshape their resource base. However, this model assumes a pace of change that allows for careful, staged renewal. The rise of GenAI, with its fast iteration cycles and widespread availability through global cloud platforms, shortens this timeline (Davenport & Mittal, 2023; Raisch & Krakowski, 2024). In such fast-moving contexts, sticking to a linear adaptation process can lead to strategic obsolescence. The ability to adapt quickly may be just as important as the ability to adapt effectively (Eisenhardt & Martin, 2000). Still, how firms—particularly legacy players in complex institutional environments—manage this rapid pace at the micro-level remains insufficiently studied.

This paper explores this gap through a detailed, longitudinal case study of Shell Kenya. As the local branch of Shell plc, a major global energy company, Shell Kenya operates within a mature, regulated market. It faces the dual challenge of managing the global energy transition while addressing the operational and strategic impacts of GenAI. This situation provides a theoretically insightful case (Siggelkow, 2007): a legacy multinational subsidiary in an emerging market striving to accelerate its adaptation to rapid digital disruption.

Our findings introduce the concept of compressed adaptation. At Shell Kenya, sensing, seizing, and transforming activities did not follow a neat, step-by-step sequence but instead overlapped, repeated, and influenced each other rapidly. Sensing became an ongoing, organization-wide effort driven by AI tools. Seizing was divided into multiple, parallel micro-initiatives. Importantly, transformation—usually the final and most challenging phase—was started early to develop the "absorptive capacity" (Cohen & Levinthal, 1990) necessary for later seizing. This compression was a strategic choice made in response to the fast-paced nature of the AI threat or opportunity.

We contribute to IB theory in three main ways. First, we adapt the DC framework to an emerging market setting by developing a process model that emphasizes the simultaneous and iterative nature of sensing, seizing, and transforming, especially under time pressure. Second, we clarify the microfoundations of pacing by identifying specific organizational mechanisms—such as sprint teams, reverse mentoring, and "minimum viable governance"—that facilitate compression. Third, we examine the liability of legacy in the digital era, demonstrating how past successes generate inertial forces that need to be actively and quickly countered through compressed adaptation. This challenge is particularly pronounced for subsidiaries operating within the constraints of both a global MNE and a local emerging market.

II. THEORETICAL BACKGROUND

The DC framework is vital for understanding how MNEs maintain their advantage in dynamic environments (Teece, 2014). The sensing-seizing-transforming heuristic effectively describes renewal activities but provides less insight into their timing or rhythm—the pace of adaptation. Eisenhardt and Martin (2000) observed that in fast-moving markets, dynamic capabilities act more like simple, experiential rules rather than complex analytical processes, suggesting a quicker pace. However, how firms transition between different pacing regimes, particularly when shifting from stable, linear settings to high-velocity ones, remains uncertain. This transition is especially critical for legacy MNE subsidiaries, which must align their pace with both the global corporate clock and the local market clock, potentially running at different speeds due to GenAI's disruption.

Generative AI as a High-Velocity Disruption: GenAI is not just a new tool but a "general-purpose technology" (Brynjolfsson et al., 2023) that accelerates innovation and knowledge recombination. Its low barrier to entry (via APIs) and rapid capability improvements create a "Red Queen" effect (Barnett & Hansen, 1996), in which firms must run faster to stay in place. For an emerging-market subsidiary, this means the global technological frontier is advancing, while local capacity to leverage it may be constrained by talent gaps, data infrastructure, and regulatory ambiguity (Zhao et al., 2024). This creates a "temporal gap" between the potential pace of change and the organization's inherent learning and change speed.

2.3. The Challenge for Legacy MNE Subsidiaries

Legacy MNE subsidiaries in emerging markets face multiple temporal challenges. They inherit a cautious, risk-averse pace typical of global companies focused on operational excellence and capital management. Operating within local institutions that may lack advanced digital ecosystems, they still face global competitive and technological pressures that demand agility (Regnér & Edman, 2014). This "temporal tension" reflects a broader "dual embeddedness" challenge (Meyer et al., 2011). To integrate GenAI effectively, these subsidiaries must recalibrate their internal rhythms—accelerating learning and action cycles—while maintaining strategic integrity and compliance with governance standards. Our core research question is: How does a legacy MNE subsidiary in an emerging market manage the pacing of its dynamic capability development to adapt to the high-velocity disruption of Generative AI?

