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DRIVING RADICAL INNOVATION: EXTERNAL STIMULI, ORGANIZATION CULTURE AND MCS'S ROLE IN STARTUP SUCCESS MODERATED BY TECHNOLOGICAL TURBULENCE

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ABSTRACT

Aim/Purpose	This study investigates how external stimuli and organizational culture influence the development of a management control system (MCS) to foster radical innovation and improve organizational performance. Specifically, it quantifies the effects of constraining and enabling levers on interaction and Knowledge sharing while examining how radical innovation mitigates technological turbulence to enhance performance.
Background	This research was conducted on startup companies because many of them are closed due to a lack of visibility into the external environment and organizational culture in creating control system management and a lack of creation of radical innovation.
Methodology	This quantitative research includes 329 respondents who are managers at startup companies in Indonesia. Questionnaires were distributed to respondents

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at startup enterprises to conduct the study. Data collection was performed both in person and online. SEM-PLS was the instrument employed for the measurement.

Contribution Startups are often in a dynamic environment with high uncertainty. This research offers insights into managing external influences and building an organizational culture that supports Knowledge and innovation to improve performance. The research can also provide input for policymakers, such as governments or business incubators, to create policies that support startup growth, especially in the face of technological challenges.

Findings Sampling 329 startup managers from Indonesia, this quantitative research was conducted using a structured self-administered questionnaire, and the data was analyzed through SEM-PLS. The results show that external stimuli and organizational culture significantly influence the establishment of the MCS and foster the ability of the startup to respond to drastic changes in the environment. This system encourages the promotion of knowledge sharing, which brings about radical innovations that increase market share and improve organizational performance. Interestingly, the analysis shows that enabling and constraining levers, knowledge sharing, and radical innovation are the factors that determine 76.9% ($R^2 = 0.769$) of organizational performance.

Recommendations for Practitioners Innovation remains the company's main focus, and startups need to consider external stimuli, cultivate an organizational culture that supports innovation, and change the management control system so that the company can take advantage of fundamental changes and achievements, especially during the technological revolution.

Recommendations for Researchers Research has the potential to simultaneously add variables such as leadership style, employee engagement, or market orientation to observe how they affect innovation and organizational performance. The study may encompass startups and other marketplaces, including large technology firms, small and medium-sized enterprises, and the creative sector, to ensure consistency in findings across diverse settings.

Impact on Society With the improvement of the performance of startup organizations, people can enjoy high-quality products or services at more competitive prices. More innovative and well-performing startups will drive business growth, directly creating new job opportunities in various sectors. In addition, the growing emphasis on innovation means that people will be motivated to gain technological and creative skills, which in turn improves workforce efficiency.

Future Research Further research could examine how changes in government policies, such as implementing digital taxes or restrictions on foreign investors, affect the interaction between radical innovation and a company's performance. Future researchers may also focus on the impact of blockchain technology on the creation of facilitating mechanisms for improving performance and innovation in technology-based startups.

Keywords external stimuli, organizational culture, enabling levers, constraining levers, knowledge sharing, radical innovation, technological turbulence, performance organization

INTRODUCTION

Today, startups have gained the reputation of being essential components of economic growth and innovation, given how effective they have responded to the rapid changes in technology and market conditions (Sherani et al., 2023). They play a crucial part in adapting to external changes, and through innovation, they help shape industries and create global and local value. Nonetheless, external environmental factors, such as government policies, market volatility, and economic conditions, make them vulnerable. These factors significantly impact the ability to create operational management systems and implement innovation (Samagaio, 2018).

The diverse environment in which external stimuli arise, including competitive pressures, regulatory systems, and technological innovations, makes it easy and challenging for startups. These market dynamics create opportunities as well as challenges for prospective companies. The management control mechanisms (MCS) focus on the organizational constraints and enable the action levers in the right direction. There is freedom to act, and resources are provided with the expectation that problems will be resolved creatively (Santos et al., 2023); at the same time, enabling levers to focus on rules and procedures to control risk and reduce inefficiency (Dimes & de Villiers, 2021).

Organizational culture refers to shared beliefs, norms, and activities of a collective and contributes significantly to the choice of management approaches and patterns of innovation used (Piliang et al., 2023). An effective culture is necessary for MCS systems and knowledge-sharing practices that radically enhance innovation (Simons, 1995). Knowledge sharing is transferring information, ideas, or skills between individuals, increasing efficiency, creativity, and problem-solving. Still, it comes with costs such as knowledge leakage and freeloading (Bastian et al., 2024).

Radical innovation, which is the creation of new, improved products, services, or business models, is essential in sustaining a new business in very competitive and unpredictable environments (Arifin et al., 2023). In contrast to radical innovation, incremental innovation focuses on refining existing systems rather than altering what the market offers. Radical innovation changes the market by providing new and innovative value propositions (Ritala et al., 2018). According to these factors, startups in Indonesia are promising because of their peculiar demographic, cultural, and economic conditions. The country has a vast and heterogeneous population that rapidly stimulates innovation in the digitization of e-commerce, fintech, and health tech for startup-scalable business models.

Indonesian startups are growing at an outstanding rate, yet it is apparent that several obstacles block their path. Bukalapak is one instance that highlights the need to understand how a particular market is structured, what the business model is, and the holistic management of the organization. While the Indonesian government initiated the Thousand Digital Startups program to help nurture entrepreneurship, there is still no clarity over how startups utilize resources to circumvent internal and external issues, especially concerning MCS and radical innovation (Bastian et al., 2024).

The importance of the emergence of a new market and regulation changes is seemingly accepted as a key stimulus for startups (Sherani et al., 2023). Nonetheless, there is scant literature on how these external stimuli lead to the configuration and deployment of MCS. The lack of literature extends to the relationship between organizational culture and MCS and the crucial issue of enabling radical innovation and maintaining equilibrium. For Indonesian startups, the integration of formal control systems is complex due to the cultural characteristics and environmental demands; hence, these issues are much more pronounced.

The investigation intends to achieve the following objectives: (1) Understand how MCS's forceful and non-forceful troubles stem from constraining and enabling culture shares and culture reading the performance of Indonesian startups with advanced technology. The idea of technological turbulence constructs a moderating impact on the performance. (2) Show practical tools to startup managers and entrepreneurs to maximize these factors to improve performance and enhance radical innovation. (3)

Partake in policy making by suggesting measures for enhancing the friendly venture environment for startups in Indonesia.

This research asserts the following contributions:

(1) *Theoretical contribution:* It addresses the lack of insight into the impact of external settings, organizational culture, and MCS on radical innovation and performance, especially concerning startups.

(2) *Practical contribution:* It assists startup managers with MCS, its link to innovation, and the need to adopt new processes to stay competitive in volatile markets.

(3) *Policy contribution:* It guides policymakers on how to craft policies that effectively grow, sustain, and foster innovation in startups in a highly competitive world.

