frontiers | Frontiers in Sustainable Tourism

TYPE Original Research
PUBLISHED 12 February 2025
DOI 10.3389/frsut.2025.1536837

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OPEN ACCESS

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RECEIVED 29 November 2024
ACCEPTED 13 January 2025
PUBLISHED 12 February 2025

CITATION
Hsiao CY (2025) Constructing recreational farm operator strategic leadership in VUCA environment. *Front. Sustain. Tour.* 4:1536837. doi: 10.3389/frsut.2025.1536837

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Constructing recreational farm operator strategic leadership in VUCA environment

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In a VUCA environment, especially during crises like COVID-19, recreational farm operators face significant challenges. This study examines how strategic leadership fosters adaptability and innovation among Taiwanese operators, drawing on 20 in-depth interviews with diverse recreational farms. Data triangulation via observations, financial analysis, and semi-structured interviews—guided by Schoemaker et al.'s framework—revealed six pivotal leadership capabilities: anticipation, challenge, interpretation, decision-making, alignment, and learning. These competencies enabled effective strategies such as forecasting market trends, diversifying products, embracing digital transformation, reorganizing processes, and developing new offerings to enhance resilience. Forward-looking decision-making and continuous learning further strengthened operations, ensuring operators could seize opportunities amidst uncertainty. The findings underscore strategic leadership's central role in cultivating adaptability and offer insights for advancing agritourism management worldwide.

KEYWORDS

recreational farm, VUCA environment, strategic leadership, coping strategy, agritourism business

Introduction

Agritourism leverages local resources to support sustainable rural development through a Triple Bottom Line (TBL) approach, encompassing economic, social, and environmental benefits (Stoddard et al., 2012; Phillip et al., 2010; Tuan, 2020). It enhances rural economies by offering educational and recreational experiences, diversifying farm incomes, and fostering community stability through employment and empowerment opportunities, particularly for women and youth (Chase et al., 2018; Halim et al., 2020; Savage et al., 2022). However, its economic impact remains debated, with evidence suggesting that smaller farms often contribute more significantly to local economies than larger enterprises (Schilling et al., 2014).

Agritourism fosters sustainable environmental practices by involving tourists in interactive activities and providing access to fresh, locally-produced agricultural goods (Kim et al., 2019; Tuan, 2020). The sector exhibits resilience to environmental changes through innovative strategies that highlight local products, scenic landscapes, and the preservation of rural heritage (Bhatta and Ohe, 2020; Hsiao and Tuan, 2023; Palmi and Lezzi, 2020). However, agritourism shares challenges with the broader tourism industry, including high financial risks, significant capital requirements, intense competition, and limited capacity for crisis resilience (Singal, 2015). Additionally, agritourism ventures face unique obstacles tied to the tourist experience, such as risks in transportation and accommodation and uncertainties associated with traveling to unfamiliar locations (Williams and Baláž, 2015).

In Taiwan, recreational agriculture is a government-sanctioned agritourism model that allows farms to offer recreational and educational activities, attracting consumers during their leisure time (Tuan, 2019). It is categorized into two types: recreational farms and recreational agriculture areas. Recreational farms, based on scale, are divided into simple and complex types. Simple farms focus on activities such as agricultural product picking, farm work experiences, food tasting, and education, while complex farms expand to include tourism services like dining, accommodation, conferences, and transportation. Recreational agriculture areas leverage rural communities' industries, culture, and ecology to design experiential activities and tours that draw visitors (Hsiao and Tuan, 2023). Recreational farms integrate family farming with small and medium-sized enterprise models, requiring operators to take on multiple roles as decision-makers. These farms offer a diverse range of organic local products, natural processed foods, and recreational services, creating varied income streams. However, this multifaceted approach also exposes operators to more complex market risks compared to specialized agricultural production.

Agritourism relies more heavily on natural resources than general tourism, with a strong dependence on seasonal activities and predominantly small- to medium-scale operations (Barbieri and Mshenga, 2008). Its core offerings are rooted in farms, ranches, orchards, and other natural landscapes, where visitors engage closely with elements such as land, rivers, and weather. This deep connection to natural resources makes agritourism highly susceptible to risks associated with climate change (Tuan, 2020). Activities like harvest festivals, pick-your-own produce events, and farm stays are tightly linked to agricultural production cycles, with peak demand occurring during harvest or blooming seasons. This seasonality often leads to uneven revenue distribution, requiring operators to carefully plan labor, marketing, and resource allocation within limited budgets to manage these fluctuations (Hsiao and Tuan, 2023).

Agritourism is also vulnerable to major health crises, such as the COVID-19 pandemic, which had a profound impact on the sector. The pandemic caused a significant decline in tourist numbers, a shift in preferences toward smaller group travel, a downturn in international tourism, and a contraction of the global tourism market to levels unseen in decades (Dolnicar and Zare, 2020; Kukanja et al., 2020; Hsiao and Tuan, 2023; UNWTO, 2020). From an operational perspective, most agritourism enterprises are run by family farms or cooperatives, as opposed to large corporations. While this structure allows for agility and swift decision-making during crises, it also imposes notable constraints in financial resources, management capabilities, resource allocation, and labor planning. To overcome these challenges, operators must rely on keen crisis perception, tailored leadership strategies, and effective adaptive measures. Prayag et al. (2024) illustrate how tourism operators in Sri Lanka effectively guided their employees and organizations through the early stages of the pandemic by employing vision sharing, task-oriented leadership, and change management. Their findings highlight the crucial role of leadership in fostering resilience within tourism enterprises. Similarly, strong leadership plays an essential role in helping agritourism businesses adapt to crises and enhance operational flexibility (Odeh et al., 2023). Given these vulnerabilities, strengthening strategic leadership capabilities is critical for agritourism enterprises to manage risks and enhance resilience (Darvishmotevali et al., 2020; Lombardi et al., 2021). For instance, agritourism operators in Italy successfully adapted their business models by capitalizing on the growing trend of direct farm sales, maintaining revenue streams through focused sales of farm-produced vegetables despite travel restrictions (Zanetti et al., 2022). This underscores the importance of innovative strategies and adaptive leadership in navigating an increasingly volatile environment.

Given the unique challenges agritourism faces during crises, which differ significantly from those encountered by the broader tourism industry, existing literature underscores the indispensable role of strategic leadership in this sector. However, much of the current research focuses on crisis management strategies in the tourism industry (Gössling et al., 2021; Heinonen and Strandvik, 2021), adaptive strategies specific to agritourism (Hsiao and Tuan, 2023; Brune et al., 2023), and the application of smart technologies in hospitality (Garibaldi and Pozzi, 2020). Additionally, studies emphasize the need for agritourism operators to enhance knowledge management (Farooq, 2019; Mahdi and Nassar, 2021), agile leadership (Lombardi et al., 2021), corporate social responsibility (Gössling et al., 2021; Magno and Cassia, 2021), and intersectoral collaboration (Filimonau and De Coteau, 2020) to effectively respond to crises. Nonetheless, there remains a significant research gap concerning long-term strategies for agritourism to address comprehensive crises. Schick et al. (2017) highlight that practical management skills for addressing systemic crises in the tourism industry remain underexplored.

The concept of the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment provides a valuable framework for examining comprehensive crises. It aids in understanding the dynamic and unpredictable nature of contemporary business settings, emphasizing the uncertainty and complexity that impact organizational goals. The COVID-19 pandemic, as a prominent example of a systemic crisis, exposed significant challenges for the agritourism sector within a VUCA context, leading to widespread operational disruptions (Hsiao and Tuan, 2023; Škare et al., 2021). Schoemaker et al. (2013) identify key capabilities—anticipation, challenge, interpretation, decision-making, alignment, and learning—as critical for navigating uncertainty in a VUCA environment. Similarly, George (2017) highlights vision, understanding, courage, and adaptability as essential qualities for addressing such challenges. Expanding on this, Adomako (2021) argues that effective navigation of VUCA environments requires a forward-looking vision, deep understanding derived from challenges, decisiveness and alignment supported by courage, and adaptability enhanced through continuous learning.

