

AI Adoption and Dynamic Capabilities in Chinese SMEs: the Mediating Role of Digital Entrepreneurial Orientation—A Conceptual Framework

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Abstract: This paper develops a conceptual framework that examines how artificial intelligence (AI) adoption may influence dynamic capabilities in Chinese small and medium-sized enterprises (SMEs), with digital entrepreneurial orientation (DEO) as a proposed mediating mechanism. Drawing on dynamic capabilities theory and the digital entrepreneurship literature, the paper argues that AI adoption does not automatically translate into dynamic capabilities. Rather, AI adoption may foster DEO—comprising digital innovativeness, digital proactiveness, and digital risktaking—which in turn may help firms sense opportunities, seize them, and reconfigure resources. Three testable propositions are developed. The framework contributes to dynamic capabilities theory by specifying DEO as a strategic mediating pathway through which AI resources may be converted into organizational capabilities. It also offers implications for SME managers and policymakers seeking to support digital transformation under resource constraints.

Keywords: AI Adoption, Dynamic Capabilities, Digital Entrepreneurial Orientation, SMEs.

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1 INTRODUCTION

Small and medium-sized enterprises (SMEs) are an important part of the Chinese economy, yet they often face resource constraints that limit their ability to absorb and exploit emerging technologies. AI has been widely discussed as a transformative technology that may change how SMEs operate, but adoption alone does not necessarily improve organizational capabilities. A central question therefore remains: How does AI adoption translate into the sensing, seizing, and transforming capabilities required to sustain competitive advantage?

Dynamic capabilities theory offers a useful analytical lens. The theory holds that firms create and sustain advantage not through static resources but through their capacity to sense opportunities, seize them, and reconfigure resources accordingly [1][2]. Prior research has begun to examine the relationship between AI adoption and dynamic capabilities, but the mechanism through which AI resources are converted into organizational capabilities remains undertheorized.

This paper proposes DEO as a key mediating mechanism. DEO captures a firm's propensity to pursue entrepreneurial opportunities through digital means, including digital innovativeness, digital proactiveness, and digital risktaking [3]. The paper argues that AI adoption may

foster DEO and that DEO provides a strategic and behavioral foundation that may help convert AI resources into dynamic capabilities.

The paper makes three contributions. First, it identifies DEO as a strategic mediating pathway between AI adoption and dynamic capabilities, extending prior research that has primarily treated dynamic capabilities as a mediator. Second, it contributes to DEO research by identifying AI adoption as a technology-level antecedent. Third, it offers a conceptual framework and testable propositions for future empirical research in the context of Chinese SMEs.

2 THEORETICAL BACKGROUND AND PROPOSITIONS

2.1 AI ADOPTION IN SMEs

AI adoption in SMEs refers to the deployment of machine learning, natural language processing, computer vision, and related technologies in operations, customer interaction, and decisionmaking functions [4]. Compared with large firms, SMEs often adopt AI through modular, low-barrier applications such as customer service chatbots, content generation, and basic analytics. These applications require relatively low initial investment and offer shorter

feedback cycles, making them feasible entry points for resourceconstrained firms [5].

Prior adoption research has identified organizational readiness, top management support, and environmental uncertainty as important antecedents of AI adoption in SMEs. More recent studies have shifted attention from antecedents to consequences, examining how AI adoption affects innovation, organizational resilience, and business model change. A common finding in this literature is that the effects of AI adoption are not automatic; they depend considerably on complementary organizational capabilities and strategic orientations.

2.2 DIGITAL ENTREPRENEURIAL ORIENTATION

DEO represents an extension of entrepreneurial orientation into digital domains. It comprises three core dimensions: digital innovativeness, digital proactiveness, and digital risktaking [2]. Digital innovativeness refers to a firm's propensity to develop new products, services, or processes using digital technologies. Digital proactiveness captures firstmover behavior in digital markets and technology adoption. Digital risktaking reflects a willingness to commit resources to digital initiatives with uncertain outcomes.

DEO is theoretically distinct from general entrepreneurial orientation because it emphasizes digital technologies as both means and context for entrepreneurial action. Firms with stronger DEO are more likely to scan digital environments, experiment with new digital business models, and reconfigure resources around digital opportunities.

2.3 AI ADOPTION AND DEO

This paper proposes that AI adoption may foster DEO through two mechanisms. First, AI adoption provides experiential learning that may reduce the perceived risk of digital entrepreneurship. When SMEs deploy AI in operational contexts, even in limited applications, they may accumulate tacit knowledge about digital technologies, their limitations, and their integration requirements. Such experience may lower cognitive barriers to more ambitious digital initiatives, thereby supporting digital proactiveness and risktaking. Second, AI adoption signals strategic commitment to digital transformation both internally and externally. Internally, it may legitimize digital initiatives and direct organizational attention toward digital opportunities. Externally, it may signal to partners and customers that the firm possesses digital capabilities, which may improve access to digital ecosystems and further reinforce entrepreneurial orientation.

Proposition 1: In Chinese SMEs, AI adoption is expected to be positively related to DEO.

2.4 DEO AND DYNAMIC CAPABILITIES

Dynamic capabilities comprise three interdependent routines: sensing, seizing, and transforming [1]. DEO is theorized to enhance each of these.