This research is highly relevant and essential because Indonesia's startup ecosystem is growing rapidly, and the region has favorable demographics and economic growth. The study, which focuses on how Indonesian startups cope with the challenges posed by external and internal factors, is exceptional in adapting the driving factors of emerging market innovation and performance. The study also resolves the gaps in the existing literature on MCS, organizational culture, and knowledge sharing and the diverse views surrounding them.

LITERATURE REVIEW

This study aims to assess the impact of two major factors on the interrelationship between organizational culture and control systems: the internal environment (organizational culture) and the external environment (external stimuli). The Management Control System (MCS) is designed to help organizations effectively and efficiently control employee behavior and utilize resources to achieve their targets (Ghosh et al., 2020). Simons (1995) identifies four key elements of MCS: (1) Beliefs Control System, (2) Interactive Control System, (3) Constraining Control System, and (4) Diagnostic Control System. These systems are tailored to organizational needs, as suggested by contingency theory, which asserts that not all rules can be uniformly applied across organizations (Nuhu et al., 2019). MCS creates capabilities necessary for organizations to adapt and thrive in changing conditions (Pistoni et al., 2024).

EXTERNAL STIMULI

External stimuli include customers, suppliers, competitors, technological development, changes in legislation, and general economic conditions, all of which impact supporting or constraining the organization's decision (Melinda & Wardhani, 2020). For these reasons, such stimuli are significant for balancing strategies and operations in Indonesian startups. For example, the increased use of the internet and smartphones has facilitated the entry of OVO and DANA as fintech startups utilizing digital payment systems. Moreover, some regulatory changes, like the Personal Data Protection Bill of Indonesia, require startups to change how they do business. Schachel et al. (2021) point out that the umbrella conditions under which the startup works, such as technological, regulatory, sociocultural, and economical, can be growth-supporting or constraining depending on the adaptability of the startup to external challenges. During these times, many Indonesian startups are trying to take advantage of the rapidly changing digital environment. At the same time, issues such as limited access to digital resources and intricate sociocultural problems need to be addressed, including how to gain trust within very traditional societies (Schachel et al., 2021).

ORGANIZATIONAL CULTURE

Sociocultural factors like familial relationships and the concept of *gotong royong* (community cooperation) tremendously impact how organizations function in Indonesia. Organizational culture underpins the values, beliefs, information, and practices an organization identifies with and acts upon

(Pedraza-Rodríguez et al., 2023). Many organizations adjust the rigidity of their policies to accommodate the societal norms and cultural expectations regarding work-life balance. In the Indonesian socio-business environment, such cultural norms enhance collaboration and mutual goodwill to establish trust and maintain business relations over the longer term.

Enabling Levers

Enabling levers are mechanisms or strategies that help organizations achieve their goals by enhancing performance and results (Mazur et al., 2021). Examples include providing training, education, rewards, and recognition. These levers are complemented by belief controls, which strengthen basic ethics modules (Hallioui et al., 2022), and interactive control systems, which promote dialogue and pragmatic decision-making (Laguir, 2019). In Indonesia, enabling levers that enhance collaboration and knowledge sharing are consistent with culture, thus increasing the efficiency of these systems.

Constraining Levers

Imposing diagnostic and boundary controls to align behavior with the organization's objectives (Piliang et al., 2023). For example, key performance indicators (KPIs) and budgets are set and monitored to guide and change the organization's performance. Performance is measured in Evaluating Systems by comparing them to set standards, whereas Boundary Systems set parameters to reduce risks. These mechanisms are proto-typical, which aid in proper regulation and mitigating uncertainty, which is considerably high in entrepreneurial settings in developing economies.

Knowledge Sharing

The transfer of information, ideas, and skills to foster innovation and collaboration is achieved through a specific component of knowledge management called Knowledge Sharing (Jamshed & Majeed, 2023). *Gotong royong* cultural values in Indonesia have motivated knowledge-sharing practices by promoting productive collaboration and mutual help. This feature of the culture allows firms to leverage collective Knowledge for innovation and sustainability (Nurrachman et al., 2019). On the other hand, startups must manage this shared approach with the competitiveness required in a dynamic market.

Radical And Incremental Innovation

One center of innovation is whether it is radical or incremental. The first type encompasses changes that are so drastic that they create new technologies, new products, or new business models, for example, the iPhone by Apple or Tesla's electric cars. As a result, radical innovation changes how industries operate, redefining markets (Thneibat & Sweis, 2023). Conversely, incremental innovation focuses on adding new features that have previously existed, such as improving mobile apps or making tangential changes to vehicle designs. While radical changes are advantageous in the long run, they pose a greater risk. However, incremental innovation ensures market survival and competitiveness. Therefore, in the Indonesian startup scene, where consumer preferences and market conditions are probably dynamic, a combination of both innovations is required to survive.

Organizational Performance

The term' organizational performance' denotes the measures applied to know the extent of an organization's goal achievement, including decision effectiveness, efficiency, productivity, and quality (Johnstone, 2022). In Indonesia, startups have to deal with specific issues relating to the weak availability of digital structure, socio-peculiar interactions, and changing consumer behavior expectations. To be successful, companies must adapt their strategies while innovating to meet these consumer requirements. Trust building and local adaptation are significant for sustainability in this highly competitive but complex market (Y. Wang et al., 2020).

DEVELOPMENT OF THE HYPOTHESIS

The research model is illustrated in Figure 1.