Considering that most agritourism enterprises are small-scale, often family-run operations, they face common challenges in managing strained relationships, making timely decisions,

Abbreviations: VUCA environment, The concept of the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, which originated in the 1990s at the American War College, was initially devised to prepare military leaders for unconventional warfare in the post-Cold War era. It was subsequently adapted for the business sector to articulate the challenges that leaders face in navigating uncertain and complex business landscapes.

maintaining financial leverage, and ensuring operational flexibility. These skills are particularly crucial in the VUCA context (Denyer, 2017; Farooq, 2019; Hsiao and Tuan, 2023; Schoemaker et al., 2018).

This study draws on the experiences of recreational farms during crises to develop strategic leadership mechanisms, addressing the existing research gaps. It explores the crisis management strategies adopted by farm operators, enabling them to navigate and succeed in challenging environments effectively.

Literature review

VUCA environment

The concept of the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, which originated in the 1990s at the American War College, was initially devised to prepare military leaders for unconventional warfare in the post-Cold War era. It was subsequently adapted for the business sector to articulate the challenges that leaders face in navigating uncertain and complex business landscapes (Schoemaker et al., 2018). Within this business context, the VUCA environment is characterized by rapid changes in business models, engendering significant uncertainty and unpredictability (Adomako, 2021). This environment presents four distinct challenges to business operations (Bennett and Lemoine, 2014; Mack et al., 2015; Schoemaker et al., 2018):

Volatile: In the VUCA setting, environmental fluctuations can severely disrupt established business models, presenting substantial challenges (Adomako, 2021; Lawrence, 2013). For example, agritourism contends with such volatility, grappling with issues like climate change, which demands adaptive strategies for farm production (Khanal et al., 2021), and technological disruptions from artificial intelligence, online marketing, and blockchain applications (Zerssa et al., 2021). Additionally, pandemics can curtail tourist visits and impact food purchasing behaviors (Gössling et al., 2021). In response, agritourism has embraced online shopping and developed food and farming educational experiences to adapt its business model (Tuan, 2020; Zanetti et al., 2022).

Uncertain: Today's business environment is characterized by a reliance on existing business models that are insufficient for predicting future trends, thereby compounding uncertainty and control challenges, including those precipitated by the COVID-19 pandemic (Bennett and Lemoine, 2014; Cook, 2015; Williams and Baláž, 2015; Williams et al., 2022). Despite these challenges, the pandemic has spurred new business opportunities in agritourism, such as the emphasis on fresh food, horticultural therapy, product processing, and the expansion of online shopping platforms (Hsiao and Tuan, 2023; Vittuari et al., 2021). The demand for outdoor spaces and digital workspaces has also prompted operators to offer long-stay options, thus enhancing rural employment and digitalization (Tuan, 2020).

Complex: The complexity of crises often leads to confusion, as businesses struggle to identify underlying causes and effects (Mack et al., 2015). The pandemic has driven agritourism operators to re-evaluate their over-reliance on tourism revenues, with occasional closures leading to a focus on diversifying production and processing to mitigate the impact on tourism. This shift has necessitated a restructuring of farm income and a reorientation of operations (Hsiao and Tuan, 2023; Zanetti et al., 2022). Government interventions, such as lifting lockdowns, have significantly influenced operators' adaptations to offer long-stay services and remote workspaces (Schuh et al., 2022; Tuan, 2020).

Ambiguous: Crises create scenarios where multiple, often conflicting, choices and misunderstandings arise, leading to business ambiguity (Macpherson, 2019; Stensaker et al., 2014). In a VUCA environment, this ambiguity can hinder operators from making prompt and accurate decisions. During a pandemic, when multiple crises converge, prioritizing decisions becomes crucial, potentially leading to significant losses or temporary operational shutdowns.

This analysis elucidates the complex interplay of factors in the VUCA environment that agritourism operators must navigate, underscoring the necessity for strategic adaptability and proactive crisis management. The VUCA environment is inherently linked to crises, often resulting in confusion and inconsistencies within business operations (Adomako, 2021; Santana, 2004; Schoemaker et al., 2018). Williams et al. (2022) explain that from a customer intention perspective, tourists are likely to plan their holidays sooner rather than later in environments characterized by uncertainty and ambiguity. In the context of agritourism, operators who cannot predict negative impacts, which disrupt established business models, and who lack control over business performance may face operational ambiguity. If agritourism operators rigidly adhere to established business models without adapting to environmental changes, this could exacerbate operational errors (Gandhi, 2017). While the literature has explored strategies for industries to cope with VUCA (Volatility, Uncertainty, Complexity, Ambiguity), there is still a significant gap regarding the practical experiences of operators in such environments.

To effectively navigate the VUCA environment, operators are advised to employ a strategic approach that encompasses the selection, implementation, control, evaluation, and feedback of adaptive strategies. Bennett and Lemoine (2014) suggest that managing a VUCA environment requires operators to develop capabilities in four key areas: preparing for volatility through robust information preparation, addressing uncertainty with enhanced information gathering and interpretation, managing complexity through the reorganization of information, and resolving ambiguity through a thorough understanding and reengineering of information.

Lubowiecki-Vikuk et al. (2023) applied the VUCA model to evaluate the resilience structure and marketing mix of hotels in Spain. Their study illustrates that changes in customer behavior and technology have a significant impact on hotel marketing strategies. Further illustrating practical applications of these strategies, Lai and Wong (2020) examined how hotel managers in Macau utilized their experience and foresight to downsize operations promptly at the onset of the COVID-19 outbreak, thereby minimizing financial losses. Such historical insights demonstrate that operators can develop effective coping strategies based on past experiences in managing crises.

This study seeks to bridge the existing research gap by developing a strategic leadership framework for agritourism operators. This framework will leverage operators' anti-pandemic

experiences to formulate robust strategies for coping with the complexities of the VUCA environment. Through this approach, the research aims to contribute to the broader discourse on strategic management in turbulent times, providing actionable insights for operators facing similar volatile conditions.

Strategic leadership in VUCA environment

In the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, leadership adaptability is crucial for maintaining business flexibility and agility. In a rapidly changing landscape, strategies that work today may become irrelevant tomorrow, requiring leaders with foresight, insight, and strong execution capabilities (Lai and Wong, 2020; Zhang-Zhang et al., 2022). George (2017) introduces the concept of VUCA Prime 2.0, emphasizing that effective leaders must embody Vision, Understanding, Courage, and Adaptability. These attributes are essential for navigating and mitigating the challenges inherent in the VUCA environment.

- Vision involves acquiring the knowledge and insights necessary to guide strategic planning and business direction.
- Understanding requires a deep grasp of available resources and environmental factors to enhance decision-making and minimize errors.
- Courage entails taking calculated risks, interpreting complex data, and fostering a culture of engagement with employees.
- Adaptability necessitates flexibility in monitoring strategy implementation, analyzing data, and evaluating outcomes.

Schoemaker et al. (2013, 2018) expand on this by identifying six critical leadership capabilities in a VUCA context: Anticipating, Challenging, Interpreting, Deciding, Aligning, and Learning. These skills enable leaders to foresee changes, interpret signals, make timely decisions, align strategies effectively, learn from setbacks, and implement proactive approaches. Similarly, Farhan (2021) emphasizes that strategic leadership involves information gathering, asset protection, questioning established norms, and resource integration to navigate crises effectively. Johnson and Hanson (1994) highlight that professional farm operators, akin to leaders in other sectors, are tasked with resource management, product and service development, marketing strategy planning, and market environment monitoring.

For agritourism operators, strategic leadership begins with establishing a vision that ensures sustainability. This involves Anticipating volatility through extensive information collection and setting clear strategic goals (George, 2017; Schoemaker et al., 2018; Zhang-Zhang et al., 2022). Addressing uncertainty requires Challenging established business models and Interpreting market data to adjust strategies accordingly. Courage is reflected in making high-risk strategic decisions and communicating these goals effectively in complex environments. Finally, Adaptability is essential for learning from past failures and responding nimbly to ambiguous situations (George, 2017; Schoemaker et al., 2018).

