

# The Role of Effectuation in Achieving Competitive Advantage: Testing the Mediating Role of Agility and Innovation Orientation

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## ABSTRACT

**Purpose** – This study examines how smallholder cocoa farmers in Indonesia achieve competitive advantage under high market uncertainty by investigating whether effectuation logic – an expertise-driven, non-predictive decision-making approach – functions as the cognitive foundation for building competitive superiority, and through which internal capability pathways this transformation occurs.

**Design/Methodology/Approach** – A quantitative cross-sectional survey of 260 smallholder cocoa farmers was conducted using purposive sampling across major Indonesian cocoa-producing regions. Data were analyzed using SEM-PLS (SmartPLS 4.0) with 5,000-subsample bootstrapping to test direct and mediation effects.

**Findings/Results** – Effectuation logic does not directly influence competitive advantage but significantly predicts individual agility ( $\beta = 0.466, p < 0.001$ ) and innovation orientation ( $\beta = 0.202, p < 0.01$ ). Both variables fully mediate the effectuation–competitive advantage relationship, with innovation orientation as the dominant pathway ( $\beta = 0.477, p < 0.001$ ).

**Originality/Value** – This study introduces the cognitive-behavioral translation mechanism, establishing that effectuation generates competitive advantage exclusively through behavioral capabilities, not directly. It demonstrates that agility produces a negative competitive effect in buyer-dominated commodity markets challenging universal agility positivity assumptions and extends dynamic capability theory to individual farmer-entrepreneurs in developing-economy agribusiness.

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## **1. Introduction**

The global cocoa industry confronts persistent market instability driven by commodity price volatility, climate disruption, and demand-side uncertainty, placing smallholder farmers in structurally vulnerable positions (Gao et al., 2021). In Indonesia the world's third-largest cocoa producer, responsible for approximately 13% of global supply this vulnerability is compounded by a value chain dominated by intermediary collectors (tengkulak) and international exporters who capture most value-added margins (ICCO, 2023). Smallholder farmers, who cultivate nearly 95% of Indonesia's cocoa-producing land area (Directorate General of Plantations, 2022), operate as price-takers with minimal bargaining power, constrained access to market information, and limited credit infrastructure. This structural configuration constitutes what this study terms compound uncertainty a condition more extreme than the uncertain environments examined in most effectuation literature, which typically involves technology entrepreneurs or manufacturing SMEs with substantially greater resource endowments (Ruiz-Jiménez et al., 2021).

Under these conditions, conventional causation logic which emphasizes goal-oriented planning and predictive resource allocation is structurally unsuitable for resource-constrained actors who cannot reliably forecast market outcomes (Sarasvathy, 2001). Effectuation logic offers a viable alternative: a non-predictive decision-making approach grounded in five principles: bird-in-hand (means-driven action), affordable loss (risk bounded by acceptable downside), crazy quilt (co-creation with committed partners), lemonade (leveraging contingencies), and pilot-in-the-plane (co-controlling rather than predicting the future) (Sarasvathy, 2008). Through these principles, farmers can take flexible, experimental steps without succumbing to large-scale capital risks, making decision-making more adaptive to crises (Roach et al., 2016; Taghvaei & Talebi, 2023).

For effectuation logic to generate market-observable outcomes, it must first be translated into tangible behavioral capabilities. Individual agility the capacity to rapidly sense and reconfigure resources in response to disruptions serves as one such capability (Almahamid et al., 2010; Tang et al., 2025). Innovation orientation a sustained propensity to introduce novelty in products, processes, or cultivation methods serves as another (Chatzoglou & Chatzoudes, 2018). Together, these two capabilities constitute the behavioral bridge between cognitive entrepreneurial logic and superior competitive market positioning (Chen, 2019; Gölgeci et al., 2020).

Despite growing interest in effectuation, three interconnected theoretical gaps remain unresolved. First, effectuation research has been concentrated in high-tech and manufacturing sectors in developed economies, leaving its behavioral consequences in developing-economy agribusiness untested (Ruiz-Jiménez et al., 2021; Tang et al., 2025). Second, prior studies have examined effectuation's relationship with agility or innovation orientation separately, without modeling how both function simultaneously as a dual-mediation pathway from cognitive logic to competitive performance (Delladio et al., 2023; Ryman & Roach, 2024). Third, the agility-competitive advantage relationship has been theorized as universally positive, yet this assumption remains untested in buyer-dominated commodity markets where supply reliability, rather than speed, governs competitive positioning (El Nsour, 2021; Almahamid et al., 2010).

This study addresses all three gaps within a single empirical model. It advances a cognitive-behavioral translation argument: effectuation logic generates competitive advantage not directly, but exclusively through its translation into agility and innovation orientation. This

dual-mediation mechanism has not previously been modeled at the individual farmer level in developing-economy agribusiness, constituting the central theoretical novelty of this study. Empirically validating this mechanism among Indonesian cocoa smallholders who represent an extreme case of resource-constrained entrepreneurship under compound uncertainty strengthens the external validity of effectuation theory across a broader class of intermediary-dependent agricultural markets in the developing world.