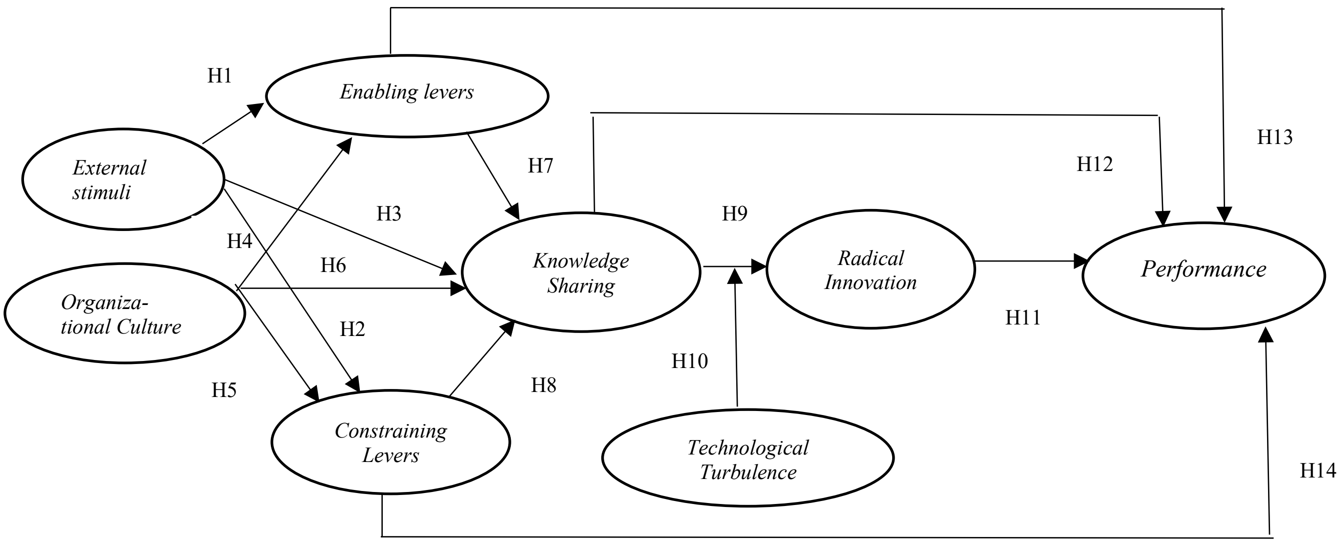

Figure 1. Research framework

External factors can include changes in the economic, technological, social, cultural, political, or regulatory environment (Usman Shehzad et al., 2023). Extraterrestrial stimuli encourage the adjustment of enabling levers to remain relevant and support the goals to be achieved. External changes encourage organizations or individuals to adapt, allowing them to stay competitive or relevant. For example, technological advances force organizations to adopt digital tools, allowing the levers to support collaboration.

External stimuli influence enabling levers by encouraging adaptation, innovation, or transformation to face challenges and opportunities from the external environment. Organizations and individuals who respond to these stimuli through the right and faster leverage will have a competitive advantage and will be able to thrive in a dynamic environment. Therefore, we can conclude:

H1: External stimuli have a positive effect on enabling levers.

The concept of external stimuli, such as economic, social, technological, political, or environmental changes that affect the ability of an organization or individual to manage risk or achieve efficiency and stability is emphasized by the idea that these stimuli can affect levers. In this case, the lever can be built as a barrier and reinforced, adjusted, or completely removed to suit the external environment better (Piliang et al., 2023). This system ensures that the organization runs according to plan and achieves the desired results. In the event of environmental changes, such as changes in market demand and the emergence of new competitors, organizations must change their restrictive (diagnostic) controls. So, the conclusions that can be drawn are:

H2: External stimuli have a positive effect on constraining levers.

Environmental uncertainty (external stimuli) can be seen as a mental state describing a person who cannot accurately estimate any of all the social and physical factors that directly affect the decision-making behavior of the company's employees (W. Wang et al., 2023). This demonstrates that a manager must be able to anticipate future events and acquire pertinent information. One of these strategies is knowledge sharing within the organization. For example, changes in government regulations related to products, prices, and other social influences will affect *the interaction of Knowledge* in the organization so that there is Knowledge sharing in the organization so that it is expected not to be wrong in making decisions (Sherani et al., 2023).

H3: External stimuli have a positive effect on knowledge sharing.

A positive organizational culture means all employees or staff collaborate to share Knowledge (Keszey, 2018). A company helps achieve its goals and plans by developing an organizational culture. In addition, culture can also be helpful for organizations that are undergoing strategic changes. It is often emphasized that a company's culture is a critical component that influences innovation. Thus, the hypothesis is that organizational culture encourages interaction and enhances the company's core values.

H4: Enabling variables are positively influenced by organizational culture.

Every built organization's constraints are different from those of other organizations. Contingency theory states that not all organizations implement the same management control systems. In the same way, performance appraisals for the balanced scorecard of any organization are unique – just like the provisions in the SOPs, they are also tailored to meet the needs of that particular organization. Pedraza-Rodríguez et al.'s research (2023) and Lam et al.'s (2021) research state that the existing organizational culture can affect the creation of regulation in the organization, for example, the creation of boundaries that are believed to be the culture in the organization. The following hypothesis may be posed:

H5: Constraining levers are advantageously affected by organizational culture.

The capacity of employees to implement knowledge exchange in the company can be inferred from organizational culture. When knowledge sharing is implemented, employees can have new ideas that can produce innovation and creativity due to exchanging Knowledge, which can affect the company's performance. In knowledge management, the way that can be done to develop the quality of employees is to apply knowledge sharing in the company environment in daily interactions (Yoshikuni et al., 2022). Empirical research proves that organizational culture is a key factor in organizational effectiveness, resulting from the study that organizational culture affects performance (Raziq et al., 2024). Organizational culture positively relates to management knowledge (Mitter et al., 2024). The presence of organizational culture will trigger the organization's knowledge interaction. Therefore, the hypothesis that may be posited is as follows:

H6: Knowledge sharing is positively influenced by organizational culture.

Enabling levers is a control management system that comprises a beliefs control system and an interactive control system. This interaction is facilitated by a substantial exchange of Knowledge in the environment (Nezafati et al., 2023). As a result, informality facilitates face-to-face communication and interaction, which is the foundation for exchanging Knowledge by establishing trust. (Ahmad & Karim, 2019). Thus, it is feasible to formulate a hypothesis:

H7: Enabling levers has a beneficial impact on knowledge sharing.

Although the boundary system has boundaries set by top management and considered by company members to be negative, this system can motivate all company members to do something positive (Bisbe et al., 2019). Diagnostic control systems are employed as management instruments to modify strategies. The focus of this system is on achieving the company's goals. This form of control allows managers to compare what is planned and completed (Heggen & Sridharan, 2021). Therefore, managers can compare the achievement of current goals with what was previously planned.

The purpose of a diagnostic control system is to supervise and coordinate the implementation of predetermined strategies (Frezatti et al., 2017). The diagnostic control system is also used as a basis for the achievement of awards by studying the performance achieved. Related to this statement, a manager must communicate this strategy by planning and setting the company's goals beforehand. The primary purpose of the diagnostic control system is to coordinate and monitor the results achieved, namely by knowledge sharing. So, the hypothesis that can be raised is:

H8: Constraining levers positively impact knowledge exchange (boundary and diagnostic systems).

Knowledge is the primary determinant in generating innovation within a company. The information that is being disseminated can provide employees with innovative ideas. When data is spread well and widely through knowledge sharing, employees will gain insights to generate creative ideas. This innovative idea will later be used as capital for innovating the company. Both product and process innovations within the company can increase its effectiveness. Therefore, this research hypothesizes that knowledge sharing positively affects company innovation. The higher the knowledge sharing in the company, the better (Ritala et al., 2018). Thus, it can be hypothesized:

H9: Radical innovation is positively impacted by knowledge sharing.

Technology's chaotic environment encourages firms to adapt to changes quickly since it is in this climate that organizations may stand out and acquire a competitive edge. In contingency theory, it is stated that the system in each organization or company is different and cannot be applied in the same way; the same is true of technology. Companies and organizations utilize various technologies, each tailored to its unique set of needs. This technology is believed to inspire new ideas that will benefit the company. Radical innovations may flourish when information can be freely exchanged and technology can be readily supported (Gonzalez, 2021). Therefore, the proposed theory is:

H10: Technological instability and the correlation between radical innovation and knowledge sharing are influenced.