Previous research has shown that strategic leadership significantly enhances resilience in agritourism, particularly through the development and implementation of long-term crisis strategies. By driving diversification and innovation, strategic leadership helps integrate and leverage agricultural resources, generating substantial economic benefits (Stone and Rahimifard, 2018; Wu et al., 2024). It also fosters community engagement by promoting localized sustainable food systems, emphasizing environmental, sociocultural, economic, and health dimensions, while preserving local cultural heritage (Cavalleri et al., 2022). Furthermore, strategic leadership facilitates sustainability by encouraging practices that rely on multilevel interactions and feedback mechanisms, strengthening the competitiveness of farms and rural destinations (Paniccia and Baiocco, 2020). Additionally, it enhances collaboration and resilience within agritourism value chains through effective communication and social engagement (Brune et al., 2024).

In a VUCA environment, agritourism operators must cultivate a comprehensive vision, engage in innovative thinking, plan operations strategically, challenge established business models, make courageous decisions, and learn from failures to ensure sustainable operations. This study adopts the six strategic leadership capabilities proposed by Schoemaker et al. (2013, 2018) as a framework for interviews, offering a robust approach to understanding and applying strategic leadership in the agritourism sector.

Recreational farm

Recreational farms utilize agricultural, ecological, landscape, and cultural resources to provide tourists with entertainment and educational experiences. Comparable to agritourism operations in Europe and the USA, these farms are predominantly situated in rural areas, where they exploit the unique attributes of their environments (Barbieri and Mshenga, 2008; Phillip et al., 2010; Hsiao and Tuan, 2023). They offer a variety of products and services, including the sale of agricultural products, food processing, catering, and souvenir sales. These activities not only enhance the value of agricultural outputs but also contribute to diversified farm income streams (Gallarza and Gil-Saura, 2020; Tuan, 2019; United States Department of Agriculture (USDA), 2017).

These enterprises leverage local resources and cultural heritage to create unique products and marketing strategies, thus representing a form of agricultural diversification (Roman and Prus, 2020; Tuan, 2019). Innovation in tourism offerings on recreational farms often originates from local communities, incorporating elements of agriculture, landscape, and history (Palmi and Lezzi, 2020). Furthermore, recreational farms demonstrate a notable capacity for adapting to the Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment, showing resilience by transforming available resources into valuable commodities during crises (Chin et al., 2021; Hsiao and Tuan, 2023).

Continuous adaptation to environmental changes is crucial for the sustainability of recreational farms. According to Tuan (2019), these enterprises are fundamentally experience-based, requiring ongoing enhancements to their activities, products, and dining experiences to align with market trends and tourist expectations. Operators must effectively gather, comprehend, and analyze

information concerning the VUCA environment to navigate their businesses successfully (George, 2017; Schoemaker et al., 2018; Hsiao and Tuan, 2023).

In exploring diversification strategies, Salvioni et al. (2013) outlined three pathways for Italian farms: diversifying agricultural production, differentiating products through organic certification or regional labeling, and engaging in non-agricultural diversification such as recreational activities. Tuan (2019) conceptualizes recreational farms as a multi-layered industry that integrates agricultural production (primary), processing (secondary), and recreational experiences (tertiary). The sources of innovation in these farms are deeply rooted in the utilization of agricultural resources, emphasizing the safety and quality of agricultural products or their use as raw materials for food and health-related products.

Methodology

To effectively establish a strategic leadership mechanism for recreational farm operators in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, this study employs a qualitative approach to capture firsthand information on operators' coping strategies during the COVID-19 pandemic, a period characterized by unpredictability and instability. Due to time and resource constraints, convenience sampling was used, enabling rapid data collection but with limitations in achieving a fully representative sample (Micheals, 2003). To address this limitation, the study applied several principles to enhance representativeness, including considerations of geographic location, farm size, years of operation, and business models. For example, farms with diverse operational styles and located in different regions were selected to ensure balanced representation.

Participation criteria included (1) a minimum of 15 years of operation, (2) a role as president or general manager, (3) operation of a legally recognized farm, and (4) provision of food and accommodation services. These criteria ensured that responses were both informed and relevant. Supplementary secondary data were also used to validate findings. In qualitative research, data saturation is achieved when additional interviews fail to provide new insights. Hagaman and Wutich (2017) indicate that saturation typically occurs within 20 interviews. In this study, saturation was observed after the 15th interview, as responses began to overlap significantly with earlier interviews, with no new themes or insights emerging. This aligns with Guest et al. (2006), who propose that saturation is achieved when all core themes are fully developed and mentioned by multiple participants.

To ensure sufficient diversity, 20 operators from various regions and farm types were selected to represent a range of business models and challenges. These operators were contacted via email and phone, informed about the study's objectives and procedures, and interviews were scheduled to enhance the reliability and applicability of the research (Hagaman and Wutich, 2017). Researchers maintained long-term relationships with the selected operators, establishing trust that fostered the depth and quality of the interviews. Notably, the first author has 10 years of academic and practical experience providing consultancy to recreational farm operators (Table 1).

In-depth interviews were the primary method for understanding operators' firsthand experiences during the pandemic. To ensure validity, a semi-structured interview format was adopted, guided by Schoemaker et al.'s (2018, 2013) strategic leadership framework, which informed the development of the interview outline (see Table 2). This outline allowed for an in-depth exploration of leadership experiences, enhanced data comparability, and facilitated insights into the specific strategies operators used to address the challenges posed by COVID-19. Although this framework could constrain the bottom-up nature of qualitative research, the study mitigated this limitation by including open-ended questions during interviews, allowing participants to freely share their thoughts and expand on their experiences.

Data triangulation further strengthened the research by incorporating on-site observations, analysis of financial documents, and other related materials provided by the operators. For instance, farm accounting records were analyzed to assess the revenue proportions from primary, secondary, and tertiary sectors, with findings summarized in tables to validate the data. During the interviews, key questions were repeated to elicit more detailed responses, and observations and document reviews enriched the understanding of strategic leadership under pandemic conditions (Hagaman and Wutich, 2017). After the interviews, the data were coded, recorded, and verified through follow-ups with participants to ensure accuracy (Niew, 2020).

The interview process adhered to ethical research standards, including principles of confidentiality, informed consent, and result sharing. Participants received the interview outline beforehand and provided consent for audio recording. After the interviews, the content was shared with respondents for validation. The interviews, conducted between January 17 and February 13, 2022, lasted 1 to 1.5 h each, enabling a thorough exploration of the questions and facilitating the comprehensive collection of detailed information.

Findings

This study leverages the practical experiences of recreational farms during crises to develop their strategic leadership mechanisms, filling existing research gaps and exploring the coping strategies devised by recreational farm operators in response to crises. Enhanced understanding of environmental factors is crucial for operators to effectively adapt in dynamic environments, a need that became particularly evident during the COVID-19 pandemic. Figure 1 illustrates the VUCA indicators for recreational farms; the horizontal axis measures the operators' understanding of environmental damage, while the vertical axis evaluates the success rate of predicted strategic responses.

Volatility

To address volatility, operators primarily adjust their strategies by predicting future trends and market changes. This includes collecting market information, analyzing consumer behavior, and developing new products to meet market demands. Specific examples include:

FARM1: By collecting market information and analyzing consumer behavior, FARM1 predicted market demand during the

TABLE 1 The interview background.