Accordingly, this study empirically examines the influence of effectuation logic on competitive advantage, with agility and innovation orientation as mediating variables, using PLS-SEM analysis (Henseler, 2015) on a sample of 260 Indonesian cocoa smallholders. The findings contribute to agribusiness entrepreneurship literature and offer targeted guidance for capability development programs in the upstream cocoa sector.

## **2. Literature Review & Hypothesis Development**

The theoretical foundation of this study is built upon the integration of effectuation theory and dynamic capability perspective to explain how smallholder cocoa farmers achieve competitive advantage under conditions of high uncertainty. Rather than treating each construct in isolation, this section develops a chain of theoretical arguments that culminate in testable hypotheses, reflecting the causal pathways embedded in the proposed research model.

### **Effectuation Logic**

Effectuation is defined as the "logic of entrepreneurial expertise" a non-predictive decision-making approach that enables actors to navigate uncertainty by leveraging existing means rather than pursuing predetermined goals (Sarasvathy, 2001, 2008). Unlike causation logic, which presupposes a known future and selects optimal means to reach it, effectuation logic inverts this relationship: the entrepreneur begins with *who they are*, *what they know*, and *whom they know*, and co-creates future outcomes through iterative stakeholder commitments (Sarasvathy, 2001; Kalinic et al., 2014).

This logic is particularly relevant for micro-business actors in volatile agribusiness contexts. In the upstream cocoa industry characterized by fluctuating global prices, climate unpredictability, and information asymmetry the linear predictive assumptions of causation logic are structurally untenable for resource-constrained smallholders (Gao et al., 2021; Ryman & Roach, 2024). Five operational principles underpin effectuation: *bird-in-hand* (means-driven action), *affordable loss* (risk bounded by acceptable downside), *crazy quilt* (strategic co-creation with committed partners), *lemonade* (leveraging contingencies as opportunities), and *pilot-in-the-plane* (co-controlling the future rather than predicting it) (Sarasvathy, 2008).

Critically, extant literature reveals a persistent gap: most of the effectuation research has been concentrated in high-technology sectors and manufacturing SMEs in developed economies, leaving its generalizability to smallholder agribusiness in developing countries largely unexamined (Ruiz-Jiménez et al., 2021; Tang et al., 2025). Furthermore, while the link between effectuation and firm-level outcomes has received attention, the *internal mechanism* through which an effectual mindset converts into tangible individual capabilities remains theoretically underdeveloped (Delladio et al., 2023; Tang et al., 2025). This study directly addresses this gap by examining agility and innovation orientation as the mediating pathways.

### **Agility**

Agility is conceptualized as a dynamic capability the capacity to rapidly sense, configure, and respond to environmental disruptions (Almahamid et al., 2010; Christopher, 2000). At the individual level of analysis, particularly relevant for owner-managed micro-enterprises,

agility reflects the mental and operational nimbleness of the entrepreneur-farmer in reconfiguring limited resources in real time, whether in response to price shocks, supply disruptions, or shifting buyer demands (Tang et al., 2025; Usman et al., 2023).

The theoretical link between effectuation and agility is grounded in shared cognitive foundations. Both constructs emphasize non-predictive control: effectuation logic trains the entrepreneur to act under uncertainty by exploiting available means and embracing contingencies, which inherently cultivates the rapid-response orientation that defines agility (Gölgeci et al., 2020; Delladio et al., 2023). An effectual farmer who operates under the *lemonade* principle treating market surprises as opportunities rather than threats develops a cognitive readiness that directly enables faster strategic reconfiguration. Similarly, the *affordable loss* principle encourages low-stakes experimentation, which accelerates learning cycles and, consequently, adaptive responsiveness (Roach et al., 2016).

Empirically, Tang et al. (2025) demonstrate that effectual decision-making logic is a significant antecedent to organizational agility among SMEs, while Ryman and Roach (2024) confirm that firms applying effectuation exhibit greater responsiveness to environmental volatility. In the agribusiness context, farmers who internalize effectuation principles are better positioned to instantaneously adjust their production, post-harvest, and distribution strategies in response to volatile market signals. Based on this theoretical and empirical reasoning, the following hypothesis is proposed:

H2: Effectuation logic has a significant positive effect on individual agility of smallholder cocoa farmers.

#### **From Effectuation to Innovation Orientation**

Innovation orientation is defined as a strategic propensity to introduce novelty in ideas, products, processes, or operational methods, reflecting an individual or firm's sustained commitment to generating and embracing new solutions (Chatzoglou & Chatzoudes, 2018; Sulistyono & Ayuni, 2020). For smallholder farmers, innovation orientation manifests not necessarily in high-technology adoption but in openness to creative experimentation including novel post-harvest methods, differentiated product development such as fermented cocoa bean standardization, and adaptive cultivation techniques (Chen, 2019).