Radical innovation significantly changes technology, products, processes, or business models. In most instances, these innovations result in solutions that have never been seen before, frequently disrupting existing markets and creating new opportunities (Barba-Aragón & Jiménez-Jiménez, 2020). Businesses can establish competitive advantages that are exceedingly challenging to replicate through radical innovation. Consequently, the company's market position is fortified, fostering performance development in financial performance and market share. To conclude:

H11: A good impact on performance may be attributed to radical innovation.

Knowledge sharing is exchanging information, expertise, and Knowledge among individuals or teams within an organization (Lam et al., 2021). This process involves transferring experiences and insights that can be used to create added value for the organization. When Knowledge is distributed effectively, employees can learn from previous experiences and avoid repeating mistakes. The available expertise makes employees work faster and more effectively, as they can access the best information or methods to complete tasks.

H12: The act of sharing one's Knowledge has a beneficial impact on performance.

Enabling leverage, which consists of a belief system and an interactive system, is an essential element in organizational management to encourage performance (Pešalj et al., 2018). Both help create an environment that supports innovation, collaboration, and adaptation to change. The belief system provides clear direction about the organization's vision and mission so that employees understand the main goals they want to achieve. Strong organizational values encourage intrinsic motivation, as employees feel connected to a larger purpose.

H13: Enabling levers has a positive effect on performance.

Constraining levers, boundary, and diagnostic systems are organizational control tools that ensure focus, consistency, and risk management (Baird et al., 2019). Although they seem restrictive, they significantly influence organizational performance by creating a framework that supports efficiency and achieving strategic goals. Boundary systems are rules, policies, and behavioral restrictions implemented to ensure employees work according to organizational values and goals and avoid risks. Clear boundaries make it easier for employees to understand what can and cannot be done, reducing the risk of violations. The term "diagnostic system" refers to a measuring system used to monitor performance, compare outcomes to targets, and provide improvements via feedback. Through the ability to monitor outcomes measurably, the diagnostic system guarantees that staff are held accountable for their performance:

H14: Enabling levers has a favorable impact on performance.

METHODOLOGY

Quantitative research was conducted, and online and offline survey approaches were used in this examination. Online surveys were conducted via email and social media platforms like Instagram and WhatsApp. Questionnaires were distributed to respondents manually via offline procedures. (Table 1 shows the responses by type of data collection.) The research population constituted executives in mid-to-upper positions in newly established Indonesian companies who could articulate their corporate strategy. These executives were then selected as respondents. Only 329 responses were obtained from 400 questionnaires distributed. This study has sample requirements (purpose sampling), namely:

1. Startups engaged in e-commerce, fintech, and FoodTech (Food Technology) in Indonesia
2. Questionnaires are distributed to startup managers/managers.
3. Startups that have a minimum number of employees of five people.
4. Startups that have a minimum profit of one year above Rp. 2,000,000,000.

Table 1. Respondent data collection

Types of data collection	Respondents	Percentage
Live interview	113	30%
Questionnaire distribution through G-Form	309	70%
Entire	422	100%

Table 2 displays that only 329 of the 422 responses meet the sample requirements and can be processed.

Table 2. Respondent data collection

Number of respondents	Entire	Percentage
Overall respondents	422	100%
Cannot be processed or does not meet the set sample criteria	93	22%
Total respondents	329	78%

The primary instrument for data collection in this investigation is a collection of questionnaires. The investigation can be divided into two distinct components. The initial segment contains inquiries regarding the demographic information of the participants. Conversely, the subsequent section includes a 5-point statement with a Likert scale. The scale consists of the following responses: "strongly disagree," "disagree," "neutral," "agree," and "strongly agree." The elements that were included in the questionnaire are listed in Table 3.

Table 3. Questionnaire items

No.	Variable	Indicators	Adopted
1	External stimuli	1. Dynamics of Global Competition. 2. The presence of governmental controls and deregulation results in an escalation in client demand. 3. Limitations on the accessibility of limited resources. 4. Competitor innovations that jeopardize existing and future goods. 5. Capable of adapting to intensifying business rivalry.	(Frezatti et al., 2017)
2	Organizational culture	1. Members of the organization express satisfaction with the existing degree of cooperation. 2. There exists a readiness for collaboration across organizational units within our organization. 3. Our company members have confidence in the abilities of others. 4. Our company members have confidence in the behavior of others to achieve organizational goals. 5. Our company provides a variety of formal training programs for the performance of duties. 6. Our company encourages people to attend seminars, symposiums, etc.	(Reginato & Guerreiro, 2013) (Pedraza-Rodríguez et al., 2023)
3	Enabling levers	1. Engage in thoughtful dialogues during meetings with superiors, subordinates, and colleagues. 2. Formulate challenges and engage in debates grounded in data, assumptions, and strategic action plans. 3. Management seldom acknowledges the contributions of the staff. 4. Management places significant reliance on its personnel. 5. The interpretation of information is a task undertaken by management. 6. Managers frequently engage with the Management Control System. 7. The mission statement of the company is communicated to all employees. 8. Managers articulate the fundamental principles of the organization to the workforce. 9. The workforce is cognizant of the fundamental principles that are the foundation of the organization's values. 10. The organization's mission statement functions to motivate its personnel.	(Henri, 2006) (Frezatti et al., 2017)
4	Constraining levers	1. Monitor advancement toward reaching objectives. 2. Evaluate the outcomes attained. 3. Assessing results against expectations. 4. Analyzing the essential indicators of achievement. 5. Enables organizations to concentrate on crucial success elements. 6. The code of conduct establishes the expected behavior of all organization members. 7. The code of conduct outlines behaviors that are not permitted. 8. Risks in the workplace that should be circumvented. All members of the organization are informed about the code of conduct.	(Frezatti et al., 2017) (Baird et al., 2019)
5	Knowledge sharing	1. Employees inside the organization exchange information derived from their job experiences. 2. Employees within the organization exchange competencies acquired via educational and training methodologies. 3. Employees in the company share business knowledge acquired informally. 4. Employees inside the organization disseminate business expertise to partners, including clients and suppliers.	(Ahmad & Karim, 2019) (Deng et al., 2023) (Santos et al., 2023)

No.	Variable	Indicators	Adopted
		5. Employees in the company believe that knowledge sharing can improve employee performance.	
6	Radical Innovation	1. Develop innovative goods and services to surmount challenges. 2. The investigation of applied technologies often propels novel innovations. 3. There exists a significant degree of risk (exploration). 4. Individuals and line units are the traditional sources of innovation. 5. Initiate clear and informal procedures and regulations. 6. A business plan that evolves from novel innovations.	(Arifin et al., 2023) (Frezatti et al., 2017)
7	Technological turbulence	1. Technology is changing rapidly in companies. 2. Technological changes present tremendous opportunities. 3. It's hard to predict where technology will be. 4. Small technological development process.	(Santos & Beuren, 2022)
8	Performance organization	1. Comprehensive organizational performance. 2. Comprehensive profitability of the organization. 3. Relative market share for principal goods. 4. The comprehensive efficiency of the supply system.	(Frare et al., 2022) (Ismail, 2015)

The association between variables was analyzed in this study using Partial Least Squares (PLS) modeling. PLS-SEM conducts regression and confirmatory analysis through a two-stage procedure encompassing outer and interior models (Hair et al., 2010). The validity and reliability of the instrument are evaluated, and the deep model assesses the measurement quality of the indicator representing the latent components. The outer model assesses the model and the relationship between variables to test hypotheses.