Code	Year	Position	Theme	Food service	Accommodation service	Labor	Area (ha)	Location	Interview time
FARM1	34	CEO	Rice	✓	✓	50	120.0	Ilan	Jan 30, 2022
FARM2	34	CEO	Fruit	✓	✓	13	40.0	Ilan	Jan 27,2022
FARM3	32	CEO	Pomelo	✓	✓	45	14.0	Ilan	Feb 6, 2022
FARM4	15	General Manager	Vanilla	✓	✓	10	1.5	Taipei	Jan,27,2022
FARM5	25	Manager	Organic vegetable	✓	✓	10	5.0	Taoyuan	Jan 21, 2022
FARM6	29	Manager	Alpine Fruit	✓	✓	80	12.6	Hsinchu	Feb 4, 2022
FARM7	30	Manager	Flower	✓	✓	45	3.3	Miaoli	Feb 11, 2022
FARM8	20	CEO	Flower	✓	✓	50	6.5	Taichung	Feb 4, 2022
FARM9	30	Manager	Flower	✓	✓	100	13.0	Nantou	Feb 10, 2022
FARM10	6	General Manager	Flower	✓		17	0.6	Pingtung	Jan 29, 2022
FARM11	9	Manager	Cocoa	✓	✓	45	1.6	Pingtung	Feb 11,2022
FARM12	26	Manager	Dairy cattle	✓	✓	100	27.0	Miaoli	Jan 26,2022
FARM13	33	Manager	Pasture	✓	✓	103	120.0	Tainan	Feb 13, 2022
FARM14	40	Manager	Dairy cattle	✓	✓	10	200.0	Hualian	Jan 30, 2022
FARM15	45	Manager	Dairy cattle	✓	✓	50	67.0	Taitung	Feb 10, 2022
FARM16	20	General Manager	Clams	✓		150	2.0	Hualian	Jan 25,2022
FARM17	15	Manager	Bamboo	✓	✓	7	1.0	Nantou	Feb 11, 2022
FARM18	16	Manager	Water plant	✓	✓	20	3.0	Ilan	Jan 27,2022
FARM19	17	Manager	Animal	✓		40	70.0	Hsinchu	Jan 22, 2022
FARM20	22	Manager	Mask in special painting	✓	✓	9	2.0	Miaoli	Jan 21, 2022

pandemic and developed vegetable boxes and essential oil products to cope with the decrease in visitors.

FARM7: Anticipating a trend of revenge tourism, FARM7 organized flower exhibitions and developed products containing tea tree oil, boosting farm income and brand influence.

Uncertainty

To cope with uncertainty, operators adopted strategies that challenge existing models and interpret market data. They collected information through multiple channels and integrated resources to develop new business projects. Specific examples include:

FARM1: By gathering market information from various channels, including professional communities, associations, and academic journals, FARM1 developed an electronic product strategy to respond to market changes.

FARM5: During the pandemic, FARM5 provided fresh agricultural products and enhanced consumer engagement through outdoor weddings and online community activities.

Complexity

Facing complexity, operators need to make quick and wise decisions to ensure that team efforts align with overall strategic goals. They addressed complex challenges through internal collaboration and external partnerships. Specific examples include:

FARM1: During the pandemic, FARM1 reorganized the internal staff rotation system to enhance empathy and teamwork, ensuring the achievement of new goals.

FARM12: Encouraged employees to develop innovative products and services, explore new market opportunities, and improve professional skills to align with farm objectives.

FARM16: Collaborated with biotechnology companies to develop bitter melon clam slices and dry hand mousse. During the pandemic, idle manpower was redirected to digital platforms.

Ambiguity

In the face of ambiguity, operators need to learn from past experiences and flexibly adjust their strategies. They improve their preparedness and resilience for future challenges through reflection and learning. Specific examples include:

FARM1: During the pandemic, FARM1 learned from the cessation of handmade dumpling production, developed an electronic product strategy, and improved marketing channels, increasing revenue.

FARM20: Focused on egg roll processing, FARM20 utilized family feedback to improve the product line, addressing fluctuations in raw material costs and changes in market demand.

TABLE 2 The interview outline.

Concept	Variable	Outline	References
Strategic leadership	Anticipate	What methods do you use to collect market information on COVID-19 pandemic and recreational agriculture, and how often do you do so, and do you find opportunities in them? How many products or services have you developed since the outbreak of COVID-19 Pandemic (from 2020 to 2021)? Did the strategy help you improve your revenue during the pandemic? Please explain.	(Schoemaker et al., 2013, 2018; Tuan, 2019)
	Challenge	Do you seek other opinions before you understand the business dilemma? Do these opinions help you understand the full picture of the situation? How did you integrate and utilize your farm resources to develop new business projects during the COVID-19 pandemic?	
	Interpret	Do you invite others to provide input before you decide on a response to reduce the likelihood of failure? During the COVID-19 pandemic, did your applications for recreational agriculture revitalization measures and grants effectively help you develop new products and services? Please explain.	
	Decide	Do you have enough time during the pandemic to develop decisions and approaches? Why?	
	Align	During the pandemic, do you communicate effectively with your employees and partners to plan your response goals at this stage? During the COVID-19 pandemic, what did you do to get your employees and partners to work together toward new goals and visions, and to focus on health at the same time?	
	Learn	During the pandemic, you were able to accept failed attempts and accept the results openly as a learning process. During the COVID-19 pandemic, were all your measures effective in dealing with the COVID-19 environment? Please explain.	

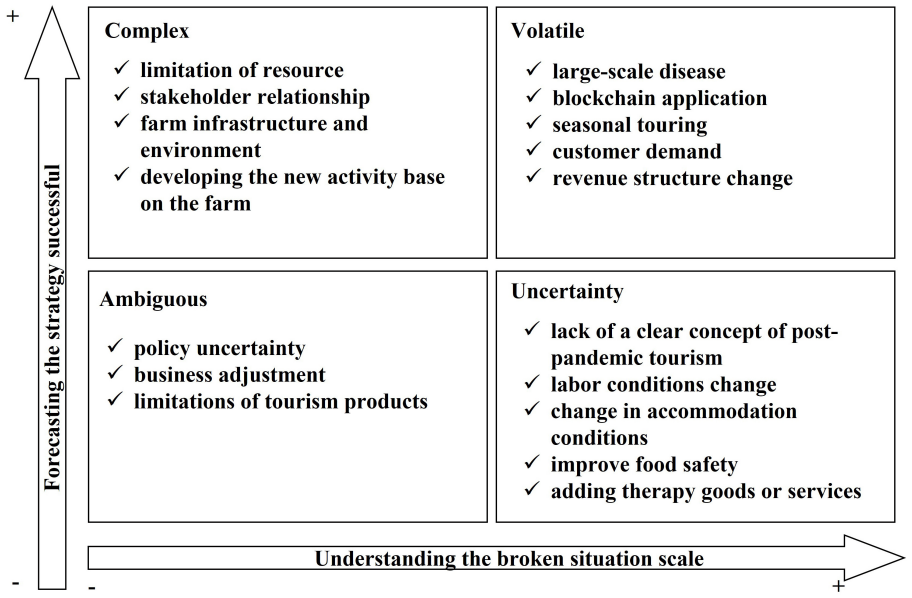

FIGURE 1
Recreational farm VUCA metrics during COVID-19 pandemic.

Operator's strategic leadership mechanism is the core of coping with VUCA environment

In a Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment, the capacity of operators to identify relevant factors is crucial, yet it is insufficient without the corresponding abilities and strategies to effectively transform their business operations. Failure to adapt can lead to suboptimal outcomes or lost opportunities. Moreover, the success of operators in navigating this volatile environment is closely linked to their level of understanding and ability to proactively respond to its challenges. This includes gathering extensive market information and identifying potential market opportunities, a skill referred to as "anticipation."

Operators who excel in anticipation are able to shape their strategic vision to address the volatility of the environment. This capability enables them to proactively mitigate uncertainties, enhancing their agility and responsiveness to changes. Such

foresight is critical in enabling operators to devise and implement adaptive strategies that capitalize on emerging opportunities while mitigating risks, thereby securing a competitive advantage in a rapidly changing market landscape.