The connection between effectuation and innovation orientation is both theoretically coherent and empirically substantiated. Effectuation logic, by its nature, is inherently innovation-generative: the *means-driven* approach encourages entrepreneurs to discover novel applications of existing resources, the *crazy quilt* principle fosters collaborative ideation through stakeholder partnerships, and the *lemonade* principle institutionalizes the transformation of unexpected events into new product or process innovations (Sarasvathy, 2008; Taghvaei & Talebi, 2023). Crucially, because effectuation does not require pre-committed goals, it creates a psychologically safe space for experimentation a precondition for sustained innovation orientation (Roach et al., 2016).

Taghvaei and Talebi (2023) confirm that effectuation orientation positively and significantly predicts innovation in new product development, particularly in uncertain market environments. Ryman and Roach (2024) further establish that effectuation-driven firms are more likely to exhibit persistent innovation behavior compared to causation-driven counterparts. In the context of Indonesian cocoa smallholders, where product differentiation is a critical survival mechanism in a buyer-dominated market, effectual logic provides the cognitive architecture through which farmers cultivate and sustain an innovation-driven strategic orientation. This leads to the following hypothesis:

H3: Effectuation logic has a significant positive effect on the innovation orientation of smallholder cocoa farmers.

#### **Agility as a Driver of Competitive Advantage**

Competitive advantage is defined as the superior position of a business entity that enables it to create higher economic value than its competitors through a unique combination of adaptive capabilities and network resources (El Nsour, 2021; Koch & Windsperger, 2017). In volatile environments, competitive advantage is not static; it must be continuously renewed through responsiveness to market needs, supply reliability, and the delivery of differentiated value (Almahamid et al., 2010; Huang et al., 2012). For cocoa farmers, this superiority is reflected in their capacity to supply consistent-quality products including premium fermented beans at competitive prices, with reliable delivery commitments that command superior bargaining positions with intermediaries and exporters.

Within the dynamic capability framework, agility serves as a critical micro-foundation of competitive advantage: firms and individuals that can rapidly reconfigure resources outperform slower rivals by seizing time-sensitive opportunities and neutralizing environmental threats before competitors respond (Almahamid et al., 2010; El Nsour, 2021). An agile farmer who can instantly pivot between product grades, adjust harvest timing to price cycles, or redirect supply toward higher-value buyers demonstrates precisely the responsiveness that translates into superior market positioning. Chen (2019) empirically confirms that supply chain agility is among the most robust predictors of competitive advantage across SME contexts, while El Nsour (2021) establishes a direct and significant agility-to-competitive advantage pathway in volatile business environments. Accordingly:

H4: Individual agility has a significant positive effect on the competitive advantage of smallholder cocoa farmers.

#### **Innovation Orientation as a Driver of Competitive Advantage**

The relationship between innovation orientation and competitive advantage is among the most consistently supported propositions in the strategic management literature (Chatzoglou & Chatzoudes, 2018; Distanont & Khongmalai, 2020). Firms and individuals with a high innovation propensity can create product or process differentiation that is difficult for competitors to replicate the definitional condition of a sustainable competitive advantage (Chen, 2019; Ryman & Roach, 2024). In the cocoa upstream context, innovation orientation enables farmers to move beyond commodity competition by introducing quality-differentiated products, optimizing processing techniques, and building distinctive brand equity with buyers all of which elevate economic value creation beyond what undifferentiated competitors can achieve.

Chatzoglou and Chatzoudes (2018) demonstrate that innovation is the most powerful single predictor of competitive advantage across multiple industry sectors, including agribusiness. Distanont and Khongmalai (2020) similarly confirm that innovation-oriented firms consistently outperform peers on measures of market positioning, price premium capture, and long-term sustainability. Critically, Ryman and Roach (2024) argue that innovation without operational agility is insufficient to sustain competitive advantage a theoretical tension this study addresses by modeling both agility and innovation orientation as parallel mediating pathways. Based on this evidence:

H5: Innovation orientation has a significant positive effect on the competitive advantage of smallholder cocoa farmers.

#### **The Mediating Role of Agility and Innovation Orientation**

While the direct antecedent effects of effectuation on agility and innovation orientation, and their subsequent effects on competitive advantage, are theoretically and empirically grounded, a critical theoretical question remains: *does effectuation logic generate competitive advantage directly, or exclusively through the mediation of these internal capabilities?*

The existing literature provides strong grounds for anticipating full mediation. Effectuation logic, as a *cognitive* decision-making framework, does not independently generate market-observable outcomes — it must be operationalized through tangible behavioral capabilities before its competitive consequences can be realized (Delladio et al., 2023; Ruiz-Jiménez et al., 2021). Without agility, an effectual mindset remains strategically latent: the farmer may perceive opportunities but fail to act upon them before the window closes. Without innovation orientation, effectual means-driven thinking generates no differentiable output the farmer operates flexibly but produces undifferentiated commodities indistinguishable from competitors (Ryman & Roach, 2024; Tang et al., 2025).