The goodness of fit test (GOF) that employs the use of RMR (Root Mean Square Residual) is among the other fit indices found in SEM, which seeks to quantify the extent of divergence to the observed covariance matrix, accurate data compared to the covariance matrix model projection. In other words, GOF is regarded as fit when $\leq$ is 0.08.

Data Analysis

The evaluation of the model measurement stage using PLS begins with analyzing both the inner and outer models. In this case, the external model is evaluated based on several validity and reliability parameters, such as convergent validity, discriminatory validity, Cronbach alpha, and composite reliability. Convergent validity is calculated based on peripheral loading with a target value of > 0.7, Average Variance Extracted at least 0.5, and the degree of accuracy of the measurement of latent variables (Hair et al., 2017). The validity of discrimination was measured through cross-loadings, Fornell-Larcker, and Heterotrait-Monotrait Ratio (HTMT). The validity of discrimination is confirmed by Fornell-Larcker when the AVE value is greater than the value of the construct correlation with other variables, while HTMT indicates the validity of discrimination when the value is less than 0.85 but sets an upper limit of 0.90 for a strict lower threshold Alpha Cronbach and composite reliability, which measures the internal consistency of a construct, set a reliability target of > 0.7 (Hair et al., 2017). The measure of collinearity relates to the Variance Inflation Factor (VIF); below 4 indicates acceptable multicollinearity, while above 10 indicates the need for corrective measures.

Results

Table 4 displays the demographic characteristics of the respondents. The poll had 329 respondents from startups, focusing specifically on e-commerce startups. This procedure was conducted from June to November 2024. The sample population of this study consisted of 200 male respondents, who accounted for 60% of the total, and 129 female respondents, who represented 40% of the sample. The demographics of the respondents are depicted in Table 4.

Table 4. Demographics of respondents

Characteristic	Value	Percentage
Gender	Men Women	60% 40%
Age	19 20 21 >21	5% 10% 20% 65%
Frequency of use of technology or digital devices for learning	Infrequently Occasional Often Always	3% 5% 30% 62%

MEASUREMENT MODEL

Convergent validity is a measurement model component frequently referred to as the outer model in SEM-PLS. Concurrently, it is known as confirmatory factor analysis (CFA) in covariance-based structural equation modeling (SEM). Two criteria are used to determine whether the router model (measurement model) meets the convergent liquidity requirements for reflective constructs: (1) a significant p-value must be less than 0.05, and (2) loadings must exceed 0.7. However, the loading criterion above 0.7 is occasionally not met in specific situations, particularly for recently developed surveys. Consequently, a sustained dosage range of 0.40-0.70 should be considered. The model must exclude indicators with a loading value of less than 0.40. It is imperative to assess the impact of the indicator's removal on composite reliability and the average variance extracted (AVE) for indicators with a weighting between 0.40 and 0.70. Indicators with loadings between 0.40 and 0.70 may be eliminated if they improve the average variance extracted (AVE) and composite reliability beyond their thresholds. The composite reliability is 0.70, while the AVE threshold is 0.50 (Hair et al., 2019). There is an additional concern when indicators are eliminated: their impact on the content validity of the concept. Indicators with minimal loading are occasionally retained because they contribute to the content validity of the construct. A variable validity assessment is illustrated in Table 5.

Table 5. Validity testing based on outer loading

	Constraining levers	External stimuli	Enabling levers	Knowledge sharing	Organizational culture	Performance	Radical innovation	Turbulence technology
CL1	0.979							
CL2	0.971							
CL3	0.979							
CL4	0.973							
CL5	0.978							
CL6	0.983							
CL7	0.986							
CL8	0.981							
CL9	0.981							
EL1			0.985					
EL10			0.983					
EL2			0.986					
EL3			0.983					

	Constraining levers	External stimuli	Enabling levers	Knowledge sharing	Organizational culture	Performance	Radical innovation	Turbulence technology
EL4			0.972					
EL5			0.975					
EL6			0.979					
EL7			0.984					
EL8			0.981					
EL9			0.981					
ES1		0.988						
ES2		0.984						
ES3		0.991						
ES4		0.992						
ES5		0.992						
KS1				0.986				
KS2				0.989				
KS3				0.988				
KS4				0.983				
KS5				0.988				
OC1					0.984			
OC2					0.987			
OC3					0.985			
OC4					0.987			
OC5					0.980			
OC6					0.987			
PF1						0.981		
PF2						0.986		
PF3						0.984		
PF4						0.985		
RI1							0.982	
RI2							0.985	
RI3							0.988	
RI4							0.985	
RI5							0.985	
RI6							0.985	
TT1								0.988
TT2								0.985
TT3								0.983
TT4								0.984

The validity requirements based on the outer loading value have been satisfied, as evidenced by the validation test of outer loading in Table 5 and Figure 2. In particular, all outer loading values exceed 0.7.