III. METHODOLOGY

Shell Kenya, founded in 1951, is a fully owned marketing branch of Shell plc. It manages over 200 retail outlets, along with commercial fuel and lubricants operations. As a classic "legacy' company, it is successful, with deeply ingrained processes, a strong brand, and a focus on operational reliability within a stable, oligopolistic market. Its choice is compelling because: Legacy inertia reflects its routines and structures from a traditional, asset-heavy business. As an MNE subsidiary, it must coordinate with global Shell policies while adapting to the Kenyan market. The Kenyan environment is vibrant, known as 'Silicon Savannah,' yet it faces infrastructure and regulatory gaps, creating a distinctive innovation landscape. The rise of GenAI introduces rapid changes, challenging its business model with applications like predictive maintenance, personalized B2B services, supply chain optimization, and carbon accounting. Our study used a real-time, longitudinal case approach (Langley & Abdallah, 2011), from June 2022 to December 2024, enabling us to trace how the company adapted over time and observe the pacing decisions made on the ground.

Data triangulation involved three sources: Semi-Structured Interviews with 42 Shell Kenya managers (including the Country Chair, Digital/IT leads, Marketing, Supply, HSSE, HR) and global digital strategy personnel, capturing evolving views on AI, decision-making, and internal challenges. Participant observation was conducted over 8 months in 2023, with the first author embedded in the "Digital Acceleration Office," attending strategy sessions, sprint reviews, and governance meetings. Archival data included internal documents (strategy decks, project charters, AI ethics guidelines, meeting minutes), press releases, and industry reports. An iterative analysis process linked data and theory (Gioia et al., 2013). First-order codes (e.g., "experimenting with ChatGPT for report drafting," "struggle to get IT security clearance for an API," "hiring a data scientist on a fixed-term contract") were grouped into second-order themes (e.g., "Micro-Seizing," "Governance Friction," "Capability Scaffolding"). These themes were further abstracted into the main dimensions of our process model: Compressed Sensing, Parallelized Seizing, and Anticipatory Transforming, representing our view of compressed adaptation.

IV. FINDINGS

Shell Kenya's evolution did not follow a straightforward sensing-seizing-transforming trajectory. Instead, it involved a condensed, iterative cycle where stages merged and feedback loops occurred rapidly. The shift from traditional to AI-augmented intelligence included several phases. Previously, strategic sensing relied on annual plans, competitor reports, and management intuition. Between 2022 and 2024, the approach became more dynamic: employees across roles began independently experimenting with publicly available GenAI tools like ChatGPT and Midjourney, fostering grassroots sensing of their utility. This bottom-up effort was ongoing. The Digital Acceleration Office introduced a weekly "AI Radar" report, leveraging GenAI to summarize global energy tech news, Shell's AI initiatives, and Kenyan startup activity, transforming sensing from months into days. Additionally, sensing expanded beyond leadership through idea hackathons, enabling collective interpretation and use case development via crowd intelligence. A key tactic was "Sensing Sprints," 2-day workshops where teams identified departmental processes that GenAI could impact within six months.

Parallelized Seizing: From Business Case to Portfolio of Micro-Experiments

Traditional Approach: Seizing required comprehensive business cases, CAPEX approval, and extensive IT procurement. Streamlined Version: Micro-Seizing: Instead of a single large AI project, Shell Kenya initiated over 15 "micro-initiatives" (e.g., AI for predictive pump maintenance, AI-generated safety bulletins, chatbots for dealer queries). Each had a modest budget, a three-month timeframe, and a dedicated "sprint team." Concurrent Effort: These teams worked simultaneously rather than sequentially. This parallel approach increased opportunities and sped up organizational learning. "Minimum Viable Governance": To expedite approval, a simplified governance model was introduced for experiments below a certain cost, bypassing traditional IT committees during initial prototyping. Core Element: "Sprint Teams"—small, cross-functional groups (business, IT, digital) with autonomy to prototype specific use cases using mostly off-the-shelf GenAI APIs, reporting bi-weekly.

Anticipatory Transforming: Building the Plane While Flying It. Traditional Pace: Transformation is the final, painful stage that follows a commitment to a new direction.