> Farm 7: Before the pandemic, the farm relied on the hydrangea season to drive overall revenue. During the outbreak, the farm's proportion of tertiary production was reduced by 60%, but the farm was able to increase secondary production revenue by 30% to 40% through the home distribution of processed essential oils. I think essential oil processing is the farm's strength, and we are working with online communities, government announcements, and news to understand consumer market information in order to capture the market for anti-pandemic products.

Despite the complexities inherent in a Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment, certain patterns do emerge that can guide strategic decision-making. Operators who possess a deeper understanding of this uncertain landscape typically achieve higher success rates in their decision-making processes. By diligently analyzing market information and observing consumer behavior patterns, especially in the post-pandemic context, operators are better positioned to challenge the status quo and steer their businesses in appropriate directions.

Success in such a dynamic environment also hinges on the operator's courage and willingness to take calculated risks. The ability to interpret and manage risks effectively is not just about avoiding potential pitfalls, but also about seizing opportunities that may arise amidst volatility. This proactive approach requires not only a solid grasp of market dynamics but also the boldness to implement innovative strategies, thereby transforming potential challenges into avenues for growth and development.

> Farm 1: I gathered market information from a range of sources including Facebook, professional communities, associations, and academic journals. They also participated in international conferences to gain insights into the behavior of international tourists in response to the COVID-19 pandemic. To develop a survival strategy during the pandemic, the farm sought input from various stakeholders including local business friends, loyal customers, academics familiar with the farm, and public sector counseling officials. Based on the insights gathered, the farm decided to develop vegetable boxes, improve the trail around the lake, convert the BandB to a long-stay resort, and implement an electronic order system. These strategic decisions were made with the aim of surviving the outbreak and adapting to the new market conditions.

The capacity to make timely decisions and adapt to a complex environment is essential for fostering unity among internal staff and stakeholders, encouraging them to work collaboratively toward common goals. Operators who excel in making swift and informed decisions are particularly well-equipped to mitigate potential losses and sustain their operations effectively. This agility not only helps in navigating the immediate challenges but also establishes a resilient framework that supports long-term strategic goals. Effective decision-making in such contexts enhances organizational coherence, ensures responsiveness to environmental changes, and stabilizes operations by aligning team efforts with the overarching strategic objectives. Thus, the ability to act decisively in a complex environment is a critical asset for operators, contributing to the overall health and sustainability of the business.

> Farm 1: For instance, in the event of a pandemic, our priority should be to address the immediate challenge of plummeting orders and revenue loss, and mitigate our losses as soon as possible. Through job rotation among the staff, I was able to increase their empathy and meet the new goals that I had set.
>
> Farm 12: I encourage my staff to collaborate with me in tackling challenges and achieving our goals in the current market conditions. For instance, I urge them to develop innovative products and services that cater to specific market needs, explore entrepreneurial opportunities, and improve their professional skills through job rotation to align with the farm's objectives.

In an ambiguous environment, understanding the cause-and-effect relationships is crucial and often stems from continuous learning and the accumulation of experiences, particularly those gleaned from past failures. Therefore, it is vital for operators to cultivate the ability to learn from unsuccessful strategies. This capacity for reflective learning enables operators to extract valuable insights and lessons that are essential for adapting and preparing for future challenges in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment. By systematically analyzing what did not work in the past, operators can better anticipate potential pitfalls and adapt their strategies more effectively, enhancing their readiness and resilience for navigating the complexities of future VUCA scenarios. This iterative learning process is fundamental to building a sustainable and agile operational framework that can withstand and thrive in the face of uncertainty.

> Farm 1: To address the impact of the pandemic, we discontinued the handmade dumpling product despite receiving substantial orders due to the high labor costs and low gross margin. However, this experience prompted me to develop an electronic product strategy by streamlining the production process and exploring new marketing avenues through electronic order fulfillment.
>
> Farm 20: I focused on improving the egg roll processing segment, utilizing my family members' taste buds and feedback to identify a suitable processing partner. During this period, the cost of raw materials for my eggs kept depleting, but my family members recognized the importance of this expense and continued to conduct tastings to identify a suitable product line for the farm's operation.

In summary, within the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, successful strategic operators are characterized by their broad vision, which allows them to anticipate environmental crises. They possess the courage to challenge established business models and the acuity to interpret market patterns specific to VUCA conditions. These operators are adept at making swift decisions and actively engage

employees and stakeholders throughout the decision-making process. Furthermore, they continuously revise their practices based on feedback and new insights, embodying what may be termed as the proactive recreational farm operator. For example, operators such as those at Farm 1 and Farm 7, as detailed in Table 3, exemplify this proactive approach by adapting and thriving under complex and unpredictable conditions.

> Farm 1: At the beginning of the pandemic, because tourists could not come to the farm to consume, they used online teaching methods to design environmental education and farm to fork education activities, and achieved an initial effect to make up for the tourists' inability to come to the farm to consume. When the pandemic broke out again, the operator learned from the last practice, integrated the agricultural products and reassembled them into vegetable boxes, and developed local branded processed agricultural food products. During the development process, it was found that the production costs did not match, and after re-evaluation, another processed agricultural food product was selected for development, and the business process was modified to cover the losses through online sales.
>
> Farm 7: At the beginning of the pandemic, the operator predicted a trend of retaliatory tourism and decided to organize a specific flower exhibition to create a marketing theme that would boost farm revenue and make up for previous losses. During the season, they also developed hand-drying products with tea tree oil to prevent the pandemic. When the pandemic broke out again, the operator realized the importance of product development from the previous practice, and integrated organic rose resources to develop food products to boost revenue.

Passive operators, in contrast to their proactive counterparts, exhibit a lower sensitivity to environmental changes and tend to adhere rigidly to their existing business models. At the onset of change, these operators often maintain their established practices and display a limited range of strategies for addressing environmental shifts. Additionally, negative operators, who might struggle more significantly, often depend on their existing cash flows and policy subsidies to weather crises. An example of this can be seen in the case of Farm 9, where reliance on external financial support rather than strategic adaptation characterizes their approach to managing challenges.

> Farm 9: At the beginning of the pandemic, we adjusted our workforce, reduced operating costs, and improved the farm environment through policy subsidies. When the pandemic broke out again, we continued to rely on our own cash flow and policy assistance to overcome the crisis, as we had done last time.

The ability to anticipate, challenge, interpret, decide, align, and learn is essential for developing effective coping strategies for recreational farm operators in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment. This study gathered insights from 20 recreational farm operators on the application of these strategic leadership abilities in formulating coping strategies. Our findings indicate that the ability to anticipate—or predict—is critical for initiating these strategies. Operators require a broad vision to foresee environmental crises and identify potential niches.

Challenges and interpretations serve as disciplines for operators, acting as catalysts for transformative changes in business models. Decision-making is crucial for execution, ensuring that strategic choices are implemented effectively. Alignment involves the operator's capability to synchronize team efforts toward achieving set goals. Lastly, learning is pivotal in transforming failed experiences into actionable knowledge, which is invaluable for refining strategies in subsequent scenarios (Figure 2).

These findings underscore the complex interplay of various strategic abilities that contribute to the resilience and adaptability of farm operators in navigating the uncertainties of their operating environments.

Anticipating: proactive market foresight

Strategic leadership begins with the ability to foresee and prepare for changes in the market and operating environment. In a volatile context, anticipation helps operators identify potential opportunities and threats before they materialize.

Key practices:

Gathering extensive market data from diverse sources, such as online communities, academic journals, government announcements, and professional networks.

Analyzing trends to predict consumer behavior shifts and emerging demands.

Examples:

Farm 7 anticipated the trend of "revenge tourism" post-pandemic and organized a flower exhibition, which not only attracted visitors but also reinforced the farm's brand presence.

Farm 1 utilized online education platforms to maintain consumer engagement, pivoting to meet the demand for environmental and farm-to-fork education during the early stages of COVID-19.

Impact: Operators with strong anticipation skills gain a competitive edge by proactively responding to market dynamics and capitalizing on new opportunities.