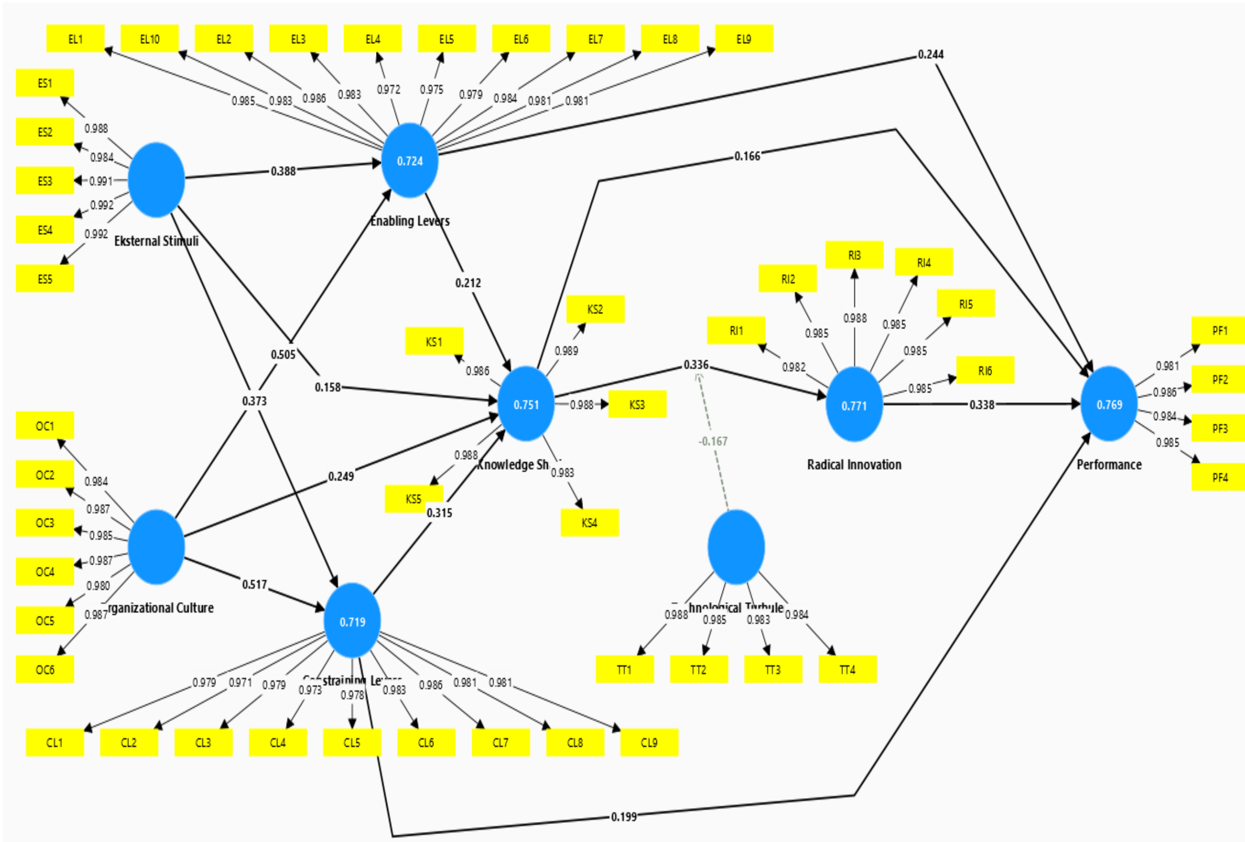

Figure 2. Validity testing based on outer loading

The optimal AVE value is more significant than 0.5. Compliance with the validity criteria based on AVE is demonstrated by all AVE values exceeding 0.5. Furthermore, composite reliability (CR) metrics are implemented to evaluate reliability. The CR value that is recommended is greater than or equal to 0.7. Compliance with the dependability criteria based on CR is indicated by all CR values exceeding 0.7. Furthermore, reliability testing was implemented by employing Cronbach's alpha (CA) values. The recommended CA value exceeds 0.7. Compliance with dependability standards as determined by CA is indicated by all CA values exceeding 0.7. The result Extracted of the average variance (AVE), composite reliability (CR), and Cronbach's alpha (CA) are presented in Table 6.

Table 6. Extracted average variance (AVE), composite reliability (CR), and Cronbach's alpha (CA)

	Cronbach's alpha	Composite reliability (rho_c)	Extracted mean variance (AVE)
Constraining levers	0.995	0.995	0.959
External stimuli	0.995	0.996	0.979
Enabling levers	0.996	0.996	0.962
Knowledge sharing	0.993	0.995	0.973
Organizational culture	0.994	0.995	0.970
Performance	0.989	0.992	0.968
Radical innovation	0.994	0.995	0.970
Turbulence technology	0.990	0.992	0.970

The recommended CA value is above 0.7. It is known that all CA values are> 0.7, which means it has met the reliability requirements based on Cronbach's alpha. Furthermore, the validity of the discrimination was tested using the Fornell-Larcker approach. Table 7 presents the results of the discrimination validity test.

Table 7. Discrimination validity testing (Fornell-Larcker)

	Constraining levers	External stimuli	Enabling levers	Knowledge sharing	Organizational culture	Performance	Radical innovation	Turbulence technology
Constraining levers	(0.979)							
External stimuli	0.793	(0.989)						
Enabling levers	0.810	0.798	(0.981)					
Knowledge sharing	0.816	0.779	0.798	(0.987)				
Organizational culture	0.820	0.812	0.820	0.810	(0.985)			
Performance	0.805	0.805	0.814	0.788	0.821	(0.984)		
Radical innovation	0.806	0.812	0.817	0.784	0.826	0.828	(0.985)	
Turbulence technology	0.803	0.812	0.816	0.784	0.826	0.830	0.836	(0.985)

Influence Significance Examination (Hypothesis Examination)

The hypothesis uses a two-tailed technique with a significance threshold of 5%. The p-value between the variables is used to evaluate the hypothesis. The hypothesis is accepted if the p-value is less than 0.05 and the T-value is less than 1.950 (Hair et al., 2019) this can be seen in Table 8.

Table 8. Path coefficient test and significance of influence

Hypothesis		Original sample (O)	Average sample (M)	Standard deviation (STDEV)	T Statistics (|O/STDEV|)	P value	Result
H1	External stimulus -> enabling lever	0.388	0.390	0.129	3.012	0.001	Significant
H2	External stimulation -> constraining levers	0.373	0.372	0.129	2.888	0.002	Significant
H3	External stimuli -> knowledge sharing	0.158	0.151	0.074	2.133	0.017	Significant
H4	Organizational culture -> enabling leverage	0.505	0.505	0.128	3.956	0.000	Significant
H5	Organizational culture -> constraining levers	0.517	0.518	0.130	3.979	0.000	Significant
H6	Organizational culture -> knowledge sharing	0.249	0.246	0.096	2.606	0.005	Significant
H7	Enabling levers -> knowledge sharing	0.212	0.217	0.097	2.193	0.014	Significant
H8	Containing levers -> knowledge sharing	0.315	0.317	0.102	3.098	0.001	Significant
H9	Knowledge sharing -> radical innovation	0.336	0.331	0.094	3.579	0.000	Significant
H10	Technological turbulence x Knowledge sharing -> radical innovation	-0.167	-0.153	0.049	3.432	0.000	Significant
H11	Radical innovation -> performance	0.338	0.348	0.130	2.606	0.005	Significant
H12	Knowledge sharing -> performance	0.166	0.163	0.086	1.930	0.027	Significant

Hypothesis		Original sample (O)	Average sample (M)	Standard deviation (STDEV)	T Statistics (|O/STDEV|)	P value	Result
H13	Enabling levers > performance	0.244	0.244	0.109	2.233	0.013	Significant
H14	Constraining levers > performance	0.199	0.187	0.086	2.315	0.010	Significant

In Table 8, it can be concluded that all H1-H14 hypotheses have a positive effect because the P-value < 0.05. The R-squared value of constraining levers is 0.719, which suggests that external stimuli and organizational culture can influence constraining levers by 71.9%. External stimuli and organizational culture can account for 72.4% of the variance in enabling levers, as the R-squared value of 0.724 indicates. External stimuli, organizational culture, constraints levers, and knowledge sharing collectively exert a 75.1% influence on knowledge sharing, as evidenced by the R-squared value of 0.751. The performance R-squared value is 0.769, suggesting that performance may be influenced by 76.9% by enabling levers, constraining levers, knowledge sharing, and radical innovation. Knowledge sharing may affect radical innovation by 77.1%, as evidenced by the R-squared value of 0.771. This can be seen in Table 9.