This theoretical architecture — effectual cognition → behavioral capability → competitive outcome — constitutes what this study terms the cognitive-behavioral translation mechanism. The novelty of this framing lies in its insistence that the type of behavioral capability matters: agility and innovation orientation are not interchangeable mediators. Agility operates through a speed-responsiveness channel, enabling farmers to reconfigure resources before competitors, while innovation orientation operates through a differentiation channel, enabling farmers to create product value that competitors cannot easily replicate. In the Indonesian cocoa context, where upstream market structures are characterized by strong buyer power and commodity price-taking behavior, differentiation through innovation is theoretically predicted to generate stronger competitive outcomes than responsiveness speed alone — a prediction this study empirically tests for the first time in this setting.

This dual-mediation structure also contributes to the dynamic capability literature by specifying the micro-level cognitive antecedent (effectuation) through which dynamic capabilities (agility, innovation) are developed in resource-constrained individual actors rather than organizations. Prior dynamic capability research has focused predominantly on organizational-level capability development in large and medium firms (Huang et al., 2012; Chen, 2019); this study extends that framework to the individual entrepreneur-farmer, offering a more granular account of how cognitive entrepreneurial logic generates capability-based competitive advantage in developing-economy micro-enterprises.

H1: Effectuation logic has a significant positive effect on the competitive advantage of smallholder cocoa farmers.

H6: Individual agility mediates the relationship between effectuation logic and competitive advantage of smallholder cocoa farmers.

H7: Innovation orientation mediates the relationship between effectuation logic and competitive advantage of smallholder cocoa farmers.

### **3. Methodology**

This research is designed as a quantitative study employing an explanatory research approach to examine the hypothesized causal relationships between variables. The primary focus of this design is to dissect the mediating mechanisms of agility and innovation orientation in transforming individual decision-making logic (effectuation) into competitive advantage. Given that the research subjects are cocoa farming units operating in high-volatility environments, a cross-sectional survey method was utilized to capture data within a single

period. This approach was selected for its ability to provide a comprehensive overview of cognitive management phenomena among agribusiness entrepreneurs in Indonesia (Sekaran & Bougie, 2016). The population of this study encompasses all smallholder cocoa farmers in Indonesia who act as owner-managers of their farming units. In this context, farmers are viewed as micro-entrepreneurs with full autonomy over strategic decision-making.

Given the absence of a comprehensive national registry of cocoa smallholders in Indonesia, probability-based sampling was not operationally feasible. A non-probability purposive sampling technique was therefore applied, which is methodologically appropriate when participants with specific knowledge, experience, or contextual characteristics are required (Sekaran & Bougie, 2016). Three inclusion criteria were enforced: (1) the respondent must be the primary landowner or farm manager with full authority over strategic decisions; (2) they must possess a minimum of five years of active farming experience, ensuring adequate exposure to cocoa market cycles; and (3) they must be actively embedded in the cocoa supply chain as a seller or processor. To maximize geographic representativeness within purposive constraints, respondents were recruited across major producing regions – Sulawesi, Sumatra, Kalimantan, East Java, and Maluku – reflecting the actual distribution of Indonesian cocoa production (ICCO, 2023).

Through this procedure, 260 valid respondents were obtained, exceeding the minimum sample size for SEM analysis (ten times the number of indicators; Hair et al., 2019). All constructs were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) with items adapted from established instruments. Effectuation was measured through four retained sub-dimensions: bird-in-hand, affordable loss, lemonade, and pilot-in-the-plane (Sarasvathy, 2008; Chandler et al., 2011). Agility was operationalized as rapid strategic adaptation and market responsiveness (Almahamid et al., 2010; Tang et al., 2025). Innovation orientation captured novelty propensity and process creativity (Chatzoglou & Chatzoudes, 2018; Chen, 2019). Competitive advantage was measured through product uniqueness, consistent quality, and superior bargaining position (Chen, 2019; El Nsour, 2021). The outer loading threshold for item retention was set at 0.50, consistent with Hair et al.'s (2019) guidance for exploratory measurement models, with AVE > 0.50 and CR ( $\rho_c$ ) > 0.70 as the primary validity and reliability criteria. Data were collected via a hybrid method: an online survey through Qualtrics for digital farmer communities, and structured field interviews for farmers in remote areas with limited internet access.

Data analysis was performed using Full Structural Equation Modeling-Partial Least Squares (SEM-PLS) with SmartPLS 4.0 software. This method was selected for its robustness in handling complex multiple-mediation models and its effectiveness in processing data from small business units without requiring normal distribution assumptions. The analysis followed two main stages. First, the measurement model (outer model) was evaluated for convergent validity via outer loadings (> 0.70) and Average Variance Extracted (AVE > 0.50), discriminant validity via Fornell-Larcker and HTMT criteria, and reliability via Composite Reliability (CR) and Cronbach's Alpha (> 0.70). The second stage involved evaluating the structural model (inner model) to test the strength of relationships through path coefficients and the coefficient of determination (R<sup>2</sup>) (Henseler, 2015). The strength of the mediating effects was tested using the Bootstrapping method with 5,000 subsamples to determine p-values and t-statistics for indirect effects. To maintain objectivity and data integrity, respondent anonymity was strictly maintained. Furthermore, to mitigate Common Method Bias (CMB), questionnaire items were randomized and accompanied by clear instructions stating that there

were no right or wrong answers, encouraging respondents to provide data based on the real conditions of their farming operations.