Challenging: questioning the status quo

Effective strategic leaders are willing to challenge existing business models and explore alternative approaches. This capability is crucial in uncertain environments where traditional practices may no longer suffice.

Key practices:

Reevaluating business models and identifying inefficiencies.

Encouraging creative problem-solving and innovation within the organization.

Examples:

Farm 1 challenged its existing product lineup by discontinuing handmade dumplings due to high costs and low margins. Instead, the farm redirected its resources toward developing an electronic product strategy, optimizing production processes, and enhancing profitability.

TABLE 3 Recreational farm coping strategies.

Farm	Farm revenue structure during COVID-19 (100% of revenue structure)			Market forecasting and trend identification	Product and service diversification	Digital transformation	Internal process reorganization	Innovative product development
	Agricultural production (%)	Agricultural processing (%)	Service and experience (%)					
FARM1	5	5	90	✓	✓(Food, vegetable box)	✓(ERP system, online course)	✓(Home delivery)	
FARM2	1	3	96			✓(Booking.com, Agoda)	✓	
FARM3	1	7	92		✓(Food)		✓(Change dining style)	
FARM4	0	0	100		✓(Food)		✓(High quality service)	✓(Food)
FARM5	75	5	25	✓	✓(Vegetable box)	✓(Online community)	✓(Home delivery)	
FARM6	5	10	85		✓(Food)		✓(Home Delivery)	
FARM7	10	30	60	✓	✓(Food, essential oil)	✓(Flower exhibition)	✓(Home delivery)	
FARM8	0	30	70		✓(Food, essential oil)	✓(Digital payment)		
FARM9	85	5	10				✓(Home delivery)	
FARM10	60	10	30	✓	✓(Flower gift box)	✓(Online community)		
FARM11	3	87	10		✓(Food)	✓(Online community-APP)		
FARM12	21	33	46		✓(Food)	✓(7–11 channel)		
FARM13	1	1	98			✓(Package promotion)		
FARM14	10	20	70		✓(Food)	✓(Booking.com, Agoda)		
FARM15	10	50	40		✓(Food)	✓(Online Shopping)		
FARM16	33	34	33		✓(Food, bio-production)	✓(Online shopping)		✓(Food)
FARM17	10	60	30		✓(Food)			
FARM18	10	20	70	✓	✓(Pencil, green wall)	✓(Online community)	✓(Home delivery)	
FARM19	0	0	100			✓(e-ticket)		
FARM20	50	20	30	✓	✓(Food)	✓(Online community)	✓(Home delivery)	

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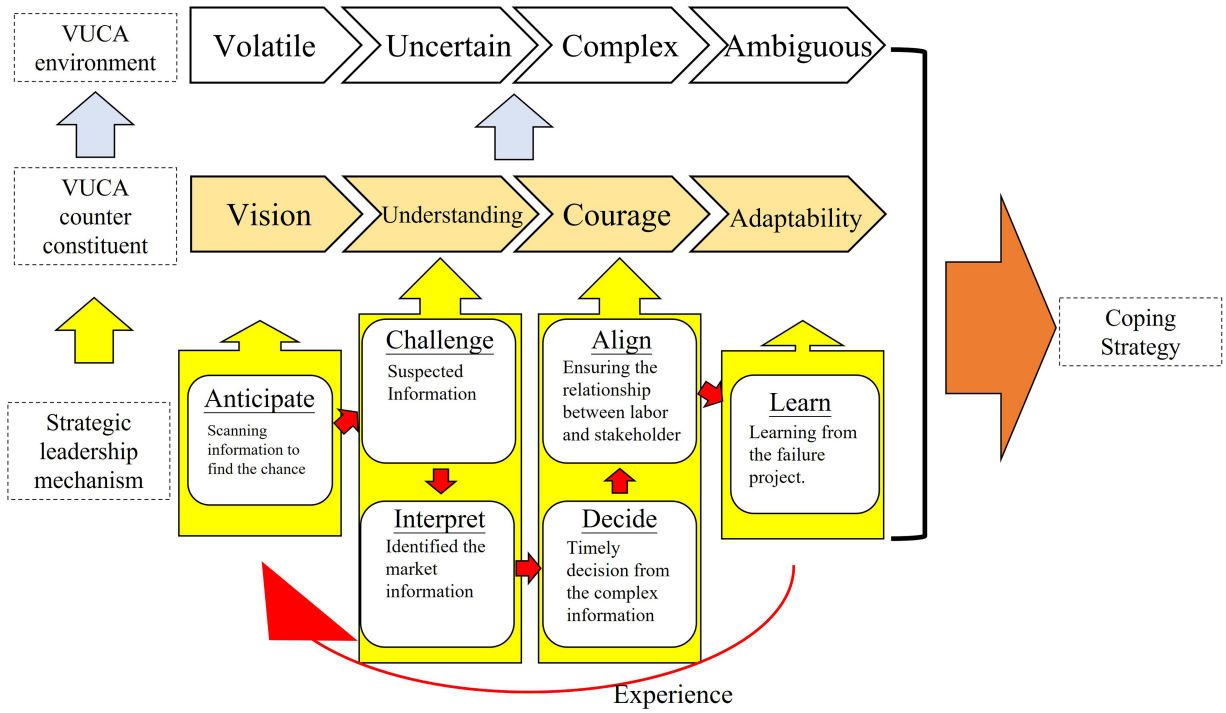

FIGURE 2
Recreational farm operator strategic leadership mechanism.

Farm 12 urged employees to think creatively, leading to the development of innovative products and services aligned with emerging market needs.

Impact: Challenging established norms fosters adaptability and innovation, enabling operators to pivot effectively in response to environmental shifts.

Interpreting: making sense of complexity

In a complex environment, leaders must decipher vast amounts of information to identify actionable insights. This capability enables operators to prioritize critical issues and develop informed strategies.

Key practices:

Integrating data from various channels to form a coherent understanding of market dynamics.

Identifying patterns in consumer behavior and operational performance.

Examples:

Farm 1 synthesized insights from international conferences, stakeholder input, and consumer feedback to develop vegetable boxes and transform its BandB into a long-stay resort.

Farm 20 relied on family feedback to refine its egg roll processing line, addressing fluctuations in raw material costs and consumer preferences.

Impact: Skilled interpretation reduces uncertainty, allowing operators to make timely and informed decisions that align with their strategic goals.

Deciding: swift and effective decision-making

Strategic leadership involves making decisive choices under pressure. Effective decision-making ensures that strategies are implemented promptly, reducing the risk of missed opportunities or escalating challenges.

Key practices:

Balancing speed and accuracy in decision-making.

Engaging stakeholders in the decision-making process to ensure alignment and buy-in.

Examples:

Farm 1 quickly implemented an electronic order system to sustain operations during the pandemic, ensuring a seamless transition to online sales.

Farm 9 optimized its logistics for home delivery, maintaining service quality despite operational disruptions.

Impact: Decisive action minimizes losses, stabilizes operations, and fosters resilience in dynamic environments.

Aligning: building organizational cohesion

Alignment involves coordinating team efforts to ensure that everyone works toward shared objectives. Strategic leaders

align resources, processes, and people to achieve cohesive and efficient operations.

Key practices:

Communicating a clear vision and setting measurable goals.

Encouraging collaboration and fostering a sense of shared responsibility.

Examples:

Farm 1 implemented job rotation to increase staff empathy and adaptability, aligning team efforts with new business goals.

Farm 12 actively involved employees in product development and skill enhancement, ensuring alignment with the farm's strategic objectives.

Impact: Organizational alignment enhances efficiency, morale, and collective resilience, enabling teams to navigate challenges cohesively.

Learning: reflective and adaptive practices

Learning from past experiences, particularly failures, is essential for refining strategies and building long-term resilience. This iterative process allows operators to adapt and prepare for future challenges.

Key practices:

Conducting post-action reviews to evaluate the effectiveness of strategies.

Incorporating lessons learned into future planning and decision-making.