Table 9. R-square

	R-square
Constraining levers	0.719
Enabling levers	0.724
Knowledge sharing	0.751
Performance	0.769
Radical innovation	0.771

The predictive significance of external stimuli and organizational culture to constraining levers is indicated by the Q-square value of 0.686. The predictive importance of external stimuli and organizational culture to enabling levers is indicated by the Q-square value of 0.693. The Q-square value for knowledge sharing is 0.727, indicating that external stimuli, organizational culture, constraining levers, and knowledge sharing possess predictive significance to knowledge sharing. The Q-square performance score is 0.739, indicating that enabling levers, constraining levers, knowledge sharing, and radical innovation predict performance. The Q-Square score for radical innovation is 0.730, indicating that knowledge sharing has predictive significance to radical innovation. This can be seen in Table 10.

Table 10. Q-square

	Q^2 (=1-SSE/SSO)
Constraining levers	0.686
Enabling levers	0.693
Knowledge sharing	0.727
Performance	0.739
Radical innovation	0.730

An SRMR value of 0.054, less than 0.1, suggests that the model is deemed to have a decent fit, as per the results of the goodness of fit SRMR test. This can be seen in Table 11.

Table 11. Evaluation of goodness of fit model

	Approximation model
SRMR	0.054

This research aims to analyze the impact of the organizational culture, external stimuli, enabling levers, constraining levers, knowledge sharing, radical innovation, and technological turbulence on the growth of new ventures in Indonesia. An organization that has an entrepreneurial culture that encourages innovation, collaboration, and flexibility positively influences the performance of the startup. Organizations that embrace diversity in thinking and allow participation in their decision-making tend to perform better. Other external forces, such as competition in the market, advancement in technology, and the needs of the customers, create tension that could force the startups to be innovative. External stimuli are really important for organizations in motivating societies to change and create something new.

Enabling levers

Enabling factors such as vision-driven leadership, availability of technological tools, and financial backing encourage and propel new ventures toward superior achievement. The development and deployment of enabling levers supply the required resources, facilities, and tools to initiate new ideas and allow one to meet set objectives. Constraining levers: some limitations, such as lack of sufficient resources, bureaucratic procedures, or lack of the necessary technology, can reduce the innovative capability and thus influence the performance of the organization negatively. As a new venture continues to grow, some obstacles will need to be managed and moved around.

Knowledge sharing

The exchange of honed skills and expertise amongst team members internally and with external organizations is beneficial for any establishment. It fosters development through creativity and, most importantly, improves marketing strategy, which, in essence, is based on the relationship between different partners. Radical innovation – taking considerable technological risks to achieve greater change and implementing novel ideas enables younger startup businesses to be competitive in the market. However, although the risk is significant, companies that take calculated risks are placed in a favorable competitive position.

Technological turbulence

Businesses across the board face rapid and unpredictable changes in technology, particularly in particular new ventures. The shift in technology can sometimes serve as an opportunity to innovate and serve as a competitive advantage, but on the other hand, adapting to rapid change while allowing the company to lag in innovation can also prove to be difficult. Research shows, and so do our observations, that being able to change with the environment while remaining innovative, alongside having Knowledge and information and the culture to support being able to respond, helps a business perform better in Indonesia. Also, levers that can assist in providing the relevant material and support needed alongside guiding the company on how to navigate constraint levers help increase the chances of a startup's survival. Companies that can adjust to the radical change in the market and navigate the shift in technology stand a greater chance of succeeding in the rapidly changing market. Also, changing the international landscape proves a greater challenge to businesses. Still, if catered to alongside assisting in the ability to change the rate of growth against changes in technology, it can help a company in growing and competitive advantage.

An application culture must be adopted in Indonesian startups, along with enhancing collaboration in knowledge sharing and maximizing internal and external parameters that will facilitate the generation of ideas and eliminate the current constraints. On the other hand, it is also necessary to initiate actions toward technological changes and make use of the available levers to ensure optimal performance.

DISCUSSION

This research sought to determine how external stimulus, organizational culture, management control system, and radical innovation affect organizational performance while emphasizing the effect of technology turbulence moderating, particularly on startups in Indonesia. Market changes, competition, and internal customers significantly affect organizational performance. Those startups that can adjust to the externals will likely perform better. However, if the technology turbulence is too high, then the efficacy of this response is bounded, as organizations cannot pinpoint their needs in times of rapid shifts. The findings of this study are in contrast with the research of Luiz and Beuren (2023); the analyses show significant negative effects of environmental uncertainty on MCS use and non- significant ones on product and process innovation, which suggests that when environmental uncertainty increases, the MCS use decreases. As some of the key factors leading to organizational performance, an innovative, collaborative, and learning culture has been proven to be critical; in Indonesian startups, the organization's culture is an important asset that may support the increased level of innovation. Startups with a culture that promotes deterring them from taking risks and accepting changes can sustain themselves and succeed amidst technological uncertainties. This contradicts research carried out by Gasela (2022) suggesting that culture negatively influences the making of MCS strategies. The research findings confirm that managerial practices promoting innovative or collaborative organizational cultures will lead to better startup performance. Managers can enhance the work landscape's imaginative, risk-loving, and learning principles.

An appropriate control management system assists organizations in achieving a compromise between the two extremes of flexibility and rigidity. In young and growing companies, management control systems (MCSs) must be developed most of the time to ensure they do not hinder innovation but enhance efficiency. The results indicated that the MCS is adequate, but for the MCS to be more effective, the control system must be flexible to cope with technology changes and enhance efficiency. Incorporating an MCS is helpful to managers in dealing with the trade-off between the need for flexibility and the need for efficiency. The findings indicate that a flexible MCS enables companies in their venture stage to remain afloat by being responsive to changes around them.

The empirical evidence substantiates that knowledge sharing positively affects the generation of radical innovations. This contradicts research by Zhao et al. (2020) and Ahmad and Karim (2019), stating that knowledge sharing can increase organizational risk. Creating new value in the marketplace can be seen as one of the main features of an organization, which can lead to growth, and radical innovation can be the key. It is often said that companies whose main objective is radical innovation are usually on the top. Nevertheless, radical innovation is associated with risks of market failure or technological failure, especially in fast-changing technology (Malmi et al., 2020).

A startup should engage in radical innovation to gain a competitive advantage and be recognized in the market. The analysis shows that radical innovation is among the most critical determinants of enterprises' performance. For example, creating a separate allocation for funding innovation activities aims to ensure.