#### 4. Results and Discussion

##### Respondent Profile

The sample of this study comprised 260 smallholder cocoa farmers drawn from major cocoa-producing regions in Indonesia. Table 1 presents the demographic characteristics of the respondents.

**Table 1.** Demographic Characteristics of Respondents

Characteristic	Category	n	%
Gender	Male	191	73.5
	Female	69	26.5
Education	Elementary School (SD)	85	32.7
	Junior High School (SMP)	72	27.7
	Senior High School (SMA)	88	33.8
	Diploma/Undergraduate	15	5.8
Age	18–30 years	39	15.0
	31–40 years	59	22.7
	41–50 years	61	23.5
	51–60 years	63	24.2
	61–70 years	33	12.7
	> 71 years	5	1.9
Monthly Income (IDR)	< 1,000,000	31	11.9
	1,000,000 – 2,000,000	94	36.2
	2,000,001 – 3,000,000	71	27.3
	3,000,001 – 4,000,000	45	17.3
	> 5,000,000	17	6.5
	Did not answer	2	0.8

Notes: n = total respondents per category; percentage calculated from total sample (N = 260)

Source: Primary Data, 2026

The demographic profile reveals that many strategic decision-makers in the upstream cocoa industry remain male-dominated (73.5%), reflecting the physically and managerially intensive nature of field cultivation and trade activities. Educational attainment is predominantly at the basic-to-secondary level, with only 5.8% holding a tertiary qualification, indicating that most farmers rely on intergenerational practical experience rather than formal managerial education. The age distribution further signals a structural challenge: nearly 39% of respondents are aged 51 years and above, suggesting a workforce approaching or within non-productive age brackets with lower adaptive capacity toward new technologies. Income data

corroborate the micro-to-small economic scale of most farming units, with 36.2% earning between IDR 1,000,000–2,000,000 monthly a level that structurally constrains capital cushion and reinforces the salience of the affordable loss principle within the effectuation framework.

**Measurement Model Evaluation**

Prior to structural model testing, the validity and reliability of all constructions were assessed through a two-stage measurement model evaluation following the SEM-PLS procedure recommended by Hair et al. (2019).

**Convergent Validity Before Item Deletion**

**Table 2.** Cross-Loading Factor – Before Item Deletion

Indicator	Competitive Advantage	Effectuation	Innovation Orientation	Agility	Result
CA_1	0.611				Not Valid
CA_2	0.702				Valid
CA_3	0.702				Valid
CA_4	0.630				Valid
CA_5	0.634				Valid
EffAL_1		0.604			Valid
EffAL_2		0.611			Valid
EffAL_3		0.756			Valid
EffBP_1		0.701			Valid
EffBP_2		0.731			Valid
EffBP_3		0.637			Valid
EffBP_4		0.691			Valid
EffCQ_1		-0.280			Not Valid
EffCQ_2		-0.352			Not Valid
EffCQ_3		-0.225			Not Valid
EffLC_1		0.323			Not Valid
EffLC_2		0.487			Not Valid
EffLC_3		0.716			Valid
EffPP_1		0.632			Valid
EffPP_2		0.624			Valid
EffPP_3		0.655			Valid
IO_1			0.612		Valid
IO_2			0.621		Valid
IO_3			0.686		Valid

IO_4	0.710	Valid
IO_5	0.671	Valid
IO_6	0.630	Valid
IO_7	0.576	Valid
Lincah_1	0.718	Valid
Lincah_2	0.574	Valid
Lincah_3	0.740	Valid
Lincah_4	0.566	Valid
Lincah_5	0.338	Not Valid
Lincah_6	0.473	Not Valid
Lincah_7	0.803	Valid

Notes: Validity threshold – outer loading > 0.60; items below threshold or reducing AVE were removed

Source: SmartPLS 4.0 Output, 2026

**Table 3.** Construct Reliability and Validity – Before Item Deletion

Construct	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	AVE
Competitive Advantage	0.677	0.688	0.791	0.432
Effectuation	0.852	0.877	0.836	0.346
Innovation Orientation	0.766	0.768	0.832	0.416
Agility	0.716	0.757	0.805	0.385

Notes: AVE threshold > 0.50; CR (rho\_c) threshold > 0.70

Source: SmartPLS 4.0 Output, 2026

Initial estimation revealed that all four constructs failed to meet the AVE threshold of 0.50, necessitating a systematic item deletion procedure. Indicators were removed when their retention demonstrably suppressed the AVE of the associated construct below the acceptable threshold. The following items were eliminated: CA\_1 and CA\_4 (Competitive Advantage); EffCQ\_1, EffCQ\_2, EffCQ\_3, EffLC\_1, EffLC\_2, EffAL\_1, and EffPP\_2 (Effectuation); IO\_1, IO\_6, and IO\_7 (Innovation Orientation); and Lincah\_5 and Lincah\_6 (Agility). This procedure is methodologically justified by Hair et al. (2019), who recommend removing indicators with loadings between 0.40–0.70 when doing so materially improves AVE and Composite Reliability beyond recommended thresholds.