Examples:

Farm 1 reflected on its decision to discontinue handmade dumpling production, using the experience to streamline its electronic product strategy and optimize costs.

Farm 20 continuously refined its product line based on family feedback, demonstrating adaptability in addressing operational challenges.

Impact: Reflective learning fosters continuous improvement, equipping operators to handle future uncertainties with greater confidence and capability.

Strategic leadership in action: the proactive operator

The proactive recreational farm operator embodies all six strategic leadership capabilities, demonstrating foresight, adaptability, and resilience. Operators such as Farm 1 and Farm 7 illustrate the effectiveness of these capabilities, leveraging market insights, embracing innovation, and aligning team efforts to achieve sustainable growth.

In contrast, passive operators, like Farm 9, who rely primarily on policy subsidies and existing cash flows, often struggle to adapt to environmental changes. This highlights the importance of strategic leadership in fostering resilience and securing long-term success in the agritourism sector.

Strategic leadership is a multifaceted process that equips recreational farm operators to navigate the complexities of a VUCA environment. By mastering anticipation, challenging norms, interpreting data, making decisive choices, aligning organizational efforts, and embracing continuous learning, operators can transform challenges into opportunities. This approach not only enhances resilience but also positions farms as adaptable and forward-thinking enterprises capable of thriving in uncertain conditions.

Recreational farm coping strategy in VUCA environment

In response to the challenges posed by the VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, this study comprehensively examines the coping strategies employed by 20 recreational farm operators. These strategies reveal the importance of strategic leadership in enabling adaptability, fostering innovation, and sustaining operations in uncertain and rapidly changing conditions. The findings highlight five primary coping strategies, each of which demonstrates how these operators leverage creativity, foresight, and resource optimization to overcome challenges such as those encountered during the COVID-19 pandemic. The primary coping strategies identified include the following.

Market forecasting and trend identification

Effective market forecasting and trend identification allowed operators to anticipate consumer behaviors and shifts in demand, enabling timely responses and the development of tailored offerings. This strategic anticipation was critical in navigating the volatility of the pandemic period.

Example 1: Farm 1 pivoted early during the pandemic by leveraging online platforms to offer environmental education and farm-to-fork activities. This not only maintained consumer engagement but also allowed the farm to diversify its offerings while emphasizing its educational value.

Example 2: Farm 7 capitalized on the trend of "revenge tourism," where consumers sought meaningful travel experiences post-lockdown. They organized a flower exhibition that significantly boosted visitor numbers and revenue. To further meet pandemic-related health concerns, they introduced hand-drying products infused with tea tree oil, tapping into the wellness market.

Market foresight among operators extended beyond immediate consumer trends, often incorporating global insights into evolving travel, food, and health preferences, ensuring their strategies remained forward-looking.

Product and service diversification

Diversification emerged as a key strategy to mitigate risks associated with over-reliance on a single revenue stream. Operators expanded their product and service offerings to meet the varied needs of their customers while safeguarding financial stability.

Example 1: Farm 5 introduced vegetable subscription boxes, meeting the rising demand for fresh, home-delivered produce during the pandemic. Additionally, they expanded into hosting

outdoor weddings, capitalizing on the increased preference for open-air gatherings.

Example 2: Farm 7 ventured into essential oil production, leveraging their existing agricultural resources to create high-value products that resonated with health-conscious consumers.

This diversification strategy not only provided immediate financial relief but also strengthened the farms' long-term resilience by creating new business models and market opportunities.

Digital transformation

Digitalization played a critical role in ensuring business continuity during periods of lockdown and restricted movement. By embracing digital tools and platforms, operators improved operational efficiency, maintained customer engagement, and tapped into e-commerce opportunities.

Example 1: Farm 1 implemented an ERP system to streamline operations, optimize resource allocation, and enhance decision-making. They also developed an online presence to promote home delivery services and offered virtual farm-to-fork courses.

Example 2: Farm 10 actively utilized online communities to connect with customers, integrating digital payment systems and social media platforms to sustain engagement and loyalty.

Digital transformation extended beyond e-commerce to include data analytics, customer relationship management (CRM), and social media strategies, which collectively enhanced their competitive edge.

Internal process reorganization

Streamlining internal processes allowed operators to maintain high standards of service while minimizing costs. These changes ensured operational stability and helped them adapt to the constraints imposed by the pandemic.

Example 1: Farm 3 redesigned their dining service by introducing a pre-order system, improving both service efficiency and customer satisfaction.

Example 2: Farm 9 optimized their logistics for home delivery, ensuring timely and reliable service even during high-demand periods.

Internal process improvements often included staff training, reallocation of resources, and the adoption of lean management practices to reduce inefficiencies.

Innovative product development

Innovation in product development allowed operators to respond to shifting consumer preferences and maintain a competitive edge. By exploring new product lines, many farms expanded into high-value markets.

Example 1: Farm 16 collaborated with biotechnology firms to develop clam-based products, leveraging advanced food processing techniques to create a unique niche in the market.

Example 2: Farm 4 introduced limited-edition seasonal offerings, such as herbal teas and organic snacks, appealing to health-conscious and novelty-seeking consumers.

Innovative products not only addressed immediate market demands but also established the farms as forward-thinking and adaptable, strengthening their market position.

Enhancing community engagement and sustainability

Operators recognized the value of community engagement and sustainable practices in building long-term resilience. Collaborative efforts with local communities and stakeholders created mutually beneficial opportunities.

Example: Several farms partnered with local suppliers and artisans to co-develop products, such as hand-made soaps and organic jams, reinforcing the local economy and promoting sustainability.

Sustainability initiatives included eco-friendly farming methods, waste reduction programs, and initiatives to educate visitors about environmental conservation, aligning with broader societal goals.

The coping strategies employed by recreational farm operators highlight the critical role of strategic leadership in navigating the challenges of a VUCA environment. By anticipating market trends, diversifying offerings, embracing digital tools, streamlining processes, and fostering innovation, operators were able to adapt effectively and sustain their businesses during the pandemic. These findings provide valuable insights for the broader agritourism sector, emphasizing the importance of proactive leadership, technological adoption, and community engagement in building resilience and ensuring long-term sustainability. This study contributes to the understanding of agritourism's adaptive capacity and offers a robust framework for future crisis management strategies.

According to Bennett and Lemoine (2014), successful operators in a VUCA environment must possess the ability to anticipate future trends, make quick decisions, and respond flexibly. Our study found that the recreational farm operators we interviewed employed various strategies to meet these challenges. For instance, the operator of FARM7 anticipated an increased demand for essential oil products during the pandemic and promptly adjusted the product line to meet this demand. This aligns with the strategic leadership skills emphasized by Schoemaker et al. (2013), which state that effective leaders must be able to identify market opportunities and act swiftly.

Furthermore, our study corroborates George's (2017) assertion that leaders should possess adaptability and innovation capabilities. The operator of FARM1 enhanced operational efficiency through digital means, which is consistent with the literature's emphasis on the importance of digital transformation in increasing organizational resilience (Glaesser, 2006). These strategies not only help operators address current market challenges but also lay a solid foundation for future growth.

Prayag (2018) points out that resilient organizations are better equipped to handle environmental uncertainty, a finding that our study supports. For example, FARM20 demonstrated adaptability and growth potential in a turbulent market through innovative product development and digital marketing. Additionally,

Filimonau and De Coteau (2020) highlight that environmental improvement strategies are crucial for enhancing organizational resilience. Our study found that most respondents value this aspect and implement sustainable development measures to strengthen their business's long-term stability.

In summary, our research results indicate that recreational farm operators employ a variety of strategies in a VUCA environment, including market forecasting, product diversification, digital transformation, internal process reorganization, and innovative product development. These strategies interact synergistically, collectively enhancing the operators' resilience and business performance.