Digital innovativeness may strengthen sensing by expanding a firm's attentional scope. Firms with stronger digital innovativeness are more likely to scan digital environments for emerging technologies, shifting customer preferences, and competitive actions. Such proactive scanning may provide richer informational inputs for opportunity identification. Digital proactiveness may primarily support seizing. Firstmover behavior in digital markets requires rapid resource mobilization, and firms with established proactiveness routines may be better able to convert sensed opportunities into concrete initiatives. Digital risktaking may support transforming. Transformation requires a willingness to abandon existing resource configurations, which is inherently risky. Firms with greater tolerance for digital risktaking may be more likely to reconfigure routines in response to sensed opportunities rather than persisting with established configurations.

Proposition 2: In Chinese SMEs, DEO is expected to be positively related to dynamic capabilities—sensing, seizing, and transforming.

2.5 THE MEDIATING ROLE OF DEO

The preceding propositions together suggest a mediation model. AI adoption, as a technology resource, does not directly constitute a dynamic capability. Sensing, seizing, and transforming are organizational routines rather than technological artifacts. What AI adoption provides is a foundation—data infrastructure, analytical capacity, and experiential knowledge—on which strategic orientations can operate. DEO constitutes a strategic mediating pathway that may translate this foundation into capabilitybuilding activity.

This logic is consistent with dynamic capabilities theory's emphasis on managerial and entrepreneurial agency in resource transformation [1]. Technology alone does not create capabilities; capability development requires strategic intent and organizational routines that direct resources toward capability building. DEO embodies such strategic intent in the digital domain.

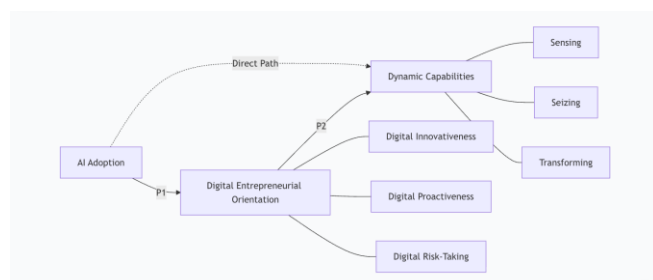
Proposition 3: In Chinese SMEs, DEO mediates the positive relationship between AI adoption and dynamic capabilities.

3 CONCEPTUAL MODEL

The conceptual model is presented in Figure 1. AI adoption is proposed to influence DEO, which in turn is proposed to influence dynamic capabilities. The model also allows for a direct path from AI adoption to dynamic capabilities. This direct path may remain positive but is

expected to weaken once DEO is included, suggesting partial mediation.

Figure 1



Conceptual Model of AI Adoption, Digital Entrepreneurial Orientation, and Dynamic Capabilities

Note. AI = artificial intelligence; DEO = digital entrepreneurial orientation. Solid arrows represent proposed relationships; the dashed arrow represents the proposed direct path after including the mediator.

4 DISCUSSION

4.1 THEORETICAL IMPLICATIONS

This paper makes three theoretical contributions. First, it identifies DEO as a strategic mechanism linking AI adoption and dynamic capabilities. Prior research has established dynamic capabilities as a mediator of the effects of AI on outcomes such as innovation performance and organizational resilience. By positioning dynamic capabilities as an outcome, this paper specifies a capability formation pathway that complements existing capability deployment models. AI adoption does not automatically produce dynamic capabilities; it may do so through the strategic orientation it fosters and enables.

Second, the framework extends DEO research by identifying AI adoption as a technology-level antecedent. Existing research has examined individual-level, organizational-level, and environmental-level antecedents. This framework positions AI adoption as a feasible entry point through which SMEs—even those with limited prior digital experience—may begin to develop DEO.

Third, the paper contributes to the literature on SME digital transformation by specifying a sequential mechanism in the Chinese context. The framework suggests that the strategic and behavioral dimensions of digital transformation are as important as the technological dimension.

4.2 PRACTICAL IMPLICATIONS

For SME managers, the framework suggests that AI adoption investments should be combined with deliberate efforts to foster DEO. This implies that initial AI applications should be treated not only as efficiency tools but also as learning platforms for digital opportunity recognition and risk assessment. Managers should direct organizational attention

toward interpreting AI-generated insights as strategic signals rather than merely operational outputs.

For policymakers seeking to support SME digitalization, the implication is that technology provision alone is insufficient. Programs that combine AI access with entrepreneurial training, digital opportunity identification workshops, and peer learning networks may be more likely to generate capability-building outcomes than pure infrastructure subsidies.

4.3 LIMITATIONS AND FUTURE RESEARCH

This paper is conceptual and does not provide empirical validation. Future research should test the proposed propositions using survey data from Chinese SMEs. Longitudinal designs would help establish causal direction. Researchers could measure AI adoption, DEO, and dynamic capabilities using established scales and then estimate mediation using structural equation modeling with bootstrapping. Objective measures of AI adoption, such as information technology investment records or patent data, could complement self-report measures. Cross-regional and cross-industry comparisons would also help strengthen external validity.

5 CONCLUSION

This paper developed a conceptual framework linking AI adoption and dynamic capabilities in Chinese SMEs, with DEO as a mediating mechanism. The framework suggests that AI adoption may foster DEO, which in turn may help build sensing, seizing, and transforming capabilities. The theoretical implication is that technology resources require strategic orientation to generate organizational capabilities—a proposition that extends dynamic capabilities theory into the domain of AI-driven SME transformation. As AI adoption among Chinese SMEs continues to accelerate, understanding the strategic conditions under which technology translates into capability becomes increasingly important.

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