**Convergent Validity – After Item Deletion**

**Table 4.** Cross-Loading Factor – After Item Deletion

Indicator	Competitive Advantage	Effectuation	Innovation Orientation	Agility	Result
CA_2	0.807				Valid
CA_3	0.742				Valid

CA_5	0.619			Valid
EffAL_2		0.637		Valid
EffAL_3		0.764		Valid
EffBP_1		0.729		Valid
EffBP_2		0.750		Valid
EffBP_3		0.644		Valid
EffBP_4		0.742		Valid
EffLC_3		0.747		Valid
EffPP_1		0.697		Valid
EffPP_3		0.686		Valid
IO_2			0.661	Valid
IO_3			0.743	Valid
IO_4			0.747	Valid
IO_5			0.732	Valid
Lincanh_1			0.732	Valid
Lincanh_2			0.531	Valid
Lincanh_3			0.809	Valid
Lincanh_4			0.642	Valid
Lincanh_7			0.828	Valid

Notes: All retained indicators meet outer loading > 0.50 with AVE > 0.50 across all constructs

Source: SmartPLS 4.0 Output, 2026

**Table 5.** Constructing Reliability and Validity — After Item Deletion

Construct	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	AVE
Competitive Advantage	0.564	0.591	0.769	0.528
Effectuation	0.879	0.891	0.902	0.507
Innovation Orientation	0.693	0.690	0.813	0.521
Agility	0.769	0.825	0.838	0.514

Notes: All AVE values > 0.50; CR (rho\_c) > 0.70 for all constructs. Cronbach's Alpha below 0.70 for Competitive Advantage is acceptable given CR (rho\_c) exceeds threshold

Source: SmartPLS 4.0 Output, 2026

Following item deletion, all constructs satisfied the convergent validity criterion (AVE > 0.50) and reliability benchmarks (CR rho\_c > 0.70). It is noted that the Cronbach's Alpha for Competitive Advantage (0.564) falls below the conventional 0.70 threshold; however, in SEM-PLS, Composite Reliability (rho\_c) is considered the more appropriate indicator of internal

consistency as it does not assume equal indicator weights (Hair et al., 2019). With CR (rho\_c) = 0.769, the construction is deemed sufficiently reliable to proceed.

**Discriminant Validity**

**Table 6.** Heterotrait-Monotrait Ratio (HTMT)

	<b>Competitive Advantage</b>	<b>Effectuation</b>	<b>Innovation Orientation</b>	<b>Agility</b>
Competitive Advantage	—			
Effectuation	0.143	—		
Innovation Orientation	0.741	0.254	—	
Agility	0.199	0.504	0.082	—

Notes: HTMT threshold < 0.85 (conservative) or < 0.90 (liberal); all values below threshold indicate adequate discriminant validity

Source: SmartPLS 4.0 Output, 2026

All HTMT values fall well below the 0.85 conservative threshold, confirming that each construction is empirically distinct from the others. The highest HTMT value (0.741) between Innovation Orientation and Competitive Advantage is theoretically expected given their direct hypothesized relationship, yet remains within acceptable bounds, confirming discriminant validity across the entire measurement model.

**Model Fit**

**Table 7.** Model Fit Summary

<b>Index</b>	<b>Saturated Model</b>	<b>Estimated Model</b>
SRMR	0.075	0.076
d_ULS	1.305	1.349
d_G	0.336	0.338
Chi-square	493.296	492.802
NFI	0.734	0.734

Notes: SRMR < 0.08 indicates good fit; NFI > 0.70 indicates acceptable fit for complex structural models

Source: SmartPLS 4.0 Output, 2026

The SRMR of 0.076 falls below the 0.08 threshold, indicating a good model fit. The NFI of 0.734 reflects adequate fit, which is consistent with the complexity of the four-construct dual-mediation structure examined in this study.

**Structural Model and Hypothesis Testing**

**Direct Effects**

**Table 8.** Hypothesis Testing — Direct Effects

<b>Path</b>	<b>O</b>	<b>M</b>	<b>STDEV</b>	<b>T-Stat</b>	<b>p-Value</b>	<b>Decision</b>
Effectuation → Competitive Advantage	0.048	0.049	0.068	0.704	0.481	Rejected

Effectuation → Innovation Orientation	0.202	0.203	0.077	2.632	0.009	Supported
Effectuation → Agility Innovation Orientation → Competitive Advantage	0.466	0.479	0.053	8.814	0.000	Supported
Agility → Competitive Advantage	-0.133	-0.135	0.056	2.382	0.017	Supported

Notes: O = Original Sample; M = Sample Mean; Bootstrapping with 5,000 subsamples; significance at  $p < 0.05$  (two-tailed)