Technological turbulence was known to have a moderator effect of more than one dimension. One break it can provide is the technological shift that enhances the chances for breakthroughs for startup companies. Conversely, excessive turbulence is said to be a barrier since it demands sophisticated allocation to cope with the rapid pace of technological change and remain competitive in the market. This research demonstrates that technological turbulence is a moderating variable that has some significance. It allows managers to be ready for such technological shifts while capitalizing on the opportunities that come with such changes.

This research adds to the body of knowledge by offering insights from the viewpoints of startups in Indonesia, which is in a fast-changing technology ecosystem. The current study shows how important it is to gain synergy across internal and external factors to achieve enhanced organizational performance. This discussion closed by stating that the interplay of the internal, external, and organizational imperative to cope with market turbulence is the missing link in understanding the performance of startups in Indonesia. Because of this unique combination of factors of novelty and timeliness, this research provides an essential answer to the challenges in the field of organization management and the generation of new ventures in the Indonesian context.

IMPLICATIONS

The findings of this study are based on several theoretical foundations that provide space for technology integration to occur in corporate management education.

THEORETICAL IMPLICATIONS

This study enhances the theory on the link between internal variables (organizational culture, management control system, and radical innovation) and external variables (external stimuli and technological turbulence) in determining the organization's performance. Including technological turbulence as a moderation variable enhances understanding how organizations can cope in an uncertain and volatile market. This study contributes to the body of literature on the contingency thinking framework, which argues that the relation of variables is conditioned by situations such as technological turbulence. This paper highlights that organizational culture must be innovative and collaborative as it is a prerequisite for improved performance of startup firms, especially in a technology-driven ecosystem. This makes it possible to theorize how the components of organizational culture can be transformed for the benefit of the startup industry. Contributing to organizational theory, especially the Resource Based View (RBV) approach, positions the organization's culture as an inimitable intangible resource, yielding a competitive edge.

The findings of this research show that management control systems (MCS) not only provide a means of coping with efficiency loss but are turned to as a means of coping with adversities such as the changing nature of technology. This finding opens up an avenue for understanding the scope at which MCS is flexible in MCS adaptation in an unpredictable perspective. This strengthens the theory of organizational control by accentuating MCS's interactive and flexible character concerning innovation support and technology changes. Therefore, This research establishes that radical innovation has a considerable bearing on an organization's performance, mainly when external stimuli and pressures exist. Within the confines of new companies, radical innovation becomes one of the most critical factors for success. The findings of this research also contribute to the theory of innovation by focusing on the disparity of influence of incremental and radical innovations and explaining how technological turbulence impacts the results of these innovations.

PRACTICAL IMPLICATIONS

The results of this study provide strategic guidance for practitioners, especially startup managers, policymakers, and other stakeholders, in improving organizational performance. Startups must develop the ability to detect, respond to, and adapt to market changes, customer needs, and competitor pressures. Well-managed external stimuli can be an opportunity for innovation and growth by adopting (a) real-time market monitoring technology, (b) establishing close relationships with customers to understand their needs in-depth, and (c) conducting competitor analysis periodically to identify new trends.

Startups need to implement a flexible management control system to balance the need for operational efficiency with the need for innovation exploration. This system must be adaptive to rapid changes due to technological turbulence. Radical innovation is one of the main drivers of organizational performance. Startups must dare to invest in innovations that can create breakthroughs in the market. Startups need to see technology turbulence not only as a threat but also as an opportunity to gain a competitive advantage. With the right strategy, startups can take advantage of the dynamics of technology to expand the market and improve performance. One example is investing in the latest technology training for employees and adopting technology relevant to their business model to improve operational efficiency.

Thus, the approach developed has been made clear to practitioners, above all managers of startups, policymakers, and other stakeholders who aim to improve the performance of organizations. Startups should acquire the capacity to notice and cope with shifts in the market, customer expectations, and competitive pressures. Properly handled, outside factors and events can represent an opportunity for market innovations and advancements through (a) using appropriate technology to monitor the markets as they happen, (b) creating ready links with the clientele to know what their needs are, and (c) carrying out regular assessments of the competition for new developments.

Advanced technologies make it difficult for startups to seek a balance between operational stability and innovative growth if they only rely on traditional management control systems. This enables them to actively participate in the competition regardless of the turbulences in the market. Startups are increasingly effective at establishing aggressive strategies geared towards making investments to enhance their performance and grow their market share. Horizontal differentiation in freelance portals may also be employed to improve competitive advantage. Subsequently, organizations should be managed in a manner that allows them to exploit this behavior through appropriate control measures.

Furthermore, in addition to seeking clear performance objectives, organizations must use innovation to capture most of the market. This will surely grow the company and improve performance in the long run. Subsequently, they will identify market opportunities to increase competitive advantage, facilitating growth.

CONCLUSION

This study contributes uniquely to the startup sector in Indonesia by highlighting the critical role of external and internal factors in improving organizational effectiveness. Specifically, it underscores how startups can leverage external triggers, align them with organizational culture, and manage inhibitory and supportive levers to foster innovation, thereby enhancing competitiveness and overall performance. This research fills a crucial gap in the literature by offering a comprehensive view of how these dynamic interactions influence startup success in a rapidly evolving market. The findings suggest that startups that effectively navigate technological turbulence (by remaining flexible and adaptive) can successfully balance the need for operational stability with the drive for innovation.

This study provides actionable insights for startup managers on strategically harnessing external triggers and organizational culture to create a competitive edge. By applying the strategies discussed, such as embracing technological opportunities and improving responsiveness to market changes, startups are better positioned to thrive in a dynamic and competitive environment.

However, the study's applicability should be considered cautiously due to certain limitations. Contextual factors such as geographical differences, variations in performance measurement, and the data collection method may influence the findings. Future research can refine and extend these insights by considering a broader range of moderation factors, international contexts, and qualitative methodologies to deepen understanding. By exploring these areas, future studies could enhance the practical relevance of the findings, providing startup managers with more holistic and actionable recommendations.

LIMITATIONS

Despite the significant findings, this study's applicability may be limited by various contextual factors, such as regional differences, variations in measuring performance, and the specific methods used in data collection. These limitations should be considered when applying the findings to other startup environments.

FUTURE WORKS

Future research could expand on these findings by examining additional moderating variables and broadening the geographical scope to include international contexts. Incorporating qualitative methodologies would also provide more affluent and more nuanced insights into the dynamics of control systems, innovation, and organizational performance. This research could further explore the interaction between different organizational aspects and provide a more holistic view of how startups can navigate complex business environments to achieve sustainable growth and innovation.

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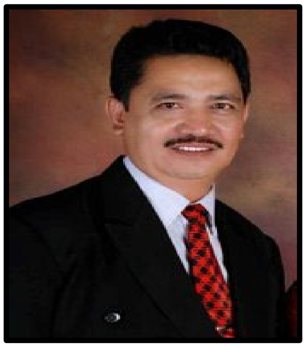

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