Conclusion

This study highlights the critical role of strategic leadership for recreational farm operators within a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, particularly underscored during the COVID-19 pandemic. The findings demonstrate that operators who possess robust strategic leadership capabilities—such as anticipation, challenge, interpretation, decision-making, alignment, and learning—are better equipped to navigate the complexities of the VUCA environment. These capabilities enable operators to adapt swiftly to changing market conditions, mitigate risks, and capitalize on emerging opportunities.

Key strategies identified in the study include the enhancement of environmental quality, development of agricultural and food products, digitalization of operations, expansion of marketing channels, and improvement of business processes. These strategies are essential for diversifying income streams, fostering innovation, and ensuring the sustainability of recreational farms.

Operators who excel in these areas are proactive in gathering and analyzing market information, engaging with stakeholders, and continuously revising their strategies based on feedback and new insights. This proactive approach not only helps in addressing immediate challenges but also builds a resilient framework that supports long-term strategic goals.

In contrast, operators lacking strong strategic leadership mechanisms often struggle to respond effectively to the VUCA environment, leading to delayed reactions and slower recovery. The study emphasizes the importance of fostering a forward-looking mindset, leveraging data for strategic decision-making, and maintaining flexibility in operations.

The insights gained from this research provide valuable guidance for recreational farm operators and agritourism enterprises aiming to thrive in a VUCA world. By integrating strategic leadership principles into their operational frameworks, these operators can enhance their resilience and adaptability, ultimately achieving sustainable growth and success in the face of ongoing environmental challenges.

These findings contribute to the broader discourse on strategic management in turbulent times and offer actionable recommendations for operators in similar volatile conditions. Future research should continue to explore the dynamic interactions between strategic leadership and VUCA environments to further refine and expand upon these initial insights.

Theoretical implication

In the context of the Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment, innovation and continuous learning emerge as critical elements for the sustainability and success of businesses. Current research extensively explores how businesses operate within a broader VUCA framework, yet there is a discernible gap concerning the specific challenges and operational mechanisms from the perspective of operators directly confronting a VUCA environment. This study seeks to fill this gap by integrating the VUCA environment, its counter constituents, and strategic leadership abilities to construct a strategic leadership framework tailored for recreational farm operators.

Our findings indicate that operators exhibiting effective strategic leadership possess a forward-looking mindset, systematically assess their farm's strengths, weaknesses, opportunities, and threats, and comprehend their competitive positioning amidst market fluctuations. These operators anticipate future market opportunities, strategically utilize data to mitigate market risks, and collaborate effectively with stakeholders and employees to achieve strategic objectives.

Key contributions

Identification of unique VUCA characteristics: this study identifies the unique characteristics and contextual elements of the VUCA environment, characterized by a continuous cycle of crisis events. Understanding these elements is vital for developing resilience strategies tailored to such an environment.

Elucidation of VUCA resilience factors: the research elucidates the specific resilience factors and strategic leadership capabilities necessary to navigate the VUCA environment. These capabilities include anticipating, challenging, interpreting, deciding, aligning, and learning, which collectively enable operators to manage uncertainties effectively.

Development of a strategic leadership mechanism: this study develops a comprehensive strategic leadership mechanism for agritourism operators. It outlines the necessary strategic leadership capabilities required at each stage of the VUCA environment and identifies the underlying factors that support these capabilities.

The strategic leadership mechanism proposed in this study provides a structured approach that empowers agritourism operators to respond effectively to the dynamic and challenging VUCA environment. By fostering a proactive mindset and emphasizing continuous learning and adaptability, this framework helps operators enhance their resilience and sustainability, thereby contributing to the broader discourse on strategic management in turbulent times.

Management implication

The management implications derived from this study on strategic leadership mechanisms for recreational farm operators are multifaceted and deeply rooted in the complexities of navigating a VUCA (Volatile, Uncertain, Complex, and Ambiguous)

environment. The following key areas of focus have been identified to provide actionable insights for operators seeking to enhance their strategic leadership capabilities and ensure sustainable operations.

Proactive environmental scanning and vision development

In a VUCA environment, it is imperative for operators to maintain acute awareness of market dynamics and proactively identify opportunities. This involves regular monitoring of environmental changes through diverse channels such as news media, the internet, and mobile applications. Engaging with industry associations, partners, and government agencies is crucial for staying informed about best practices and available subsidies. Additionally, seeking expert advice from academics and institutes can facilitate the development of innovative operational strategies and ensure sustainability in the face of challenges like the COVID-19 pandemic.

Integration of agricultural secondary and tertiary industries

Operators should focus on diversifying their business offerings to span various sectors, including agricultural products, casual foods, health foods, essential oil processing, souvenir items, outdoor weddings, and theme-based exhibitions. By integrating these diverse agricultural resources, operators can create new business items aimed at increasing income and enhancing the overall business model and profitability of their farms.

Fostering cooperation with employees and stakeholders

Effective management in a VUCA environment requires the distribution of decision-making pressures among employees and stakeholders. This can be achieved through action learning, education, training, hands-on work, and clear communication of visions. Strengthening cooperative relationships with stakeholders through shared experiences, effective communication, and shared profits is essential for fostering a collaborative and supportive business environment.

Maintaining an innovative attitude

Navigating market uncertainties necessitates maintaining an innovative mindset. Operators need to challenge and innovate their business models as required. Strategic leadership provides a framework for engaging in strategy analysis, selection, and control. Continuous reflection on potential new products and services that can sustain or enhance competitiveness is vital for recreational farms operating in a VUCA environment.

Digital transformation

Embracing digital technologies is essential for modernizing operations and improving market reach. Operators should invest in digital tools and platforms to streamline processes, enhance customer engagement, and create new revenue streams. Digitalization efforts could include online sales platforms, virtual tours, and digital marketing strategies, which can help in adapting to rapidly changing market conditions and consumer behaviors.

Internal process reorganization

Reorganizing internal processes to increase efficiency and responsiveness is critical. This may involve implementing new management systems, optimizing resource allocation, and fostering a culture of continuous improvement. By refining internal processes, operators can better align their operations with strategic objectives and respond more swiftly to environmental changes.

Developing innovative products

Innovation in product development is crucial for maintaining relevance and competitiveness. Operators should focus on developing unique products that cater to evolving market demands. This could include introducing new agricultural products, creating value-added goods, and exploring niche markets. Innovative product development not only meets consumer needs but also enhances the farm's brand and market position.

These management implications underscore the necessity for strategic leadership that not only responds to immediate challenges but also proactively shapes the future of recreational farm operations. By adopting these strategies, operators can better adapt to the rapidly changing environment, ensuring long-term sustainability and success.

Through these comprehensive strategies, recreational farm operators can navigate the complexities of the VUCA environment, leveraging strategic leadership to drive resilience, adaptability, and sustainable growth.

Limitation and future research

This study employed a qualitative methodology to explore the practical and managerial significance within the recreational farm sector. Despite achieving insightful outcomes, the research encountered certain limitations, particularly the inability to gather firsthand information due to time constraints and the scope of data collection. Future studies could benefit from adopting a longitudinal qualitative survey approach to delve deeper into the operational intricacies and strategic leadership mechanisms of farms, which would help in further clarifying these concepts.

In the context of agritourism, where small and medium-sized enterprises (SMEs) predominantly make up the market, the ability to identify and anticipate crises is crucial for survival. This capability was a focal point of the current study. However, it was observed that most operators lack the necessary management and financial skills and often do not adequately monitor external environmental factors. To address these gaps, future research should consider employing quantitative methods to assess the management capabilities and knowledge reserves of agritourism operators. Such an approach would help in strengthening their crisis response capabilities, preserving corporate resilience, and maintaining decision-making flexibility.

It is important to note that this study was geographically confined to Taiwan, where the dynamics of recreational farm operations may differ significantly from those in other countries. Thus, future research should extend this strategic leadership mechanism to a broader context and compare the differences in farm operator strategies across various national settings. This comparative analysis would provide a more comprehensive understanding of how diverse environmental and cultural contexts influence strategic leadership in agritourism.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

CH: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsut.2025.1536837/full#supplementary-material

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