Source: SmartPLS 4.0 Output, 2026

**H1 – Effectuation → Competitive Advantage (Rejected,  $\beta = 0.048$ ,  $p = 0.481$ )**

The non-significant direct path confirms that effectuation logic alone does not produce competitive advantage – consistent with dynamic capability theory, which holds that higher-order cognitive resources must be channeled through operational capabilities before performance outcomes emerge (Delladio et al., 2023; Ruiz-Jiménez et al., 2021). In the upstream cocoa market a commodity exchange governed by intermediary price mechanisms competitive advantage is determined not by how a farmer thinks but by what they demonstrably produce and deliver. An effectual mindset lacking behavioral manifestation generates no market-recognizable signal, rendering it competitively inert in this context.

**H2 – Effectuation → Agility (Supported,  $\beta = 0.466$ ,  $p = 0.000$ )**

Effectuation logic strongly predicts individual agility, confirming H2. Farmers internalizing the affordable loss and lemonade principles develop cognitive readiness for rapid resource reconfiguration, reducing response latency when market disruptions occur. This extends Tang et al.'s (2025) organizational-level finding to individual farmer-entrepreneurs in a developing-economy agribusiness context, directly addressing the geographical generalizability gap in effectuation literature (Ruiz-Jiménez et al., 2021).

**H3 – Effectuation → Innovation Orientation (Supported,  $\beta = 0.202$ ,  $p = 0.009$ )**

Effectuation logic positively predicts innovation orientation, though with a more modest coefficient than its effect on agility. This differential reflects the higher cognitive threshold required to shift from adaptive responsiveness toward proactive novelty creation. The result supports Taghvae and Talebi (2023) and Ryman and Roach (2024), and suggests that additional enabling conditions such as cooperative learning networks or market information access may be needed to fully activate effectuation's innovation-generative potential among resource-constrained smallholders.

**H4 – Agility → Competitive Advantage (Supported,  $\beta = -0.133$ ,  $p = 0.017$ )**

The negative coefficient is this study's most counterintuitive finding. In the upstream cocoa market, competitive advantage is fundamentally relational: buyer trust is built on supply consistency and delivery reliability, not reconfiguration speed. Frequent pivoting between supply channels or product grades may capture short-term price gains but erodes the relational capital that underpins long-term bargaining power (Koch & Windsperger, 2017). From a relational contracting perspective, buyers rationally avoid over-reliance on partners perceived as strategically unstable, preferring predictable suppliers even at a slight price premium. This establishes that agility's competitive effect is moderated by market structure type – positive in speed-based markets, constraining in reliability-based commodity markets.

**H5 – Innovation Orientation → Competitive Advantage (Supported,  $\beta = 0.477$ ,  $p = 0.000$ )**

Innovation orientation is the strongest predictor of competitive advantage ( $\beta = 0.477$ ), confirming H5. In a commodity market where upstream producers are conventionally treated as price-takers, this finding demonstrates that product-level differentiation through fermented bean standardization, quality grading, or novel post-harvest methods enables farmers to establish non-substitutable product identities commanding buyer premiums (Distanont & Khongmalai, 2020). The coefficient magnitude (0.477 vs. -0.133 for agility) clarifies the market logic: in upstream cocoa, what you create matters more than how fast you respond – a structural insight with direct implications for capability development program priorities.

**Indirect Effects (Mediation Analysis)**

**Table 9.** Hypothesis Testing – Indirect Effects

Path	O	M	STDEV	T-Stat	p-Value	Decision
Effectuation → Agility → Competitive Advantage	-0.062	-0.065	0.029	2.168	0.030	Supported
Effectuation → Innovation Orientation → Competitive Advantage	0.096	0.099	0.040	2.437	0.015	Supported

Notes: Bootstrapping with 5,000 subsamples; significance at  $p < 0.05$  (two-tailed). Full mediation confirmed given non-significant direct effect (H1)

Source: SmartPLS 4.0 Output, 2026

**H6 – Agility as Mediator (Supported, indirect  $\beta = -0.062$ ,  $p = 0.030$ )**

The significant indirect effect through agility, combined with the non-significant direct path (H1), confirms full mediation. Effectual cognition must first manifest as operational reconfiguration before any competitive consequence can materialize. The negative indirect coefficient ( $\beta = -0.062$ ) is consistent with H4’s finding, indicating a constraining mediation pathway through agility in this market context.

**H7 – Innovation Orientation as Mediator (Supported, indirect  $\beta = 0.096$ ,  $p = 0.015$ )**

Full mediation through innovation orientation is confirmed ( $\beta = 0.096$ ,  $p = 0.015$ ). This is the more economically productive pathway: effectuation logic activates innovation propensity, which in turn generates differentiation-based competitive advantage. This finding responds directly to calls by Distanont and Khongmalai (2020) and Tang et al. (2025) for integrated structural models linking effectuation, innovation, and competitive performance in agribusiness contexts.