Compressed Adaptation: At Shell Kenya, transformation activities began in tandem with early seizing experiments to avoid bottlenecks. Capability Scaffolding: Even as the first sprints began, HR launched "AI Literacy" programs and recruited a Data Science lead on a flexible contract. IT began designing a secure "AI Sandbox" environment. This was transforming the capacity to seize. Cultural Pre-emption: Leadership communicated a "learn-fast, fail-fast" narrative early on, attempting to shift the risk-averse culture in anticipation of experimental failures. Policy Prototyping: The Legal and Compliance team began drafting principles for AI ethics and data usage while sprints were running, rather than after the fact, shaping seizing in real time. Key Mechanism: "Transformation Taskforces" – Deliberate, proactive groups (e.g., on Skills, Ethics, Infrastructure) launched concurrently with seizing sprints to build the organizational runway for scaling successful experiments.

The Pacing Orchestration Role of Leadership. A critical finding was the emergence of a pacing function, primarily embodied by the Digital Acceleration Office and the Country Chair. This function did not just manage projects; it managed the temporal rhythm of adaptation by: Setting the Beat: imposing short, non-negotiable deadlines for sprints. Synchronizing Cycles: ensuring transformation task forces and seizing sprints were aligned. Buffering Temporal Conflict: shielding sprint teams from the slower-paced corporate IT governance while negotiating eventual integration.

V. DISCUSSION

A Temporal Process Model of Compressed Adaptation: Our findings challenge the sequential depiction of DC development. We propose a Temporal Process Model of Compressed Adaptation (Figure 1), in which Sensing (S), Seizing (Z), and Transforming (T) are not stages but continuous, interdependent streams of activity. Under time pressure, these streams compress: they start sooner, overlap significantly, and iterate rapidly through tight feedback loops (e.g., from a seizing experiment back to sensing new technical constraints). The model shows that in high-velocity contexts, transforming is not an outcome but a concurrent enabler of adaptation.

Theorizing Microfoundations of Pacing in IB: We build on the microfoundations of DC (Teece, 2007) by pinpointing specific micro-activities related to pacing. Temporal Bricolage involves utilizing accessible tools like public GenAI for quick sensing and seizing, skipping slow procurement steps. Parallel Processing structures act as a portfolio of simultaneous micro-experiments to accelerate learning and create options. Anticipatory Investment means proactively developing skills and infrastructure based on expected needs, not just proven demand. Minimum Viable Governance creates fast-track institutional pathways that temporarily reduce barriers to action. For MNE subsidiaries, these micro-activities require a careful balance: speeding up local pace while maintaining alignment with the global MNE's control systems and risk appetite.

Our case emphasizes the "liability of legacy"—the inertia stemming from successful past routines (Khanagha et al., 2024). For Shell Kenya, compression was a strategic response to this challenge. However, this decision is not automatic. We propose that legacy multinational enterprise (MNE) subsidiaries must make a strategic pacing choice. The options include: **Compressed Adaptation**: Accelerate and layer digital change activities, which may lead to chaos and governance issues but allow for quicker learning and relevance. **Sequential Catching-Up**: Follow a traditional, linear approach with fewer risks but a higher likelihood of becoming outdated if technology advances faster than adaptation. **Ecosystem Piggybacking**: Rely on local tech partners or startups to drive innovation, focusing on commercialization and externalizing the pacing challenge. The choice depends on the subsidiary's level of autonomy, leadership mindset, and the global MNE's digital direction.

VI. CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

This study shows that for legacy MNE subsidiaries in emerging markets, adapting to high-velocity disruptions such as GenAI requires more than adopting new technology; it demands compressing

the temporal architecture of adaptation itself. At Shell Kenya, this meant shifting from a sequential, deliberate DC model to concurrent, iterative, and anticipatory activity streams. The ability to manage this compression—to orchestrate pace—emerges as a critical meta-capability for established firms in the digital age. It underscores that in the race to adapt, time is not just a metric but a fundamental strategic variable to be actively managed.

Limitations and Future Research: Our study is based on a single, albeit revealing, case. Future research could compare pacing strategies across emerging markets, industries, and MNE home-country contexts. Quantitative studies could measure the performance implications of different pacing choices. Other promising avenues include: examining reverse knowledge flows from a compressed subsidiary to a slower-paced HQ; exploring the geopolitics of AI pacing, where subsidiaries in different regulatory regimes (e.g., Kenya vs. the EU) adapt at different speeds; and investigating the long-term sustainability of compressed adaptation and its potential for organizational burnout or strategic fragmentation. The era of GenAI forces a reckoning with time in international business strategy. This paper offers a first step toward understanding how firms, especially those carrying the weight of history and complex geographic embeddedness, learn to run before they can walk.

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