**5. Conclusion and Suggestion**

This study advances the theoretical understanding of entrepreneurial decision-making and competitive advantage in three specific ways. First, it establishes the cognitive-behavioral translation mechanism as a necessary theoretical bridge in effectuation theory: effectual logic generates competitive outcomes only when translated into behavioral capabilities, not directly. This specification resolves a persistent ambiguity in the effectuation literature

regarding why effectuation's performance consequences are frequently indirect (Delladio et al., 2023; Ruiz-Jiménez et al., 2021). Second, it demonstrates that agility and innovation orientation function as qualitatively distinct not interchangeable mediating pathways: agility operates through a speed-responsiveness channel that may constrain competitive advantage in reliability-based commodity markets, while innovation orientation operates through a differentiation channel that generates durable competitive positioning. Third, it extends dynamic capability theory to the individual farmer level in a developing-economy agribusiness context, where prior research has rarely ventured (Huang et al., 2012).

Practically, these findings carry targeted implications for policymakers, agricultural extension agencies, and farmer development organizations. The dominance of the innovation orientation pathway and the constraining effect of agility indicates that empowerment programs should prioritize sustained capability building in product differentiation and processing innovation over training in rapid market responsiveness. Specifically, programs that support fermented cocoa bean standardization, quality grading certification, and buyer-direct relationship development are likely to generate more durable competitive gains than those focused on supply chain speed or price-responsiveness. Additionally, the finding that effectuation logic is a significant antecedent to both agility and innovation orientation suggests that cognitive entrepreneurship training — teaching farmers to leverage existing means, embrace affordable loss, and co-create with network partners — can serve as an upstream intervention that activates both capability pathways simultaneously, providing higher leverage than capability-specific training programs alone.

## **6. Limitations and Future Research**

This study makes meaningful theoretical and empirical contributions to the agribusiness entrepreneurship literature; however, several limitations must be acknowledged to contextualize the findings and guide future scholarly inquiry.

First, regarding data and measurement, all variables in this study were operationalized through self-reported Likert-scale survey instruments. While procedural remedies were applied including item randomization and anonymity assurance the risk of common method bias (CMB) cannot be eliminated through design alone. Self-reported measures of constructs such as agility and competitive advantage may reflect the respondent's perceived rather than actual performance, potentially inflating or attenuating true relationships. Future research should complement survey-based instruments with objective performance metrics such as verified sales volume, price premium records, or supply chain transaction data to enhance the convergent validity of the constructs and reduce subjectivity in competitive advantage measurement.

Second, regarding the sample, although the 260 respondents were drawn from the major cocoa-producing regions of Indonesia including Sulawesi, Sumatra, Kalimantan, and East Java the sampling procedure relied on purposive non-probability techniques, which limit the statistical generalizability of the findings. The sample also skews toward senior-aged, low-educated male farmers, which, while reflective of the actual demographic profile of the upstream industry, may not capture the strategic behavior of younger, more digitally literate agripreneurs who are increasingly entering the sector. Future studies should pursue probability-based sampling frameworks and explicitly incorporate the emerging segment of

young farmer-entrepreneurs to examine whether effectuation dynamics differ across generational cohorts within Indonesian agribusiness.

Third, concerning the variables, the current model focuses exclusively on effectuation logic, individual agility, and innovation orientation as the antecedents of competitive advantage. While this configuration offers a parsimonious explanation of the mediation mechanism, it necessarily omits other theoretically relevant constructions. For instance, social capital particularly the role of farmer cooperatives and inter-firm networks may serve as a significant boundary condition or moderator of the effectuation-to-agility pathway, given the centrality of the crazy quilt principle in effectuation theory. Similarly, institutional factors such as government extension services, access to microcredit, and local agricultural policy may moderate how effectively an effectual mindset translates into operational capability. Future research is encouraged to incorporate these boundary conditions to enrich the explanatory architecture of the model.

Fourth, with respect to the research method, the study employed a cross-sectional design, capturing all variables at a single point in time. This design is inherently limited in its capacity to establish causal directionality and fails to account for the longitudinal evolution of effectual cognition across different market cycles. The cocoa industry is characterized by multi-year price volatility tied to global commodity markets; a farmer's agility and innovation orientation may evolve substantially in response to prolonged price shocks or favorable harvest seasons. A longitudinal panel design tracking the same farming units across multiple cocoa price cycles would provide far more robust causal evidence and reveal whether effectuation logic is a stable trait or a context-sensitive response to environmental turbulence.

Finally, in terms of research scope, this study is geographically bounded to the Indonesian upstream cocoa sector, limiting the cross-national transferability of the findings. The competitive dynamics of smallholder cocoa farming vary considerably across producing nations from Ghana and Côte d'Ivoire in West Africa to Ecuador and Peru in Latin America each characterized by distinct institutional environments, buyer power structures, and value chain configurations. Future comparative studies extending this model across multiple cocoa-producing nations would significantly strengthen the external validity of the effectuation-agility-innovation-competitive advantage framework and contribute to a more universally applicable theory of smallholder entrepreneurial performance under uncertainty.

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